1:

For me, it was personal names with too many of the letter "q", "z", or "x". With apostrophes. Big indicator of "call a rabbit a smeerp"; and generally, a given name turns up on page 1...

2:

Large scale conspiracies over large time scales that remain secret and don't fall apart. (This is not *explicitly* limited to SF, but appears more often in branded-cyberpunk than one would hope for a subgenre borne out of Bruce Sterling being politically realistic in a zine.)

Pretty much *any* form of large-scale space travel. Low earth orbit, not so much; but, human beings in tin cans going to other planets within the solar system is an expensive multi-year endevour that is unlikely to be done on a more regular basis than people went back and forth between Europe and the americas prior to steam ships. Forget about interstellar travel.

Any variation on the old chestnut of "robots/ais can't be emotional/creative". On the one hand, this is realistic because human beings have a tendency for othering other races with beliefs and assumptions that don't hold up to any kind of scrutiny (see, for instance, the relatively common belief in pre-1850 US that black people literally couldn't feel pain). On the other hand, we're nowhere near AGI right now and it's already obvious to everyone with even limited experience that AI can be creative (nothing is more creative than a PRNG) and emotional (since emotions are the least complex and most mechanical part of human experience and thus are easy to simulate). Extra bonus hate for robots who are clearly emotional and creative but insist that they aren't.

Designated villans. (Again, not strictly limited to SF, but something that breaks science fiction a lot more than other genres -- it's not entirely unreasonable for a fantasy novel to contain EVIL as a literally-and-materially-existing force in the universe. And, I've seen it ruin a lot of otherwise good stuff: I had a hard time getting through John Shirley's A Song Called Youth because, up until quite close to the end, the neo-nazi antagonists were just Evil People Doing Evil Things even when it contradicted their ideology, before we finally got a good look into the mechanics of control and the details of the ideology that made their behavior make a little more sense.)

Another thing that's prevented me from reading SF recently, that might not be as much an attribute of the medium as an attribute of recent trends in SF publishing, is pointless/masturbatory digressions. (I like Neal Stephenson's digressions because they're entertaining. I'm not talking about that kind of digression.) I found that I was unable to finish The Unincorporated Man because of a number of things that I can only associate with unprofessional habits/lack of skill, and the most egregious was the fixation on extraneous details that fail to flesh out the world and appear to be interesting only to the author (for instance, there are a couple pages about how the protagonist -- ostensibly an old man with his youth recently artificially returned but characterized like a fifteen year old boy -- decides to name his computer Sebastian). To a lesser extent I saw these tendencies in Daemon, even though that book is generally more competently written. Presumably this is related to these books gaining their popularity prior to going through an established publisher, who would have an interest in cutting out masturbatory passages like this before printing.
3:

1 megaJoule of thrust

Should be meganewton, no?

However, I admire your restraint in discussing the snake oil that goes under the name of 3He. For me, it's long been a red flag that things, whether fictional or ostensibly serious, have gotten into "walk away from this" territory.

4:

How about manually-aimed guns? Self-guided bullets exist in the lab and will be standard sniper issue within a decade. You can currently buy rifles with technology reminiscent of a CounterStrike aimbot (it was too easy to detect cheaters whose reticules would lock onto the enemy's head; much harder to detect one which automatically pulled the trigger at the exact moment your wavering aim happened to coincide with the enemy). And that's just current-gen tech; we could hypothesise a pistol with waterjet-based attitude & inclination control, twisting in your grip to point at the naughty heat signatures in front of you.

And yet, so many SF characters are only as good as their own aim when they try to have a shootout...

(I apologise in advance for potentially derailing this thread onto one of the strange attractors! I can repost this in 100 comments' time if you prefer.)

5:

Faceless 80's style corporations ruling entire planets (hint: who handles the externalities?)

Wasn't part of the point with these that the companies would just ignore them and let the externalities exist and make things terrible for the workers, until they packed up and left when it got too much, all as a sign of their callousness? I mean it was always a very thin cover to criticize global capital doing that.

For me it is aliens in almost any context. Very rare are the examples of the times where they are portrayed in a truly alien way. Far too often they are somewhere between "gross oversimplification of a society, racism-lite", and even more often it is scientific racism of the 20s gussied to slide under the radar (like what The Iron Dream was calling out and most unfortunately, ignored). And that's because they are meant to be that. Niven and Pournell get a lot of praise of the Moties that I've never quite understood, because the society doesn't make sense and what they wrote weren't aliens, they were a reskinned setup of their fears to criticize second wave feminism. Ringo, same, it is just a mob so he can glory in slaughter of the political groups he hates. Even with nice aliens like E.T. they are just McGuffins to trigger growth rather than an agent with their own agenda. Never mind how all these run headlong into the apes/angels problem.
So yeah, aliens. I think Peter Watts is the only one I've read who does aliens really well, because he set out to make them alien instead of a stand in for something else.

6:

1. Ignorance of the fact that FTL travel always implies time travel. Only very interesting human stories can allow me to gloss over that. The Expanse series is my guilty pleasure in that regard. Still they could just prevent the original plot by talking to their past selves with the time machine that they have on board. I think you mentioned something similar while discussing Iron Sunrise.

2. "Let me fix that impossible problem with my space wrench" aka "the inverted tachyon reflector beam closes the catastrophic singularity". Once an author resorts to that resolution, I have to close the book.

3. Not limited to SciFi: Women suddenly lose all competence when a man is around. That's a subset of your "out-of-character" trope.

4. Not limited to SciFi: Otherwise intelligent character suddenly sabotages himself or everybody else so the story has a reason to go on. Even worse is the trope of "let me keep this vital information a secret for no reason other than that it will create an excuse for drama"

and finally the worst offender:

5. Characters being prodigies in 15 scientific fields at once aka "the author is too much in love with their hero" problem. So the master assassin is also a competent computer scientist, chemist, sniper, electrical engineer, race driver and can impersonate accents in 10 languages? This is expanded into the SciFi problem where a colony of 5 people maintain a nuclear reactor, but not as a stupid appliance that they operate like a microwave, no, one of them repairs the machine that took hundreds of professions to come together to make in an afternoon with a wrench.... I struggle to give this one an easy name, but basically it's about any story that ignores that it takes a planet-wide network of industry to make anything technologically advanced in today's age. In my previous job I was asked why we didn't manufacture the mainboards for our appliances in Germany and the answer is: "because there is nobody here who CAN". What makes some authors think that a space station will have someone on hand who can even read the structural specs for the material your antimatter generator is made out of let alone manufacture anything?

Unfortunately the above has made it completely impossible for me to enjoy Star Trek since my late twenties. :( Thanks for letting me rant here though :)

7:

you are not going to get dust or gravel pinging off the hull ... unless you're insanely unlucky

But...but what if you're going through a ring system?
You know some of those asteroids in ESB were potatoes, and at least one shoe.
Seriously now, John Ohno and Mister_DK have brought up some of the reasons I can't stand MilSF (along with what you've said wrt the physics), that the enemies generally stand in for racist/political tropes. Admittedly, I haven't read much of it, mostly seen movies and TV shows, where they always call the alien invaders something like Snakes or Bugs, which seem to be obvious racist epithet replacements. I finally read "The Forever War" a few years ago, it was okay, but such a product of its time that it was difficult to really enjoy.

Anyhow, I would be interested in your take on Nanotech.

---

8:

Curiously, I have absolutely no problem suspending my disbelief even at the most incoherent setups (like having the guys watching the Millenium Falcon dock at the Death Star perpendicular to the - admittedly probably weak - gravity field of a small moon-sized structure which, the next time you see it, has spaceships that fly around it in the "proper" orientation for its gravity well).

The only thing that consistently throws me off is incoherent characterisations. When most of your characters are obviously characters rather than people, you've usually lost me.

That and conspiracies. But using trains as the main interstellar transportation system? No problem, steam away!

---

9:

fiction is an exploration of human interior spaces, and that sometimes a spaceship or a princess is a metaphor

yes

A superb example was a re-telling by the still-missed Charles Sheffield of Orpheus/Euridice, with the descent into Hades being the gravity-swing around a blue giant ...

A metaphor for an aspect of the human condition under the writer's examination.

"Go on, tell your story, it'll only be one of the Old Ones, anyway" _ U. K. le Guin.

But still new things can come from those old tales.

As for Rabbit/Smeerp, a much admired (by many) author did that, to my intense annoyance, & I only found out after I'd bought the bloody book which I shall never, now, read.

Anathem.

Utter tripe - why couldn't he simply use the names?

---

10:

I absolutely agree with your argument on an intellectual level, but I can't let go of the conviction that the asteroid-dodging chase in The Empire Strikes Back is the best 30 seconds of film in the entire Star Wars canon (so far). The cavalier treatment of "light speed" in those movies is a different
issue, but never mind that for now.
More broadly, what bugs me is when I'm asked to willingly suspend my disbelief in too many
different things at once. I'm usually quite happy to accept hyper-space travel in a story, or
telekinesis... but usually not both.

11:
... or manually controlled flying (usually through the above asteroid fields). Trek has been really
bad about this, but it was always about the human superiority to the machine (Cmdr. Data the
notable exception, but he wanted to be a real boy...).

12:
Well, this is sort of tangential, but I'm remembering a discussion I had with another Steve Jackson
Games fan. We were talking about their Transhuman Space setting (which, to be sure, has some of
the stuff you're objecting to, such as a helium 3 economy), and they wanted to introduce some
added elements, and I objected that all of those elements said to me "previous generation SF" and
that, despite its imperfections, Transhuman Space was a fairly pure example of current generation
SF.

When I read SF with FTL; or with lots of solar systems with planets generally similar to our local
set and similarly distributed; or with FTL that doesn't equate to closed timelike lines; or with time
travel in general; or with any version of psionics; or with mutant superhumans (though that's mostly
relegated to the comics these days)—all that says to me "old paradigm SF." You know, the sort of
stuff that largely defined the Campbellian era, and that gave Star Trek most of its plots, and that
defines Traveller, probably the most widely played SFRPG. And that stuff can be enjoyable to read,
but it's a partly nostalgic pleasure; it's not remotely a credible "future" now. Yesterday's tomorrow,
to borrow Panshin's most memorable phrase.

In contrast, Transhuman Space has STL space travel; lots and lots of robotics and AI; genetically
modified organisms, and a major political split between Transhumanists who want more of them
and Preservationists who want them banned; and various other things that are projections of current
concerns, or actually of the concerns of ten or fifteen years ago, when it came out. It's not nearly as
hard as you're looking for (though it makes attempts at hardness) but it's a much more recent future.
Even if its global politics is starting to look wildly optimistic. . . .

13:
DOes it really imply Time Travel & therefore (I think) 2nd-Law of Thermodynamics violation?
Not necessarily.
I think there may be a "restricted curvature" get-out for that one.
Let's suppose we travel at 10c to a star-system in a straight line or a good approximation, thereto. Slow down, if not stop completely, then turn around & come back the way we went. We will still arrive back on Earth, by Earth's clocks, after we left, won't we? But, what may be impossible is a significantly curved path, travelling at same "speed" for the same ship-clock time, aiming to return to Earth, which might break the Universe's causality, or something.

Difficult question - if my hypothesis is correct, then where's the limit, since it should be possible to write an equation for that one, if you were to sit down & think about it for a bit.

I.E. Closed-time-like loops that violate causality are forbidden by something (some equation) written into the Universe's structure, involving a combination of radius of curvature & either/or the angular velocity or speed along the course of said closed loop.

Um, err ....

14:

Farming planets don't ring my alarm bells until they say they're a monoculture. I don't have an issue with farming planets in the same way many countries (currently) have agricultural areas and urban areas. Nothing forces the farming planet to only grow crop x, it can produce a range of crops.

(interestingly a story I read where the planet only produced a monoculture turned out to have a deep and interesting reason for it but it wasn't set up as a monoculture by the greedy human corporation, it was discovered that way and they went ETF?)

If I'm reading a space opera and the like, I don't care enough about the bad physics if there's a good enough story: I've willingly decided to read a space opera after all. I know they're not going to detail accurate space travel, realistic physics and the like. If they're inconsistent about their own rules I'll usually give up, but if their rules remain consistent I'll give them a pass. (The same applies to fantasy for me - I don't care what their rules for magic are, as long as they don't break them, although the characters can misunderstand them but that has to be carefully written.)

My shibboleths tend to the biological. Plagues that kill 100% of people. Viral infections you treat by stopping bacterial ribosomes. (Yes, really happened. That was a paperback, I was on the bus. It caused raised eyebrows when I swore and tore it half.) Ancient diseases to wipe us out - hint, we're the descendants of the survivors, our immune systems are in a dramatic arms race every day. Ancient alien diseases stand a chance though.

There are some tech ones too. People are awful at predicting how tech will change. I posted an infographic a while ago about Moore's Law and what it really means. In 2000 the Bondi Blue iMac was a snazzy, mid-level computer. In 2010 the then new iPhone cost ~1/3 of the price of the iMac, had a slightly worse screen resolution and outperformed the the iMac on everything else. Oh, it weighed <1% of the iMac and would make phone calls too of course and fit in your pocket. I don't make a living making good guesses about what's to come. But there are some shockingly bad ones out there. If you're going to ask me to believe in, say, Ai and cheap fusion power and so on, your homes have got to do better than the 5 years ago model of US TV on a cable.

But bad characters and bad plot will do it more than these every time.
15:
Actually, I thought the trains were one of the few original, innovative, amusing, and redeeming features of the Commonwealth saga. (I bailed on it 50 pages before the end of book 1, when I realized there was another book the same size lying ahead of me if I persisted in banging my head on that wall. As I'm a sucker for the sunk cost fallacy, you may consider this faint praise indeed (and I finished the Reality Dysfunction trilogy).)

16:
Space colonization in the context of no-FTL SF is annoying. If you can spend 20 years in your spaceship flying to another star system, then you can also spend 200 years in your spaceship. You don't need planets anymore.

17:
>>My shibboleths tend to the biological. Plagues that kill 100% of people.

Very long incubation period?

>>Viral infections you treat by stopping bacterial ribosomes.

Maybe the virus reproduces inside bacteria?

>>Ancient diseases to wipe us out - hint, we're the descendants of the survivors, our immune systems are in a dramatic arms race every day.

Genetic drift gradually destroys every adaptation you don't need. Ancient disease is kinda plausible.

>>Ancient alien diseases stand a chance though.

No, if something is utterly implausible, it is alien diseases infecting human being. It's less likely than getting an infection of Pyrolobus fumarii (which thrives at 113 °C).

18:
Mmph. I disagree, conditionally; for 20 years you can just about conceive of carrying consumable materials for -- at 8 tons/year/astronaut (NASA's old estimate for an open-loop Mars expedition) that's 160 tons/person, which is heavy but not obviously more than the weight of a fault-tolerant closed-loop support system for growing/recycling everything including micronutrients for a human-apex food web ... especially if it's a one-way 1-3 astronaut recce expedition to, say, Alpha Centauri (astronauts to die of old age before return).

200 years implies full sustainability. Which means a wholly different kind of LSS. It may need periodic replenishment of raw materials harvested from comets/asteroids, but if you can last that
long then you're right, you probably don't need planets. But 20 years? Probably do-able while remaining planet-centric.

19:
- Printers taking the place of nanotech assemblers. Actually, I may use the Smeerp-9000 brand printer in a novel sometime (SmeerpCorp. We're good at branding).
- We live sustainably by depending on these magic boxes here...
...And these magic boxes run off solar power from the domes we live under. In fact, why would anyone want to live in a city under a dome anyway? Is this just a tribute to Bucky Fuller, or what?
- All the biology I need to know I learned in High School. What was my teacher's name again?
- Oh, and, if I got it wrong, I'll just arrogantly tell the person who points it out that they're the only person who noticed that I screwed up.

20:
Rubber forehead aliens are a big kick out, but truly alien aliens are a rarity. Iain Banks had some, and C.J. Cherryyh does well with the Atevi, but most aliens act like humans with speech impediment.
I have quite a well trained suspension of disbelief, so as long as the handwavium is consistent within the setting, I don't mind.
Space Opera is a good example - if they make a setting and stick it, I'm quite happy - I'm reading the SF version of an adventure novel after all.
Hard SF I'm more picky about, but I'll also give a pass for time it was written in. They tend to be more a thin story wrapped around a cool science idea, so the idea needs to be good, even if later proved impossible.
For MilSF I think the politics throws me out more than the implausible tactics and free flowing idiot balls.
OTOH Tom Kratman makes John Ringo (no!) look like Tolstoy.

21:
I recall a short story where the new wormhole exit to a new colony was bouncing around all over the place, and the protagonist has the job of trying to fly through it. By the end of the story, he's realised the bouncing was random, and that tethering a balloon would be just as effective. Also, that as the wormhole is tightened down, eventually people will be able to drive trucks through it.
As I see it, Hamilton's take on that is that you could get even better throughput if you had rails. Yes, it's a delightful conceit. And yes, the rest of the story doesn't work for me either.
22:

**Just in case you were wondering:** an editor is inciting me to commit space opera (don't wait up, even if I agree to do so it won't be published before 2018) so I'm updating my basket list of "213 things Skippy is no longer allowed to do in space opera", just in case I don't feel like writing #3 in the Freyaverse (and do not ask for a third Eschaton novel, Or Else). Tentative idea is to ditch the mundane SF straitjacket and go back to far-future wide screen SF, but to avoid cliches as I would the plague. So think in terms of the space operatic equivalent of Stockhausen, or maybe a concept album by Laibach.

23:

- Calling a 2 kilogram alien blue hexapodal herbivore with an abdominal furcula a rabbit, because someone told you not to call it a smeerp. (cf koala bear)

-- Setting the action on the moon of a gas giant, having the gas giant take up most of the sky (cf Saturn and Jovian ring widths) and having the gas giant rise in the east and set in the west every day (cf tidal locking). Didn't you take trigonometry?

-- Alien starfarers who are anatomically incapable of lighting a campfire by friction.

24:

I was working out a pitch for one of the Elite:Dangerous SF novella slots until the setup of the whole (Traveller-based) economy completely torpedoed my enthusiasm.

Seriously, you (and everyone else) have to blast your way through about 50 billion credits worth of space pirate hardware to deliver your 20 tonnes of crisps?

Every? Single? Run?

Just play the game and don't think about it too much.

25:

-- Alien starfarers who are anatomically incapable of lighting a campfire by friction.

I've discussed this previously, but this is basically the argument for rubber forehead aliens. It turns out that the anatomical structure needed to light a fire through friction is far more restrictive than most people realize. Since you need fire for basically all technologies that would lead to starflight, an alien that builds ships but can't build a fire is a walking contradiction.

26:

I don't mind technologies not directly extrapolated from known: knowledge accumulates and I'm perfectly willing to accept progress in technology sufficiently advanced as to appear to be magic, so
long as it isn't posited to be, say, tomorrow. Down the road a century or two is fine for me. This includes potential advances in the physical sciences which appear to be ruled out based on current knowledge. I would consider it a leap of faith to assume that what we know is in some fundamental sense the ground truth of the universe yet when extraordinary advances come they tend to be dazzling precisely because they overturn what 'everyone knows'.

So if someone wants to posit something that lets spaceships travel FTL, I'm fine with that, so long as that's not what the story is about. So long as miracles remain in the background as stage dressing, I'm fine with it. Sadly, one thing that SF may have taught us over the years is that miracles can be rather dull from the viewpoint of ordinary individuals.

What makes me close the file I'm reading would be classical goofs such as poor characters, uninteresting plots, situations. The classic faults of poorly written fiction, in other words. When sales start to fall off the probable is more likely to lie in the classical reasons than in any failure of extrapolation, I think. May our Good Host never be subjected to such!

Mike

---

27:

Heck Charlie, set the story 5,000 years from now on Earth, make it post-collapse, and have undiscovered continents with strange human cultures on them. And do it with windjammers firing broadsides for all I care. Most planetary SF is just ripped off from the Age of Colonial Empires, replacing "colony" with "planet" and so forth. Spin the tropes back to their origins, set it on an Earth that's become strange, and have some fun. Why use space marines when you can have real ones who aren't wearing red coats?

---

28:

I was talking about colonization, remember, not just going there and back again. So, 20 years to get to a nearby star, and them how many until you can produce food there? 20? 50? 200?

I guess it can work with a constant delivery of supply ships.

---

29:

*Since you need fire for basically all technologies that would lead to starflight, an alien that builds ships but can't build a fire is a walking contradiction.*

Unless they can domesticate/train something else to do the dextrous work.

(Imagine an elephant-analog, with big brains, abstract reasoning, and language, that has managed to domesticate and train a monkey-analog, with manipulator limbs and good binocular vision. Not plausible in our biosphere, but not in and of itself implausible among aliens.)
And then have them carrying the monkeys on a backpack because that way there's always one conveniently to ... trunk.

A human would look at that and assume the monkey was in charge.

If it - technology, social evolution, whatever - appeared in "Snow Crash," you had better think long and hard about it and its implications before attempting to use it.

(To me, at this distance, "Snow Crash" works best as novel-length Bonfire of the Cyberpunk Cliche Vanities.)

Alternatively: spaceships sheltering from detection behind an asteroid

This would seem to imply you put down James S.A Coreys Expanse series very, very early in the first book, which seems like it would be a damn shame.

I've got a whole bundle more shibboleths up my sleeve that flag a work of SF as being implausible (this may account for why I'm more comfortable reading fantasy these days).

I still encounter people who get all het up about the inclusion of, say, David Weber, or the latest Star Wars or Warhammer 40k novel tie-in, under the umbrella of science fiction; "They're not science fiction! They're science fantasy, dammit!"

small farming planets (hint: just one ecosystem for a planet?):

I'm curious; why do you find this implausible?

Well, let me back up. I get "this entire planet is literally nothing but amber waves of grain." But, well... let's make some assumptions. Let's assume that interstellar trade involving bulk products produced in the bottom of a gravity well is cheap enough to be ongoing concern, that local competitive advantage can be a thing. I suspect that at this point we're already edging up against your suspension of disbelief, as your tolerance for FTL seems to have massively decreased over time. But let's make that assumption. Let's also make the assumption that either earthlike planets are common or that terraforming isn't the near-impossibility it probably is. (And again, those things by themselves probably already cause you to nope the hell away.)

But if those things are possible, then absolutely small farming planets with a crop monoculture would be a thing. Example here in the real world: Indonesia. Indonesia is a medium-sized country with a wide variety of ecosystems, but if the corporations had their way all the arable land in it would basically be producing palm oil. They'd just ignore the parts of it unsuitable for that.
So it seems logical to me you'd get planets with, say, a continent the size of North America that is suited to the supernal production of one or two foodstuffs for export. The rest of the planet gets ignored except inasmuch as it can be used as a convenient local source of stuff they need to support the major industry.

political structures based on design patterns proven to be unworkable in the context of any society more modern than the late middle ages (empires in space, I'm looking at you)

This just seems flat out wrong. Authoritarian and/or imperial political structures on classic design patterns are still going strong and show no signs of collapsing in ways that discredit the model such that no successor state will want to touch it.

The last bit is important. I live in an imperial state; I'm an American. Prior to us, the pre-eminent global imperial state was the British. China remains governed more or less as it's been for the last several thousand years, by an oligarchic, authoritarian bureaucracy punctuated by the occasional direct control of an Emperor. I could go on.

Why wouldn't we export these models to the stars in the hypothetical situation of interstellar colonization being possible?

It seems, Charlie, (and I have no particular beef with you over this) that you greatly object on an aesthetic (not moral!) level to portrayals of the universe as anything other than it is; a massive, hostile, hard-to-traverse void that will kill baseline humans dead if they look at it funny with massively intractable physical and biological problems that preclude making it less massive, hostile, and hard-to-traverse for said baseline humans.

And that's fine and all, but aside from strongly transhuman settings in which we stop being baseline humans with fleshy bodies that stop working if they absorb a small amount of radiation, it's going to lock out a shit-ton of sci-fi from you. That's okay, I suppose, and you can't exactly control your aesthetic preferences, but it does seem like you're missing out. Although it isn't like there's a shortage of book-media for you to consume, or indeed a fair amount of sci-fi that doesn't involve ever leaving the atmosphere.

Speaking for myself, I love me some traditional sci-fi. Teleportation! Huge, art deco starships that people walk around in wearing shirtsleeves! Reactors that go wom-wom-wom! Laser barrages, chases through asteroid belts and the upper atmospheres of gas giants, guys in power armor wielding giant laser cannons, the whole nine yards. Psychic warriors, shit, sign me up.

Hell, I love drop pods and boarding torpedoes. Do you know how ridiculous that shit is? So ridiculous. Cramming a bunch of people into a torpedo and shooting them at another starship, which they will ram and then board as a battle tactic? That's bananaballs. I love it. Can't get enough of it.

33:

I wrote something about epic fantastic ecology on my blog about 7 years ago along this line.
The TLDR is ...

Elves are always dying out, but why? If you have a race of creatures that arrived in the region tens of thousands of years before humans, and said race lives for thousands of years (or forever), then even with a very slow rate of reproduction, we would expect them to completely dominate the local landscape by the time of your story. Did they all get bored with having sex for some reason?

Dragons in underground caves?! What does it eat? Stupid adventurers can't be in such great supply, and a dragon probably needs to eat at least 3-4 D&D parties worth every few months (5 if the party is mostly dwarves and gnomes). How do they survive in an underground cave system with no exits big enough for their enormous bodies?

34:

Do you feel better now? Probably, and I like your books, but probably the singularity ;)

35:

"Ignorance of the fact that FTL travel always implies time travel."

Or travel between alternate, but almost identical, realities in the QM MWI. So it's time travel or slider tech.

36:

Did they all get bored with having sex for some reason?

That, in fact, is explicitly the case with Tolkien elves. They literally do get bored with having sex after awhile. Well, not bored per se. But they lose the desire for long, long periods of time.

(They also never desire sex outside of the context of being romantically in love with someone, and only have sex while married. Yeah, you can tell Tolkien was a Catholic.)

37:

BTW, stealthing spacecraft is quite possible, but only from limited directions. Think hiding behind a mirror cooled with liquid Helium. Once did a brief analysis of stealthing ICBM warheads using LN2 jackets to reduce their IR signature.

38:

"...warships using active radar to hunt for one another (hint: active sensor reach is inversely proportional to the fourth power of the emission strength, passive sensors obey the inverse square law) ... "
Not really, because the beam is a beam not an omni-directional emitter. It reduced to inverse square law of the reflected signal. That's how the moon was detected back in the 1960s using a low energy laser and no retro reflectors.

39:
In that case, what very often gets underestimated is the area that needs to be covered with that beam.

40:
*That's how the moon was detected back in the 1960s using a low energy laser and no retro reflectors.*

I have to admit I read that as the Scientists reporting an exciting new discovery. "Sir, sir, we've found a moon!" <looks up> "Oh my god where did that come from?"

41:
Opportunity Cost is going to neuter fusion as a commercial power source. Unless they literally pull a commercial version ready to build out of a hat sometime in the next ten years, they won't be able to start doing commercial fusion power until (probably) mid-century or later - by which time we'll be deep into solar/renewable and the grid/storage system to make it work. Fusion would just be a curiosity at that point, with maybe some capacity added for baseline power.

That's assuming it works out at all. Nature's fusion reactors don't fill me with confidence in that regard - the Almighty Sun is so inefficient that its core's power output per cubic meter is on par with a compost heap.

@Charlie Stross

Has anyone ever done a space opera story with no permanent off-world inhabitants? It's certainly not implausible - if you have comparatively cheap access to space and relatively fast spaceships, then you wouldn't have to have permanent habitats in space anymore than we need them floating on the ocean. You would just send out ships on missions, and have them come back - and the people in such a society might consider space colonies in the way we think of undersea colonies today.

@Dirk Bruere

Stealth in space is an odd debate that's only applicable to a few number of stories. One of the fundamental Laws of War in space combat would almost certainly be that warships have to identify themselves as such with radio transponders, with only space pirates refusing to do so.

@Dave Rolsky

I guess you could rationalize it as Elves being linked to "nature", and receding in power and influence as nature gives way to human-shaped landscapes.
Or it was mostly a brain bug out of Tolkien, where his Elves were leaving/fading away because God decided that their active role in the world was done and they need to go off to a blissful unchanging land to wait until the end of days.

42:

*Elves are always dying out, but why?*

Because Tolkien, that's why. Tolkien invented the elves of modern fantasy, or rather, everyone decided to copy him. In Tolkien's universe, everything had an explanation. Elves are few because they are not breeding during war time, and for most of their history they are at war. Elves are not *dying out* in *LotR*, they are *leaving* the mortal lands because that's the divine plan... et cetera.

But hey, what we get is elves are dying out, dwarves drink beer out of their axes and humans are too ambitious.

43:

Nope, Charlie's right, google "radar range equation". - the radar range equation varies with the fourth power, because it's inverse square for transmitter to reflector, and then inverse square for reflected signal back to the receiver.

As for moon detection with radars (allegedly as detected by BMEWS - range aliasing can be fun, kids) it isn't very reflective, but there is an awful lot of it...

44:

I read the whole book, blurbed it, and immediately regretted it. It was one of those books I had a loud ranty conversation with in the privacy of my own head but decided to give the benefit of the doubt. (It ... got worse, rather than better, as it went on. Hint: see my point about cultural/cognitive familiarity being a red flag. Never mind the stealth-in-spaaace bit.)

45:

On FTL: I think people are overstating the case when they object to FTL that doesn't include time travel.

Look: FTL plus special-relativistic spacetime does imply time travel. So yes, given current physics, FTL and no time travel is impossible.

But this just in: given current physics, FTL *by itself* is probably impossible. So we're not answering the question: "what are the constraints on FTL, given physics?" We're answering the question: "how do we posit new physics, for storytelling purposes, that enables FTL without time travel?"
Put that way, there's a clear answer: drop special relativity; or, more precisely, assume that the symmetries that define special relativity aren't exact symmetries but apply only approximately, and in particular don't hold for whatever handwavium enables FTL jumps. The full FTL physics (which obviously you're only going to sketch schematically; writing full physics theories is kind of hard) includes a preferred rest frame, and superluminal motion is defined relative to that frame. (The microwave background radiation frame is an obvious choice.) Ta-da: FTL without time travel.

I don't think this is a very elegant physical theory, but the idea wasn't to construct an elegant physical theory: it was to permit Space Empires and Interstellar War. Having said which, if you want a realist way of understanding quantum theory (which you should) and if you don't want to adopt the Many Worlds Interpretation (which, however, you also should) then some kind of underlying superluminal physics is quite difficult to avoid, and most implementations of that that have been tried do just posit that the symmetries of special relativity are violated.

46:

BTW, stealthing spacecraft is quite possible, but only from limited directions.

Indeed, I once looked into this and it turns out that there many situations in which objects in space can be quite stealthable. Not spaceships with blazing terawatt reaction drives, it's true -- think in terms of more or less passive satellites and probes. Understanding the characteristics and locations of the threat sensors is key.

See

https://fas.org/spp/military/program/track/stealth.pdf

47:

and do not ask for a third Eschaton novel, Or Else

Ah, yes:

"We fruit-fetishits demand a fair crack of the Whip!"

Second voice, probably Bill Oddie ... "ooh! NOW you're talking!"

Cough

48:

In no particular order, a few other problems (none of them, I'm afraid, unique to any particular flavor of speculative fiction):

* Learning of largely-error-free alien communications with less than several years of intense study. Heck, it's even a terrestrial problem on this planet, and we at least share biological imperatives for communication...

* SF military subcultures that draw their disciplinary and command imperatives from not later than Wellington... when every newly minted recruit in any SF military will have a basic education giving
basic knowledge equivalent to the top 0.5% of Wellington's world. Hint: People who have been implicitly taught that knowledge is valuable don't perform well (or predictably) when led by purchased-commission nabobs or subject to arbitrary discipline; if nothing else, see "frag."

* Cultures with no casual or decorative art, popular magazines/equivalents, popular music, or leisure activities not directly related to improving a character's already-excessive competence at something seemingly plot-related. And, conversely, cultures that are purely decadent in this respect.

* Military and exploration efforts that do not focus on logistics and gremlins (as Babylon 5 defined them: "Russian for poor maintenance practices"). As a specific current-day example, well under 5% of the military personnel (not even counting the civilians doing depot maintenance or anything else) in a Western-style "air force" are the glory-attaining pilots of combat aircraft. Hell, less than 40% of the aircrews are the pilots of combat aircraft. And civilianizing the logistics does not make the logistics go away... it just changes the uniforms (from, say, RAF to Lunar Industries).

* Dispute resolution devolving to might-makes-right.

49:

BUGGER
"fetishists"

50:

Nope; for the simple reason that it's a lot cheaper, lighter, and faster to just point the firearm at the thing you want to shoot. Try carrying one around all day, and you'll soon appreciate that any extra kilos of "water-jet firing stability" are singularly unwelcome. Particularly in a pistol, which is a weight-critical item for use at very close range.

The "guided bullet" stuff is really only for deliberate fire from a static and stable position, where stability in the aim is needed for the time of flight of the bullet. It solves the problem of crosswinds and poor range estimation, because all of the smarts are at the rifle end, not in the bullet. Currently, these are only solutions for very low rates of fire (e.g. snipers in the military, and hunters in the civilian world).

It's easy to solve "keep looking in a particular direction while you're moving" in a computer game, but we don't work that way in real life. Try running across country without looking at the ground every so often, and you're going to fall over a lot. In fact, try pointing a rifle while at anything other than a walking pace...

Oh - and the military / paramilitary market are rather keen on being able to hit a particular target among similar targets. Having the weapon decide to second-guess your aimpoint because it's seen something warmer? Pull onto centre-mass when you're going for a specific aim point? Not so welcome.
People who can't do sums. For example, there's an episode in Donaldson's Gap series (which was recommended to me by a colleague whose taste is usually good, but everyone makes the odd mistake) where a spacecraft accelerates from essentially zero (in orbit round a star, so at best a few hundred km/s) to a significant fraction of c in a few hours. Even if we give him a whole day (and, although the narrative didn't actually give a time IIRC, the events indicated less than this) and assume only 0.1c, this still implies an acceleration of over 30g. In a culture where he's gone out of his way to say that they don't have artificial gravity. Assuming the spacecraft even stays together, most of his principal characters are now a layer of strawberry jam on the aft bulkhead. (That's OK. I didn't like any of them anyway.)

The "all for one, one for all" syndrome: if my alien has feathers, ipso facto it also has claws and a beak (and either wings or remnants thereof).

(Not confined to SF): inability to grasp basic genetics, e.g. dark child of blond parents, with no implication anywhere that child is adopted or of otherwise irregular parentage. (I remember a detective story which turned on blood groups, but the author had failed to do the most elementary research on the subject: her victim (blood group AB) was pregnant with a child of blood group O. Much faffing about who the father might be. No realisation that this would have to be a surrogate pregnancy!)

Inability to read an astronomy textbook, e.g. book by Jack McDevitt which turns on imminent close approach to planetary system of compact object, but seems completely incapable of deciding whether compact object is a white dwarf or a neutron star, and keeps giving it properties that are an incoherent mixture of the two. Either would do the job: pick one and stick to it, damn it! (Also, several people who appear to think that the region in between the spiral arms of spiral galaxies has no stars in it. Rubbish. Known to be rubbish since the 1950s when red-sensitive photographic emulsion became available.)

Agree with Heteromeles @24 about non-tidal-locked moons of gas giants (are you thinking about NK Jemisin's Dreaming Moon?)

Most of John Scalzi's Old Man's War, including but not limited to:

- the idea that a cloned brain would be similar enough to the original that you'd be able to basically imprint it with the original's content (hint: we have a lot more neurons than we have genes, and that's not considering the interconnections);
- the backdrop of multiple expansionist civilisations, some much older than humanity, which like to colonise planets—this is a universe with a bad case of Fermi paradox;
- his alien biology, especially the Gulliver-among-the Lilliputians episode—structures don't scale like that.
Eh, in Scalzi's defense, they don't seem to be so much clones as a walking pile of water-phase nanotech. The real question is, "Given that tech, why the heck is anyone mortal?" They should be able to out and out take *backups*.

---

53:

I finally read "The Forever War" a few years ago, it was okay, but such a product of its time that it was difficult to really enjoy.

I disagree - I think it still stands up well, bearing in mind it's not really about MilSF, mostly it's about non-FTL physics, and about feeling isolated and "other" within society (hardly surprising, as it was written by a returning veteran of Vietnam with a Physics degree).

MilSF is just the setting; it's about isolation on grounds of politics (the first visits home), and sexuality (being "the old queer"). Note that this was far more challenging stuff in the USA of the 1970s, when gays were still barred from the military...

---

54:

The cultural-cognitive familiarity thing also has me scratching my head a bit, given that you just last year (so two years ago for you, I suppose, given you finish these things a year before we get'em) wrote a sci-fi novel with humanish robots who fundamentally do seem to think the way we think today. The polities and ideologies presented are all different flavors of polities and ideologies that exist today, as are the people, who seem to also think the way people today think except inasmuch as they don't have exact biological need equivalents to humans.

I mean, Medea is fundamentally indistinguishable from any other autocrat (aside from her ability to fork herself) as is Sondra. Krina... seems oddly detached from anything other than a vague sense of decency; she has no recognizable ideological or moral goal aside from being vaguely outraged at the economic system she's spent her whole life studying. And the one group of people who *don't* demonstrably think and act like we do in a recognizable-to-us culture (the communist/altruist deepwater squid folks) had to massively re-wire their brains in order to manage it.

Seems a bit silly to slag on something you yourself do.

---

55:

So: You didn't like the latest Ian McDonald, I guess.

Helium-3 aneutronic fusion is waaaay lower on my list of shibboleths than on yours. Mine starts with alternate histories with real-life characters born *after* the divergence. FDR can't exist in a world where Lincoln was assassinated *after* the play. That kills almost all of Harry Turtledove for me. FDR analogues, okay, which is why I can accept (say) Kim Stanley Robinson's *Years of Rice and Salt*. 
then some kind of underlying superluminal physics is quite difficult to avoid

The July 2015 issue of Physics Today had a retrospective on John Bell, he of quantum nonlocality fame. In a final section titled "The Great Puzzle" there was this:

"[Quantum] nonlocality disturbed John deeply, since for him it was equivalent to a breaking of Lorentz invariance -- a feature he could hardly accept. He often remarked, 'It's a great puzzle to me. Behind the scenes something is going faster than the speed of light.'"

At this point, I think a certain amount of epistemological humility is in order.

Yes: it's exactly the violation of Bell's inequality that I had in mind. (It's not a problem in the many-worlds interpretation, but Bell was Not A Fan of that approach.)

Years of Rice and Salt had that effect for me - I couldn't buy the premise. The Plague in real life actually did cause mass death and devastation in both the Middle East and China in the 14th century, so a plague that kills 99% of Europeans is going to do the same thing to the Middle East and China.

One key question is, "how much is a kill worth"? Bullets are individually cheap, but if it takes 20,000 rounds to hit one insurgent in a jungle, that adds up -- especially as it exposes your own shooters to opposition fire. Using a Brimstone missile against a single enemy soldier (cost: £100,000) might seem cost-ineffective, but given the estimated lifetime economic value of a first-world citizen (currently about US $4M, in actuarial terms, in the USA) then it might be worthwhile. And as guidance packages get smaller and cheaper, the problem turns out to be target selection and tracking, not can-we-build-a-magic-bullet.

(I don't expect guns to become obsolete, but obsolescent -- in the same way that an officer's sword was obsolescent as a weapon of war by 1914: still lethal, but not the primary killing tool it once was -- is another matter. Think sidearms and personal protection, and a shift from crew-served kit like MGs to rapid-fire missile launchers like the grandchildren of the XM25, with active guided rounds rather than the current straight-line airburst warheads. (Plausible ...?)
The real question is, "Given that tech, why the heck is anyone mortal?" They should be able to out and out take *backups*.

Yes, and indeed in cases where the original owner of the brain in question is not around to be recorded, it turns out that they can turn the clone/android into a soldier anyway, and those trained in this way are better than the imprinted ones. So why imprint? And, given that you don't have to do the imprinting (which kills the original), why would you need to get the initial tissue sample from a left-behind Earthling anyway, when you could just ask some of your own citizens to volunteer? The entire house of cards collapses as soon as he lets non-imprinted clone/androids be trainable.

61:

Nope. I was asked to cover-quote "Luna" and didn't make it out of the second chapter before it tripped my throw-book-at-wall impulse (and not just for the lunar 3He -- there were other things wrong with it too).

62:

Monomolecular edges that cut through anything.

Monomolecular string that's arbitrarily strong in all directions and stable at high heat and just generally invincible.

63:

The last 50 odd pages of the reality dysfunction books is the reason why I will never pick up anything written by Peter F Hamilton again.

I came close to chucking a book across the room a couple of years ago when the action stopped so that one of the characters could have a long interior monologue about how annoying the author found evangelicals. I agreed, but preaching to the choir is still preaching ffs!

64:

Note that the rifle hasn't been the primary killing weapon since Hiram Maxim and Henry Shrapnel... but it's still vital in close combat. The bayonet is still regarded as a useful item, even though it's fractionally effective as a weapon.

The old quote is (from Napoleonic times, but still valid) is that it takes a mans' weight in lead to kill them. Lots of ammunition is fired speculatively, for suppression (too much in most cases, but that's poor training for you); and lots of it is fired at fleeting targets.

Just that alone, is a problem; your reaction time is on the order of a quarter-second at best. You see something in your sights; you pull the trigger; you miss, because by the time your finger moved, the
target was gone. This is the source of much "X is rubbish ammo, the natives just shrug it off and keep fighting" mythos - what you remember is the sight picture decision to fire, not the sight picture a quarter-second later; this is one of the things I have to explain while coaching, because it's not well-understood (even by experts).

So, no, the rifle will be around for a while. Because when you have to kick open a door, a grenade isn't always the answer...

---

65:

Priority requirements for a primary military weapon, roughly:

- it must be deadly to the enemy at expected fighting ranges
- it must not be so heavy, including ammo, that it gets dropped
- it must be reliable enough to work under non-ideal conditions for the expected lifetime of the soldier carrying it
- it must be cost-effective
- it must be selective enough to threaten a specific person in a group, and dispersive enough to suppress the enemy at range
- it must be useable by a soldier in the stress of combat

An automatic grenade launcher or micro-missile launcher is great at taking down a wall, stopping a vehicle, killing a crowd. It's difficult to threaten a single person when you are inside your own blast radius, and the ammo tends to be heavier than a human wants to carry around.

Now, if everybody has cheap, small power-armor, you can increase the useful carrying capacity of a grunt. You also need to carry energy supplies, though, and the dense ones tend to be explosive, turning a lucky shot into a multiple casualty.

---

66:

Next pet hate, particularly MilSF. Any character that overdoes the description of an item, presumably for exposition or to show off depth of research. If it's got a generic name, that's what people use.

No-one says "where's your M16A4?", they say "where's your rifle?". Far better "he picked up his gun", not "he picked up his Glock 17 with the extra gubbins"... otherwise it reads like Brett Easton Ellis...

After all, we eat with a fork, not a stainless steel Viners model 13 medium fork... we pick up the vacuum cleaner, or Hoover, not the Dyson MD05 with extra-length cable.

---

67:
You don't need near supersonic smart rounds when you can employ a hummingbird size drone that can do 30 m/s, and see through its eyes before deciding whether of not to fire the small shaped charge built into it.

68:

On stubbing toes: there seems to be a whole genre that's based on the notion that information technology is magic, capable of having sympathetic effects on the real world with no physical basis. (Jeff Noon's Vurt, with its Tokyo flitting in and out of physisical existence because it has been virtualized, is an example.)

Another thing that gets to me is projection of human psychological structures and drives on AI systems that wouldn't necessarily have them -- in the "accidental AI" scenario, the system often spontaneously gets not just a better grasp than expected of the world around it, but human-like drives toward self-preservation and social status. Why should we take it for granted that the machine will value its own future existence when there are suicidal humans who don't? (You more often hear this complaint about aliens, but honestly, non-colonial biological organisms are likely, just by virtue of those facts, to have a lot more in common than any biological construct would have with an AI.)

And if I'm not in the reading mode where I'm treating space opera as fantasy with rocket-shaped magic chariots (which, honestly, is the only way a lot of it is tolerable at all), then there's the part where a significant fraction of planets are not only life-bearing, but life that doesn't poison us immediately on contact (and vice versa).

On the flip side: I'm wondering to what extent an Orion drive (the classic Freeman Dyson nuclear putt-putt) gets around the waste heat issue by radiating a lot of that waste heat into empty space directly, and evaporative cooling from the oil on the pusher plate. It can't be total: the colossal shock absorbers that were supposed to absorb the shaped nuclear blasts have to have some internal friction -- but the General Atomics crew did enough math to assure themselves somehow the thing wouldn't melt.

(Declaration of interest -- and spoilers for my trunk novel:

Gur gehax abiry srngherf na Bevba bs fbegf, onfrq ba gurezbahpyrne cryyrg obzof, juvpu vf qrfpevorq ol gur crbcyr jub olvyg naq bja vg, sbe ernfbaf gurl svaq tbbq naq fhssvpvrag, nf fbzrguvat ryfr. V'ir abj ibg fbzrguvat gb nqq gb yvg gur ernfbaf gung gur pbire fgbel znxrf ab frafr (juvpu jnf nyernql cerggl qnza cynva gb bar bs gur punepgref...)

69:

As risk of spoilers: you might want to check out "Invisible Sun" when that novel finally sees the light of day (it's book 3 of the trilogy starting with "Dark State", which is now due out in early 2017). Hint: it's entirely relevant to your trunk novel spoiler, and comes up with a barking mad work-around for one of its other problems ...
70:

A few thoughts on too many above to hit Reply.

FTL & time travel: MacLeod dealt with this in his "Engines of Light" trilogy in a "You can't go home again" way, at least as I remember it. You can go back and forth between worlds at FTL, but every time you return to a planet decades or centuries will have passed, so you're in essence traveling into the future.

Guided bullets: Last year (iirc) there was a demonstration of a sniper rifle with computer assisted aiming. The idea was floated that the software could be hacked to change the target. Add in Wifi/Bluetooth connectivity, and if you have self guided bullets....

As mentioned above "Star Wars" isn't Science Fiction, it's Space Fantasy, with swords and wizards and all that. So I give it a pass (and I think a generational thing, having grown up with it--was 6 when the 1st movie came out and saw it in a drive-in). I think maybe realizing that has led me to reading more fantasy, though still not into much traditional Epic/High Fantasy, and more into the Urban and Fracture Fairy Tale variety. After the last time I went on about this, I realized that what most influenced my taste in fantasy is reading Bradbury as a kid.

I think there was one more thing I was going to reply to but am now forgetting. Probably just as well. Back to catching up on the comments

71:

Charlie brought up guns being obsolescent, but what if you had something that did make them obsolete? Let's say someone figures out - either using solid-state lasers or very small missiles - how to make something that could be carried aboard an armored personnel carrier or humvee, and which could hit bullets and drive them off-course to avoid your troops?

If it's shooting bullets out of the sky, it's probably not impossible for it to also shoot artillery shells and small missiles out as well, too.

Maybe we start getting small snake drones that crawl in the dirt and blow up on the treads/wheels of the vehicle.

72:

Oh, just remembered what the one thing was: "Fetishits" - coprophilia's not my kink.
Yeah, should have left it forgotten.

73:
...then there's the part where a significant fraction of planets are not only life-bearing, but life that doesn't poison us immediately on contact (and vice versa).

Why would it? Most biological poisons are poisonous on purpose: the organisms that produce the poison have a good Darwinian reason to do so (it allows me to eat the thing I have poisoned; or, conversely, it allows my relatives not to be eaten by the thing that has just terminally regretted having eaten me). I'd imagine that a genuinely alien biology would most likely be biologically inert from our point of view: you wouldn't be able to survive by eating it (nor it by eating you), but it wouldn't actively poison you. (It might actively kill and eat you: you can't expect the alien equivalent of a tiger or a great white shark to realise that you are not very nutritious.)

On the other hand, we biological organisms are a bit finicky in our environmental preferences: I do have trouble with alien planets that provide shirtsleeve environments (it wouldn't require too much variation in the atmosphere of Planet X compared to ours to make it seriously lethal).

I don't think we yet have a strong steer on how similar to ours alien biologies might (or might not) be. I can't see a good reason why they'd pick the same stereoisomers: alien life might use left-handed sugars and right-handed proteins, if it used sugars and proteins in the first place. How much of our biochemistry would re-evolve given the same initial conditions is not, AFAIK, well known. But it does at least make heavy use of very common elements: the building blocks would be available anywhere.

---

74:

*Think sidearms and personal protection, and a shift from crew-served kit like MGs to rapid-fire missile launchers like the grandchildren of the XM25, with active guided rounds rather than the current straight-line airburst warheads. (Plausible ...?)*

Maybe, but it seems like that is begging an awful lot out of production QA. That's the real key for a dominant weapon; that it works each and every time you need to use it. The spear dominated for such a long time because a pointy stick will always hurt, and doesn't require as much training in use than other weapons do. It took about 140 years for guns to get reliable and simple enough to let them win a battle (Cerignola), for things to get to the point where you could grab a farmboy, drill him for a few weeks, and then have him use the weapon was even longer.

Set aside the implications of the cost crashing of your guidance packages, what are the implications of being able to manufacture things much more complicated than bullets to have the same failure rate as bullets?

---

75:

Necessary comment: "the eight deadly words" were originated by Dorothy Heydt, and are "I don't care what happens to these people."
and sexuality (being "the old queer"). Note that this was far more challenging stuff in the USA of the 1970s, when gays were still barred from the military...

This is where I had some of the most trouble with it. It seemed too much like Haldeman was trying to be progressive in the post-Stonewall world, but not having much experience with actual LGBT people. I don't know that much about him, so correct me if I'm wrong. Also, I was an Army brat in the years right after it came out, so familiar with some of the attitudes toward gays in the military then, my mother had a couple gay/lesbian friends in the Army at the time.

FTL & time travel: MacLeod dealt with this in his "Engines of Light" trilogy in a "You can't go home again" way, at least as I remember it. You can go back and forth between worlds at FTL, but every time you return to a planet decades or centuries will have passed, so you're in essence traveling into the future.

It's a while since I read the "Engines of Light" books, but my recollection is that they posited more-or-less-exactly-speed-of-light travel, rather than FTL. In which case the travel time is near zero for you (in the ship reference frame), but the appropriate number of years for the distance in the rest frame of the Galaxy. Except for the unobtainium needed to get to within a whisker of lightspeed in the first place, that's self consistent and doesn't produce closed timelike curves.

I do suspend disbelief for FTL in space opera, though I prefer ones (e.g. Bujold) in which it's done via wormhole or similar. But previous posters are right that FTL automatically violates causality: if you start at spacetime coordinates A, travel FTL to spacetime coordinates B, and then do something at B, there are frames of reference in which B will be seen to occur before A. (So, if the thing that went from A to B was a missile, say, observer in such a reference frame would see target at B disintegrate before missile fired at A. Physicists generally see this as presenting a problem, and we are hence not overfond of tachyons.)

"... there seems to be a whole genre that's based on the notion that information technology is magic, capable of having sympathetic effects on the real world with no physical basis."

Like non-interactive measurements in QM?

Things that really turn me off of a novel:

a) Characters that have no motivation save to advance the plot.
b) Authors who can't write believable dialogue for their characters.
c) Stuff that doesn't make sense in the context of the novel's imaginary world.

d) The assumption that the Default Person Setting is straight white dude, and that other character types are relegated to at best walk-on, supporting roles.

'D' seems to be the real killer for me these days. If all of the characters are dudes, then where did everyone else go? (If I handed out bonus points if all of the dudes are white and straight, I'd be handing out lots of bonus points to books I don't care for).

80:

(It's not a problem in the many-worlds interpretation, but Bell was Not A Fan of that approach.)

What did he like? He himself and subsequent experiments did in hidden variables, Copenhagen Interpretation/ wave function collapse relies on a magic event, so the last hypothesis standing seems to be many-worlds/aka the wave function never collapses.

If, as it seems to be, the evidence is against hidden variables and Copenhagen relies on a magic wand, what's left other than many-worlds?

81:

given you...wrote a sci-fi novel with humanish robots who fundamentally do seem to think the way we think today.

Keep in mind that the characters are descendants of robots built and designed by Humans, with all the hangups that entails.

82:

One of the things that distinguishes a "proper" scientist is the ability to let evidence take you to conclusions you don't like.

Personally I never saw a QM interpretation I was really happy with. Maybe we should stop trying to kid ourselves that properly understanding it is possible with our jumped up ape brains, or as a better physicist than me put it: "shut up and calculate!" :)

83:

We already have radar-guided counter-battery fire for artillery; one reason everyone with a defense budget these days uses self-propelled artillery is that in a non-asymmetric conflict the position of your old-school non-mobile guns get whacked within 60 seconds of opening fire. (Exceptions: towed artillery work just fine against light forces without their own modern artillery, and lightweight towed howitzers can be schlepped into position by helicopter.)
But anyway ... what you're looking for is to generalize counter-battery fire down to rifle-bullet scale: put sensors on every vehicle such that the instant someone pops a cap at your forces the sensors locate the shooter's position and engage automatically.

(This is going to work fine against irregulars attacking a patrol or convoy, but relies on a lot of logistical support to keep it going, and it'll break down when someone mounts a proper ambush.)

84:

*Years of Rice and Salt* had that effect for me - I couldn't buy the premise.

I liked it, but my problem was that in 800+ pages there were exactly two mentions of Jews, and only as historical background. In the real plagues Jews came through fairly well (why they were scapegoated for them), presumably due to cleanliness rituals, and there were Jews throughout Europe and Asia—all the way to Kaifeng China. So why no Jewish characters in the book?

85:

IIRC our choice of stereoisomerism is baked-in; can't remember the source, remember reading about it as an emergent property of stereoisomerism observed in the components of protoplanetary dust clouds and attributable to some sort of underlying cosmological chemosythetic process.

86:

Indeed, we've had the MISTY satellite program, which was a stealth satellite. The point is that it's already been done, and Dirk's right, it's not that hard to camouflage a spaceship from observation from a particular direction.

It should also be noted that stealth planes and ships are not universally invisible from all directions. Indeed, they have to fly a precise route (what do they call it, the blue line?) past previously mapped air defenses to be stealthy at all. Stealth as a real-world technology is more *Oceans 11* than cloaking device.

87:

RE: FTL

For real fun, consider the experienced time for the people on the FTL going craft.

Everyone talks about how time dilates as you approach C, a few mention how there is no experienced time at C, but I'm yet to see anyone who considers how it works if you are going faster than C.

Mathematically you can handle it easily enough to get a real number. But for storytelling purposes, that real number is now dilating in the other direction - instead of things being slower on the ship relative to the outside, they are now faster relative to the outside. You then need some sort of time retardation device so that your passengers don't die of old age.

and isn't that a fine externality your worldbuilding then has to handle? If your starship now has a time dilation device for FTL travel, why not drop the FTL travel and save yourself the trouble of patching over all the implications for your story from that?

---

But you don't need a precision weapon to have the same failure rate as a bullet; you need it to have the same failure rate as (number of bullets fired per target killed), which is some thousands to tens of thousands. A guided missile with an after-launch failure rate of up to 20% isn't useless, because if it works at all it almost certainly strikes the target and destroys it: you just need to ensure a margin more missiles than targets. Whereas a bullet that jams takes out your weapon and ensures all your remaining bullets are useless.

---

Yeah, it's been several years since I've read them too. So I don't remember what ship speeds were, I'm pretty sure that MacLeod says that shipboard travel time was measured in weeks, so slightly less than FTL? (IANAPhysicist.) And I seem to remember a character in the second book commenting that 50 years had passed on one planet since they'd last been there, though it had only been a couple for them.

---

Things that annoy me enough to stop reading on occasion:

1. New books that ignore old science/discoveries. e.g. We know that Buzzard Ram Jets don't work now. I prefer magic technology etc. to known inaccurate science.

2. Quantum Computers as magic infinitely fast solve everything machines. We already have a solid understand what QCs are theoretically capable of.

3. In fact most "quantum".

4. Evil AI is Evil. Because, AI.

5. Sentience achieved just by making a network bigger and more connected — "the internet wakes up" trope. In fact pretty much any "accidental" sentience.

6. For no obvious reason all the aliens we meet are conveniently just at just the right technological level for interesting conflict.

7. Terraforming with any unit under 1000s of years.
10. Folk who think "intelligence" is a dial that you can arbitrarily turn up.

91: It was somewhat common in older SF for a Heroic Genius protagonist to notice/discover something that hordes of other people failed to notice over a period of years. And also have it be obvious enough that a moderately clever reader would make the same crucial observation before the protagonist. That's really unappealing.

I find it grating in both science fiction and fantasy when there's plot-setting dissonance. Like fantasies with powerful and/or common magic that have looked like pseudo-medieval European pastiche for the last 500 years from a peasant's POV. Or where magic has thoroughly permeated war and adventuring but nobody ever applies it to ship navigation, agriculture, household chores, or anything else out of the heroic mode.

There's SF where protagonists have all the ingredients of at least a weakly post-scarcity society but the economy is thoroughly late 20th century (Commonwealth Saga, I'm looking at you!). Also SF where anyone can have a reactionless drive, compact nuclear reactor, self-reproducing robotic factory, etc. and there is no explanation of how the danger is mitigated or indeed in-text awareness that there is extreme danger calling for mitigation. I recently saw a movie where robots have taken all the jobs except those of the Exploited Prole and his friends working in the dangerous grimy robot factory run by an Evilcorp.

Plot-setting dissonance can sometimes be patched over by invoking secrecy or cultural taboos, but it just makes things worse if the dissonance is ubiquitous. Like the Butlerian Jihad of Dune that means nobody ever builds autonomous machines, the Eugenics Wars trauma of Star Trek that justifies the whole Federation of the 23rd century having less genetic technology than the early 21st, or not one person on Earth being able to reverse-engineer the magical superbattery Shipstones of Heinlein's Friday because they're just not smart enough. Though in the case of Friday I kind of wonder if the Shipstone is an authorial wish fulfillment about being able to publish books that can't be copied, transposed to batteries in the story.

92: It should also be noted that stealth planes and ships are not universally invisible from all directions. Indeed, they have to fly a precise route (what do they call it, the blue line?) past previously mapped air defenses to be stealthy at all.

Yes, if you go back and look at reporting on the faceted F-117, you'll find occasional mention of pilots carrying mission tape cassettes. Those tapes very likely were the result of lots and lots of behind-the-scenes modeling of threat radar sites and calculation of how to fly among them while showing them nulls in the F-117 BRDF(*)

On MISTY I, a similar thing seems to have happened. It was designed to be radar and optical stealthy against sensors in the USSR. On that score, there's no evidence that it failed, but there
were other sensors that hadn't been taken into account. So it flew big and bright over guys in
Canada and elsewhere who liked to watch satellites. Oops.

(*) BRDF: https://en.wikipedia.org/wiki/Bidirectional_reflectance_distribution_function

93:

Ahem: Bussard (sic) ramscoops do work (probably); but they're incredibly good brakes, rather than
being good for acceleration. Indeed, they're so good at slow-down that they may have a role to play
on interstellar missions for that very purpose; use a propulsion beam system powered from back
home, coast for most of the distance, then engage ramscoop for deceleration into destination star
system.

Ahem.

Things to watch out for:

Cyber- as a prefix.

Ditto Nano-.

Quantum as an adjective.

These are all egregiously misused fluff which often signals that the author doesn't know what
they're talking about and just wants a buzz-word. (This is not always the case, but you should use
them sparingly unless you know exactly what you're doing.)

94:

Before I answer, I'd like to note that the two most "throw the book at the wall" examples of
supposedly-sympathetic narrator who didn't deserve any sympathy I've encountered were both
memoirs. I couldn't read either Henry and June or American Sniper for this reason.

One thing which immediately signals that I'm reading the wrong book is what I call the "drive-by
message." You hear a lot about message fiction these days, and it's seldom meant as a compliment,
but I like it when my books have a point of view. While I'm no fan of Ayn Rand's politics, I think
her books were better for never trying to hide what they were about.

However, if the author is trying to tell a story but feels the need to throw in an aside about how "all
libertarians are stupid" or "SJWs caused the downfall of civilization" or somesuch, it takes me right
out of the narrative. Unless the writer is exceptionally skillful, it sticks out in a cliche-inspiring way.
If you want to write about why people like me are what's wrong with the world, by all means, do it.
If it's a good book, I'll probably still enjoy it.

But, if you are writing about about space kangaroo pirates and you have one of them essentially
look at the camera every couple of chapters and say "Oh, and by the way, Ridley Kemp is a terrible
person," I'm out.
Lately I've been stumbling across a lot of books with really bad orbital mechanics -- the spaceplane that leaves the Earth's atmosphere and minutes later docks with a station at L5, asteroid bases trailing a few million miles behind the Earth in its orbit, spaceships that drift to a stop between planets when their engines fail, military missile platforms orbiting over the north pole. In a few cases, I thought the author was having a little fun with us readers, and we would soon find out about some magic technology -- inertial cancellation, gravitic engineering -- that would explain it. But no. The author just didn't know the physics. I can enjoy military SF and space opera that doesn't have clanking hard science, but some of this basic stuff just breaks me out of the story.

That reminds me of something that really bothered me about the Ancillary Justice universe. You had a civilisation that had been technologically stagnant for millennia, and yet were able to go around invading anyone they liked because they were the only ones with force fields. By the time of the novel everyone due to be invaded had known they were coming for about 3000 years, yet nobody had put any effort into physics research. It's a lot easier to reproduce a technology if you know it is possible.

It's slightly more plausible that the starfish aliens have toys that the humans haven't copied yet, but when you can make superhuman AIs at the drop of a hat then there is no reason for them to be beyond humanities ken for long.

Ahem: Bussard (sic) ramscoops do work (probably); but they're incredibly good brakes, rather than being good for acceleration. Indeed, they're so good at slow-down that they may have a role to play on interstellar missions for that very purpose; use a propulsion beam system powered from back home, coast for most of the distance, then engage ramscoop for deceleration into destination star system.

Yes — Bussard (damn… always get that wrong) ramscoop as brake is fine. I only wish that was a feature of the story I was thinking of ;-)

Another one that annoys the heck out of me is brain copying by _just_ copying the synapse connections, and ignoring the neurons themselves.

I don't think that's an accurate account of the narrative.
Having elves leave Middle-Earth wasn't decreed by Eru. Rather, the Valar discovered that the elves had sprung up, and wanted to keep them safe from Melkor, so they appointed some leaders to get them to the West. Tolkien rather strongly hints that this was not a good idea!

99:

(Imagine an elephant-analog, with big brains, abstract reasoning, and language, that has managed to domesticate and train a monkey-analog, with manipulator limbs and good binocular vision. Not plausible in our biosphere, but not in and of itself implausible among aliens.)

Um, no, because the monkey analog

a) has to be probably as big as a bonobo (body weight adds to the friction in most friction-fire devices), and

b) that monkey still has to be smart enough to take the training to make the fire. In other words, unless the elephantoid is deliberately helping the monkeyoid in part of the process, the monkeyoid can make a fire by itself.

And that monkeyoid is a fairly good stand-in for a rubber-mask alien.

Now note that something shaped like a velociraptor might be able to make a fire. It's not limited to tailless bipedal tetrapods. Getting a starfish to make a fire is something else entirely.

One thing no one (to my knowledge) has ever tackled is the possibly symbiosis between a failing human colony and an intelligent but non-technological alien. The aliens keep the humans alive through whatever their means are, and the humans make fires, cook food, and do other stuff for the aliens. It's in the theme of "humans make great pets." I'm thinking along the lines of 40,000 in Gehenna, mostly because I want to play with dragons myself, but there's no reason that the aliens have to be particularly draconic.

100:

Pasting in a few offhand references to a Black President because, hey, it's the future.

But nothing else changes, and it's still an Orwellian state where the cops gun down the underclass and the citizens gun down everyone else.

101:

my two:

- Things that Have Obvious Consequences or Counters: You postulate a physics paradigm, often there is some very obvious destructive thing that would be kinda easy to do and yet somehow never occurs to anyone.
It often reduces to "I would put a lot of ball bearings in orbit" "I would nuke it a lot" or "I would drop a lot of rocks on it at high velocity".

I’d say "I would nuke it a lot" alone short circuits about 70% of the hard scifi out there, especially the ones that postulate nuclear propulsion systems on space ships

Hint, if you have space travel (yes I am talking to James Corey) and you don’t have a way to deal with those three things, you either don’t get to keep space travel or you don’t get to keep planets

My second is the idea of a small set of actors. This manifests in large conspiracies with only a couple sides, big wars with only a couple of sides. People don’t work like that, power monopolies or even duopolies are rare as humans immediately invent sub factions inside the big faction.

There are almost always many actors. Your conspiracy has to contend with many semi competing power vectors rather than one or two opposing ones. Ian Banks got this at least...

102:
Wasn't that basically the plot of the old ACC story "Second Dawn"?

Smart telepathic unicorns with no opposable thumbs and corresponding lack of tech discover less smart creatures with fingers and put them to work.

103:

In a galaxy far, far away, an eldritch monstrosity squats on an airless moon, howling into the void as it weeps tears of bitter ichor, grieving for its lost shibboleths...

That's the problem, isn't it? I mean, we can and have beat on Star Wars for decades, and people will still want to fence with light sabers and watch the Millennium Falcon fly the Kessel Run in five parsecs. It's even more frustrating when producers take that to mean that stupid sells and think that being smart is a waste of time and money.

Beating on shibboleths only helps if it makes a more enjoyable story. It's certainly good to vent, but if a broadside of x-ray lasers sells more books, do we just weep tears of bitter ichor, or what?

104:

But you don't need a precision weapon to have the same failure rate as a bullet; you need it to have the same failure rate as (number of bullets fired per target killed), which is some thousands to tens of thousands. A guided missile with an after-launch failure rate of up to 20% isn't useless, because if it works at all it almost certainly strikes the target and destroys it: you just need to ensure a margin more missiles than targets. Whereas a bullet that jams takes out your weapon and ensures all your remaining bullets are useless.

Wrong comparison. Things are very different between a platform launched munition meant to hit a target unawares (or undefended) and a heavy infantry weapon. The failure rate for the guided
missile is much more acceptable because the ship that fired it is over the horizon and the target probably isn't firing at them - and if it is they have a multitude of other defensive systems, it isn't a case of "them or me".

When you are in the middle of a firefight and the other guy is right there trying to kill you quicker than you can kill him, your weapon failing to work absolutely matters.

First consider the cost in lives in that scenario and the resulting pressure from that - do you want to be the representative telling grieving families that yes, their loved one died, but you got a better marginal savings on this inoperable weapons system?

But setting aside that, your cost/benefit then shifts - you aren't just losing the cost of the round, but also all the invested training and equipment for the soldier who just got killed, and the opportunity cost of now not having the dead for future operations. Then tack on the costs of lives lost because you were undermanned, the enemy gaining the march, etc etc etc.

105:

Science Fictions is, and always has been, a sub-genre of Fantasy. Even John W. Campbell, Jr. admitted as such, though as an editor he tried to minimize the logical incoherence.

So. Global corporations ignoring externalities aren't unreasonable. People perceive things locally, so such things are a good model for criticizing current affairs. I still like Mack Reynolds work, e.g., even though he proposed the Communists lasting long enough to turn into a Mandrinate and the West into a Corporate state. What he was doing was depicting current trends in a "If this goes on..." kind of way. (For that matter, BlackWater, the military corporation, gives it even more plausibility than I would have thought.)

We can't always know what would work and what wouldn't. Hiding in an asteroid belt behind an asteroid might work. You essentially need magic to get yourself into that position quickly, but if you could get there it might work. Yes, asteroid belts are mainly empty space, but there's enough small stuff to make high speeds unreasonable. OTOH, it's unlikely enough that it needs to either be unimportant or well justified. (And as you indicate, fat chance of that.)

Since I read science fiction as fantasy, I usually ignore physical impossibilities or improbabilities in the narrative, reading instead for the underlying story. If the metaphor is loose enough, impossibilities at the surface may not be a problem, but things that are quite plausible at the surface level can cause narrative disconnect. If the metaphor gets too lose, I can totally lose interest. I also lose interest if I don't like the character I'm supposed to empathize with. This is a problem I had with Rule 34, though the story was gripping enough to make up for it. (And I think Athena is a quite plausible direction for an emergent AI...one that could lead to either a positive or a negative singularity...or one that's a blend of the two, but still so different that the term singularity is still appropriate.)

FWIW, I think the most likely kind of "super AI" is Alan Dean Foster's Colligatarch (from "The I Inside"). But I doubt that he depicted a likely social structure to arise from its presence.
I can't think of a single wholly satisfactory Science Fiction book, but "Halting State" comes closer than most I can think of. The only problem I have with it is the general unselfish motivations of the holders of power. (OTOH, we aren't shown much of the motivations of those near the very top, so it's not that implausible. In the "Man from Uncle" scene the "false story of what happened" and bureaucratic CYA read quite true.)

---

**106:**

More shibboleths:

--Eusocial aliens, where the queen is the equivalent to human royalty. In ants and termites, the royals are the gonads, and decisions are made collectively. Wouldn't it be fun to see collective decision making (thousands of aliens smelling each others' butts to see what they all think) in eusocial alien species?

--The Squad of Marines rule in SF battles. If a group of modern soldiers could take out your futuristic warriors, or at least do a better job of combat, security, or logistics, then your tech (and/or your tactics) are crap. Star Wars stormtroopers are the classic example of this (as is the Jedi, meet shotgun scenario), and the finale of Scalzi's *The Human Division* was such a horrible example of this that I quit reading the series in disgust.

--Martial arts based on current tai chi or karate. Here's some news kids: what they teach in the mall is designed to keep you coming back month after month, not to teach you combat. They don't spend nearly that much time teaching, say, marines, and marines fight pretty darn well.

One thing novels generally don't get is the spectrum of force, from verbal conflict through unarmed combat, armed combat, missile weapons, bombs, artillery, nuclear war, death star, and so forth. Modern martial arts cover a tiny part of that spectrum, and worse, each tends to be optimized for a particular type of fight (two person sport combat for tae kwon do and judo, health for tai chi, forms for karate, dealing with a mugger for Krav Maga, etc.) While it's fun to see people play with future martial arts, most authors don't understand how existing martial arts work well enough to pull it off.

---

**107:**

Your counterfactual is rejected for implausibility. Good try, but nobody would believe it if I tried to sell it in a near-future SF novel.

---

**108:**

For me it's almost never the tech/science that breaks things for me, it's unbelievable human reactions to the tech/science. In particular, scientists who are informed of alien science and don't ask questions, or engineers who are shown advanced technology and don't try to figure out how it works or what it's made of. "It's an alloy never before seen on Earth!" "Huh."

(Probably the worst offender I've ever read: *Calculating God* by Robert Sawyer.)
FIRST ALIEN EVER TO COME TO EARTH: "Hello, scientist I have traveled many light years to meet. My people discovered a grand unified field theory of physics which, among other things, disproves the anthropic principle, so there has to be a creator god, and intelligent design is a thing, QED."

PROFESSIONAL SCIENTIST: "Well, I'm super bitter about having cancer or my wife dying or something and that's why I'm an atheist, so we should spend the rest of the book arguing about that."

ALIEN: "Okie doke! Atheists are dumb!"

SCIENTIST: "Nuh uh."

Et cetera. I gave up a third of the way through but I seriously doubt it got any better.)

109:

But you don't need a precision weapon to have the same failure rate as a bullet; you need it to have the same failure rate as (number of bullets fired per target killed)

Not quite. You need it to have a better reliability than (time it takes the other bloke with a reliable weapon to fire back). That might be only one shot. That first bullet from your weapon just has to work, or it will be abandoned as an untrustworthy design (as an operationally experienced type once explained to me, it's also the reason why you always trigger your ambush with a weapon that fires from a closed bolt; you'll guarantee at least the first shot...)

Whereas a bullet that jams takes out your weapon and ensures all your remaining bullets are useless.

Actually, a great deal of military weapon training is about training the firer to clear a stoppage as quickly and as safely as possible. With a bolt-action rifle (short of a case fault), you just work the bolt. With the current and previous UK service rifle, if you're in the habit of releasing the trigger forwards under control after the shot, you can feel the action falling back into place for the next shot, and hence know whether the chamber is empty or not (the current UK rifle holds open on an empty magazine; you can feel the last shot being fired, if you weren't one of those clever sods who put a round of tracer two from the bottom of the magazine).

The rate at which weapons jam under various environmental conditions was trialled very, very thoroughly by the SA80A2 trials team, and they found that the H&K rework had given the British a weapon that's more reliable as anything other than an AKM...

...and that the M16 / AR-15 and G36 were far from the panacea that the fanbois would have them believe.

110:

People laugh at me when I make a similar argument for the US power grid. Between political pressures to do away with coal and how unlikely it is (at least in my mind) that any of the current
fleet of nukes will be licensed past about 2045, that looks like an enormous amount of new investment in the next 25-30 years. Unless fusion comes in sooner, and much cheaper, than people seem to think, it's going to be too late to compete with a bunch recently built stuff.

111:

...and that the M16 / AR-15 and G36 were far from the panacea that the fanbois would have them believe.

Really? I thought M16 had a reputation for not being reliable.

112:

One thing no one (to my knowledge) has ever tackled is the possibly symbiosis between a failing human colony and an intelligent but non-technological alien.

Eric Flint's *Mother of Demons* is close to this, though it's a crashed starship rather than a colony.

113:

IIRC, they travel at near c, so the transition from one destination to the next is virtually instantaneous from the point of view of the passengers. From what I recall, this means the FTL ships are moving from one atmosphere to the next directly, so don't need complicated life support.

114:

One thing that gets me is near future SF that requires vast changes to be happening now for the setting to make any sense. For instance, your teenage protagonist in a story set in 2030 is alive or in users now, so the extensive commonplace genetic engineering they've undergone should be public knowledge by now.

Similarly, and more common in visual media, futures where every non-landmark building older than a few dozen years has been replaced by FutureHouses or similar, ignoring a) the practical difficulties of building new housing and b) how much easier it is to retrofit existing buildings.

115:

Actually, a great deal of military weapon training is about training the firer to clear a stoppage as quickly and as safely as possible.

Generally because someone in a firefight typically does this very badly. (Look at the entire rationale for the idea of a chain gun.)
There has always been a strong tension between the desire of an army for logistics optimization and the desire of the infantry for their opponents to die immediately if not sooner; it's what leads to using anti-armor grenade launchers as direct fire anti-personal weapons. Neither side of the argument is obviously correct. (Here we are, and yes, the first four waves of the enemy are destroyed, but we're out of ammo and waves five and six are coming forward, for example.)

There's no reason to suppose a guided bullet requires software (you can build a nervous system just as readily); there's no reason to suppose it won't fly straight if the guidance fails, either.

Since small arms in general have stagnated on being good enough I would be very surprised to see anything like that developed or deployed; current full-tech capability is caseless ammo and cobalt alloy barrels and no one is deploying those. There's no reason to undertake the expense.

Even light autocannon have trouble selling the smart rounds -- the Bofors shrapnel round for 57mm that blows up all pointed down when it flies over the target, for example, just the thing for shooting up RIBs and small craft, for example -- because it's better, but it's not enough better.

I expect "enough better" is going to involve small autonomous vehicles with very precise aim.

---

116:

The first strong AI has self-awareness, has wants and desires, has...

A great pair of boobs and an erotic-yet-innocent curiosity about your cock!

Prototype one-of-a-kind androids that are strongly humanlike are by themselves a huge leap--getting robots that can fucking walk down a flight of stairs on two legs is a huge leap, nevermind concurrently developing self-aware synthetic consciousness--but to then add a functioning sex drive and at least recreationally-functional sex organs on top of that gets into silly territory very quickly. These are scientists and engineers at the very forefront of human achievement, and they're thinking like a porno company? Really?

By the time you get to people making a real attempt at a synthetic sex worker (which, by the way would be a type of sexual slavery so grim that one should shudder to think of it) strongly human androids should be common enough that they are a well-established consumer technology (again, slavery becomes a real concern). You'd already see a lot of obviously not human people walking around, because to be a plausible sex partner for a human, you'd need to master all the gross and fine motor functions of a human as well as the social perception and decision making loop necessary to interact with us in an alluring manner. By the time you get to that point, you're already at people, so this "I'm the first of my kind, I'm so special and also beautiful and I'm all yours" appeal doesn't pass the smell test?

And no, RealDolls aren't a real life suggestion that this trope could come to live. RealDolls are expensive sex toys with about as much in common with an AI as a goddamn Furby. Positing current sexdoll examples as a path towards an android you could fuck is absurd on its face except for a very slim segment of the population that is in to that sort of thing--but then again, they'd probably want an android that was explicitly and recognizably not human so you're back at square one.
Also, the number of cute (and usually synthetic) girls who make their first appearance naked and covered in goo after the dramatic opening of some kind of high tech shipping crate is large enough that TVTropes has a page on it.

Why does this one piss me off so much? Because it's literally an idea that the perfect woman is one you buy and assemble out of a goddamn box.

117:

Goddessdamn typos....

118:

WRT First Contact stories;
Years ago I had the idea for a story to be titled "First Contract": a ship pops out of hyperspace at the edge of the Solar System and starts beaming a signal to Earth. It turns out to be the Vita-Meata-Vegemin skit from I Love Lucy, and the alien is an interstellar travelling salesperson looking for new customers. I never got past that idea, then saw a novel with that title and scrapped it. My understanding is that Sagan got it wrong in "Contact", that the German broadcasts in the 30s were far too weak to make it out of the heliosphere, if that far. I guess I'm done with the idea of Earthly broadcasts attracting alien attention, unless they decide to invade because of a perceived insult, or to stop the noise pollution spewing out.

119:

>> Why does this one piss me off so much? Because it's literally an idea that the perfect woman is one you buy and assemble out of a goddamn box.

Perfect woman - unlikely.

Perfect female body, on the other hand, why not?
We are talking about a high-tech masturbation device here, not a general AI.

120:

My mish-mash list ... a few already mentioned in some way by other posterss.

Static cultures … Everybody still works, but at what?
Everybody works at the same place for…ever … their entire lifetime!

Nobody ever dies anymore. (Nobody gets sick anymore.)

Psychology is a societal delusion and has nothing to do with that squishy, complex mind-brain thingie.
No one ever learns from past mistakes.

Evolution stops .... No new species or races ....

Ayn Rand school of casting and/or character development (‘My way, or no way!’ ‘All of the rest of the world is both really, really stupid and jealous!’)

We’re all perfect specimens … there are no only so-so attractive or physically unfit people.

We’re all perfectly and equally-well educated, i.e., nearly all-knowing about our society and sciences by the time we’re 20, 25 tops!

Kids are still left to figure out all by themselves how to become well-adjusted adult human beings with perfect knowledge of all social nuances.

We will be the same person in our 120’s as we were in our 20’s. The tertiary education, marriages/divorces/children, etc. have no impact and/or have completely predictable effects/consequences.

There is no such thing as social media … what you tell your best friend/lover/spouse will never ever get communicated to anyone else, ever!

Society will always value [job/career] highest!

Fire-building alien … an octopus-like creature that can hold onto and rub a couple of sticks together really, really fast.

Planets have orbits, axial tilts, geography (climate zones, weather patterns, seasons, etc.) that’s why monoculture won’t work.

A planet can be perfectly run by a team of ten technologists.

Number of personnel needed to operate a spaceship … okay, after you’ve worked your 40-hour week, where do you go, and who supplies all of those goods/services? How many excess people do you actually need to ensure minimum strength at all times? How do you make sure that crew returning from extended duration treks remain up-to-date re: technology, social norms, etc.

How aliens wouldn’t sicken and die out if they ever met us in the flesh even though we’re crawling inside and out with all sorts of foreign, yucky very aggressive bugs. (Or, a UFO story where the alien steals some human DNA, replicates it at full blast (superfast) in ‘alien agar’ only to discover that the end product bears little resemblance to humans.)

Abandoned infant humans able to speak/understand ‘human’ by the time they’re in their late teens.

Domestic policing, not theater of war scale … Computer-assisted shooting … there’s computer assisted everything else, so why not add guns? Would probably reduce accidental hits. Every snooping camera is also a ‘gun’ (or, laser, if you prefer). Brand name is easy ... iKill.

Why no one ever wears gloves or otherwise covers up and has no qualms about leaving extremely personal information (DNA) thus providing easy to follow tracks (fingerprints, irises, etc.).

Everyone has the same digestive and immune system … everyone can eat/drink/wear/touch the same things without ever getting ill. Food never spoils/microbes never hitchhike.
121:

My big tropes are:

Not following Magic A is Magic A or Minovsky Physics: That is, you introduce your magic or physics system and then stick to it. That may mean not fully exploring it in the novel if you're undecided about something (and hence leaving a door open) or it becomes a doorstopper to try and explain it all (see a comment Charlie had about Phangs and living animals in another thread). Heck, it's been a good narrative device before, Larry Niven has written many books around a consistent magical system of magical physics system (like the Ringworld). The detail doesn't need to be great on the system so long as you just keep to the principles. So if magic needs a wand, no wandless magic figured out by the hero alone.

Forgetting your single shot plot tools: Harry Potter has the classic example of the Time Turner as very useful plot item that author made too useful for later plots. The time turner's existence is pointed at as the solution to all other plots for the rest of the series, and is something brought up alot. This is a much bigger problem in long runners, especially shows with many writers, as the writers don't pay attention to each others works. Stargate was the rare show that kept pretty good consistency about this, despite the risk of continuity lockout.

Strawman Political foes: Let's here what the author thinks is right, who they hate, and make it impossible to read if you're not the 'right sort' of person. Mil SF has a problem here, but so does the opposing political view point. This leads into the problem of the author creating a straw utopia or distopia, which is usually an author wanking out their politics. Only when an author really understands an issue can a distopia work. Utopias never work. The worst works are ones that lack any sense of understanding or empathy for the opposition. Heck, even in the mil SF favorite of an extermination war between humans and aliens, Orson Scott Card as well as Jim Butcher and a few others, demonstrated that there's ways to do it without the otherside being monsters.

Evil for Evil's Sake: People believe they are good, or at least working evil for a good end. Maybe they are doing a war crime, but its to make X safe from Y. People rationalize away evil. Dispelling the rationalizations from a character deep in the system can be a good plot.

122:

Possibly more a TV/film shibboleth than books: humans only use a tiny percentage of their brain, so we can turn them into superpeople just by activating everything at once. Limitless and Lucy being recent examples.

Often with the follow up shibboleth that the researchers who develop this stuff only do so for shady semi-criminal enterprises instead of immediately publishing in Nature.
"...and that the M16 / AR-15 and G36 were far from the panacea that the fanbois would have them believe."

I'm a fanboi for the HK417

----------

That one was hoary in written-form SF when A. E. Van Vogt was using it. Or Theodore Sturgeon. (IIRC it's something that John W. Campbell fell for, by way of a certain Mr Hubbard ...)

----------

Mil SF has a problem here, but so does the opposing political viewpoint.

This is (one of) the reasons I bounced off the Honor Harrington series hard. I'm willing to accept the tortuously contrived magic system, I mean space travel assumptions that allow for Napoleonic naval combat in space. But from the prologue where we here that the EEEEVIL Commonwealth has decided to become a ruthless expansionary power Because Welfare, I felt a trepidation that only grew once we arrived at Basilisk Station and met the completely straight-faced and unironic imperialism. Massive colonization of a planet with low-tech natives presented as morally neutral or even positive, complete with condescending nodding along with the local religious leaders, concerned that they will become "crazed" and "uncontrollable" when given access to fire water, uh, I mean Space Drug...

If the characters had managed to achieve something as innocuous as cardboard, I might have stuck it out to see how silly things got. Alas, Honor is (at least in Book 1) the very definition of a Mary Sue, right down to the super special pet that she's allowed to have but nobody else gets one because Rules, and people hate her irrationally for no reason but she's so cool she wins them over in the end and, and, and...

I didn't like that book. Can you tell?

----------

current full-tech capability is caseless ammo and cobalt alloy barrels and no one is deploying those

Not yet, at least. The LSAT project has progressed to troop trials, and the XM25 made it to Afghanistan for a short while (with the caveat that this was very definitely seen as trials, not the finished equipment).

Meanwhile, fill your boots - here's PowerPoint enough for anyone (with appropriate Conference caveats that while some presentations are credible, others are perhaps driven more by the "hey, a trip to Baltimore!")

127:
My point at which suspension of disbelief fails - technology more than 100 years ahead that isn't magic. Humans more than 100 years ahead. Full stop. Except dystopian global crashes ala Mad Max - which I never read.

128:
I can't take the idea that the universe is going to give us anything as cool as "magic" seriously. That doesn't mean we won't all be killed by smart machines of course, just that if it happens it will all seem a bit mundane.

129:
Your aliens will need to be able to make fire before they can make fancier stuff, but they don't need to be able to use friction to do it; assuming appropriate local chemistry and geology, flint+steel works fine, or whatever other combination of rocks that'll make spark when you bang them together near flammable tinder. Your Little-Green-Elephants could set up their targets and whack one rock into the other with their trunks. Or you could have a planetary surface with lots of crystals to focus sunlight.

130:
Science fictional shibboleths I dislike:

Names: if you cannot pronounce the names of any the main characters without dislocating your tongue, stop reading or watching the thing.

Anything harder to pronounce than "Quetzalcoatl" or "Republika Srpska" and I'm bailing.

Planets: single biome planets. Just no! (Unless it's been purpose-built by Magratheans)

Drugs: Aliens getting high on milk (Alien Nation), Ginger (Turtledove), children (Torchwood)

Eye-rolling will ensue.

Technology: "Hey, there's a cache of alien tech thats been lying dormant for hundreds/thousands/millions of years and...[pushes button]...works just fine."

131:
Most of this is interesting as hell. And really useful.
I'm still not sure I understand what factors DETERMINE who wins in the fight of willing-suspension-of-disbelief vs. something-really-implausible.

The conversation doesn't usually go in that direction. There are so many other things to talk about.

For instance, Charlie gives some examples of physics blunders that will result in a shattering of his suspension-of-disbelief (and possibly a book smacking into a wall). I have a much more general, physics-pig-ignorant sense of these blunders: I know THAT they're wrong, and I could maybe start to describe HOW AND WHY they're wrong ... but very quickly I'd be blustering & bringing up Wikipedia or Atomic Rockets (or this thread). So when I encounter those same errors in a novel, I recognize them and register them but -- I'm pretty sure even if I memorized Charlie's reasoning and internalized it and chanted it every morning like a Pledge of Allegiance -- they will never have the same effect on me. My hand doesn't twitch.

And no doubt there are things that my hand does twitch for, that Charlie is able to recognize as problematic, but able to suspend nonetheless.

It's definitely true that SOMETIMES, it's harder to swallow something when it's wrong for complicated reasons. When something is wrong in a simple way, it's sometimes simple to file it under "Stuff The Disbelief Of Which Must Be Suspended." But that pattern isn't TOTALLY consistent.

I wonder if, loosely speaking, we also tend to have our suspension-of-disbelief broken by problems that we think are important in a kind of political or ethical way?

I was interested in something on Ian Sales's blog recently -- people will swallow anything, no matter how crazy, so long as it's an existing trope. "FTL, fine. An advanced civilization that never invented gunpowder? Preposterous!"

Here's a somewhat extreme thought experiment. What if I said I found it unbearably implausible that novels are written in syntactically coherent sentences and yet are held to be "from the POV" of a particular character? What if, for me, it's just too much of a leap to imagine away the difference between a screed of text bound by grammatical conventions, and a stream-of-consciousness, arranged by its own mysterious laws, but certainly way more fragmentary and weird than even the transcriptions attempted by various modernists e.g. James Joyce, maybe Dorothy Richardson, Beckett?

Of course that's not true -- I'm able to suspend THAT disbelief incredibly easy. But why?

(Sorry this is a bit rushed :()
Aliens coming to earth and appearing in space ships over various photogenic landmarks (and then destroying them) rather than sampling the DNA and dropping a small matchbox sized canister of some deadly biological weapon to wipe out 90+% of the human population without needing to show themselves.

Large troop concentrations of said aliens, invading with inaccurate fire. First, it would take more energy to get them here than a coke can sized invasion force. Second, as above, they aren't needed. Third, troops are pretty dumb even here and now, let alone for a space crossing race.

Human's fighting off any space visiting aliens at all. Worst of all when they are using sodding AMRAAM missiles against something a mile wide, from point blank range, and expecting it to have any effect when they've just shown it shrugging off a nuclear blast.

Human's fighting off said attack, then just brushing themselves off and fixing things up again. Civilisation is very unstable and wobbly at the best of times - any kind of significant damage and the systems start falling apart. Hell, one nuke going off in a city is probably enough to permanently kill the financial system back to the 17th century.

Human's getting shifted en masse via some MacGuffin to a new planet and not ending up as graveyard full of gnawed bones (and yes, there is a third Eschaton novel in what would really happen if you dumped 21st century groups onto even benign planets and gave them supplies. Hilarity ensues.)

Novels where women are not seen as sex objects by men (except the evil villain) because it's the future, and in the future everyone has bought into the dogma of certain right-on groups of today and couldn't possibly have any other view because obviously they have developed, it's the future in'it? Similarly for anything else that's politically 'right on' today. The 1960s movies might look weird to us with the damsel in distress trope, but you can bet our movies/books/etc. will look equally weird for having all women capable of drop kicking a 300lb man to the floor and no male ever even glancing at her tits, despite them strategically on show.

Situations where the evil guy has no motivation that makes any sense to us, or methods that make no sense. If you want to "take over the wooooooorlddddd" and you have the resources to enact evil plan Mk1, you should have worked out evil plan Mk2 where you just buy politicians to do your bidding instead.

Thinly veiled cover for religious allegory.

And finally, not a 'throw it across the room' thing, but space epics that feel small with resolutely human sized focus and nothing that really gets across scale. Space is big, really big. Yet the stories are too often small in service of an author's desire for 'human focus'.

133:

Frequently a bit of unnecessary complexity will take me out of it. There is a reason why campers still often carry flint and steel, why people prefer cast iron pans, woodwind reeds are still mostly actual reeds, and why you see more working vacuum cleaners from the 50's, than the 90's.
Often the extra failure modes of added parts are unneeded or the activity was designed around the material.

Tech that allows new capabilities never seems out of place in scifi, but complex tech that helps perform trivial functions never seems to have the added points of failure that we see in real life. The times people do use the simple solution, it always seen as a rustic pastime or something that happens only in the neo-slums.

A subtype of this that always gets me are odd elevators (particularly planet-side). In the best examples, the stairs have been replaced by an access tunnel designed by HR Giger.

---

134:

I have a reasonably high tolerance for extraneous technical details in SF if and only if it's not describing something that violates well-tested scientific principles. If the story has (say) a nuclear thermal rocket delivering going to the outer Solar System, sure, describe it with love. I'll even read wiring diagram fiction for sufficiently interesting devices. But if the story incorporates e.g. inertia suppressors, FTL communication, or force fields, the less said about the imaginary blueprints of the impossible devices, the better.

---

135:

I suspect that Anathem was a fairly good short story before it metastased ;-)

---

136:

What really bugs me are not SF novels doing the impossible, but SF novels doing the impossible and forgetting that they'd done it for the sake of creating a crisis.

Aurora busted me suspenders-of-disbelief after they apparently solved most of the HARD problems associated with space colonies only to fall apart trying to solve some easy ones. And the colonists seem to gain and lose IQ points more or less randomly when the plot requires it.

But the one that really blew up those suspenders was SevenEves.

SevenEves had some pretty cool KSP fan-fiction followed by a more-or-less impossible biological and technological bottleneck but OK, for the sake of the story I can get over that... then they completely failed to do anything about the rest of the solar system except sending robots out to collect comet heads for *five thousand years*. Even after a civil war and half the population apparently going through a soft singularity.

(oh, and having the survivalists in the mountain survive the bombardment violates thermodynamics all over the place)
I find the bit about ginger (for example) kind of odd. My cats get high on catnip, which has no effect on me, and I understand that onions or garlic would poison them. And that's close relatives within the same biota.

"Human's getting shifted en masse via some MacGuffin to a new planet and not ending up as graveyard full of gnawed bones (and yes, there is a third Eschaton novel in what would really happen if you dumped 21st century groups onto even benign planets and gave them supplies. Hilarity ensues.)"

I think the Eschaton started them out with perfect cornucopia machines rather than just "supplies".

Novels where women are not seen as sex objects by men

How about novels where, three thousand years in the future or in an alien society, gender dynamics work exactly like they do today, because gender isn't socially constructed and is obviously immutable for all time and universal to all species?

(And the closely allied Smurf-style population dynamics, where only one in ten characters are women.)

Similarly, the future is always capitalism plus representative democracy, because what's good for America is good for a hegemony comprising half a trillion sophonts across a thousand planets.

But the future always has planetary governments because we only have the invasion and colonization of the Americas to draw on and we simply mapped countries to planets.

* "Quantum as an adjective."

Unless the author is Greg Egan.

This all reminds me of reading Stanislaw Lem's MICROWORLDS, a collection of critical essays on SF. I found it a fun read. One particular essay titled “The Time Travel Story and Related Matters of Science-Fiction Structuring” Lem analyzes time travel stories written by various authors and has a pet shibboleth about stories with time loops. He selects “All You Zombies” by Robert Heinlein as
an example of a time loop that is “internally contradictory.” Lem thinks Ray Bradbury's “A Sound of Thunder” is “an excellently written short episode”.

I'm kind of partial to time travel stories like Ray Bradbury's “A sound of Thunder”. I picked up a copy of WIRELESS and read your novella “Palimpsest” and enjoyed the time travel overwriting on a vast time/space theme.

142:

Oh, something I forgot but that came up in the last scifi novel I read: never send a human to do a machine's job.

Machines are cheap. Humans are expensive. For instance, if you have contemporary automation with FTL communications and travel, and want to explore distant planets, you don't send a person to do it. People are needy. They get unhappy when they don't have food or water or air. They want to come back and talk to other humans every couple years. And to add insult to injury, they want a salary to boot! If you care about getting exploration done efficiently, you will send unstaffed expeditions.

Manual labor. In Star Wars, droids aren't legally people. They're slaves. Why would you employ a human to do any manual labor at all when a droid could do it instead? An AI that's as smart as a monkey could displace a lot of manual labor. Manufacturing, agriculture, you name it. As long as you have a compact, all terrain fuselage with human-style hands, you can get rid of humans. And it will eventually get cheap.

Hazardous jobs. We already have robots to examine nuclear reactors and safely detonate small bombs. That's only going to expand, yet scifi stories still have humans in hazardous occupations.

The military. Occupations, especially annexations, require boots on the ground, and human soldiers might be better at assimilating territory than killbots. But why do we want humans involved in space combat? Or military action aimed at extermination? You might sometimes be able to come up with a reasonable answer, but it's rare that anyone thinks to ask the question.

143:

So- a lot of FTL haters here. Is there some reason the Alcubierre Drive is implausible that I'm not aware of?

144:

Is there some reason the Alcubierre Drive is implausible that I'm not aware of?

Among other reasons, I find it implausible because it requires exotic matter with negative mass, perhaps in astonishingly large quantities. It's interesting once the requisite exotic matter has been observed. Until then it's just swapping one prayer for another -- never-observed FTL phenomena being traded for never-observed negative mass.
145:

Or to put it another way: I find antimatter catalyzed fusion rockets sufficiently plausible for SF because fusion and antimatter alike have been observed in nature and produced in the laboratory. That's even though nobody is even close to producing the quantities of antimatter needed to drive a Voyager sized probe between stars this way. By way of contrast, nobody has observed FTL phenomena in nature or the laboratory, by means of an Alcubierre Drive or anything else, so invoking FTL via Alcubierre Drive seems like saying FTL via quality brand-name magic (not just generic magic!).

146:

On Wikipedia, there's a long list of hypothetical problems with this hypothetical drive. Personally, I keep hoping that a NAFAL jump drive is possible, one that doesn't violate causality, but which allows the ship to avoid going through all that spacetime to get from planet A to planet B.

147:

Devil Facial Tumour Disease is highly contagious and as far as we know 100% fatal. Admittedly it does depend on some quirks of Devil genetics, but it's not beyond the realms of imagination to think that HeLa could evolve a way to fool the immune human system. After all it used to be a human and that's sure to give it a head start. It's highly contagious, having contaminated virtually every other cell line.

I'm not suggesting that HeLa is going to kill us all any time soon, but as a plot device in a work of fiction? It would pass my suspension of disbelief test.

148:

I occasionally stop reading some books, but I've never really analyzed the reasons beyond "this particular detail breaks my suspenders of disbelief". I have more tolerance in tv series and movies, though I've grown more cranky lately.

The last time I had to stop reading a book was when I read the Three Body Problem. It's description of the CMB measuring was so Wrong I just couldn't read it. (I have personal issues with this, I worked with the Planck satellite for some years way back. Not in the CMB areas, but I had to understand how the thing worked.)
I just thought of one: **Unrealistic Near-Term Manhattanization of American cities.** The wikipedia entry on Manhattanization is [here](#).

Essentially, this imagines that all NIMBYs and land use restrictions have been defeated. Even areas that are sprawling suburbia today with layer upon layer of anti-density restrictions and staunch opposition are now apparently Manhattan 2.0, complete with giant skyscrapers close together, tight streets, and the like. Give me more cyber-punk suburbs and rural areas.

Of course, this is just the US I'm talking about. It doesn't apply to areas that have a better tolerance for density and urban development, and the whole "super-dense, grimy noir city" trope probably would work fantastically if you set it in a major Chinese city.

@dhasenan

What I've always liked about Kim Stanley Robinson's science fiction works is that he tries to do this - tries to show a future that's the product of social change as well as technological and political change. So in the Mars Trilogy, you have the supplanting of traditional corporations with large cooperative style institutions, in 2312 you have the "Mondragon" and the quasi-legal secondary market, and so forth.

To be honest, I'd be suspicious if even a capitalistic market economy looked too similar to what we have now in 200-300 years - same corporate structure, same financial structures, etc. The institutions and rules involved in such economies has changed drastically in that time.

Manual labor. In Star Wars, droids aren't legally people. They're slaves. Why would you employ a human to do any manual labor at all when a droid could do it instead?

I've been thinking about that. Go back and look at all the folks in the Star Wars movies who weren't soldiers, rebels, or government workers (or in the case of Anakin and his mother, slaves). The regular citizens all seem to be in some form of self-employment: Han Solo flies his own ship, Watto owns his own shop, the cantina owner has his own bar, Boba Fett is self-employed, that one guy runs a greasy spoon restaurant in Attack of the Clones, etc.

Maybe there are only biological "employees" in the traditional sense in certain managerial roles plus governmental roles like the military.

---

150:

Well, we've had "terminal phase steered grenades" for roughly 30 years. This is grenades that are not communicating with anything for the steering, mind you. It's programmed with an approximate target IR profile and once it's in the descent part of the ballistic curve, it'll scan and aim for something fitting the profile that it is likely to hit. If you want a name, "Strix"

I suspect the main size limitation for "steered bullet" is going to be the size of the steering surfaces, the electronics should be fairly small. I idly suspect at anyone firing them would be somewhere between "happier" and "much happier" if they're fire-and-forget rather than requiring active control by whoever set it loose.
Actually, another limitation is the mass of the projectile, any active steering will bleed off forward speed every time it activates and since there's no engine, this means you have a limited amount of correction to do, before the delivered energy is not worth the extra precision. The grenade I talked about in the first para doesn't rely on kinetic energy, but an explosive payload. It's also powered by gravity throughout the entire descent.

---

151:

"...good binocular vision."

I haven't read the rest of the thread yet, but I must point out that this one is a real red rag to me. To be sure it did have its uses in school, in terms of providing a spurious "disability" excuse to games masters for my poor performance at ball games which attracted less flak than the real reason which was that I couldn't be arsed with this tedious shit, but that didn't stop me producing a two-page rant in place of the expected two-line answer when it came up in a physics question (to the teacher's approval, as it turned out).

The idea of binocular vision as the be-all and end-all of depth perception is bollocks. I know this very well indeed because I don't have it: I was born with one eye fucked beyond recovery, but my depth perception is just fine. I can catch and throw as well as anyone as long as there is some better motivation than the requirements of some hideously boring sporting activity (a tautology) which I am only participating in under duress. (As is to be expected; the angular resolution of the human eye is too low for binocularity to make any difference at the distances concerned anyway.) Occasionally I have difficulty with the fore-and-aft alignment of small items in close and intricate work and find I am poking something a centimetre or so behind or in front of where I think I am poking it, but even that is a function not of monocularity but of general deterioration in clarity of vision due to age; when I was younger it was not a problem. The only point in which having one eye puts me at a disadvantage is that it buggers my peripheral vision on one side and means I have to move my head to make certain observations when driving when normal people don't. (It does also mean that illusions based purely on binocularity, like 3D movies, don't work, but I don't care about that; I'm not interested, and ordinary movies aren't noticeably not-3D anyway.)

People with two eyes learn the binocular vision fallacy in school and appear to reinforce it by reason of things looking strange if they close one eye. But that is just unfamiliarity: their brains have not adapted to it, whereas mine has, and a brain so adapted doesn't need the extra eye. I'm not saying that binocularity confers no advantage; merely that the overall gain is very, very small, and the post-processing the visual input receives is well able to derive the same information from other cues (I believe there are something like 14 that have been identified).

So any time I see any reference to binocular vision in any context other than totally artificial exploitations like 3D movies, it clashes brutally with the visceral knowledge from a lifetime of experience that the author of the reference is completely wrong, and gets me frothing upon the instant.
Those aren't so much written fiction blunders as Hollywood Movie blunders (rack up the count from "Independence Day" alone and you've covered about two thirds of your list).

Actually the diseases with the highest mortality rate tend to the opposite extreme. Things like Marburg and it's more famous cousin Ebola. Long incubation periods tend to give you lower mortality rates. And even things like HIV which ought to be a good candidate for a 100% mortality rate infection, albeit indirectly, isn't an absolute death sentence without treatment. It's really high, but it's survivable. But, again, a fairly short incubation period, although a long period where you're infected before you die unlike the other two.

There isn't an example of a virus that parasitises a bacterium to cause disease in humans. I can't find one in an animal species although that doesn't mean there isn't one. It's possible for someone competent to set up the story so I'd buy it, but not when the research scientist comes in to say it out of the blue.

I'll stake the on-going arms race that is the immune system against genetic drift thanks. But there are plenty of infectious agents that jump the species barrier, and regard one warm bag of CHONSP and some biological processes as good as any other. They're not specialised to do this, they're just not fussy about their surroundings. There are others that are incredibly fussy and specialised to do this. One of the former, as long as the alien biochemistry isn't too far removed from ours (their physiology maybe, their anatomy and culture as weird as you like) stands a chance.

The Turtledove epic that spawned the ginger trope had one howlingly huge logic hole (in the ginger sub-plot, never mind the rest of the eight book series): Harry seemed to miss the point terrestrial plants produce a shitload of interesting chemicals, including a huge range of alkaloids and weird terpenoids that were evolved as weapons. If your alien invader's biology is close enough to humans that there's a neurotransmitter analog in ginger -- probably a gingerol derivative -- then they're going to be losing soldiers left, right and center to the lethal neurotoxins produced by garlic and pine trees (or similar). And more to the point, when the Lizards tried to colonize Australia their animals and plants seemed to supplant the local biome rather than dying writhing in agony from eating the wrong plant. Ginger-as-addictive-drug was an interesting plot point, but the rest of the picture was missing.

But the future always has planetary governments because we only have the invasion and colonization of the Americas to draw on and we simply mapped countries to planets.
"When I see a planet with just one government I look for the mass graves. It's some kind of natural law or something, world governments grow out of the barrel of a gun." -- Rachel Mansour speaking, in "Iron Sunrise".

(I'll stand by those words today, too.)

156:
I find the use of antimatter outside a laboratory (a rather big laboratory with a collider stashed somewhere) extremely unplausible. How do you generate the quantities needed for applications? And more important, how do you store it?

157:
I read the whole Reality Dysfunction trilogy too. Even though all through the first one the "word" sequester grated over and over again. I suppose my best understanding of it is a sort of Dan Brown cross Neal Stephenson thing, where it might or might not be intelligent but its appeal is in how it panders to the worldview of a target audience. Eg Stephenson seems to feel obliged to always include a parable against altruism.

158:
I suspect the main size limitation for "steered bullet" is going to be the size of the steering surfaces, the electronics should be fairly small.

Nope, you missed out the size of the sensor package doing the guidance. If it relies on an external input -- for example, if it's a beam-rider -- you can make it very small indeed, but if you need to image a target and identify it? That's going to be problematic, especially in low light level or poor ambient conditions (rain, fog). Consider how well a smartphone camera CCD performs in comparison with a DSLR's half-square-inch CCD in twilight with a short exposure time, if you want a metaphor. (Exposure time had better be short, or your steered bullet is going to run into a counter-bullet bullet before it reaches its target.)

159:
Disagree. I have about 60% of a normal person's working retinas (plus myopia, presbyopia, and astigmatism on top) but wasn't born with these defects -- they arrived over time. You might have adapted to having only one eye from birth, but to someone who started out with two working ones, the difference is markedly noticeable.

(I also remember the first time I wore a corrective lens -- when the undiagnosed myopia in one eye only was finally noticed -- and I spent the next day nearly falling over my own feet at all the extra depth-related detail I was seeing around me.)
HIV which ought to be a good candidate for a 100% mortality rate infection, albeit indirectly, isn't an absolute death sentence without treatment. It's really high, but it's survivable.

That's a very dangerous myth and I'd rather you didn't propagate it here, please. Per a survey of the literature, median time from diagnosis to death without anti-retroviral treatment is 6-19 months (source). While there have been documented cases of someone surviving full-blown AIDS without treatment, it's about as common as surviving judicial execution by hanging: it's an extraordinary and noteworthy outcome.

For my money the nightmare scenario would be if some lunatic tried to hybridize an influenza virus with HIV. (They're both RNA viruses, so it's not totally impossible, but I'd rate it as implausible to extremely difficult.) HIV is limited because it's not very contagious, but influenza with a supercharged coat protein mutation engine and HIV's immunosuppressant properties and influenza's contagion level? That'd be a potential end-of-the-world scenario.

It would not surprise me at all if adaptation was less successful the older you are; after all that is true for plenty of other things. But the point is that (under the right conditions) it is certainly possible, and works very well; this shows that binocularity is not required for depth perception if you have a sufficiently capable post-processor for visual input. (Again, not particularly surprising, given how so much of what we "see" is synthetic.) Your monkeyoid does not need to be binocular, it only needs to be highly visually-oriented.

"There isn't an example of a virus that parasitises a bacterium to cause disease in humans."

There are certainly examples of bacteria that do not cause disease in humans unless they have acquired the genetic code for the toxin that causes "their" disease from a virus. I forget which exactly without looking it up, but they are by no means exotic; I'm pretty certain that out of tetanus, cholera and botulism, at least two of the causative toxins are built from the descriptions in "foreign" viral genes.

I wouldn't say I find that a stopper but I certainly agree that it does spoil things. Building things to break quickly and be impossible to fix, like 90s hoovers, is a product of capitalist consumerism; I find it disappointing when an advanced and intelligent species is said to be subject to the same variety of moronic idiocy as present-day humans, and unrealistic when the timescaling makes it
clear that they indulge it on a long-term basis without wrecking their habitat and depleting their resources.

164:

"I can't take the idea that the universe is going to give us anything as cool as "magic" seriously."

To the average person 300 years ago most of the modern world is magic. Telling them it's not magic and all they need is 20 years of using it plus intensive daily education does not make it less so. As for our future, what happens when/if most science and technology is done via (say) genetic algorithms? The end products we can use but almost certainly no Human could ever understand. That's as close to magic as makes no difference.

165:

Another show stopper - big battles, planetary invasions, space warfare - without nukes. Looking at you Star Wars and Star Trek. The remake of Battlestar Galactica at least got that one right to a degree.

166:

I think that the worst thing a book can do to put me off is to fail in consistency. EE "Doc" Smith's "Skylark" series, for instance, is stuffed full of extremely implausible elements, but they all more or less make sense in relation to each other, and so it isn't a problem - until we get to half way through the last book and... what is this he's just pulled straight out of his arse that bears no relation to anything else that has happened anywhere at any time in the series? Witchcraft? Oh, fuck off.

The same series provides an example of how my own ignorance can trip me up. The World Steel organisation struck me as a horribly cartoonish overexaggeration, a thoroughly inept attempt to construct a Really Villainy Villain who is Evil and Nasty and Does Bad Things and is ridiculously over the top - until I found out it was based on US Steel who really did act like that.

Also with EE "Doc" Smith - characters just being plain dumb puts me off, which is why Children of the Lens is my least favourite from the "Lensman" series. In particular, Kinnison going into the Hell-Hole in Space, when he knows it's a suicide mission and won't even do any good, because "Lensmen always go in" - even though he had begun to question that axiom some time ago. (And re. how he gets out, see my first paragraph.)

Things I find bad but not show-stoppingly so:

Things that are just plain wrong. I suppose everyone does this sometimes. Iain Banks is usually very good... but in "Canal Dreams" we have one character burning another one's face off by igniting an oxyacetylene torch off the end of the fag in his mouth. Sorry. No. Doesn't happen. That IB so rarely drops such a bollock makes it stand out even more. Or perhaps a better example would be Tom Clancy getting every single nuke-related thing horribly wrong in the one where the terrorists nuke
the stadium. He says at the end that he did it deliberately, but I'd prefer it if he'd just avoided the
detail altogether, as the silliness completely ruins every scene that involves the nuke.

As far as the FTL / time travel thing goes I actually prefer stories that don't try and be realistic about
relativistic time effects. I think my view is that having FTL at all has basically chucked large chunks
of relativity out of the window (even if it isn't described that way, it still gives that effect), so it isn't
inconsistent for time effects to have gone with it.

Silly names, as others have said: alphabet soup, conventional names mis-spelt, whatever. I don't
really care what a character's name is (or even if they are just "the tall scientist", or something), I
just want it to be a normal word that doesn't smack me in the face by looking weird so my reading
hiccups. Also, dialogue that uses a character's name every time they are addressed. The few people
that do this in real life are pretty irritating; for everyone to do it in every sentence is both a lot more
irritating, and very unrealistic.

167:

The concept that has been bothering me is the super high tech society that is obsessed with
exploring the universe and finding nice real estate specifically and only as "functional biospheres at
the bottom of deep gravity wells" because hey - you have spaceships and wormholes and artificial
gravity and the best use is fighting about planets?

If you can do all that, you can build lovely habitats where you are and never have to waste time or
money on all that gravity well stuff.

168:

This is something I really liked about Piper and Cherryh, actually; they can build habitats as well as
starships, but they can't get the environment completely closed-loop and have to import things to
keep it running. I find that entirely plausible; it's really tough to build a small closed environment
that works.

169:

Re: '.. turn them into superpeople just by activating everything at once.'

Yea ... grand mal seizures on an on-going basis would be just peachy! (Mayo clinic website excerpt:
'Grand mal seizures occur when the electrical activity over the whole surface of the brain becomes
abnormally synchronized.') This is the biologic equivalent of having your army march in step across
a suspension bridge. Not a good idea.

170:
How about manually-aimed guns? Self-guided bullets exist in the lab and will be standard sniper issue within a decade.

In addition to everyone else's objections, self-guided bullets aren't a stable outcome. Once an algorithm is aiming the bullet, then it won't be long before cops insist that bullets be programmed not to target them, and it won't take long after that for organized crime to copy the protection method. Some bright spark is going to market a line of tactical clothing that makes bullet's algorithms neglect you. There's a natural arms race between target identification technology and attack avoidance technology, and the biggest losers are going to be any civilians nearby since they weren't minimizing their detection probability. At that point, there's a real advantage to using bullets that are too dumb to fool.

Aircraft have had over-the-horizon munitions for decades, but policy has been to visually identify targets before firing because the spoofing and counterspoofing makes them too unreliable otherwise (except in an all-out war when visual identification would be suicide).

171:

'... you have spaceships and wormholes and artificial gravity and the best use is fighting about planets?'

Agree ... Never could understand why advanced civilizations would literally opt to destroy resources/wealth via warfare ... it takes resources to destroy resources. Typically, the weapons and ammo are single-use, the manufacturing is single-purpose, the people/infrastructure are wiped out.

And who's supposed to benefit from all this ... who's left over if you keep sending your best, most fit/healthiest, most altruistic and brightest to be slaughtered ... what's left in the gene pool?

172:

Star trek does planetary devastation pretty well, they just don't go there often. The payload on the enterprise was shown to wreck planets. They just have crazy shields on the ships for plot and budget purposes.

173:

"...be Tom Clancy getting every single nuke-related thing horribly wrong..."

Yes. Another plot fail that annoys is when some key element of the plot is just plain wrong. That's why I hate watching those TV shows where the hero escapes by improvising X. Except as I watch it becomes obvious that X cannot possibly work.

Here is one egregious example - igniting a trail of jet fuel in snow, which catches up with airliner taking off and then leaps through the air to blow up the plane. Die Hard:

https://www.youtube.com/watch?v=P0Tr7VUMLs8

Utter shit.
Having integrated the gene originally from a virus into your genome, or requiring a plasmid for toxin expression do not a viral infection make. Please learn some microbiology.

Manhattanization...

Oddly enough, some urban planner are pushing for increased urban density, because it's "more environmentally friendly," in that people who live in apartments tend to walk to work, rather than commuting 20 miles in a car.

So yes, there is a push on for this kind of development.

If you think this is stupid in short pants, I'm kind of with you, because in some ways, suburbs and rural areas are a bit more survivable when a crisis hits: you can collect rainwater, grow a garden (or a subsistence farm) and so forth, if you have space to do it. In a dense city, you're warehoused and praying all the resources you need can reach you.

Where I am, they're doing dense clusters of houses without yards surrounding a mall that has a grocery store, a drugstore, a bank, and random other small business. That few if any of these buildings have solar power, rainwater collection, or so forth has escaped the attention of the largely right-wing builders, for some reason that makes no sense to me.

The problem is that modern rural areas depend on tremendously long commutes, because living on a small farm is difficult these days. We don't have good electric pickup trucks yet, and that's one thing we need for a better rural life.

Even in southern California where I live, the major change that we've made since the 1980s is to build the houses closer together and do a bit better job with stormwater. According to a local planning board member that I talked to about a month ago, the idea that local homes should be built with solar and the ability to collect rainwater was dismissed as dangerously speculative and radical, even though we are in a record-breaking drought. What better base for a noir novel do you need than the kind of small-minded idiocy that this board member exhibited?

I think the tl:dr version of this is that anyone who's aware of the basic insanity that is planning and development right now* can have a lot of fun doing a near future noir scenario, whether you want to "cyber-" it or not, especially in the US.
buildings have solar power, rainwater collection, or so forth has escaped the attention of the largely right-wing builders, for some reason that makes no sense to me.

That's totally inside-out. The way it works in much of Europe (and in Japan, minus the gardens) is that you get a square or triangle of multi-storey apartments with stairwells opening onto the streets outside. The internal area is given over to gardens (US: yards), and the retail stuff is at ground level facing out onto the streets.

(Solar happens, but not here in Scotland because we're stupidly far north: rainwater mostly doesn't happen because we're wetter than Seattle, but it could, which is the point.) By having shops at ground level facing out you ensure that there's lots of daytime pedestrian traffic and maximize housing density in the interior of the city without needing to go more than 3-5 stories up. And by using apartments you get to cut down on heating/insulation bills.

177:

I'm in no way trying to support any of the rest of the nonsense that often goes with the statement - AIDS-associated mortality is crazily high (way over 99%) if untreated and we should treat people, absolutely. But it isn't quite 100% as you said yourself.

Your second comment brings up the other leg of the complaint about 100% killer plagues of course, even bio-weapons so far don't have a 100% infection rate that we know of. I'm not going to take chances with being exposed to HIV, getting infected is just too nasty, but for most behaviours short of needle sharing the risk of infection from exposure is pretty low. I'm not sure what the infection rate rate from exposure to Ebola is, it seems to vary between outbreaks but it's one of the most infectious thins we know and it's below 100% infectious.

My virology is spotty and old, but I'm pretty sure they're different classes of RNA virus which suggests your bio-terrorist might have problems. I do remember HIV has a really mutation rate, it's part of its immune evasion strategy, which might suggest all the hard work to introduce Influenza genes as a virulence factor would be rapidly mutated out. But if they're successful it's certainly a civilisation killer, yes. Although people would survive the infection (naturally immune etc) it could be a small enough number with enough secondary infections to wipe out human life.

178:

Re: 25: 'Since you need fire for basically all technologies that would lead to starflight, an alien that builds ships but can't build a fire is a walking contradiction.'

The only thing that matters is the availability of a reliable and flexible/controllable form of energy. Otherwise, the type of energy is irrelevant. (Electricity in a water environment: a few different fish have evolved this ability independently.)

An interesting description of how electric eels hunt their prey. (Good PS note at the end of the article.)
179:

Yes. The planners love to sing the praises of "mixed use development," and sometimes they even build it.

But yes, you're right: it's possible to build a sensible city. When you throw in US politics and the love of cars, things get, well, weird and stupid.

One of the big contradictions that will play itself out in the 21st Century is that, in the short term, it appears to be environmentally advantageous to pile almost everyone into cities, rather than trying to suburbanize the world.

On the other hand, really dense cities only work if food, water, power, and other resources flow into them. If you want to keep death rates down, it's also good to have the sewage flowing out, although many developing cities routinely ignore this little problem.

If things start to collapse, you want to be as far away from the big cities as you can get. This normally puts you in a place that's suboptimal for a comfortable life (those are where the cities got built), but it might be better than the alternative.

180:

I think, if you look at every bit of materials science, at some point you need to really heat it to either refine it, soften it to shape it, cause reactions, alloy it, change its internal structure, and so forth.

Hard to do that in an aqueous environment. If you don't believe me, try doing underwater ceramics, rather than underwater basketweaving.

181:

That still leaves open the question as to whether an intelligent species could evolve in a water world that could be capable of very advanced biological manipulation to the point where their "super advanced biotechnology" would be fire.

182:

It's not that I think it's stupid, just that I think it's unrealistic on a time frame of the next couple decades. Resistance to density is fierce in most US cities, and especially in the affluent and upper-middle class neighborhoods that have usually managed to downzone everything. That's the quietly spoken factor in gentrification in cities like Chicago and New York City - it's happening in poorer neighborhoods because most of the rich ones have blocked major changes or densification.
183:

It makes sense in Star Wars. They have such capable starships that getting in and out of gravity wells is trivial for them, so why not live planet-side and fight over planets?

There's another advantage to that which only comes up if you're a Star Wars nerd who has read a ton of the outside fluff. Star Wars has planetary-level defensive shield technology that can essentially make planets untouchable from space assault (hence why the Empire built the Death Star, which can punch through those easily). One advantage of using a planet as a base of operations is that if you become pinned down and besieged, you can probably keep yourself alive and sustained off the planet's surface resources until help comes.

@Charlie Stross

That "flu/HIV hybrid" is scary stuff. Even if it was treatable with existing anti-viral drugs (like with HIV), you'd still have mega-death across much of the world because of distribution problems. I assume in that in most rich countries, the drugs necessary would be nationalized so that they could be supplied at extremely low prices to citizens who need them.

184:

Actually, come to think of it, Star Wars warfare as seen in the movies is a rather interesting combo. Starship fleets that can essentially get anywhere in the galaxy in mere hours, without warning - combined with planetary defenses that are nearly impenetrable unless you have a Death Star. There's nothing really like it in the real world, although the tactics in the battles themselves are definitely call-backs to real historical warfare.

185:

Never met any humans then, eh?

186:

Of course you can do underwater ceramics. Clams do it every day.

187:

No, clams do something much cooler involving calcite and proteins. If you don't believe me, try cooking on a clamshell in the oven at high heat. Be very careful with what comes out, as this is a traditional way to make quicklime.

In general, biological systems are optimized for room temperature reactions in an aqueous environment. Things like space travel happen in a vacuum at widely fluctuating temperatures, in the
presence of radiation and such. This is a radically suboptimal environment for living things, and nothing truly lives in a vacuum (tardigrades surviving in a vacuum through anhydrobiosis aren't exactly alive, as their newly-decoded genome seems to show).

Indeed, I'd say that the living ship is another shibboleth that needs to die. If you want to design a living system that handles things like pumping liquid hydrogen around in a rocket motor, go right ahead. It will show you what the problems are.

I'd also point out that the thing that makes humans different from every other species on this planet is both our ability to make fire and our biological need to have it. Unfortunately, this is so obvious that most people reflexively argue against it, saying that whatever it is that makes us special, it has to be something about brains or hands or speech or writing or religion. Just one of those oddities about our species.

188:

The thing that makes humans different from every other species is our need to believe there's a thing that makes us different from every other species.

189:

Sorry, coming in late to the discussion.

I first stumbled into the GURPS Transhuman Space books back in 2009. Was deeply impressed by their extrapolations of technology, politics and culture (particularly Fifth Wave). Later learned that James Cascio was involved in writing the early books, which made sense given his political science background and interest in the intersection of technology and culture.

So circa 2009-2010, I found GTHS to be one of the most believable extrapolations of 21st century "future history", surpassing many dedicated science-fiction books.

Now some 12-13 years after their creation, the GTHS vision still seems one of the "hardest" extrapolations of plausible 21st century history. I've been surprised at how hard it is to find anything else similar as a vision for how the actual 21st century might unfold.

Does anyone recommend any other recent works which paint a "hard sci-fi" vision of the 21st century while taking into account the recent slowdown in Moore's Law, the delays in dealing with climate change, etc?

I've read OGH's Rule 34 (and really appreciated his alternative model for AI portrayed by ATHENA). But other recent 21st century works like Sevoneves assume a global catastrophe. It just seems very hard to find anything which is set 2030, 2050, 2070 in a realistic extrapolation from today barring epic disasters.

190:
Okay, I'll grant that one: The problem is not in the ginger as such, but in the failure to think through the implications in proper Wellsian style.

191:

I read "Years of Rice and Salt" not as an alternate history but as what you might call a counterfactual history: Okay, says your experimental sociologist, let's run the history of the world over again, but delete the region where things like Baconian natural science and fossil-fuel-based industrialization took place, and see what happens in the other regions. Robinson seems to believe that it steam engines when it's steam engine time; the alternative conclusion would be that there is something distinctive about the West and that China, India, the dar al-Islam, and other regions would never get there. That's an interesting question even if the method of removing the West is crude and implausible.

If you think about it, it's surprisingly parallel to the Fermi question about where the other intelligent races are.

192:

Hydroxyapatite and silica are also available. The first is usually strengthened/cushioned by chitosan or proteins, but diatoms turn out pretty pure silica glass.

193:

"I assume in that in most rich countries, the drugs necessary would be nationalized so that they could be supplied at extremely low prices to citizens who need them."

Whuuurruruurh??!?!? A drug that you have to have, because you're guaranteed to die if you don't?

It, and every variant, would be patented, registered, copyrighted, younameited, locked down to the hilt and sold for the most fearful price imaginable. The factory would be more of a fortress than anything else with a private army defending it, tooled up to the balls with the latest kit. Nobody would be allowed out, either, or even to communicate with the outside, to prevent information being extorted out of them etc. There would be what amounted to a war with everyone who didn't have the money. The real army would get involved, either as defenders if they were guaranteed their own supply or as attacking rebels if they weren't. Sheer force of numbers would prevail in the end. Everyone who got away with enough knowledge would set up their own pirate plant. Then the pirate plant operators would be shooting each other up at every opportunity. In fact the best you could hope for would be that nobody would manage to develop the drug in the first place.

194:
If you agree to commit Space Opera, you can either go for really hard science, or commit handwavium.

If you go down the really hard science route, you're not really committing Space Opera, you instantly exclude a chunk of the tropes although you might write hard SF with an operatic overtone that you're happier with and I'll almost certainly buy it.

Down the other branch, one of the key bits of handwavium is how the hell the chorus line and the lead singers move around that hard vacuum so easily. The Expanse novels have a system that allows constant application of acceleration so they burn all the way. Another way is the Star Trek way with some warping of space somehow, so you effectively travel shorter distances.

The latter, applied differently, potentially allows for stealth in many directions, you warp space so all your heat and electronic noise only squirts away from your target. You can't use it in a pitched battle, but to sneak up on a ship or even a group of ships it should be OK. Yes, it's entirely not possible by today's science but nor is bending space in that fashion to move. It's a somewhat plausible use of the handwavium technology. Apply lots of limits to it, like it knackers your top speed etc. but it becomes non-irritating if it's worked in well.

The Expanse stealth tech and hiding mostly worked for me because I cared about the characters and the story. Also, the characters who were trying to hide hid against an asteroid - they practically moored to it - and were convinced stealth technology was impossible. In fact it was: the stealth ship was never said to be completely hidden and undetectable, it had technology on board to spoof typical sensor arrays, and Naomi on a shuttle managed to spot something weird anyway - just not fast enough to usefully warn anyone. But each to their own.

195:

*I find the use of antimatter outside a laboratry (a rather big laboratry with a collider stashed somewhere) extremely unplausible. How do you generate the quantities needed for applications? And more important, how do you store it?* 

Oh, I find it implausible with known techniques too. I just find it considerably more plausible than violating special relativity by FTL-ing around the galaxy. I even enjoy stories littered with physics-violating technomagic or witches-and-cauldrons magic (the Culture setting of Iain M. Banks, Paul Cornell's urban fantasy) if the story is otherwise compelling and if the reality violations have consistent consequences. Violating logical consistency is much worse in a story than violating physical laws.

196:

Seriously - energy not just fire ... all you need to guarantee is that you have/can create an environment where basic chemical reactions can occur. (PVT etc.)

'Hyperbaric welding is the process of welding at elevated pressures, normally underwater.
Hyperbaric welding can either take place wet in the water itself or dry inside a specially constructed positive pressure enclosure and hence a dry environment.'

197:
Yeah, I've met a few humans ... and most have actually been quite nice.

198:

*Indeed, I'd say that the living ship is another shibboleth that needs to die.*

Funny you should mention that.
The discussion here, about building spaceships without fire made me try to think of a form that might work. What I came up with was some sort of aquatic plant, perhaps engineered. Growing enormous pneumatocysts (had to look that up) that float up out of the ocean and through the atmosphere, where once in vacuum it would sprout leaves like a water lily that would act as solar sails. Just having fun with a quick thought, I'm sure you could poke it full of holes (ahem, deflate it).

199:

*It, and every variant, would be patented, registered, copyrighted, younameited, locked down to the hilt and sold for the most fearful price imaginable.*

That's American thinking, market uber alles.
The way it works in India and the developing world? Anywhere with a major epidemic that's being held to ransom by some shitheaded blackmailer with a [patent portfolio] Nationalization without compensation -- at gunpoint if necessary.

Big Pharma's business-as-usual model only works as long as it's not politically destabilizing.

200:

Fascinating thread, tho the diversions into guided bullets are more MilSF than I would want.

Is it not the deal between SF readers and authors that we do suspend belief? I absolutely love Charlies tales of the Laundry, but suspension of disbelief is a given there, surely?

Our good host has suggested, very strongly, that colonisation is impossible. Fair enough, but should we then ignore all fiction that assumes the opposite?

I am not too sure we should, for instance the works of Arthur C Clarke, Isaac Asimov and many other authors would be politically incorrect, or summat.
Sort of related, but maybe tangential. There has been some criticism of Cixin Liu here. Personally I thought that aliens that thought our ability to lie was a reason to exterminate us was, perhaps, one of the great concepts in Science Fiction. I also thought that his exposition of the Fermi Paradox was, at the very least, interesting.

I noted the incredibly faint praise for it in Interzone. The critic waited until the last sentence or so to suggest that we should keep an eye on Chinese Science Fiction. The rest of it was, well, damn with faint praise.

People smoke in the future? How can that even be!

201:

I was going to say something very similar.
Any naturally deep water aquatic life form that has evolved to explore the surface has already cracked the ability to exist in vastly lower pressure environments. Expanding to Space is simply learning to cope with the extreme dessication inherent in the system.

How it actually gets there is trickier, but I could see a multipart symbiotic organism, where one part provides lift, another the structure, another the photosynthetic food source etc.

202:

OK, so it's STL or bust, it seems. Let me pitch something:

In the mid-term future (next 100 years or so) humanity gears up for the first attempt at interstellar colonization. The basic idea is to establish what amounts to a conveyor belt made of space ships running to the target system (someplace close by) and back. In other words forget about single ships- establishing a viable and self-sustaining connection between two stars involves creating and maintaining an entire industrialized transportation process. The ultimate goal would be to extract a resource of some kind- something easier to get over there that isn't over here, but something like 90% of the investment goes into the fleet of ships that's expected to make regular runs back and forth. Lets space them out a year at a time- if it takes 100 years to get there (at say 5% c or so) then obviously that's 200 ships plus whatever is in the loading/unloading/maintenance phase of the process. Each ship is a habitat, designed to haul a cargo of supplies and people, and return with the desired resource.

From the point of view of return on investment to the funders back on Earth, the resources being delivered is the point of the whole thing, but to the people on the ships, it's their home and way of life. Depending upon their life expectancy, entire generations would live most of their lives on one ship (and when they get to their destination, there's no a priori reason to assume that most system residents are living on a planet). So these things will need to be big, comfortable, and self-sustaining for at least 100 years at a go.

The point is that the entire infrastructure for this has to be designed and built all at one go (well, each ship is launched one year apart, but everything else has to be in place), because one little ship
traveling by itself so far from humanity makes little economic sense. So it's the single largest project every undertaken by the human race. Given international rivalry, there might be more than one "line" operating at a time, but not very many (I could see the US/EU, India/Russia, and the Chinese each attempting this independently of each other).

Assuming an average habitat size of 150 people (a number that I carefully pulled out of my butt) that's 30,000 people in transit at any one time, plus whoever is manning the mining operation at the other end (times the number of international alliances involved).

From a narrative point of view it's an epic that involves many competing political factions and individuals each promoting their own agenda within a broadly cooperative framework. The story would include dozens of point of view characters and entire generations of people. Most of the action would take place on the ships, but some of it is on Earth (esp at the beginning) and some in the target stellar system.

The parameters can be played with. The speed of the ships could be faster so that the transit time is shorter, the ship-habs could be larger, etc. I haven't given any thought as to the technical details-which drives and whatnot.

Plausible? Readable?

---

203:

Whuuurrurrururh??!?!? A drug that you have to have, because you're guaranteed to die if you don't?

It, and every variant, would be patented, registered, copyrighted, younameited, locked down to the hilt and sold for the most fearful price imaginable. The factory would be more of a fortress than anything else with a private army defending it, tooled up to the balls with the latest kit. Nobody would be allowed out, either, or even to communicate with the outside, to prevent information being extorted out of them etc. There would be what amounted to a war with everyone who didn't have the money. The real army would get involved, either as defenders if they were guaranteed their own supply or as attacking rebels if they weren't. Sheer force of numbers would prevail in the end. Everyone who got away with enough knowledge would set up their own pirate plant. Then the pirate plant operators would be shooting each other up at every opportunity. In fact the best you could hope for would be that nobody would manage to develop the drug in the first place.

You don't see this in the real world though. What's the most horrible disease humanity has eliminated, smallpox? And we're closing in on polio. In both cases the preventions were indeed supplied at extremely low cost, often as a charitable service with positive externalities for the global public.

In the early years of antibiotics those too amounted to a miracle cure for bacterial infections that were often deadly. Nothing like the quote above happened with penicillin.

More recently with HIV/AIDS, some companies that developed antiretroviral drugs did want their monopolies to be enforced around the world until the original patents expired. But developing countries with large populations needing treatment ignored patents in the name of medical need,
most of even the rich-world public agreed with them, and nobody went to war to try stop it. In the rich world those patents expired as planned just the same as for trivial drugs with much lower value.

I find it extremely irritating in fiction if somebody invents a cure for death/aging in the form of a drug or vaccine, then ends up controlling every significant politician and oligarch in the world with their power over life and death. Or even maintaining their exclusivity for more than a few years. That ignores the history of successful reverse engineering of basically every widespread invention, and it's terrible psychology. A non-negligible fraction of people that you try to control with the death cure are going to try to ruin you instead of submitting, because they're too young for creeping age to really be scary and/or because threatening people (even indirectly) is a great way to make enemies. The psychology might work if you found a planet full of Homo Economicus instead of human beings, I suppose.

204:

Mayhem,

Correct me if I am wrong about this but on Planet Earth, the movement from aquatic to terrestrial habitats was incredibly slow, was it not? We are, perhaps, looking at deep time here?

205:

I have absolutely no idea what commodity would justify that effort. Do you?

206:

The point is that the entire infrastructure for this has to be designed and built all at one go (well, each ship is launched one year apart, but everything else has to be in place), because one little ship traveling by itself so far from humanity makes little economic sense. So it's the single largest project every undertaken by the human race.

I think this could be good if the author thoughtfully depicts the drivers and implications of cooperation on such enormous (compared to present-day politics) scales of geography and time. It would need to be speculative fiction of sociology/psychology/politics as much as of space travel. I have read many space proposals that go something like "if everyone in the USA just gave up pizza for a year and spent the money on space, we could easily have a crewed lunar base." But they don't consider where the persuasion rays came from or what they might be used for other than getting people to build stuff in space.

207:
The problem with that should be obvious. Essentially you have the "god of the gaps" problem. 300 years ago there were holes in physical knowledge you could drive a bus through and hence plenty of scope for "magic" advances.

As the holes get smaller the scope for anything new and really impressive dwindles.

Right now to see something new and interesting you either need a multi GW power supply and a particle accelerator or you are waiting years to count individual events from processes so weakly coupled to things we can effect that they may as well not be there.

I fully expect there to be interesting things to be found. I do not expect them to be particularly useful.

Quantum computers will be nice of course, and fusion will be good in a "better fission" kind of a way but they aren't huge game changers. We have most of the good stuff now.

208:

Chris:

_Does anyone recommend any other recent works which paint a "hard sci-fi" vision of the 21st century while taking into account the recent slowdown in Moore's Law, the delays in dealing with climate change, etc?_ 

The best example I can think of is half a book: the parts of William Gibson's _The Peripheral_ that deal with the near-ish future. You have to do quite a bit of work to figure out the background situation, though; Gibson is not one for pages and pages of world-building description. A phrase here, a fragment of dialogue there: you have to sift the clues and figure it out for yourself.

Linda Nagata's _The Red: First Light_ is also good in this respect. Quite a plausible alt-future.

209:

The "Engines of Light" space travel system converted the ships into light particles that travelled exactly at c until, by a Handwavium-powered process they were converted back into solid objects.

In the frame of the passengers it was instantaneous travel from system to system. At the end of the story refinements to navigation meant they could convert back to being a solid object a lot closer to the target planet (as in, a few centimetres above the landing pad). I don't recall if Ken mentioned the Earth-shattering kaboom! involved with either the displacement of the air to make way for the hull or the matter-to-energy conversion of the atmosphere trapped during the re-emergence.

210:

There's a story which involves First Contact being via a TV signal where the aliens are acting out skits from the Disney TV kids shows of the 1950s and 60s.
"We have most of the good stuff now."

I just don't believe that. For example, one HUGE area of ignorance is why the laws of physics are what they are. Whether they are immutable under all conditions is also not known.

It's not really about pressure, it's about circulation of stuff.

With plants, to answer James Padraic's question, the problem is that they have an open circulatory system. Liquids move through the xylem because they get sucked in the roots and traspired out the shoots. With phloem there is active translocation, but it's cell to cell translocation, not through vessels as in animals.

There's a simple way to make a plant resistant to space: put it in a space-proof greenhouse, and we do that already. Engineering a plant that's resistant to space is a lot harder, because you've got to figure out a mechanism for it to get nutrients in through its roots (which are, perhaps, interfaced with the lunar regolith, and probably therefore in vacuum as well, so most of the chemistry that plant roots use--which involves liquid water--won't work very well), then you have to actively circulate those nutrients to the leaves for photosynthesis (so this plant now has a closed circulatory system with a heart or similar pump), and so forth.

Note that this all takes energy. The advantage plants have with their system is that they've minimized their energy requirements, so that they can grow more (by using the carbohydrates to build tissue rather than power circulation). A plant with a closed circulatory system has a much higher metabolism, because it has to pump all that stuff around, and that cuts way back on the advantage that the plant has. If you look at Earth, there are some (secondarily) photosynthetic animals, including corals, some jellyfish, and a couple of sea slugs. They're all relatively small. I suspect you're not going to see the equivalent of a photosynthetic whale, ever.

As for any life form, we're not sealed in. A deep sea life form may have "solved the pressure change problem" (and many do: there's a big vertical migration in the ocean every night), but they haven't solved the problem of respiring and osmoregulating outside of water, any more than terrestrial species have figured out how to survive a vacuum without anhydrobiosis (which has its own issues).

If you want something like Scalzi's Gamerans, a life form that can live in vacuum, you've got to:
--Make it meteor proof, since it can't react fast enough to avoid getting hit (this argues for minimizing surface area and making that surface very tough and/or thick)
--Make it very metabolically efficient
--If you want it to photosynthesize, you've simultaneously got to maximize its surface area for light exposure,
--and last and probably least, you've got to solve the pressure differential problem between inside and outside in a way that allows it to move its joints.

Of these, I'd say the contradiction between the solar panels and protecting the body is the biggest problem. You can see this design in modern space craft and satellites, where silicon solar panels are
big and fragile, while the life support area is as small and tough as they can make it. Making the solar panels out of living tissue really isn't a great option, if you look at it that way, but the other choice is to photosynthesize off the integument of the main body, which drastically limits the amount of energy the organism has to play with.

Hope this helps explain why I'm no longer bullish on living spaceships. I've actually played with the idea for years, and I finally decided that a greenhouse in space was about as close as we could realistically get it.

213:

Technology: "Hey, there's a cache of alien tech thats been lying dormant for hundreds/thousands/millions of years and...[pushes button]...works just fine."

Never used a Model M keyboard, huh?

214:

"...while taking into account the recent slowdown in Moore's Law..."

Slowed, but far from over. Even using relatively conventional technology we still have decades left. For example, currently we are at the 12nm node for cutting edge stuff. Recently IBM demonstrated a proof of principle device at the 1.8nm node and expressed the belief it could go beyond this to sub nm features.

http://www.eetasia.com/ART_8800716190_480200_NT_84758f25.HTM

That is without other tech such as wafer scale integration of chip stacking.

215:

"Technology: "Hey, there's a cache of alien tech thats been lying dormant for hundreds/thousands/millions of years and...[pushes button]...works just fine.""

Any reason why it shouldn't if it has been stored at ambient 2K7?

216:

Well yes, but we're talking living ships, so I'm not seeing that happen any time fast. They might evolve from living in a surface layer of a gas giant too (spitballing hypothetical environments where a deep pressure creature could appear). One of them could say crash onto an aquatic world and find as comfortable an environment as possible in an abyssal chasm. Hmm, is that the plot of The Abyss? I've never seen it.

I'm pretty sure a living ship would be a composite communal organism though - akin to say a man-o-war jellyfish. One part would provide food, another structure or shelter, another defence, and they would be have to be relatively small organisms so that any damaged parts could be relatively easily
replaced. If several parts fed off different types of radiation, you'd have the ability to protect the inner core environment.

Why they would ever want to produce an oxygen environment is left as an exercise for the writer ;)

217:

Hmm, that certainly makes sense. Shame, really.

As an aside, what do you think of Baxter's Spline ships?

218:

Re the OP:

Making up words (nouns, adjectives, verbs) and speech structures gratuitously and without any internal consistency. The Merchant Princes series is an example of how to do it right: alt-Low German. Collectively the words and syntax make sense as a language. But mostly I'd say if you're not a linguist by training, don't go there.

Blood magic: these days I can't read any book where the protagonist is special by birth. Extra demerit points for having her/him start in a "lowly station in life".

Masochnism: Friends who continue helping and supporting the main character out of the goodness of their hearts, despite the MC being a total narcissist who alternately ignores and manipulates them, and repeatedly leaves them to clean up the messes he/she creates.

219:

I haven't read those stories, but as disbelief suspenders, they sound just fine, as does flying the Millennium Falcon.

One thing I would like to stress is that just sometimes, science enables stories, rather than pooping on the party. Many shibboleths are basically there to make a story more palatable to its target audience, and reality is generally a lot weirder. I keep hoping that more writers will opt for the weirder route and try to make their science harder, rather than simply swiping oceanic metaphors and talking about living starships as, say, space nautiluses or space whales or some such, and having living astronauts as photosynthesizing space-turtle men.

Speaking of which, I've thought about space turtle-people as much as Scalzi did, and perhaps rather more, considering what he attempted to do with their metabolism (IIRC, he plumbed the gamerans backwards). They are one case where having a spot for a large, positronic battery to make up for the lack of photosynthesis would have worked out pretty well (life tends to run off gradients of hydrogen ions, rather than gradients of electrons, so if you want space life based on Earthly patterns, something like the old shibboleth of the positronic battery actually makes a little bit of sense). It might sound rather silly to have space-turtle man shove a large positronic battery up his
arse to take a long jaunt in space, but turtle do some weird things with their butts, so it's not as silly as painting space-turtle man green and calling him photosynthetic.

220:

Give me the Anti-shibboleths the tropes done so well that actually the shibboleth's become irrelevant or even better slyly undermined. As long as the rest of the story is well crafted who cares?

Hedging an author with too many rules is only beneficial if they can think of innovative ways around it. Nobody wants to read a book where the author has rules-lawyered all the fun out of it. Also subgenre lawyering is bad m'kay write on a spectrum not in a bucket.

221:

Most authors have do you want fries with this degrees. They don't know anything about science. Most SF fans seem to prefer NON believable SF. Its more exciting then the way science actual works.

Can someone post links of sites to find lists of books that have solid science in them?

I get pet peeves on the Fantasy side. I will suspend disbelief, but it bugs me with how wealthy people are in pre-industrial agricultural societies. In these societies at best a fraction of the 1% are wealthy and they get wealthy exploiting every one else. I always wonder when fantasy books have defined magic systems why the hell the magicians don't use their magic to make money? Make crops grow fast and better, set up a trading empire to sell your superior products.

Fantasy stories where most people are relatively clean. A homeless person would have good hygiene for these worlds. Then you have world where there monsters everywhere and I think, there is no way human civilization could exist with all of these marauding monsters.

222:

On the Years of Rice and Salt... 90% of the native americans were wiped out by european diseases. They lived in far less dense communities and were spread out more in smaller bands. Though they didn't have any defenses.

Here is a video that discusses why we had a plague in North America that killed 90% of the population and we didn't get a plague going back to Europe.

https://www.youtube.com/watch?v=JEYh5WACqEk

Below I posted a link to a course on the middle ages where the processor says e thinks 1/2 of the European population died from the Black Plague. He said that the 1/3 number is just a number people have been saying for so long no one remembers who came up with it. He also says he thinks taht 70%+ of many mediteranean cities died of the black plague. Going to 99.9% is unrealistically
high. 90% may not have been out of the ballpark if the disease incubated a little longer. That may not have left enough people left in Europe for technology to advance.

BTW, if you are in the US, check your local library. They market to libraries. They may have these. They are very good.

http://www.thegreatcourses.com/courses/late-middle-ages.html

223:

"Then you have world where there monsters everywhere and I think, there is no way human civilization could exist with all of these marauding monsters."

Try being a chimp in Africa. The answer is that we became the marauding monsters.

224:

"Technology: "Hey, there's a cache of alien tech thats been lying dormant for hundreds/thousands/millions of years and...[pushes button]...works just fine.""

Any reason why it shouldn't if it has been stored at ambient 2K7?

I don't know about hundreds, but for tens of thousands of years and up, you have:-


225:

It was exactly that particular shitheaded blackmailer that I was thinking of when I wrote it :)

I suppose it does come down to the situation; but the mere postulation of such a disease had me thinking in terms of what would happen in some form of dystopia, rather than in the world as we currently know it.

226:

I think we brought this up some time ago, but one untapped story is the alt-history idea that all those pre-Columbian voyages from the Old World to the New World actually happened. You know, the egyptians, phoenicians, Romans, Mongols, Basques, Irish, etc. While none of these expeditions actually made colonies, they were sufficient to transfer some basic livestock (pigs, goats, horses) and a whole bundle of epidemic diseases to the New World, centuries before Columbus got there.
When the Europeans got serious about colonizing the New World, they found a rather different place waiting for them, and colonization went very differently than it did in our world.

227:

A few people have mentioned it in specific form, but the generalised case is: Any mention of a specialised area of knowledge that the reader is a specialist/familiar with.

It never works. I'm yet to read or view an account of diving or living at pressure that's not absurdly wrong. I'm even including a story that was written by my cave diving instructor and made into a movie. There was an SF by a major author that had a plot device where the surface pressure on the planet was higher than earth normal. It's something that's bound to be common, but rarely ever explored, so kudos to them for trying to use that. However they got every single consequence of that so scrambled that it was unreadable. I doubt it would have bothered anyone else in the slightest.

228:

Feel free to have faith. I find scepticism tends to be more useful.

Talking of faith, have you tried that quantum suicide thing you keep posting links to? Thought not :)

229:

And I would add to that: stability and social evolution on board the ships themselves. It seems to me a very big assumption that the ideals, motivations, customs, religion, and so on, of a society that has spent several entire generations in total isolation in what is effectively a high-class prison, would retain more than the most minimal degree of compatibility with the ideals under which the mission was conceived. I think an awful lot of the ships would never arrive or else arrive in an uncooperative mood, having decided to change course and do something else, or had one or some of the crew go mental and sabotage the ship, or develop some wacky religious belief in service of which they do unscheduled things... Even without such a catastrophe it would be hard to maintain stability. What of education? The ship may be sent off with a highly intelligent and well-educated crew, but several generations down the line the distribution of intelligence and of scientific aptitude may well have reverted to that typical of the species as a whole.

Come to that, even "normal" societies change hugely over the kind of timescales involved, so the problem is planetside as well as shipboard. How is the controllers' interest in the mission maintained through all this? Does mission control even survive? Do opinions of whether it is a good or a bad idea change for the worse and cause it to be abandoned by its instigators' descendants? And so on...

230:
I know just what you mean - the sort of book that has you screaming "no, no, no!!" at it every other paragraph. But it does sometimes work, and when it does it's a delight. Lieutenant Blouse inventing double-pumping and RLL encoding off the top of his head, for example; he doesn't call them that, of course, and he doesn't even describe them fully, but it is very clear what he is talking about and the recognition brought a big grin to my face when I read it.

231:

Personally, I like looking at generation ships and space colonies through the lens of Polynesian (and to a lesser extent, Micronesian) history, as these are the closest analogs we're likely to get.

It doesn't have to be a high class prison, but things can get very interesting in a wide variety of ways.

232:

Actually Orson Scott Card taps that somewhat with Pastwatch - his one way time travel goes back and forces a more balanced form of first contact with the continent, thereby ensuring a utopian future free of the environmental collapse from our time line, and the slavery devastation of the time line where the Aztecs conquered Europe. It's one of the better books involving time travel, and much better than most of his others.

Going back to Years of Rice and Salt, I think what bugged me so much was that I'd read it before from of all people Piers Anthony. Still, KSR did it much better.

233:

There's also the alt-history SF/Carlos Castaneda mashup by Thomas Harlan (I think the series has died, but it was "In the Time of the Sixth Sun") that started with the Japanese finding the Aztecs, the two cultures fusing, taking over the world, going into space, an asteroid strike happening at some point, and then things got weird. He got three books out of the idea anyway.

234:

Hmmm. Just to throw it out there, my disbelief suspension also factors in how much I'm enjoying the book: for example I find references to 3d printing really annoying, but if the story carries it (Rule 34!), I can let it go. I've just read "long way to an angry planet" by Becky Chambers. It's got rocks hitting the hull of a ship in the first couple of chapters and it kinda ends boringly, but I really enjoyed reading most of it. Actually that's my main bugbear; people who can't nail endings: great start, great middle, but the ending goes sideways and blurrmmnmsnms into forgettableness.

235:
"Most authors have do you want fries with this degrees. They don't know anything about science."

Or they don't care.

There is, in this thread, a lot of presumption that using bad science means you don't understand the science, which in turns is based on the fact that many people seem to care about the science FIRST. But if you care about story first, then the presumption that any bad science in a story doesn't follow.

I, as a specific for instance, have a pretty good knowledge of guns. I will nevertheless fudge the capabilities or limitations as I like to make the story more fun.

There are, I'm sure, gun bunnies that this drives insane and presume I don't know anything about guns because they value technical fidelity first and I don't.

---

236:

And yet as a species we are capable of being as nonsensical and self destructive, which is why the things you originally mentioned are plausible. We do that stuff NOW.

Or to jump back to the question posed by the person you were responding to "Why fight over planets when you can have habitats in space"

I can think of several behavioral reasons to just that. People (collectively, especially) are not perfectly rational actors. Our tendency to horde and our status seeking alone will justify all sort of things, narratively speaking.

---

237:

Most authors have do you want fries with this degrees. They don't know anything about science. Most SF fans seem to prefer NON believable SF. Its more exciting then the way science actual works.

To refute I direct you to Dr Travis S Taylor who has more degrees than I'd want, a solid background in astrophysics, and who honestly couldn't write a character I can relate to if I stood over his shoulder and instructed.

He does base everything in solid science at the time, though he also suffers from OGH's issue of whatever cool thing he discovers being rendered obsolete between writing and print.

His right wing redneck rocketeer persona is wildly popular amongst the Baen faithful though.

---

238:

@Matt/Pigeon/Heteromeles: The most plausible driver I can think of is alien contact. If an alien showed up, explained that there was an entire trading network out there, and we could link up with it if we just made the effort (and underwrote the cost of building the link) I think you would see a race to get there first. The aliens may or may not be playing us, but that doesn't matter insofar as our motivation is concerned.
The effect on human society would be incalculable. The entire planet would be forced into close cooperation even as every political, economic, and ideological faction would strain to gain an advantage over its rivals. There would have to be a lot of institutional and organizational consolidation—hundreds of nation-states and thousands of multi-national corporations would be too complex and disorganized to pull this off. Yet human tribalism wouldn’t disappear—just take new forms. The aliens, of course, would understand none of this—a lot of mistakes will be made. There could be a war.

As for what motivates the people to go—they would have to be the type that “wants” to live in a small, self-contained technologically advanced village for the rest of their lives. There won’t be any shortage of volunteers. Nor will they be entirely isolated during their trip—once the first ships get going, some enterprising groups could easily set up some shuttles that travel between the ships—they are 1/20th of a light year apart, so traveling between them, while not trivial, wouldn’t be impossible. Flight time in some number of months I would imagine. And there won’t be any shortage of things to do—the ships will be leaking and breaking down continuously, so repairing them from the inside is a mandatory occupation. Upon arrival, no one is forced to leave. But if they want to re-stock or upgrade their home, they need to sell off the cargo. So the incentives to remain “on-mission” are pretty strong. The interesting question is how long they would maintain their Earth-based national identities. Maybe for one round-trip, but after that?

Once launched, a ship is on its own, and doesn’t need any further direct support from Earth. But over the long term sustaining this lifestyle depends upon maintaining the trade route—everyone is a small part of a larger system that can only continue to function if everyone fulfills their role. It’s pretty robust—X% of losses can be absorbed over the long term—there’s another ship every year after all. But that robustness itself depends on everyone doing their best in a highly interconnected yet decentralized institutional context. That’s probably the most radical change in so far as human culture is concerned—we’re used to having a clear “someone in charge” for something on this scale, but here that isn’t possible. Even on Earth the timeframe is so long that over-dependence on any one agency to oversee the whole thing is going to fail. It’s going to have to be deliberately designed to function independently of the specific actors involved at any one point. I don’t think that’s ever been done before.

239:

Oh that is a lovely idea. Does anyone know if it’s been done? I would be enormously interested in reading something along those lines, even if it were just an essay or thought experiment.

240:

Ships going up and down gravity wells like it was about as hard as the commute to work. If you don’t have implausible tech, it absolutely will be a big deal to get up to orbital speed. And the two obvious imaginary technologies that could achieve it, gravity blocking (float up, no need to orbit) or easy access to enormous amounts of energy, are both also, not coincidentally, doomsday weapons. Point a gravity blocker down: volcano in the location of your choice. Turn up the power, and the
planet fizzes into a splat like somebody took away the bottle from around the cola. And anything that can casually blast a spaceship to orbit can do the same with an occupied city.

241:

Agreed. I'd even come up with an even nastier scenario which did not require an interstellar trading network out there to motivate human butts off the planet. Whether I'll actually publish anything based on this idea remains up in the air.

My frustration is probably more with the publishing world, in that we tend to see the same damn books over and over and over and over and over again. It's perfectly understandable, but it's really frustrating, especially when, as now (with the Paris climate talks on), many of us are praying that the world will change radically and for the better.

One reason to hammer mercilessly on the humanities students who write, edit, and publish clueless SFF is that there's a lot of cool science out there that can make their books new and different. These ignoramuses ignore all the possibilities and rewrite the same hackneyed stories again, for an aging and diminishing audience, and brag about how new and cool it is. It's not.

That pisses me off, not that I'm part of the industry or have much to do with it. It's this lack of curiosity that is so frustrating to read.

One of the subtexts of Hot Earth Dreams is that there's a full four hundred thousand years out there of future totally unclaimed, for writers to play in. Actually, there's millions of years. You want an Earth with monsters that are well-adapted to dealing with humans? Set a story ten million years from now. I guarantee that whatever's living then will be really good at dealing with us, and in the book, I provided a really good rationale for why recognizable humans will likely still be around then, and a bunch of ideas for how to build said world. And that world will lack fossil fuels, so you can set your medievaloid fantasy there quite easily. You can even have knights riding smeerps if you want.

Do I expect most SFF writers to play in that area? Of course not. All that means is that whoever is crazy enough to try it might end up with a monster best seller that redefines the field and leaves everyone else plagiarizing furiously.

That's the ultimate problem with shibboleths. They're safe. They're clueless. They don't express real possibilities, they just ring another change on what somebody else already did. Yes, I understand that most people don't want to take risks, they just want to have a decent life with a family, but still. Who reads science fiction any more? Do I really need to see another smeerp-gun fight between asteroid miners and mercenaries in another dingy spaceport bar? Where's the wonder in that?

242:

Shibboleths:
Failure to understand orbital mechanics. If you are traveling from planet A to planet B, you
generally can't stop at gas station C in between. (Barring huge energy reserves and massive acceleration).

Putting a max speed on your spaceship.

Getting free fall wrong. If your spaceship is thrusting, you aren't in free fall in the cargo hold.

People breaking their internal code of honor without struggle, comment, or remorse.

---

243:

I read one SF novel which was otherwise quite well written where alcohol was strongly restricted by the ruling powers Because Reasons, and there was never a hint that people were making their own. Prisoners on death row make their own alcohol, people! The instructions for this are somewhere on our junk DNA. I didn't hurl the book, but that was a big thing for me to get over.

---

244:

I like imperialism, i think is normal, what i don't like is Republics, but what i dislike more is like most of them in SciFi are United Earth, United Federation, United Colonies, or something like that, is like everyone of them is the United States of Space, everyone be welcome, human, black, white, yellow, red, or octopus, we will fight for freedom and liberty because we are space yankees.

---

245:

I think "The instructions for this are somewhere on our junk DNA." is going a bit far with regard to alcohol. There was little or no alcohol in North America before Europeans introduced it. I think there was some alcohol in Central America and Peru, but I don't think it had the cultural importance that beer (the fuel that built the pyramids!) and wine did on the other side of the Atlantic. Or that sake/rice wine did on the other side of the Pacific, for that matter.

Semi-related: on practically the first page of Alliete de Bodard's Obisidan and Blood Trilogy, her Aztec hero has milk in his morning chocolate. I shrugged and said "Oh well, the author is French" but it did pull me out of the story a bit.

---

246:

For a reader, a higher level of expertise in a subject will likely result in a lower threshold of disbelief suspension. If you know more about a subject, it's harder to ignore the stuff that doesn't fit your knowledge base.

Biology issues tend to hit me - I've got an extensive background there, so aspects that run counter to known data are annoying. Case in point - inheriting resistance to an infectious agent where the primary means of resistance is antibody-based. Antibody diversity is generated in somatic cells via
random recombination events in the precursor cells. Thus, someone who happens to have an
effective antibody against a devastating plague will not be able to pass on that resistance, as the
germs cells are segregated well prior to the somatic rearrangements leading to antibody formation.
Even if the resistance is due to a mechanism other than antibodies (and related processes), if the
resistance could arise from mutations in multiple genes then inheritance patterns for multi-locus
traits are going to mean that there's going to be lots of inviable combinations in the generations
following from the resistant individuals. Stephen King's 'The Stand' was problematic this way....

247:

I'm late for this discussion. I won't repeat some of the mentions. I'll add my own, and add alt-history
to this.

The first has to do with demographics. I have amateur interest in demographics, which is a
relatively young science. However, one trend is clear in our world/time line: industrialization causes
a huge demographic spike followed by a birth rate drop off. So far, I've found SF books limited to
the colonization of the solar system the most realistic as they inadvertently acknowledge the
demographic limitations of our society.

As for the previous discussion about fire underwater - don't forget volcanoes. For electricity, don't
forget hydroelectric power.

248:

I give a huge pass to writers writing about FTL and ignoring social change. FTL is impossible
according to (currently understood) physics, so its inclusion is inconsistent.

Social change is too unpredictable to guess for two reasons. Most trends have been predicted only
by first-order backfitting. Urbanization came completely out of left field to the people at the
beginning of the Industrial Revolution. I doubt many people predicting the effects of the Industrial
revolution would have predicted our urbanization rates.

The second reason is that most people who try to predict social change try to make "logically
optimized" social changes. However, social change comes through compromise, resulting in very
convoluted logic. An extreme example would be western society's treatment of female vs male rape
victims in the 1990s and 2000s. It is too easy to forget that any social change is bound to be
hypocritical, and thus too unrealistic.

249:

Kind of. There's an old de Camp story from the 1930s called the Wheels of If. A New York City
politician gets his mind transferred to an alternate universe where Celtic rather than Roman
Christianity converted Britain and the Scandinavian countries. The resulting society started
exploring and settling the Americas around 1000 AD so while they established settlements and eventually independent nations, the Native Americans were able to play catch up and by the 1930s had their own industrial age nation states.

decamp wrote before it was generally known how devastating European diseases had been and I suspect there's other dated details I'm missing but the end product is a North America that includes industrialized Native American states.

---

250:

The problem is it doesn't make any sense. Imperialism is basically a scaled up protection racket - you smack around the locals and make them cough up wealth and make your profit off of that.

The problem is that technology has made a lot of this impractical. In ancient times barbarians or certain civilized cultures might have tough enough lifestyles that they were more effective fighters and could run protection rackets on their neighbors. Where this breaks down is when technology comes along - having a modern army is much more important than having hardy warriors. Gibbons pointed out back in the 18th century that you needed a modern army to beat a modern army and you needed a modern society to have that modern army. Barbarian hordes, R.I.P. In modern wars your more martial societies tend to lose (e.g., US Civil War or World War II.)

Even back in the 1950s science fiction writers realized traditional imperialism didn't make sense - see for example Poul Anderson. You could come up with scenarios where raiding other planets made a kind of sense (e.g., Space Viking) but the set ups always implied the situation was transitional. Modern imperialism tends to be about either security (Country X is causing us trouble) or getting control of some kind of unobtainium. The Honorverse scenario doesn't make much sense. The Republic of Haven has to have an advanced industrial base to build their vast fleets. They can't attack low tech societies because low tech societies are too poor to be worth looting. So they're attacking opponents who can fight back and paying all the cost of the wars plus transportation just to get their loot. And they have an economy carrying a lot of dead weight. Wouldn't it be a lot easier to just switch the military budget to welfare? Or use your stormtroopers to smack around the welfare recipients? Jerry Pournelle would. Hell, some neocons complain entitlements keep the West from spending more on the military.

Personally I'd like to see a story where the Empire exists to give the ruling class something to do rather than any practical reason. That arguably describes the British Empire in the 20th Century and the US invasion of Iraq.

---

251:

On, remembered another, not limited to SF:

Heroic limited omniscience justifies evil. Somehow, our square-jawed hero knows that his one suspect knows where the evil macguffin is, so he tortures said villain, and gets to save the city while looking smug.
Someday, I want to read a story where our hero tortures a busload of people, gets 27 leads, and then races around town only to find that all of them are wrong...

252:

I viewed Anathem's "Smeerps" as a sort of roman a clef for concepts and ideas. But the reason everything has been smeerped becomes clear when the plot resolves towards the end.

Not that I cared for that resolution much. I did enjoy the ride leading up to it, though.

My shibboleths have already been mentioned: Lord Nelson in space, an interstellar empire based on trading anything other than information (unless you have a good reason why it's cheaper to transport something between stars systems than it would be to just break up a few local asteroids for raw materials). At which time: what makes it an empire? Intellectual property laws?

253:

At which time: what makes it an empire? Intellectual property laws?

Piper had a good answer for this.

Starships.

Starships are very, very dangerous because they involve really scary amounts of energy. An appreciable mass at NAFAL speeds involves enough energy to re-melt the crust of a terrestrial planet and re-enact the Hadean. Or there are Nicoll-Dyson lasers. Or a gate drive that conserves momentum and can be applied to Kuiper-Belt objects. Or, well, take your pick.

The Empire exists to control and regulate the starships so no one can go around going "nice plant you have there" with them.

254:

That Mediterranean figures match what I've read about other cities that got hit by the Plague. IIRC the German cities and towns that got hit by it lost between 60-80% of their population too.

@Heteromeles

It's a great idea. I'm imagining a huge empire - China-esque in size and population - springing up in the drainage basin of the Mississippi River and other rivers in the southeastern US. An empire built around maize, beans, and squash instead of wheat and rice, but pretty damn impressive.

The tricky part is that they'd still be starting on these things much later than in Europe. They might still be behind in various technologies ranging from wheeled transportation to iron-weapon-making. But with the disease resistance and what they have, they'd certainly be resistant to mass colonization - it'd be more like Europe dealing with China before the 19th century.
I've always thought medical immortality might be a good impetus for greater off-world colonization in a SF setting (as well as further population growth, at least for a while, past the Demographic Transition). It doesn't seem at all implausible to me that the elites on Earth might encourage the younger generations to migrate off-world to deflect calls for fundamental political and economic reform on Earth that might require them to surrender power - assuming the capabilities for off-world colonization are available.

@dm

At which time: what makes it an empire? Intellectual property laws?

It could be a change in what determines status, from your material wealth to how many people you have in your service and loyalty. Nobody cares that you have $10 billion space bucks - they care that you can mobilize 10 million soldiers and control a world of 5 billion people.

There might be historical precedent for that. The book 1493 about the Columbian Exchange mentioned off-handedly that a number of the west African societies that sold slaves to European slave traders had a thing where your status was determined by your number of warriors and number of slaves.

Parallel case - in a discussion on radio recently...

The Human Genome originally took something like 10 years to sequence & cost $_billions, but now a single person's genome can be sequenced in a couple of days, for approx $1000.

Um

This is the exact same argument that was posited approx 1890-1905. Don't believe you.

Numbers for "The Death" in England are pretty good, because of the record-keeping in this country. It varied.

Some places, it was as low as 20%, average was between 33-40%, some places it went to 60%, some villages were completely abandoned, with the few remaining living moving to somewhere else.

And that is where the "one-third" number comes from....
But the reason everything has been smeerped becomes clear when the plot resolves towards the end.
Oh, does it?
But, why should I bother wading through approx 1000 pages of compete trash to get that far?
Stop wasting my time & everyone else's, actually ( Not you, Stephenson, that is. )

260:
By way of making a little extra money when I'm not writing books, I sometimes read and critique books by unpublished novelists by way of explaining to them what they're doing wrong or right. In almost every case that I've critiqued a work of space opera or science fiction, there's a chase through an asteroid field - with lots of asteroids bumping and crashing into each other.

I used to say that Star Wars has a lot to answer for, but in reality the problem is writers who mistake rematching that movie for "research". Those are unpublished writers, however, rather than the pro's you're talking about here.

I sometimes feel a touch overwhelmed by the depth of your knowledge, Charlie. I didn't really know enough about H3 to know it was a shibboleth, but I'll certainly remember it now. God knows I'm sure I've produced some howlers in my time.

You know, I do wonder if there's room in your undoubtedly busy schedule for a how-to book concerning realistic science in writing. I'd certainly read it.

261:
I haven't done much empirical research but my gut feel is that there is a strong BSc bias in SciFi and Fantasy authors.

then factor in authors like CJ Cherryh who despite/because of? 2 classics degrees was writing some of the most plausible relativistic space warfare, (Downbelow Station, Hellburner) and most Alien aliens (even the play to the crowd cat aliens) when half the current generation of Authors were still in nappies.

I'd personally say its not a big shibboleth generating factor.

262:
Wrong. The claim back then was that new physics would be found in the fifth decimal place. And that's pretty much where it was.

Fortunately it has low energy side effects that can be exploited.

My claim is slightly different, that if there is new fundamental physics then exploiting it will be too difficult for it to be useful.
Even if Dirk is right and you can muck around with the laws of nature to create new forms of matter and energy that would revolutionise the world it doesn't actually help if you need to go all the way to the Planck scale to access it. The old GUT scale is a bit closer but it's pretty much discredited these days.

Same thing with black holes. Even if all the cool things people like to think are possible with black holes are true it doesn't help if we don't have one.

263:

"Radiation embrittlement (at 2K7, it's in space). Crystal growth (tin "whiskers" and the like). Migration, decolloidisation and decomposition of lubricants. De-alloying. Migration of ions in, for example, solid-state semiconductors. Fractures from residual stress. (At 2K7, nearly everything is brittle.) Nuclear decay of quasi-stable isotopes."

Easy. Put the cache in a small iron shell. A few hundred metres of iron is easily good enough. And a label saying "warm to 300K before use". All the rest are solved problems, or non problems at 2K7

264:

"Ships going up and down gravity wells like it was about as hard as the commute to work. If you don't have implausible tech"

Not really. I can quite imagine a plausible technology based on Plasma Focus Fusion. It's an ideal concept for use in rocket form.

265:

--Make it meteor proof, since it can't react fast enough to avoid getting hit (this argues for minimizing surface area and making that surface very tough and/or thick)

Not practical, period: we're not talking "thick skin" here, we're talking about impacts with objects travelling an order of magnitude faster than an armour penetrating anti-tank round. You might as well call for a species of tree that has evolved to be volcano proof because trees can't dodge erupting volcanoes.

Mind you, John Varley took a very good shot at the envelope of the problem in his Eight Worlds stories, notably "Gotta Sing, Gotta Dance" with the Symbs (symbiotic bioengineered space suits used by a culture living in the rings of Saturn) ... although the biology itself is basically handwavium.

266:
"Right now to see something new and interesting you either need a multi GW power supply and a particle accelerator or you are waiting years to count individual events from processes so weakly coupled to things we can effect that they may as well not be there."

There is a whole largely unexplored and massively underfunded area of physics that could turn up some very interesting stuff. It is exploration of the interface between QM and classical mechanics.

267:

Never used a Model M keyboard, huh?

Take a car, any car.

Park it in a barn without prepping it for storage -- draining engine oil, brake lines and all other liquids, putting it up on blocks, storing tyres correctly -- and leave it for 50 years.

Now come back and turn the key in the ignition. What happens?

(Nothing, as you perfectly well know, and that's a good thing, because the flat battery will keep you from running the starter motor and fuel pump and wrecking the engine.)

Yes, it may be suitable for restoration and be roadworthy again with a few weeks' work and some replacements for perishable parts, but it's not exactly "jump in, turn key, drive off".

Now look at your average modern piece of crap consumer electronics (as opposed to an insanely over-engineered keyboard that cost as much as an entire modern PC, from back in the day of lead-based solder that didn't form tin whiskers and ICs made on a micrometre process rather than a nanometre scale so they were less prone to dopant migration). How well is it going to fly without a contemporary internet infrastructure and a command and control server to tell it to tie its shoelaces before it bootstraps?

Every so often someone on Ars Technica digs out a circa-1998 operating system, installs it on a circa-2004 laptop, and writes a long screed about how useful/useless it is for their daily office job, which is mostly email, web browsing, and word processing. You know what? Even when the machine works, about 95% of modern websites won't render, and the email clients don't understand modern implementations of SSL. And that's just after 10-15 years.

The idea that we're going to get "turn ignition key and go" responsiveness out of alien high tech artefacts in the thousands to millions of years age-range is just delusional -- unless they've been engineered with "strangers come along and try to turn us on in a million years" as a design goal. In which case, be very afraid ...

268:

Simple answer: there isn't one. Classical mechanics doesn't really exist! :)


I take it you mean the question of why we get something that looks like classical mechanics. I agree it would be good to see that cleared up - all the interpretations are unsatisfactory in one way or another.

Not sure how under funded it is though - most of the work in that area is pen and paper stuff, and the energy levels are amenable to tabletop experiments. My understanding is that research goes slowly in that area because it tends to be unrewarding and hard.

269:

Blood magic: these days I can't read any book where the protagonist is special by birth. Extra demerit points for having her/him start in a "lowly station in life".

Would that trope work for you if tackled ironically in medium-future SF?

Our baby is the product of very deliberate CRISPR-mediated germ-line genetic engineering to give them certain traits. A bunch of ova are prepared and eventually a fertilized embryo is implanted in a host (human or artificial uterus) for the satisfied oligarch/billionaire purchaser who wanted a canned heir or assistant with a laundry list of properties deemed optimal to inherit responsibility for a sprawling satrapy in a stratified, post-rapid-tech-change Grim Meathook Post-Capitalist future. (It could be as simple as splicing the private key to the royal treasury's authentication crypto into their genome, giving them access to the crown jewels without being electrocuted or something, or it could be a more exotic bunch of upgrades. Irrelevant at this point.)

One of the low-paid workers in the clinic has been paid/blackmailed to obtain one of the spare zygotes for an enemy faction, who want to figure out how the next generation of oligarchs/royalty are configured. She does a shell-game with the petri dishes in the lab then self-inseminates using the ACME baby-o-mat, leaves work, and discovers the hard way that the folks who were going to take delivery have just been whacked. At which point her options include a quiet back-street abortion (procuring a dose of misoprostol or similar), or going on the run because her employers' medical service will be very interested if she shows up with an unplanned pregnancy.

Instant cyberpunk dystopian chase novel with added "baby born to low-status parent with a Destiny" High Fantasy cliche! What could possibly go wrong?

270:

The bigger issue is something seldom addressed. We seem to have put all our eggs into a *very* small number of baskets as the lemmings rush for papers on fashionable topics and funding on "sure things". The two biggest wastes are IMHO String Theory and Tokamaks. Give it a year or two to be sure, but I might add LHC to that list.

271:
Said blackmailer is an idiot. He doesn't have a viable lock on the product, he just bought the last barely-economical-to-run factory churning out cheap generics and announced a 7500% price hike. At which point, within days, other pharmaceutical co's saw an opportunity to fire up the manufacturing line at a price maybe double the previous barely-profitable selling point, thereby positioning themselves as white knights while making out like bandits. (As the original generic price had depreciated to virtually zero, though, this is unlikely to harm anyone ... and competition should drive the price back down to marginal again fairly soon.)

272:

There's also the approach taken by IMB in "against a dark background". Secret information only made available to person with special DNA. You don't even need to engineer the person then - all the magic is in the detector.

Doesn't work so well if you allow cheap PCR machines and cloning though.

273:

I take it you mean the question of why we get something that looks like classical mechanics.

Actually, it's dirt simple. If you apply QM to a system on a scale where Planck's constant can be approximated as zero, all of the equations of QM give the same answers as classical mechanics. Classical mechanics is just a special case of QM.

274:

That is true, but given that planck's constant is not zero there are still plenty of fiddly details.

275:

For day to day purposes on a human scale, Planck's constant is near enough to zero as makes no difference. There was a lot of experimentation on the transition regime between QM and classical mechanics in the mid 20th century, but by 1970 or so the experimental questions had been answered fairly conclusively. The Feynman lectures address the issues in some depth, for instance.

276:

once the first ships get going, some enterprising groups could easily set up some shuttles that travel between the ships- they are 1/20th of a light year apart, so traveling between them, while not trivial, wouldn't be impossible. Flight time in some number of months I would imagine.
Forget travel between the ships in that scenario: your intuition is broken. Remember the ships are themselves travelling at 1/20th of light-speed. To get between them in less than a year, your "shuttles" are going to have to be moving faster than the starships.

You can't even chat properly. The ships are so far apart that it takes 18 days for a radio/laser signal to crawl between them. Over a month for an exchange of email (a month and a half if you want some sort of acknowledgement of receipt).

277:

You missed space elevators, although they have their own issues (and won't be "commute to work" fast -- more like "catch the trans-Siberian express from Moscow to Vladivostok").

278:

"Actually, it's dirt simple."

No it isn't. Otherwise physicists would not have been arguing over it for the past century or so,

279:

You know, I do wonder if there's room in your undoubtedly busy schedule for a how-to book concerning realistic science in writing. I'd certainly read it.

That's a job for someone like Dave Clements, not me -- although you could do worse than look at "Hot Earth Dreams" by Frank Landis for the global warming/terrestrial future angle.

280:

"...but by 1970 or so the experimental questions had been answered fairly conclusively."

Nowhere near true. For example, it is not known whether there is a limit on the macroscopic mass that can be put into a superposition, nor the relationship between the mass and the time a superposition can be maintained.

281:

Talking about He3 ...

This actually came up at work in conversation recently. As in, "why are we using He3 in this experiment?" and "isn't that incredibly expensive?" and "what practical use would it be in an operational fusion reactor, given that its basically unavailable"
So, it turns out that minority He3 ions have useful absorption lines for ICRH heating of plasmas, and you really want to heat the ions, not the electrons. Yes it is expensive, but we're only using trace amounts, and an operational DT fusion reactor breeding tritium would also produce He3. As far as I understood what she was telling me.

282:

Wait, ageing and diminishing audience? Do you mean the readers of paper published stuff that is labelled SF? Because as far as I know lots of teenagers and YA are reading stuff that is SF. However, whether it is labelled as such I don't know.

Relatedly, I saw a book by Lauren Beukes in a bookstore. She wrote "Moxyland", which got a nice cover blurb from our host, and I think comes under SF. However the new book describes it as, I am paraphrasing due to my poor memoery, "near future political .... ....."

No mention of SF at all. I get the impression that some marketing bots are attempting to appeal to different market segments in different ways at different times. Or else being branded as a mere SF author when you are trying to write urban fantasy isn't seen as a good thing.

283:

When reading the OP, the first thing I thought was "I would like to nominate every paragraph of every book ever written by James S. A. Corey."

This would be slightly unfair, because I haven't read them all, just one complete book, and then enough of a couple more to not bother.

284:

I was going to suggest each chapter could be written by a different author with a particular specialty. Though if their fields happen to overlap, and they have differing opinions, could need a bit of negotiating/editing.

285:

One thing I'm tired of hearing about (since I haven't actually read any, unless "Little Brother" counts) are YA Dystopias. Are we trying to raise a bunch of depressives? I suppose they're intended to be uplifting, but...

Once had an idea for an Anti-Dystopian Dystopia, where the protagonist only knows the world they've grown up in, always hearing the oldsters going on about the Good Ol' Days and thinking
they're full of it. Sure the world is a crapsack, but the old ways clearly didn't work out well, so how to improve things?

---

286:

So, what were the good old days like? say, the 50s, 60s, 70s, 80s... Having been there, they were shit. Now is *way* better.

---

287:

...an operational DT fusion reactor breeding tritium would also produce He3...

Tritium ($^3\text{H}$) decays to $^3\text{He}$, so anything that makes significant amounts of tritium can be regarded as making $^3\text{He}$, with a lead time of about a decade (half-life of tritium is about 12 years).

The plan, as I understand it (one of our students has just finished writing a PhD thesis on it, but he's not my student and I haven't read the thesis) is to line the tokamak with lithium, ideally enriched in $^6\text{Li}$. The neutrons released by DT fusion then hit the lithium, which breaks up into $^4\text{He} + ^3\text{H}$. You greatly reduce the problems caused by loose neutrons, and you breed more fuel (the D part of DT fusion is easy—refine water—it's the T bit that's the problem).

Heteromeles@212: best vacuum-dwelling life form I've ever seen in SF remains Fred Hoyle's Black Cloud. Doesn't satisfy any of your requirements, because it's not using a body plan designed for planets.

Guess@221: Greg Egan respects physics: in fact he builds half his plots around concepts from theoretical physics. (I'm never sure how well they work for someone who hasn't got a physics degree...) Al Reynolds is a former professional astronomer, and also tends to respect physics.

---

288:

There is a term of art that developed early on in the field of SF criticism: willing suspension of disbelief.

A bit earlier than that - it was coined by Coleridge in 1817, initially in reference to his own and Wordsworth's poetry.

---

289:

Hidden sociopath leads a mutiny on/takes over a generation/spaceship...

Let's see --- Hares' psychopathy checklist is routinely used to risk-assess individuals for security purposes. In crappy SF, you get an agency pouring billions into a project which inexplicably decides to not do a personality assessment, relying on their gut-instinct instead. Good grief! Major orgs with
well-educated/trained HR departments fact-check CVs in detail, run series of these types of tests, and then compare results with the ‘feel’* obtained from group (or serial) interviews. Team building/team management is based on such tests being reasonably good at ferreting out major problems.

* Some of these are multiple choice style questionnaires which are then mapped.

---

290:

NASA doesn't show what tests they're currently using to screen its astronauts, only says that such tests are important. Meanwhile, below is DOD's current take on personality testing to screen for/gauge security risk:


---

291:

People have been arguing over how to interpret QM for a century or so. The experimental results have been in for decades and repeatedly validated to many decimal places. Pretty much nobody argues about them any more. This is even true for experiments in the mesoscale, where quantum effects are noticeable but not dominant.

I remember a series of exercises where we took standard QM equations, made the assumption that any term containing Planck's constant was negligible, and derived classical Newtonian physical laws. Physics and chemistry students typically do that sort of exercise in the second or third year of college. Relativistic physics also reduces to Newtonian physics if appropriate assumptions are made ($v \ll c$, $c >>$ the escape velocity of relevant gravitational fields, etc).

---

292:

Whoops. HTML and much much greater than signs did not play nice together. Ignore the parenthetical comment in my last post.

[[ Now as you intended - mod ]]

---

293:

No idea what NASA looks for, but it seems like Mars One is looking for suicidal introverts, judging from the candidate videos I've seen (and assuming it's not a scam looking for gullible applicants). The son of someone I know* made it through phase 2. Apparently he was cut after some psychological testing, my guess is he was too well balanced.

*and with whom Charlie once had a Twitter argument, for my money Charlie won.
Persinality testing is irrelevant if the system is biased towards selecting sociopaths eg the typical CEO of a fortune 500 company therefore in my mind its one of the more believable tropes.

Underwater metallurgy: electroplating/electroforming. And let's not forget that gold nuggets (and probably native copper) are the result of hydrothermal processing.

And quite a few employers want hand-written CVs to put it to their graphologist, where describing evidence as "mixed" is putting it too lightly. Guess they'd also employ phrenologists if that had not fallen out of favor.

In other cultures, employing astrologers or heating turtle bones might be en vogue.

Sorry, something widely employed in industry is quite often more testament to human gullibility than efficiency. And psychometric tests were quite often not designed for employees, but for clinical settings. And with certain ethnic groups or gender.

Also, for what it's worth, the Hare PCL-R has a 5-year test-retest reliability of 0.89. Excellent for a psychometric test, BTW.

Except that we know for a fact that QM and GRT are incompatible and one or both of them have to be modified. Also, there is not much experimental work concerning the QM measurement problem, which is the key to distinguishing between interpretations.

Just a couple of loose ends, and when they are tidied away that will be the end of physics. Reminds me of...

Or their ancestors could have started fires by focusing light using lenses from the abyss dwellers (giant squids?) that would occasionally wash up on shore. This might have led to a primitive eyeball-based trading economy and, possibly, interesting design choices as their technology evolved.
I'll admit up front to being a fan of the Galaxy Quest and Hitchhiker's Guide variety of science fiction. Absurdity is part of the fun, so I just don't care how things work to very much detail. Need a beryllium sphere to power the spaceship? Cool. A cracked one won't work which means a trip to the nearest planet for an adventure? Go for it.

What does bother me is when the story comes to a full stop for several pages of explanation about how a particular bit of science does work. Imagine if they did that in a movie. Everybody stops what they are doing while we sit and get educated.* I like novels that play a movie in my mind's eye. When the writing becomes merely informational, the movie goes dark.

Which means that I'm okay with a plain old 'fusion reactor' as a power source if it's not central to the plot. It sufficiently answers the question about where the electricity comes from without raising any technical plausibility arguments.

*The scene in the first Jurassic Park movie where Hammond explains how they cloned dinosaurs is an exceptional exception. It was set up moments earlier when Grant asked him - "How did you do this?" "I'll show you." The filmmakers were very aware of what they were doing and kept it dynamic and short.

300:

Dirk...
I was going to comment on the 3-way dispute you are having with Jay & dbp, but you have finally hot the nail ....

What's different is that when I first came across this, approx 1967, it was whispered of & you were hushed at if you dared to mention it.

Now it's out in the open all over the place, but with no potential solution in sight.

The late 19thC equivalent was the "Ultraviolet Catastrophe" - which was resolved, originally by Planck suggesting that at a sufficiently small level of "size", the universe was "Lumpy" = "quantized" = discontinuous.

That is our present problem between QM & General Rel.

BUT

Remember that both GR & QM were originally "PAPER" exercises in true Theory, with no apparent practical applications.

Yet every transistor & laser on the planet depends upon QM working as the theory predicts, so it is anything but esoteric handwaving, & on a serious industrial scale.

The mismatch between the two is, what 32 orders of magnitude or 28, or something like that? When (& it will be when, it's just that we have no idea if it is going to be next week, or 50 years from now ) this anomaly is cracked, then you can expect really serious alterations to the real world, in the same way, that QM & GR have altered ours.

301:
The two people who make up James Corey - Daniel Abraham and Ty Franks - have openly stated that they wanted to create space opera and weren't interested in hard SF. My copy of *Leviathan Wakes* had an interview with them at the end of it as an add-on, and they said that the fusion drive in the books is unrealistic.

You could read them as Space Fantasy if you wanted to, just like with Star Wars.

@JamesPadraicR

I'd love to see a story that was basically "how a Mars colony dies". It wouldn't even have to be "they run out of supplies, the promoter back home goes bankrupt, they all starve to death or die when things break down". You could show how the colony has an initial burst of thousands of colonists coming from enthusiast ranks, followed by the dwindling of it over time as the romance wears off, the colony draws few further migrants, and the first Martian-born generation romanticizes Earth and starts moving back.

RE: Aquatic Civilizations

Couldn't they just do a lot of construction on the surface, after bringing materials to the surface of the seas? It's not like going out of water is instant death for sea life - they just have a hard time breathing and supporting their own weight. If they figure out how to keep their gills damp and build themselves support harnesses/waiting tanks, maybe they'd build platforms in shallow water upon which they would do all their metallurgy and dry-environment engineering.

@Tom

It's something else to go back and read *Jurassic Park* again. Oh, the optimism about genetic engineering in the late 1980s/early 1990s . . .

302:

Phrenology ... yes, my favorite is the Diskworld version.

Meanwhile back to reality ... here's a bit about Einstein's lobes that's the modern day equivalent of phrenology. If you're a fan of Kurzweil's 'Singularity', this may be a good place to start figuring out how/whether to map a human mind.

[http://brain.oxfordjournals.org/content/early/2012/11/14/brain.aws295](http://brain.oxfordjournals.org/content/early/2012/11/14/brain.aws295)

Summary: 'Upon his death in 1955, Albert Einstein’s brain was removed, fixed and photographed from multiple angles. It was then sectioned into 240 blocks, and histological slides were prepared. At the time, a roadmap was drawn that illustrates the location within the brain of each block and its associated slides. Here we describe the external gross neuroanatomy of Einstein’s entire cerebral cortex from 14 recently discovered photographs, most of which were taken from unconventional angles. Two of the photographs reveal sulcal patterns of the medial surfaces of the hemispheres, and another shows the neuroanatomy of the right (exposed) insula. Most of Einstein’s sulci are identified, and sulcal patterns in various parts of the brain are compared with those of 85 human brains that have been described in the literature. To the extent currently possible, unusual features of
Einstein’s brain are tentatively interpreted in light of what is known about the evolution of higher cognitive processes in humans. As an aid to future investigators, these (and other) features are correlated with blocks on the roadmap (and therefore histological slides). Einstein’s brain has an extraordinary prefrontal cortex, which may have contributed to the neurological substrates for some of his remarkable cognitive abilities. The primary somatosensory and motor cortices near the regions that typically represent face and tongue are greatly expanded in the left hemisphere. Einstein’s parietal lobes are also unusual and may have provided some of the neurological underpinnings for his visuospatial and mathematical skills, as others have hypothesized. Einstein’s brain has typical frontal and occipital shape asymmetries (petalias) and grossly asymmetrical inferior and superior parietal lobules. Contrary to the literature, Einstein’s brain is not spherical, does not lack parietal opercula and has non-confluent Sylvian and inferior postcentral sulci.

303:

The movie "Moon" not only was mining for He3, but it had an extremely expensive conspiracy to do so. Apparently because they were bad guys who obviously were willing to give up lots of profits in order to be evil.

304:

I would have said the same thing before reading KSR’s 2312. That struck me as a plausible extrapolation IF we don’t develop human or near human-scale machine intelligence. KSR’s future has a great deal of control over human genetics (transhuman body types and gender experimentation), some degree of self-reproducing robotics (necessary to create the asteroid habitats), etc. The implanted quantum AI was a little questionable, since having that level of technology would have many other knock-on effects not visible in his setting, but the rest of it held up pretty well.

But yes, if we’re able to machine intelligence that can perform scientific research and experimentation at greater-than-human levels (be it speed, level of insight, etc) than I agree that it’s hard to see how the world doesn’t become quite strange >100 years out.

305:

"The Martian Chronicles" sort of goes along those lines; the romance of Mars begins the wane, and colonists start to return, along with being called back because of a nuclear war. That last bit never made much sense to me, but I love the book.

Of course, a Hard SF version would be a very different story.

306:
I'm surely expressing an embarrassing degree of ignorance here, but what about dark energy and dark matter? I find it hard to reconcile the statement that we understand nature to N number of decimal places when you look at these new discoveries.

Perhaps dark energy and dark matter will offer no hooks for science or engineering to exploit. But the history of the 20th century -- where we learned how to pry open and harness both nuclear forces and QM effects -- suggests that would be a bold statement to make.

307:

My question is what could possibly be physically traded that couldn't be created at home once the informational pattern is known? Presumably, the same elements exist everywhere in the galaxy.

I loved James Cameron's artistic vision of the interstellar starship created for 2009's Avatar. But the expense of the ISV Venture Star (supposedly powered by laser sail to 0.7c from Earth and then decelerated via antimatter engines on arrival) was justified by the presence of "unobtanium", a hypothetical mineral only found on Pandora. That mineral was supposedly the secret to room-temperature superconductivity back on Earth, thus justifying the fantastic energy expense to get humans to Alpha Centauri and back in 7-8 years.

How would the same physical laws allow for a mineral to form only in one star system and nowhere in our Solar System? Barring this kind of "magic mineral", what other raw material could possibly be worth trading with alien civilizations?

The alternative is that there's no interstellar trade in raw materials, but then what do we humans have to offer in return once the interstellar trading network is discovered? The only thing I can imagine humans offering to an intergalactic trade network is our art, history, culture... the things that make us unique.

That might make an interesting story - about how an alien trading network is willing to give us occasional baubles of ultra-high technology or scientific insights in return for artifacts of our culture. Has anyone written a story like this?

308:

Bingo! I'd read that book in a heartbeat :). I'm happy to go along with the old tropes (the Special Child) if you make it plausible in a near-future society. OGH's plot hook here reminds me of something Heteromeles was saying earlier, about how new scientific discoveries often open up new ways of telling old stories rather than necessarily closing them out.

309:

Greg - Thanks for the specific recommendations. I tried tackling The Peripheral last year, and found myself totally "at sea" trying to figure out the setting. I'll give it another shot. Never heard of The Red: First Light, off to go download a sample!
Tourism. There's something special about experiencing things directly, for humans anyway.

I don't know of a rule that says that life is limited to planets with medium levels of surface water, and you can have some fun discussions with astrophysicists on the topic of how complex a dirty plasma can get.

Or you've got to come up with the biological equivalent of a Whipple shield and/or aerogel, and then figure out the fun problem of articulating joints that are covered by such (thick) surfaces.

I'm one of the advocates for spaceships being warm and fuzzy, I guess.

My question is what could possibly be physically traded that couldn't be created at home once the informational pattern is known?

There are two obvious candidates. One is peculiar chemistry; we don't have the resources in the other solar system to figure out how that particular bit of the local biosphere is making that stuff, but it does something very valuable. (Typically anti-aging or curing cancer in extant fiction; if I was trying for plausible I'd be looking at "wet nanotech industrial substrate" or something, something that allows either better or faster production of something critical to the sinews of power. Maybe it gets the success rate for growing CNS tissue from .03% to 85%, and all the wealthy and the great need it to keep their brains from senescing by stuffing in fresh cloned tissue. Use stem cells and your personality changes, can't have that...)

This wouldn't last; there would be massive efforts to figure out how to synthesize it. But that effort might involve having to be able to support a thousand research scientists and a full-scale AI in the source system, and while the ships are delivering the city-in-pieces necessary to support that to the system of origin they might as well be lugging alien mollusc ligaments back to Earth.

Two is the product of really extreme conditions; there's an Anderson story about a planet that used to be a super-jovian, and then the system primary went supernova and plated it with, among many other heavy elements, stable transuranics. Belief in stable transuranics is no longer with us, but the idea that you can get something in a particular spot because something drastic happened there might hold up. (little pieces of cosmic string? exotic matter? Something, non-baryonic matter is matter of vast squishy possibility at the moment.)
Huh. That's interesting. Reading other articles in the mainstream tech literature, I was under the impression that Intel was having real challenges seeing a viable path for anything below ~ 7nm.

NextBigFuture last year had an article (http://nextbigfuture.com/2014/10/ieee-panel-agree-moores-law-via.html) about the IEEE conference with the quote that "All three morning panelists here agreed Moore's Law is approaching an end, and it's not clear what enabling technology could replace it as an engine of exponential technology growth."

One big question is whether we need an entirely new S-shaped curve of information processing technology (ala the leap from prop engines to the jet) in order to achieve human-equivalent machine intelligence? Or can we get there using algorithmic optimizations on the progress we've already made, perhaps with specialized "bolt-ons" (photronics, quantum computing for certain narrowly circumscribed classes of problems)?

And before I get swatted down for veering towards the Singularity attractor, I'm only interested in whether we can develop machine intelligence in the 21st century that is human-equivalent for contributions to scientific and engineering projects. Don't need to open the philosophical questions of self-awareness, "emotional drives", etc.

I have a good friend who's a lead negotiator for the US at the current Paris conference on climate change. He freely admits that it's likely going to require geoengineering or other engineering solutions to avoid catastrophic climate change, given the current thermal inertia locked in and the slowness of the global response.

So from where I sit, the shape of 21st century history is going to depend greatly on whether we see major scientific and engineering breakthroughs in biotech, energy and space. And whether we see breakthroughs will depend greatly on whether our machine intelligence can be developed to become equivalent to BS students, MS students or even PhD researchers. The prospect of having human scientists in 2050 supplemented by vast networks of Masters or PhD level "minds" working on these problems 24/7 gives me at least a little frisson of optimism.

One thing that can rescue some of those technologies from being doomsday devices is restricting the area of effect. You can negate gravity in a 10cm area for almost free, 50m radius cheaply, but at 500m and higher it's absurdly expensive.

If that's a property of the affected area rather than the effector, you can't sidestep it using a large array of emitters.

That would force you to use other technologies for planet-to-orbit mass freight -- or maybe that's not even viable and most of the economic intercourse is based on orbital mining, farming, and manufacturing.
That would still get you from surface to orbit as a daily commute, though it wouldn’t get you planets exporting grain to other star systems.

316:
Possible "ultimate resource" - a black hole used as a hypercomputer:
https://en.wikipedia.org/wiki/Hypercomputation

317:
He freely admits that it's likely going to require geoengineering
Geoengineering cannot work.
I really wish people would get this through their heads.
In order for geoengineering to work, we would have to be able to predict weather on long term -- years -- time spans, and not only do we know we can't, we have pretty good reasons to believe there are fundamental causes for that, such that if we had a bunch of Culture Minds willing to help out, they couldn't do it, either.

If we don't have that, all we can do is move the global average temperature. Moving the average temperature doesn't help. Temperature isn't the problem; unpredictable weather breaking agriculture is the problem. Creating big atmospheric zones where the temperature equilibrium has been adjusted makes the weather no more unpredictable, and plausibly less because oh look, extra forcing.

EVERYTHING ELSE is secondary to breaking agriculture. A functioning industrial civilization can move cities if the sea rises; it can build airconditioners, it can move populations. If we lose industrial civilization billions die. And if we lose agriculture we lose industrial civilization.

318:
Anyone care to provide a plain-English explanation of potential applications of Q-carbon esp. re: space tech & exploration?
http://scitation.aip.org/content/aip/journal/jap/118/21/10.1063/1.4936595

319:
(Reply also to peteratjet)
Hesitating to teach a physicist to suck nuclei, but... there are side reactions which produce \(^3\)He directly. The cross section is much lower and the energy required much higher, but there will be
particles in the high-side tail of the thermal energy distribution that have enough energy to make it happen at least to a detectable extent.

Of course, $^3$He likes to suck neutrons in an attempt to be $^4$He, only to find that it ends up being tritium and a proton instead, much to its chagrin. This being a far more likely event than reactions with other nuclei at the temperatures of D-T fusion makes it the prime factor in determining the equilibrium concentration of $^3$He.

AIUI the idea of catching the fusion neutrons in lithium has been part of the plan pretty much from the start (and the US got their fingers burnt discovering that $^6$Li enrichment is not as necessary as they thought when you have lots of neutrons over about 4.5MeV or so to play with). It strikes me as an odd idea for a PhD thesis in this day and age, but then I'm not familiar with the selection criteria for thesis topics.

320:

People really want carbon for circuitry or substrate in dense electronic devices because it's such an excellent heat conductor and heat dissipation is a major issue with increasing circuit density. (Witness the half kilo hunks of copper heatsink found on high end graphics cards.)

The paper's talking about doing quantum sorcery with lasers to get carbon to form diamond at STP, and how they can get the resulting tiny bits of diamond to link up. This would be fantastically useful if they can, for example, create a diamond thin film as a circuit substrate so the circuit dissipates heat much better.

There are probably other applications with direct carbon circuitry and the moderate magnetism. But I'd expect the thing driving the research is heat dissipation.

321:

And how do you make the wires and electricity underwater?

322:

"an alien trading network is willing to give us occasional baubles of ultra-high technology or scientific insights in return for artifacts of our culture. Has anyone written a story like this?"

Yes - I am sure I have read something of the kind, probably more than one. Unfortunately my memory is not throwing up anything more specific. There is probably something in the vast list of Asimov's short stories. The theme of some kind of human-specific weirdness being the primary determinant of the nature of human/alien relations is one he has used more than once, although the only variant I can remember off the top of my head is the one with the cyanide-breathing quadruped aliens which concerns darker matters than trade.
There is also at least one story in which apparently benign products of human culture turn out to be useful as a weapon. Frequency combinations which sound harmonious to human ears turn out to be actually painful to the aliens concerned, enabling a group of captured humans to escape from an alien zoo by singing "It's a long way to Tipperary" and other music hall favourites. Very silly, but entertaining, and I wish I could remember what the story was.

323:

Agreed, and that's part of the "problem." I'm thinking off all those kids (many of whom I know) who read Harry Potter, the Hunger Games, and have gone onto, um, video games and such.

One of the critical failures in SF seems to be the rise of Young Adult Literature. Once kids have read their kids stuff and are ready to read adult literature, they don't go over to the SF/Fantasy aisle, because that's where the nerds hang out.

We, on the other hand, read The Lord of the Rings, then started looking at what else was sitting in the Fantasy aisle, and kept reading. That split between the aisles is certainly a problem, because kids seem to be migrating out of the store, not across the aisle.

That's just my personal experience. I'd love to hear some counter examples.

324:

It's somewhat both cultural and an agricultural product but John Ringo had some fun with one of his hero's becoming a billionaire by selling Maple Syrup to aliens who found it addictive in return for hi tech geegaws.

325:

@Heteromeles: I guess it depends on whether or not you're an optimist or a pessimist! I rather think (or maybe I hope) that any aliens out there advanced enough to pay us a visit will have evolved enough cooperative impulses to make working with us preferable to working against us.

@Charlie: Doesn't that depend on how much faster the shuttles can go relative to the ships? If they can double their velocity, then traveling between the ships should be quite practical. To travel 1/20th of a light year at light speed takes 1/20th of a year- about 20 days. Double that every time you halve the velocity: .25c is only 80 days.

@ChrisJ: I think you're being unduly pessimistic. After all, the same elements exist everywhere on Earth- therefore there should be no reason for international trade. To make the trade route viable, it's only necessary that something be obtainable there in sufficiently high quantity that the expense of going there is still worth it. Depending upon what shape our own planet is in after a century or so of climate change, that "something" might be organic.

But if that scenario does not appeal to you there is one other resource that we might offer-ourselves. Depending upon how common sentient life is in our section of the galaxy, and how
difficult it turns out to be to manufacture GAI of human IQ or better, a workforce of several billion teachable individuals and a reasonably advanced industrial infrastructure might be of considerable value. We could become the galaxy's Amazon - give us the specs and we'll make it to order, and ship it to the nearest transit point to boot! That might even make us worth fighting over (plot hint).

Our cultural artifacts might be worth something too, much like indigenous crafts on Earth, although in that case we could reduce our costs by faking it.

326:

@Heteromeles

It's a great idea. I'm imagining a huge empire - China-esque in size and population - springing up in the drainage basin of the Mississippi River and other rivers in the southeastern US. An empire built around maize, beans, and squash instead of wheat and rice, but pretty damn impressive.

The tricky part is that they'd still be starting on these things much later than in Europe. They might still be behind in various technologies ranging from wheeled transportation to iron-weapon-making. But with the disease resistance and what they have, they'd certainly be resistant to mass colonization - it'd be more like Europe dealing with China before the 19th century.

Actually, I might do a blog post on this at some point, because things get so very messy so very fast in this kind of alt-history.

If the New World has already been inoculated against old world epidemic diseases, then one of the probable knock-on effects is that the worst of the Little Ice Age never happens.

The argument goes as follows: when explorers hit the New World in the very early 16th Century (1500s) they unleashed a bunch of plagues, the evidence of which is their accounts of large civilizations where later people found it largely empty. By the beginning of the 17th Century, the world was getting colder, and one good candidate for why is that all the regrowing forest in the New World sucked enough carbon out of the air to trigger/exacerbate the Little Ice Age.

There's a nice book *Global Crisis* by Geoffrey Parker, about the 17th Century and the effects of that little climate shift, a drop of 1-2oC and general crop failures. This is when there were civil and other wars across Europe, the end of the Renaissance and the beginning of the Enlightenment (including the Peace of Westphalia, which the beginning of our modern nation-state system), the end of the Ming Dynasty and the beginning of the Qing Dynasty, end of the Kongo kingdom, civil wars in the Mughal, Ottoman, and (IIRC) Russian empires, and so on.

In this alt-history, none of this happened, because the New World was not depopulated, the forests never regrew, and the climate stayed more constant.

It can get arbitrarily more complicated from there. When the Chinese got their hands on things like maize, potatoes, and sweet potatoes from the New World via the Spanish Manila Galleon trade, their population exploded, because upland areas that had previously been unfavorable for rice-based agriculture were suddenly farmable. This population explosion happened all across east and south-
east Asia and kind of rebuilt the place, starting in the 16th Century. Pervuian silver shipped to China via Manila also held up the Ming (and later Qing) economies and made Spain rich in the process. Given how huge an impact New World plants and precious metals had on China in our timeline, I'd say there's no way that China would have left these resources with the Aztecs et al. had they gotten over there in the first place.

So a world where the Chinese set up trading relationships with the Aztecs (or heck, colonized them directly) would look very different than what we have. China would have gotten rich, and Europe would have stayed a backwater, possibly trading across the Panamanian Isthmus with Chinese traders.

The basic point is that messing with the discovery of the Americas radically changes history in the Old World too. It's not just a matter of what the European colonists face when they arrive, it's what happens in the old country. The General Crisis of the 17th Century arguably decreased world populations by somewhere around 1/3. If that didn't happen, there would be a lot more poor peasants in Europe, fewer places for them to migrate to, and more countries where the divine right of kings and similar political theories hadn't been disproved by a century of disastrous war. The Qing would still be a bunch of nomads north of the Great Wall, and something else might have brought the Ming down.

What does that all look like?

All you have to add to turn it into a true fantasy world is posit that the Magic Didn't Go Away with the Little Ice Age, or some renaissance researcher codified the rules of magic (per Randall Garret), and you can take off from there.

327:

Biologically? Electric eels and so on... they seem to be jolly good at it, certainly a lot better than Volta's piles were. And insulation isn't a big deal as long as you keep the voltages below the electrode potentials (although you do then find that everything is an enormous capacitor). Also, a general philosophy of electricity that comes from the Thevenin angle rather than the Norton as ours does.

But aren't we looking at this the wrong way? "Doing tech" requires (apparently) some means of concentrating energy. Our methods, naturally, are based on those means which work in air, and water dissipates the energy and buggers them up. But water also allows for other methods of concentration which don't work in air and so aren't the sort of thing that occurs to us. Cavitation, for example, which eats propellers. That shrimp which stuns its prey by means of high-energy acoustic pulses. It's just really hard for us to imagine what might work because we are so used, both intellectually and biologically, to such very different conditions.

I don't think a marine technological species is impossible. I just think its technology would begin and develop in ways enormously different from ours. To write a good story about it would require an author with an exceptionally good imagination and a huge amount of fairly obscure knowledge, to be able to see the differences in environment in terms of their possibilities rather than their limitations, but if it was properly done it could be excellent.
328:

*Geoengineering cannot work.*

*I really wish people would get this through their heads.*

*In order for geoengineering to work, we would have to be able to predict weather on long term -- years -- time spans, and not only do we know we can't, we have pretty good reasons to believe there are fundamental causes for that, such that if we had a bunch of Culture Minds willing to help out, they couldn't do it, either.*

I don't think that is true. Any method of reducing the equilibrium concentration of GHGs in the atmosphere/oceans will reduce radiative forcing. Whether it takes 100,000 years via natural silicate weathering or less time with human help, excess CO2 that humans have been producing with fossil combustion will eventually be bound as minerals again. You don't need long term weather prediction to effects of CO2 falling again more than you need it to understand CO2 rising.

The IPCC is already exploring "net negative emissions" (e.g. geoengineering for carbon dioxide removal) and I expect it will become more prominent over time. Global emissions still aren't falling and even when (if) they do, the tremendous climate lag means there's a lot of warming still to come without active stabilization measures. None of the options look great but it's far from clear that intervention will be worse than waiting an aeon for unaided nature to take care of excess CO2.

329:

"...how much faster the shuttles can go relative to the ships..."

As far as the shuttles are concerned, the ships are standing still. The difficulty with shuttles is that they keep needing fuel/propellant to accelerate away from one ship and then decelerate at the next, so how much of this do the ships need to carry to keep the shuttles moving?

330:

Several shibboleths that violate basic realities about computers and software bother me whenever I encounter them.

Firstly, in a classical computer network, treating a "move" operation as anything other than "copy and delete". When, in a story, a classical AI moves to a new computer, what it's really doing is copying itself to the new computer, then killing the original. Why just not skip the second step, and become more numerous? I vaguely remember one novel about AIs where an evil AI is "killed" in transmission through space by moving or disabling the receiver. Why did the original not wait to delete itself until transmission was confirmed?

(However, thanks to Hannu Rajaniemi, I now realize that in a quantum computer, there is no copy -- only move. But I can't think of any other author who has successfully and correctly exploited this distinction.)
Secondly, any novel about virtual reality in which humans can become trapped or lost in VR is just confused. People minds don't "enter" VR. Our minds stay inside our brains where they always have been; the VR equipment merely fools those minds into thinking they are elsewhere. Even positing computer implants that can interrupt and redirect the sensory stream to your brain, your mind can't become "lost" in VR; you can, however, become disabled or crippled due to the malfunctioning of your medical prostheses.

More generally, if you're thinking of writing a story about virtual reality, read Rudy Rucker's "The Hacker and the Ants". If your plot still holds up after internalizing Rucker's understanding of computers, you might have something.

Thirdly, positing any sort of world-conquering AI that successfully (or nearly successfully) conquers the world the first time it is run. Most prototype software is crap; even more so highly complex, distributed software. It never works the first time. Why should a world-conquering AI be any different? This was one of the objections to Reagan's vision of SDI: the software to manage the defense would need to be so complex it could never be debugged and so was unlikely to work the first time. Think about it another way: despite our limitations, humans rarely keel over dead when the doorbell, phone, and Skype connection ring simultaneously. Prototype software often does, it's called a race condition. How many race conditions would it take to conquer the world?

331:

It's true that QM and relativity are incompatible. It's also true that those incompatibilities have absolutely no practical consequences under any conditions that human ingenuity has been able to devise. If the incompatibilities had consequences that could lead to competing predictions under any experimental conditions, we would have solved that riddle years ago.

@ChrisJ: Dark energy and dark matter are fudge factors that cosmologists insert into their equations to try to explain why the overall structure of the universe looks the way it does. They're possibly nonsense, like the epicycles added to Ptolemaic astronomy to explain the movement of the planets. Whatever they are (if anything), they don't seem to matter at non-cosmological scales of time and space.

332:

Any method of reducing the equilibrium concentration of GHGs in the atmosphere/oceans will reduce radiative forcing.

But not all at once, evenly, over the entire world. You're applying differential forcing somehow, and that will have unknown effects. Since they're unknown, they can't be good.

(Try not to cause an ice age. Go back to the CO2 levels of 1850 and you might well. Oh, wait, poorly understood feedback mechanisms with decadal lag are involved.)
Sequestration is very, very difficult. That hundred thousand years may be as fast as it can happen. And yes, lots of people are looking at the problem. That doesn't mean it can work. (Lots of people have looked at getting people to behave in the common interest for millennia. No known solution.)

333:
"I now realize that in a quantum computer, there is no copy -- only move."

That's the conventional wisdom, but it may be wrong.
https://en.wikipedia.org/wiki/No-cloning_theorem

BTW, if quantum cloning were possible it may well imply FTL communications

334:
"It's true that QM and relativity are incompatible. It's also true that those incompatibilities have absolutely no practical consequences under any conditions that human ingenuity has been able to devise."

As might have been said just before QM and SRT appeared. Except that when we did get a handle on them there were most definitely applications, albeit lagging by decades.

335:
Sigh.
That pushed me over the edge on buying. As soon as I get a spare $20 I'll buy a copy. Still don't like the price point, but ...
--
Otherwise a fascinating discussion.

336:
I suspect that they are very like Ptolemy's epicycles: "nonsense" in themselves, but required to make the sums come out right because said sums are based on an understanding which is fundamentally wrong at some deeper level. We can't say that some huge big thing which we have got wrong is unimportant until we know what it is and have put it right.

Same with the cosmological constant, which Einstein admitted he made up because it looked nicer (pretty much) and has continued to appear and disappear in various guises ever since according to how the theories of the moment do or don't call for such a fudge factor. Or string theory, which strikes me as a whole mass of shots in the dark because we don't know why the problems we're trying to solve with it arise in the first place and all we can do is make up maths that seems to fit - exactly like epicycles.
Lifespan prolonging technologies - immortality, even - but people still look old.

The amount of money spent on research into the cosmetic concealment of age is three or four orders of magnitude greater than the money spent on life extension.

We'll have people looking 25 years old at 80 long before they think or move like 55-year-olds at 80, and a very, very long time before people live and breathe and reason at 250 years of age.

We'll probably have people looking 25 years old at 55 while I'm capable at spitting fragments of my dentures (or rejuvenated molars) with sheer jealousy... If not with any hope of accuracy, or intellectual coherence.

Shibboleths, or maybe just face desk impactors...

Bad geometry. Specifically, the space battle in the Trojan asteroids, with Jupiter big as house in the background, allegedly 60 degrees away in its orbit. (Space Above and Beyond)

Bad economics. If you have the energy resources and technology to launch an interstellar invasion, stealing our water seems a bit petty. It would be like using the 6th Fleet to knock over a Sicilian post office. Admit it, you're just doing this for kicks. (V)

At this point, there are two geoengineering methods that look like they'll (cough, cough sort of) work:

-- Emit no greenhouse gases, and
-- Capture what's in the atmosphere in the soil, and, to a lesser extent, in wood.

Things like sulfur aerosols just temporarily ameliorate the problem for part of the globe, and often the side effects far outweigh the benefits. For example, blowing a bunch of sulfur into the high latitude stratosphere might make it cooler in Seattle, but it would likely cause a drought in Bangladesh and surrounding areas, meaning that hundreds of millions of people would still be on the move. Moreover, as soon as the sulfur emissions stopped (and they'd probably have to eventually), the previous cool areas warm up that much faster.

Carbon capture and storage (e.g. putting carbon deep underground) requires (per Vaclav Smil) a global industrial ecosystem substantially larger than today's oil industrial ecosystem. It would have to be built within 10-20 years (oil infrastructure was built over a century), and it would be a net money suck on the global economy. It's doable, certainly, but unless we force the oil companies to bankrupt themselves paying for it, we're not going to get carbon back in the ground this way.
Getting carbon in the soil sort of works, but the problem is keeping it there for more than a few decades. Ditto with growing lots of trees. Still, these are being deployed now and they don't take huge amounts of tech.

This is why people worried about climate change really, really, really want Elon Musk to get a lot of copycats so that we can stop emitting GHG as fast as possible. Trying to get GHG out of the atmosphere and oceans once they're emitted is a hard chore.

340:

The Gene Editing Summit here in DC wrapped up early last week. They seemed very confident that the technology (CRISPR-CAS9) is here to stay and that it works so well that it's time for some controls to be implemented. The primary concern is that demand for the technology will create market forces that cannot be resisted. Here is a link to the website where the agenda, participant bios, and videos of the event are presented:

http://nationalacademies.org/gene-editing/Gene-Edit-Summit/index.htm

341:

Moon mining - even if all the other points weren't valid we still wouldn't have a colony of square jawed engineers on the moon - it'd all be teleoperated by half a dozen bored guys in a converted shipping container (probably outside Shanghai).

342:

*Has anyone written a story like this?*

"The Big Front Yard", Clifford Simak. A trader gets anti-gravity technology in exchange for the idea of paint.

343:

"Since you need fire for basically all technologies that would lead to starflight, an alien that builds ships but can't build a fire is a walking contradiction."

By way of a counter argument - I think its pretty clear that if anything 'human' is going out there its going to be pretty heavily engineered and creating fire by friction isn't a core skill on a spaceship (hopefully!). You could posit a species that engineered out the unnecessary limbs/appendages/organs (do you need that kidney or would it be more efficient to hook up to a dialysis machine once a week?)... a space faring alien might look like a brain wrapped in a membrane (the skull if probably redundant in space and you can wear a helmet outside your ship) some limbs for movement in zero g spaces (long tentacles for reach and pull maybe?) and some basic sensory organs. Plug into a suit or a machine or a ship as needed less biomass means less
environment support (feed off a sugar solution - or maybe beer, Charlie did say beer was essential to space travel).

Anyway tl;dr fire seems necessary for basic technology but it doesn't necessarily follow that an alien species would need to do it by hand (ha) thousands of years after they developed spaceflight.

---

344:

*Unfortunately the above has made it completely impossible for me to enjoy Star Trek since my late twenties.*

Original ST was fun. And I was around 10 to 13 years old.

STNG was an amusing watch but it got old real quick that magic was used to resolve plot lines so often. This mostly ended when Roddenbery died and the plots actually had to be resolved in ways that made some bit of sense.

Not to mention that humanity had out grown religion, money, etc... but many of the plots only worked with those things in the background.

---

345:

*Tourism. There's something special about experiencing things directly, for humans anyway.*

Fair point. Agree that even if there aren't unique raw materials worth trading, seeing alien vistas and cultures would drive demand from Earth. Of course, we'd need to hope that the aliens find Earth sufficiently interesting in return to want to come here. Otherwise we have nothing to trade for our opportunities to go see the galaxy. Everyone wants to see Paris & Hawaii, not so many are dying to get to North Dakota.

---

346:

*There are two obvious candidates. One is peculiar chemistry; we don't have the resources in the other solar system to figure out how that particular bit of the local biosphere is making that stuff, but it does something very valuable.*

Ah, I'm reminded of the silk trade with China. A biological product, created under common planetary conditions (raw materials, gravity, etc), but dependent on a particular species and applied technique.

---

347:

Where the fuel for the shuttles is stored depends on the drive technology involved, which we haven't specified. Could be anything from open core fusion to solar sails (with the lasers on the ships). I don't have the mental energy right now to go over to Atomic Rockets and do the math.
The theme of some kind of human-specific weirdness being the primary determinant of the nature of human/alien relations is one he has used more than once, although the only variant I can remember off the top of my head is the one with the cyanide-breathing quadruped aliens which concerns darker matters than trade.

Here's one of the shibboleths for me, the idea that Humanity is the Special Child. The idea that we'd stumble blinking into a vast pre-existing civilization (or network of civilizations), and yet we'd somehow be instantly recognized as uniquely valuable, even compared to other intelligent races.

I tried watching Star Trek Enterprise years ago, but couldn't get past the conceit that a newly warp-capable species (which had only recently survived its own Third World War) was supposed to leap to command of the entire Federation within 100 years. It struck me as an exercise in ego-stroking reminiscent of pre-Copernican religions.

Now if it turns out that interstellar trading networks are hungry for any cultural artifacts which add diversity to the pre-existing mix? That seems more plausible. Much like Fauvist artists in the late 19th century were inspired by trips to Tahiti and exposure to new artistic styles. We might have something to offer in trade in that scenario simply for being different and offering a novel perspective. E.g. we're the Tahitians.

Secondly, any novel about virtual reality in which humans can become trapped or lost in VR is just confused. People minds don't "enter" VR. Our minds stay inside our brains where they always have been; the VR equipment merely fools those minds into thinking they are elsewhere. Even positing computer implants that can interrupt and redirect the sensory stream to your brain, your mind can't become "lost" in VR; you can, however, become disabled or crippled due to the malfunctioning of your medical prostheses.

This seems a distinction without a difference.

If future VR technologies could override incoming nervous system inputs, then your mind IS someplace else. The brain has no way of knowing what exists outside the black box of the skull without incoming sensory data. This includes the usual suspects like visual and auditory nerves, but also includes a host of internal "body data" such as the kinesthetic position of limbs and sensations from internal systems like the digestive tract.

Assuming those inputs have been hijacked and are being fed alternate data, you could easily become "lost in VR" with no way out. The horrifying possibilities of virtual reality torture was one of the most spine-chilling features of Richard Morgan's "Altered Carbon".
Or we make great pets.

351:

One key question is, "how much is a kill worth"? Bullets are individually cheap, but if it takes 20,000 rounds to hit one insurgent in a jungle, that adds up.

Saw a show on the development of proximity AA shells in WWII.

ABICR

At the start of the war in the Pacific the US was firing 5000 5" shells per downed plane. After they came up with proximity shells that was cut down to 500. Both numbers seem absurdly high to me but I'm not in this field.

352:

That scenario is one of the scenes in the novel he linked to (ie, "The Hacker and the Ants").

353:

If all of the characters are dudes, then where did everyone else go?

My wife and daughter just spent 5 days walking around Jerusalem and a few other nearby towns doing the tourist thing on the cheap. Mostly the older areas. She was struck by how few women were as they walked around.

354:

These things go in cycles. Back in the 1960s and 1970s John Christopher (real name Sam Youd) made a good living writing YA dystopias and he had plenty of company. The 70s were not an optimistic time. We've got a lot of YA dystopias right now because the Hunger Games made a ton of money and every publisher wanted a piece of that action. Same way Harry Potter led to a whole bunch of YA books about kids with magic powers. Eventually there will be a new hit and something else will be the obsession of the hour.

355:

Things to watch out for:

Cyber- as a prefix.

There's a new TV show in the US called CSI: Cyber. I thought that just maybe they get some of it right. Turned it off after less than 5 minutes. Sigh.
Since a lot of the discussion revolves around space opera, I feel obliged to link to the **Tough Guide to the Galaxy**. But that useful site makes an important point - a lot of these tropes persist in the face of logic and reason precisely because readers want them. They want the tramp steamers in space, they want starship troopers fighting over planets and they want the Napoleonic Wars in space even when it makes no sense. It's not even specifically political - John Scalzi has been noted as a repeat offender and he's left of center politically. He's also very popular- just got a multi-million dollar contract.

It's all a little depressing. The space opera of the 1950s and 1960s may be woefully dated but the best authors tried very hard to make sure the stories made sense and that they were creating a future that might happen. The modern writers largely don't seem to care and neither do the readers. Frankly, if we're not going to bother with trying to create a plausible fictional future, bring on the dragons and wizards.

---

**357:**

Ha!

You all missed the biggest one. (Btw - this is actually manifestly destiny depressing, and shows you're not actually thinking).

*Environment determines and shapes consciousness.*

Your children (12 under) will live in a world without Lions, Tigers, Bears, Rhinos, Elephants etc. Your children will not only never-have-seen an animal apart from on a screen (that's 2015, today, btw) but they will live in a world where they are now extinct.

You can do the same for abstract ideas as well ("freedom"; "free thought"; "progress").

~

Kinda funny.

#357 and no-one got it yet.

Hint: Eloi and Morlocks.

---

**358:**
Forget the rocks hitting the hull. Did you notice the bit where she had starships fueled by algae (!) that is grown in vats on the ship? Presumably, the algae is grown with lights that are powered by the algae that is grown with lights powered by...

359:

Guess you weren't paying attention when I mentioned using Polynesia as a model. Paucity of species is kind of baked in there. Of course, most people live in cities and get by with even less.

360:

>>>Your children (12 under) will live in a world without Lions, Tigers, Bears, Rhinos, Elephants etc.

1. The vast majority of children already only ever see those animals in the zoo. This will not change. They will not go extinct, only "extinct in the wild".
2. Bears are not going anywhere.

Environment determines and shapes consciousness

I like to live in an environment where I am not interacting with large carnivores, thank you very much.

361:

Here's a semi-new idea:

I just found out about the New Age Bullshit Generator which is an automated generator of New Age-y psychobabble, based on the Twitter stream of a well-known practitioner of the art. Fun stuff if you haven't seen it already. I'm just late to the party, as usual.

The challenge for the coders among us is to write the code to use standard SFF shibboleths and plots to generate SF book proposals (at least the elevator pitch therefrom) that writers can turn into novels and thereby pay off their student loans and make a living. It shouldn't be that hard, as the code for the New Age BS generator is available on Github.

362:

Never mind. It's been done. In multiple, different ways (I could add quite a few more on).

there's a random generator for SF props, too.

I guess automating the generation of shibboleths is, itself, a shibboleth. Are shibboleths a strange loop? Or is that a shibboleth in itself?
Might be interesting to compare Einstein's brain to what is known about frequent peculiarities in close relatives of schizophrenics

https://en.wikipedia.org/wiki/Eduard_Einstein
or maybe developmentally disabled

https://en.wikipedia.org/wiki/Lieserl_Einstein#Lieserl_Einstein_.28Albert.27s_daughter.29

One thing that can rescue some of those technologies from being doomsday devices is restricting the area of effect. You can negate gravity in a 10cm area for almost free, 50m radius cheaply, but at 500m and higher it's absurdly expensive.

Of course how the "absurdly expensive" cost is limited by the lower radius items. For quick back of the envelope calculations, if a 50 m radius antigrav can be done at price X, a 500 m radius one can't cost much more than $10^2 = 100$ times that.

This is just from using enough of the inexpensive 50 m radius units to cover the 500 m radius area.

Oh, yeah, these kind of basic math errors are one of my science fiction shibboleths. I can't think of any particular examples right now, but I think I've seen and forgotten them already.

And, yes, Dave Clements should write a book about science writing in science fiction, please. ;)

If the incompatibilities had consequences that could lead to competing predictions under any experimental conditions, we would have solved that riddle years ago.

How do you know that this is true & are you really sure of that?

Dark energy and dark matter are fudge factors that cosmologists insert into their equations to try to explain why the overall structure of the universe looks the way it does. They're possibly nonsense,...

Really?

Dark Matter, or something very like it has been "observed" in the sense of producing effects (gravitational) that can not be explained otherwise, & Dark Energy is Einstein's "Big Lambda" form GR theory.

I'd be careful about being so dismissive, actually.

As used by 99% of Psychiatrists & 150% of politicians & property developers, I assume?
367:

Thanks! I might track it down.

368:

"Lions, Tigers, Bears, Rhinos, Elephants etc" have been living in a world without my children since 1962! ;-) 

369:

Did you notice the bit where she had starships fueled by algae (!) that is grown in vats on the ship?

I've never read this and I doubt I'd want to. It's interesting to wonder how such a scheme could be salvaged, though. Maybe the algae is genetically engineered to produce thiotimoline, which in turn activates the time engines... *grin*

370:

Of course how the "absurdly expensive" cost is limited by the lower radius items.

Re-read the original post; dhasenan explicitly addressed that question in the next paragraph.

As an example, suppose Antigravity Device Foo affects a given spherical radius and the power consumption increases by volume not radius; reasonable but maybe annoying for large applications. But where does the weight go? A plausible-for-storytelling answer is that it's pushed out to everything around the ADF field, in a region proportional to the size of the antigravity effect; this is all the excuse an author needs to say that two or more ADF units can't operate right next to each other (and makes bringing down ADF vehicles very easy). Large arrays of small machines are not always practical at all, much less as replacements for one big gadget.

371:

Hazardous jobs. We already have robots to examine nuclear reactors and safely detonate small bombs. That's only going to expand, yet scifi stories still have humans in hazardous occupations.

Actually those are ROVs. Which still require people nearby. Until AI gets a whole heaping lot better. And if it's that much better than current state of the art it should impact the plot of almost any book.

372:
Actually those are ROVs. Which still require people nearby.

This seems to be a good argument for humans-in-a-can in orbit around inhospitable places, at least. There's no obvious reason to send humans to the surface of Titan or the interior of Europa when it's so much easier to send expendable ROVs instead. Particularly if the AI is good enough for routine traveling and a human mind only needs to drop in to do specialized tasks; that way one human can oversee multiple semi-autonomous robots widely dispersed over an arbitrarily large area.

373:

There's certainly some element of that. I guess it depends crucially on how good resolution you actually need for the sensor package.

With a beam follower, you can probably get away with somewhere in the region of 30 pixels total, if the shape of the sensor is right (might be able to do it with 4-5 pixels, but to some extent more is better).

I suspect that you can trade resolution for light sensitivity, as long as you can somewhat reliably distinguish "target" from "background" (total flight time is probably going to be short enough that you can risk the possibility of one target being confused with another as they cross over).

I still suspect it would be hard to drop it down below 10 mm diameter.

374:

*Once an algorithm is aiming the bullet, then it won't be long before cops insist that bullets be programmed not to target them, and it won't take long after that for organized crime to copy the protection method.*

Will not happen. There will be a security back door which only the good guys have access to use and they will thus be able to keep the bad guys at bay.[/sarcasm]

Riffing on current TLA agencies demands.

375:

Tritium is an unwanted product of nuclear reactors. It is produced in the reactor and escapes from the generators sufficiently that it becomes a local pollution problem, found in noticeable concentrations in groundwater near the plants. However its biological half-life is so short it's not regarded as any kind of risk to health.

I could tell you a funny story about tritium and the regulations for disposal thereof...

376:
Here is one egregious example - igniting a trail of jet fuel in snow, which catches up with airliner taking off and then leaps through the air to blow up the plane. Die Hard: https://www.youtube.com/watch?v=P0Tt7VUMLS8
Utter shit.

Sorry you missed the fact that all of the Die Hard movies are comic books implemented with live actors.

377:

**genetically engineered to produce thiotimoline**

I will see what you did there, in a couple of years! :-D

378:

*Where I am, they're doing dense clusters of houses without yards surrounding a mall that has a grocery store, a drugstore, a bank, and random other small business. That few if any of these buildings have solar power, rainwater collection, or so forth has escaped the attention of the largely right-wing builders, for some reason that makes no sense to me.*

Because they have certain profit numbers to meet. And to meet them they will take the local zoning/planning rules and then build to fit in those rules while maximizing profit. A thing most of the people making up the rules don't seem to get. They do things like demand a grocery store be built on a unused city lot. Then get upset when no one will build there as the numbers don't work. Real life example here. Most of my business client income is from architects who are more into your thought on things. But reality bites hard a lot of the time.

... *the idea that local homes should be built with solar and the ability to collect rainwater was dismissed as dangerously speculative and radical, even though we are in a record-breaking drought.*

I'm looking hard at just tearing down my 1961 suburban split level house and building something more ameiable to growing old in and that might have some resell value donw the road. I'd done some preliminary design and are looking to make it so solar can be added later and rainwater collection and drainage is more than just a barrel at the corner of the house.

But I'm sure that a neighbor or two will flip out when they get an idea of what I might do. See this for how a similar house a few miles away had issues.


379:
By having shops at ground level facing out you ensure that there's lots of daytime pedestrian traffic and maximize housing density in the interior of the city without needing to go more than 3-5 stories up.

Building codes in the US make this hard. Having a business below a residential area really ramps up the code requirements for fire safety and such and makes it hard to pull off for a price point that works unless you're talking much taller buildings.

380:

I can think of a third (speculative) capture process: capture GHGs dissolved in the surface waters of the ocean and precipitate them out in some insoluble form, notably carbonate ions to calcium carbonate.

That process is currently going into reverse -- acidification is fucking with diatoms and molluscs ability to build shells. But what if we deliberately set out to drive it, using a combination of large-scale reactors tweaked to produce aragonite at maximum efficiency, and the square-cube law? Aragonite tends to dissolve in an acidified, carbonated solution -- but the more massive the chunk, the lower its surface area will be in proportion to its volume, so the less efficient the dissolution mechanism becomes.

I'd envisage some sort of "floating island" mass sitting on blown bubbles of aragonite, supporting a sub-surface mass of genetically modified organisms tweaked for maximum aragonite synthesizing efficiency and if necessary fed nutrient supplements to keep them going; surround the whole thing with a pumped osmotic membrane to keep the carbonate concentration optimized for shell synthesis. As more matter builds up, periodically detach it in big chunks and let it sink to the bottom of the sea.

Assumptions: that we can build a better shellfish or coral, optimized for producing insoluble carbonates, under semi-controlled conditions. Not plausible in the short term (5-50 years), may be plausible in the 50-500 year time frame (which is what we need to worry about).

Secondary assumption: we can find sources of calcium minerals that are not fully carbon-bound by mining on land, or that there's enough free calcium in seawater to make this process viable.

381:

Actually, come to think of it, Star Wars warfare as seen in the movies is a rather interesting combo. Starship fleets that can essentially get anywhere in the galaxy in mere hours, without warning

In my watching it seemed to be days and weeks, not hours.

382:

Plausible? Readable?
Why would the people of Earth commit their entire GDP to such a thing?

These ships would make US aircraft carriers look disposable and cheap.

383:

If the incompatibilities had consequences that could lead to competing predictions under any experimental conditions, we would have solved that riddle years ago.

How do you know that this is true & are you really sure of that?

That's pretty much the scientific method in a nutshell. If two hypotheses made different predictions under any practicable circumstances, obviously we would run the experiment to falsify (at least) one of them if at all possible. The remaining questions in physics are so difficult to answer precisely because they're so inconsequential.

384:

Note that teleoperating robots is fraught by control-loop lag due to the speed of light. The Soviet experience with their Lunokhod rovers was that driving them on the lunar surface was extremely fatiguing and difficult for the drivers, because of the roughly 1.5 second light-speed propagation time for signals in each direction. (Think of it as like playing a computer game talking to a server over a very laggy link, with no save points, no respawns, and a hundred million dollar penalty in real life if you screw up.)

These days, with some autonomous capability, driving vehicles on the moon shouldn't be too onerous -- instead of trying to directly control, you direct the onboard autopilot to proceed to a specific point. But this will only get you so far; experience with three American Mars rovers shows that when your control-loop is 15-30 minutes, every single move has to be very carefully choreographed in advance, and it's worth noting that those Mars rovers typically travel on the order of single-digit kilometres per year, not per hour.

Now add the repair problem and it gets even worse: messing with intricate assemblies in an unfamiliar gravitational field is orders of magnitude harder than pointing a rover at a target waypoint. Teleoperated humanoid robots ought to be able to do the job, but only if the control lag is short enough for it to feel like real time telepresence to the human operators. That, to me, suggests a moonbase; either on Luna -- with a shirtsleeve environment for the folks controlling the maintenance bots on the surface -- or, for Mars exploration, dug into the surface of Phobos or Deimos. (Use a layer of moon rock for radiation protection, run an antenna farm and/or solar collectors on the surface for comms and power, use comsats in low orbit to relay signals to the ground -- not geosynch or areosync, the signal lag is noticeable -- and you can provide a working telepresence illusion.)

So, bored buys in shipping container outside Shanghai? You can use that for the grunt work of bossing dump trucks and bulldozers around on the moon, but for anything more delicate, your bored guys need to be in a shipping container on the Sea of Tranquility or dug into Phobos.
Shibboleth: "It will take me a couple of minutes to break/bypass the encryption..."

Sticking a Lambda on the end of a GTR equation in no way "explains" Dark Energy. Or if it does, it is as useful as the word "Dark".

A few people have mentioned it in specific form, but the generalised case is: Any mention of a specialised area of knowledge that the reader is a specialist/familiar with.

In the US the common thread is lawyers can't stand to watch the TV show "Law and Order". And doctors have the same issue with the show "House M.D.".

Your interesting proposal about the anatomy of space-going aliens reminds me of H. G. Wells' predictions of how humans would continue to evolve in the far future. He thought: big brains, vestigial limbs and bodies.

Me, I call bullshit. For one thing, we've got a model of what an ideal human body should look like baked into our wetware -- think of beauty and aesthetic sense as an emergent side-effect of our reproductive drive -- and changing the body proportions and appearance of a new model human too far away from that is going to produce massive body dysphoria in them, unless we also tweak their nervous system to match. For seconds, a lot of human reproductive issues revolve around the ratio of skull size of the neonate to pelvis size of the mother: the "big brains" direction is not going to work without external incubation because it'd kill the mother (or require a mandatory caesarian delivery).

We're actually a fairly finely-balanced compromise between a whole bunch of requirements. I can easily envisage a set of tweaks to human cellular biology intended to make us more viable in microgravity, or more radiation-resistant, or less susceptible to ageing and senescence: possibly, much more speculatively, to formalize the endosymbiotic relationship we have with our more useful prokaryotic passengers. (It'd be really useful to regain the ability to synthesize vitamin C, or to build in the ability to break down lignin and cellulose in our gut as an emergency food source and/or to help simplify a space colony or starship's biomass recycling.) But gross morphological departures from the original template are a lot harder, and the stuff I'm proposing is already much more challenging than folks without a biosciences background might appreciate.
389:

Under that assumption a car that can go at 200mph should only cost twice as much as a car that can do 100mph.

If a story requires it some Handwavium can be expended to explain, for example, that a large anti-gravitational area effect is more unstable than a smaller one and hence needs more energy or equipment to sustain it or it can't be held in place for as long etc. etc. Hopefully the story isn't written around the Handwavium, it's just a prop for the real tale.

390:

I thought that was kind of obvious?

(A quick google isn't helping me find it, but a few years ago I pointed out that we're raising the first generation who will never know what it's like to be lost -- that is, unable to orient themselves geographically. If that isn't a WTF moment, I don't know what is! But I will note that on visits to major cities I've pretty much given up on buying local street maps in the past couple of years -- I just make sure I've got mobile bandwidth and a spare USB backup battery.)

391:

Under that assumption a car that can go at 200mph should only cost twice as much as a car that can do 100mph.

If a story requires it some Handwavium can be expended to explain, for example, that a large anti-gravitational area effect is more unstable than a smaller one and hence needs more energy or equipment to sustain it or it can't be held in place for as long etc. etc. Hopefully the story isn't written around the Handwavium, it's just a prop for the real tale.

I was talking about just that if you have a gadget (drone, ship, whatever) which does Things to gravity in a 50 meter radius and is cheap, you can cover a 500 m radius with about hundred of them.

If you handwave it so that the small devices interfere with each other or something, then, yes, but that requires more handwave and needs to be addressed (in my opinion) at least somehow.

The car analogy would (in my opinion again) be more like "if you can fit five people in a car, and you need to transport 50 people, buying a bus is necessary only if it's cheaper than buying ten regular cars". Not about speed in this.

The car speed comparison would be more akin to "if this can fiddle with gravity for up to half a gee, we could use two to fiddle up to a gee".

392:

The idea that we're going to get "turn ignition key and go" responsiveness out of alien high tech artefacts in the thousands to millions of years age-range is just delusional
Aw. Now you've gone and ruined Stargate SG1 for me.

393:

Interesting. There are three things that piss me off, and only one has been widely commented on: the separation of compatible biochemistries and compatible exoparasites; panspermia (still just about plausible) might give both, but not just one! The others have been touched on, though.

One is the portrayal of very different societies with the people (or aliens) thinking exactly like modern westerners. I have a little experience of pre-science cultures and education, and the difference in the way that people think about ordinary life is both drastic and pervasive - much more than between two post-science cultures. Of course, describing that well obviously requires actual genius ....

The other is treating complexity as simple (and here I blame the professionals (both academics and science writers). One simply cannot have immortality, immunity from all disease (including cancer and auto-immune ones), AI without the comparable flaws, etc., without full-blown deity powers. One needs a workable metamathematics of the mathematics of the physical universe to do that!

The most annoying nonsense here is the myth promoted by so-called computer scientists that proving P=NP would have any practical effect; I could explain why not, if wanted. Goedel/Turing is more interesting, especially as there are computational models where its standard proofs fail, but that area gets seriously arcane quite quickly and the 'state of the art' is best summarised as 'dunno'.

394:

... (hint: infrared emissions, second hint: the background temperature you want to avoid standing out against is 2.73 degrees Kelvin, i.e. liquid Helium temperature

A minor nitpick, but:

This, as it happens, depends rather a lot on where you are and is mostly not true, though I see it fairly often in science fiction discussions. Most people don't realize how much extra background radiation there is in space, in addition to the 2.725 K cosmic microwave background radiation.
In the inner Solar System, for example, the dominant infrared background is thermal emission from dust grains (plus scattered thermal photons from the Sun). This peaks at around 10 microns (roughly peak emission for something with a temperature of 250-300 K). There's also a significant background from stars and dust in the Milky Way, and the so-called cosmic infrared background (the cumulative infrared emission from billions of distant galaxies).

This is what the infrared background looks like from within the inner Solar System (as seen by the COBE satellite):

http://lambda.gsfc.nasa.gov/product/cobe/dirbe_image.cfm

This doesn't really invalidate the general "stealth is really difficult in space" argument, but it's not exactly correct to say, "2.73 K cosmic background radiation is the only thing out there".

---

395:

Admit it, you're just doing this for kicks.(V)

Wasn't it "for a fine dining experience", as in "To Serve a Human"? :)

---

396:

Alien contact, and the resulting international competition for technological advantage, is the most plausible scenario I was able to come up with.

---

397:

At the start of the war in the Pacific the US was firing 5000 5" shells per downed plane. After they came up with proximity shells that was cut down to 500. Both numbers seem absurdly high to me but I'm not in this field

Sounds plausible...

Firstly, "success" is not "shoot down plane" but "stop plane hitting ship with bomb / torpedo". Hitting the plane is just a bonus.

Secondly, hitting a plane at anything above low altitude is a non-trivial problem in 3-D maths.

- You're firing a barely- or non-supersonic heavy artillery shell upwards, and trying to get the fragmentation to intersect with the aircraft sufficiently to achieve critical damage.

- You're having to "lead" the target (pronounced as in "dog's lead/leash", not the heavy metal), i.e. predict where it's going to be in a couple of seconds time. Any bearing or velocity error, is a miss. Any significant variation in muzzle velocity, is a miss. Note - barrel temperature can be significant.

- Originally, this was achieved with timed fuzes in the shell; effectively "go bang at altitude X", Any mistakes in the estimation of altitude, is a miss.
The "Variable Timed" (VT) Fuze (code word to obscure the obvious) is in fact an omnidirectional radar; anything big enough to register a closing velocity gets the good news once it stops closing - hence the later name of "Proximity" Fuze, once the secret was out. Suddenly, an exact estimation of altitude is less critical, but still important when predicting the "lead" on the target.

If you fire a VT fuzed shell at the ground, you can set it to go boom at a given altitude; i.e. airburst artillery, which is an order of magnitude more effective at killing people than point-detonation fuzes. Of course, in the 90s some bright spark in the US figured that you could spoof said fuzes and get them to go boom fractionally early and ineffectively; basically a manpack artillery shield (called Shortstop, if you want to search for it). So now they had to make artillery fuzes proof against ECM...

398:
I didn't find it plausible, beyond the cost and feasibility of such a system I just don't get the point. I can't imagine there being anything physical worth trading over interstellar distances. Even technology, might as well do that by (long drawn out) communication.

That's assuming that humanity had anything useful to trade.

399:
I was talking about just that if you have a gadget (drone, ship, whatever) which does Things to gravity in a 50 meter radius and is cheap, you can cover a 500 m radius with about hundred of them.

Shouldn't the number required vary as the third power of the radius?

400:
For what it's worth, biological eyes actually do trade resolution for light sensitivity. The size of a retinal cell is fairly constant, but under low-light conditions organisms link the outputs of multiple retinal cells over a larger area to boost the probability of detecting photons.

401:
Not to mention Douglas Hill, who did a whole bunch in the 80s as well.

I think Dystopias and disaster scenarios are particularly popular for YA literature because they solve the number one problem - how do you get most of the adults out of the way so that your teenagers can be the heroes.

The few remaining adults can fill the role of Grizzled Mentor, Primary Antagonist or Figure of Authority while the kids get up to mischief.
402:

I hope you don't live in a neighborhood where a 1961 split-level is considered "historic", much less in need of preservation. I have seen the same mindset somewhat inverted in new neighborhoods with residents' associations, which is why I purposefully bought a house in a neighborhood without such nonsense (for James Padraic R, off West Uintah north of Old Colorado City). There's something bizarre about the Land of the Free and the Home of the Brave having many people who want to tell you what color you can paint your house.

Per the shibboleths, for me there seems to be a sliding scale that depends on whether I know and like the author; and I can usually apply my dross filter based on blurbs and jacket summaries.

I will also admit to consuming brain candy, if I find the packaging attractive enough.

403:

Actually, I could see low mass luxury items that are the result of complex biological processes - think spices, for example. There are also variations in crops grown under different environments, i.e. Central American coffee beans have a distinctly different flavor than Pacific coffee beans.

404:

*current full-tech capability is caseless ammo and cobalt alloy barrels and no one is deploying those*

One of the biggest issues with caseless ammo is that it turns out a significant amount of the heat from firing is soaked into the brass and then ejected. With caseless, you lose that one shot replacing heatsink, instead, the chamber absorbs all that heat and has to get rid of it, and in general, it's not shaped to do that well -- and high strength steels as a class are generally not very good conductors of heat. They have a high heat capacity, yes, but not good conductors, so you end up with a significant heat buildup right at the source. (This, BTW, is why we make heatsinks of things like copper and aluminum -- they conduct heat very well, so the heat gets away from the hotspot fast.)

And when the chamber gets hot enough to light the next round when loaded, you suddenly have a full-auto weapon that you can only stop firing by dropping the magazine.

405:

Pretty late to this party, but Star Trek teleporters annoy the hell out of me. Humans as a species have access to a technology that can manipulate matter on a molecular level. It's too big a thing to allow any other aspect of Star Trek to be plausible (which it largely isn't.) Klingons on the starboard bow? Dissassemble them molecule by molecule. He's dead Jim? Not anymore, the computer had to map him down to the atomic level during his last transporter trip, lets just print him out using old vegetable matter. Explore strange new worlds and seek out new civilizations? Why bother? We can
get everything we need from our Solar System, taking apart matter and rebuilding it however we wish.

406:

*Actually, come to think of it, Star Wars warfare as seen in the movies is a rather interesting combo. Starship fleets that can essentially get anywhere in the galaxy in mere hours, without warning*

*In my watching it seemed to be days and weeks, not hours.*

Your watching is wrong. That they are crossing the galaxy in less than a day is explicit in the text, multiple times, from 1977 on. This was a major plot point in at least 4 of the films.

*Aw. Now you've gone and ruined Stargate SG1 for me.*

Unless, as he pointed out, the hardware is explicitly designed to be that way. Which, per the text, it was. That the aliens built things to last millions of years and designed them to be usable by someone with the knowledge of someone in the middle ages was a major plot point for the series.

407:

That was [back in 2011](#).

408:

Per smart bullets, etc. Another factor to consider is the cost of the improvement versus the projected payoff. This is why the US Army hasn't been able to move off the Beretta M9 pistol for the past 20 years; while there are more effective pistols, they aren't ENOUGH better to justify the expense (and if you're using a pistol in combat for anything other than a last resort, you're doing it wrong).

Nuances can lead to major missteps. When the Army bought the M16, they decided to use a different propellant than that the designer intended, leading to much more fouling and more stoppages on the battlefield. For a long time, the M16 was considered unreliable by the grunts, and they held on to their M14's as long as possible. Over time, most of the design shortcomings of the M16 family have been overcome, and it's likely to remain the main infantry weapon for the foreseeable future.

Equipping a sizable military with a "smart bullet" weapon will probably be much more expensive than replacing a service rifle or pistol. Since small arms make a relatively small proportion of casualties, I'd argue that, even with the technology, it'll be a long time before it's adopted en masse.

409:
The main reason the Swedish Army moved from a 9mm pistol to a 10mm pistol as the general service weapon is that people insisted on breaking the one rule of pistol firing, "never use the 9mm SMG ammo" (it's over-loaded, so relatively quickly causes stress fractures in the frame of a pistol). When there'd been enough severe injuries to self-disassembling pistols, they switched to one that is not ammo-compatible with the m/45.

Having common calibres is only useful if there's full compatibility between the rounds.

410:
He did it twice, then; "So Bright The Vision" had Earth as the galaxy's sole source of fiction.

411:
God, I love Slashdot some days:

http://science.slashdot.org/story/15/12/03/2153218/if-climate-change-is-a-problem-then-lunar-helium-3-fueled-fusion-is-the-solution

412:
Oww! It just goes to show that there's no such thing as "soldier proof". That sucks from a logistical point of view. Consider the US military in WWII; there were two calibers of pistol ammo in use (.38 and .45), .30 carbine, and 30-06 for the M1903, M1 Garand, M1918 BAR, and the M1919 LMG/MMG, plus the .50 ammo for the Ma Deuce. Now we have 9mm, 5.56mm, and 7.62mm (primarily for vehicle-mounted MGs), and STILL the 12.7mm for the Ma Deuce. Wait, that's not so much progress after all. Guess it still sucks to be a loggie.

413:
*Shouldn't the number required vary as the third power of the radius?*

No. If you shield the surface you are effectively shielding the whole volume. How is the gravitational interaction coming through the surface? Think Faraday cage as an analogy. (Unless of course, there is some higher-dimensional handwaving)

414:
I suspect that future Mars rovers and other robots exploring the Jovian moons will be more autonomous (smart-bots) rather than operated like a drone. These smart-bots will have a set of preprogrammed tasks for the first part of their mission and then go solo for the remainder of their lifespan. However, there will always be drone-bots.
My Shibboleth: Large moon or Mars bases established in the 21st century (including my mythical Armstrong moonbase mentioned in an earlier blog posting). There may be an ISS sized moonbase established by ~2050, but I don’t foresee manned Mars missions happening in my lifetime.

Exempting alternate histories/universes and everything written between 1950 and 1980, they had high hopes for the future. How were they to know we were on the road to a dystopian future. Every time I re-watch 2001: A Space Odyssey and see Clavius Base, I think of what could have been.

415:

*There’s something bizarre about the Land of the Free and the Home of the Brave having many people who want to tell you what color you can paint your house.*

Especially as in other regards, such as the environment, your legal system seems to let companies do pretty much what they want to, no matter what local residents want.

I wonder how much of that is displacement control? People can’t control what they breath, drink, drive on, work for, etc — but at least they can have some control over the neighbour’s paint colour?

416:

Actually you would be amazed how quickly all our geolocation tech breaks down as soon as you get into the real back country all the standard stuff is very reliant on some kind of connectivity.

There is a reason why Gaiman is still in business

There are apps that work well with some preparation (spyglass etc) but they are hardly part of the standard kit

The really interesting thing that I have observed with my son as he gets old enough is how completely helpless he is with direction finding and manual orientation. iPhone stops working he is screwed. Been working on that

417:

Sigh. You’re confusing national foundational mythology with reality again: it’s propaganda, folks, not an actual depiction of reality. ("The Star Spangled Banner" was written in 1814 as wartime propaganda, adopted by the US Navy in 1889, and endorsed by Woodrow Wilson in 1916, not coincidentally during a world war; official national anthem status achieved only in 1931.

That sort of myth builds a nice cultural self-image that people like to see themselves reflected in, but it’s not necessarily very accurate (the "rockets red glare" and "bombs bursting in the air" were British Congreve rockets during the bombardment of Baltimore).

So, triumphalist narratives reflect a kind of wishful thinking, rather than an accurate depiction of the world as it is: and yes, the USA’s legal framework privileges the strong and big organizations so
much that petty control over their neighbours in the hope they won't do something that decreases
real estate resale value is about all individuals can hope for.

418:

One of the biggest issues with caseless ammo is that it turns out a significant amount of the heat
from firing is soaked into the brass and then ejected.

Absolutely.

Which seems to be why the point of commonality between the H&K G11 and the current US LSAT
[1] test articles is a rotary breech, so there's extra air cooling and the breech and the barrel can be
made out of different materials.

So, yes, it's an engineering concern but it's well and truly solved. It's just very expensive to replace
all that ammo inventory and all those small arms, and the expected benefit isn't all that big.

[1] someone has a sense of humour

[2] the Army wants to go with cased telescoped rounds; the Marines want full caseless. That should
be interesting. In both, err, cases, the driver looks like weight of ammunition, rather than
performance.

419:

You re-quote yourself & not me ...
And ...& But
We know that both QM & GRE are both "true"
And you state, ex cathedra:
"The remaining questions in physics are so difficult to answer precisely because they're so
inconsequential."

How do you know that?
QM looked completely practically inconsequential, except to a tiny community of theoretical
Physicists in 1895-1905.
Look at it now.

420:

Re-read the original post; dhasenan explicitly addressed that question in the next paragraph.

Ah, yes, I read it too fast. Thank you for correcting me.

It seems my couple of posts earlier today were talking about things already discussed, sorry.
Teaches me to read before responding.
One of the biggest issues with caseless ammo is that it turns out a significant amount of the heat from firing is soaked into the brass and then ejected.

True, but not unworkably so; they seem to have solved this with the LSAT project (the solution involving some isolation of chamber from barrel, so that a very hot barrel doesn't dump heat into the chamber to the point of cook-off).

And when the chamber gets hot enough to light the next round when loaded, you suddenly have a full-auto weapon that you can only stop firing by dropping the magazine.

There was an interesting trial that DoD did with the M-4/M-16 (PDF), in response to some SOF types who were complaining about firing accidents. Essentially, if you run several magazines through an M4/M16 in a hurry, you can get the barrel to melt in about 500 rounds (just under three minutes, if you work at it).

I did hear of a UK demonstration with the L86 at the Small-Arms School where they didn't fire to destruction, but fired instead at a realistic but very heavy rate - you could heat up an L86 to cook-off every few seconds after nine or ten magazines. Note that cook-offs due to heat are not "fully automatic", because it takes time for each round to be heated up by the chamber to the point of ignition - "it just went fully automatic" typically happens because of carbon build up within the body of the weapon and the lack of a safety sear in the design - I saw it happen to a Sterling SMG that had spent all day on the range, and had fired seven or eight hundred rounds.

With air-cooled belt-fed MGs, you tend to carry spare barrels that are changed over every 500 rounds or so. Given that the normal rate of fire, mounted on a tripod, is 100rpm; rapid rate is 200rpm; and that the tripod comes with two spare barrels; at worst you've got five minutes to allow each barrel to cool down, for a well-trained MG team.

Yeah
I want my future back - some bastards stole it!

"Star-Mangled Spanner" surely?

A UK military friend serving at a NATO post in the US, described the Commonwealth types holding a dinner this year to commemorate the two-hundredth anniversary of the US invasion of Canada; there may have been a flambeed dessert in the form of the White House, but the US types took it in good humour :)
After a Regimental Dinner where our band murdered the US National Anthem (it was at short notice, and to be honest they didn't murder it so much as commit war crimes), I did point out that we could have avoided some of the embarrassment if they had played "God Save the Queen", and claimed that it was "My Country, 'tis of Thee" (same tune)...

425:

Long time no hear! Some of the gang here have been wondering how you've been.

Now, back to your post. I was sorta heading in the same direction ... be gentle when you pick apart.

Evolution-in-a-bag (why-we’re-so-special: flexibility and resiliency) – okay, we’ve no idea how evolution would progress, what it would produce anywhere else. But the story premise is that aliens in a routine mapping of the galaxy find something very unusual about Earth: all life is related, despite the extreme range of diversity including being able to occupy every conceivable niche everywhere they look. A series of core samples when examined closely contain life forms from every major geologic epoch. Therefore the aliens decide to study us … in depth.

From a story perspective this provides a platform for discussing differences between alien and humans starting with the solar system, planet formation evolution, ecology, extinction events, appetites and internal controls (homeostasis, satiety, addiction, learning, immune system, junk DNA), reproduction, developmental bio/psych, etc. and what each means when looked at from the different (alien vs. human) point of view. I’m assuming said aliens have really nifty stats software.

What the aliens decide to do with their newly acquired knowledge is up to the writer/reader. Possibilities: aliens feel they’ve become stagnant as a species so want to see how biologic diversification might pep things up for their species, or some groups need/want to migrate therefore need to develop/test alternate proven biologic evolution strategies/scenarios.

Topic change ... carbon capture, Q-carbon

I like this new materials possibility, but it's probably a shibboleth for other posters.

Carbon expulsion instead of carbon capture? What would happen if you could send/vent the excess carbon into space?

Energy sunroof ... Floating gas bags that combine physical sun-screening* with Q-carbon PV cells to generate/store energy.

*These sun-screens would be enormous flat sheets at very high altitudes floating over seldom traveled areas such as the southern Indian Ocean. They'd be timed to drift up/down around the equator in time with the earth’s axis. Supplies, etc. could be done using reconditioned/repurposed ghost ships currently floating in a boat graveyard off Johor in Malaysia. (Maybe the Q-carbon could also be used as a really long extension cord? … The description of Q-carbon makes it sound as though you wouldn’t get the same sort/rate of electric current/power loss as you do with regular copper wires.)
Back on topic ...

Worst shibboleth of all … profit is ‘the’ sane reason to do anything.

Off-topic again ...

Since someone has already ventured into real-world pet peeves:

Personal transportation devices … check any road or highway and about 75% of all cars are occupied by only one person. On a per-car basis – in my neck of the woods anyways - multiple person transportation accounts for maybe 10% of all automobile trips/mileage. Plus - just how many groceries, how much baggage/gear do you really need to haul around? And do you need this capacity every single day? This car trope is insane and a major rethink is overdue. And no, this is not a plug for bicycles. This has to be powered, stable (so four wheels) as well as provide weather/environment protection and privacy for the driver.

---

426:

*never use the 9mm SMG ammo*

I may have been on ranges where we were handed 2Z ammunition... testament to the strength of the Browning 9mm, none of them broke :)

Note for all - rather light loadings of 9mm by litigation-averse US ammunition companies has led to the US myth that 9mm is somehow an ineffective ammunition nature; forgetful of the fact that 9mm Parabellum (near enough 9mm NATO, and a +P+ load) had filled graveyards all over Europe.

---

427:

Not really.

There are multiple forces at work causing development patterns, going all the way back to Eisenhower green-lighting suburbanization as a way to make sure everyone didn't get incinerated when nuclear war started and the nukes rained down on dense cities.

Here are some of the players: Home Owner's Associations, along with the various covenants, deed restrictions, etc. The notion here is that blighted houses drive everyone's property values down, so they mandate certain design criteria in an effort to keep the values comparable. Since the value of your house is determined not just by what it is but by the quality of the neighborhood it's in, this is a way to control the quality of the neighborhood.

In California, there's also the fun with ways of getting around the tax-limiting Proposition 13, which also involves taxing neighborhoods for the expenses they generate, and also (IIRC) involves the HOAs, because no taxation without representation. The boards are allegedly elected, but they control their membership quite easily by doing things like controlling when they meet so that most people can't make the meetings.
There are also planning boards. I've said some things about volunteer democracy, and the planning boards are one. You too can sit for 4-6 hours every month without pay and help decide what gets built in your community. Are you surprised that most of the people on these boards are real estate agents, agents for developers, and major land owners? Me neither. I've had the opportunity to go onto one for years, but because their meeting conflicts with another meeting, I can't do it.

As for the bad design of local developments, it's interesting how, now that solar is taking off, the newest homes have these pyramidal roofs with lots of dormers that would be crappy for solar panels. That's not cost-savings, that's politics. It would be cheaper for them to build simpler roof lines and align them with the local sun.

And that takes us to the final bit of nastiness: US politics. The US grew to be a world power on the back of petroleum, which still powers our military. One of the things most people don't explicitly talk about is what switching to 100% renewables will do to that balance of power, and it's one reason I think that going sustainable is going to be really bloody at some point. HOWEVER, I suspect that this is one reason that the US Right Wing really, really doesn't want to go off fossil fuels, and why moderates like Obama and Clinton want it to be a gradual process (e.g. not on their watch).

At this point, I think it's less dangerous to go sustainable fast, but everyone reading this should realize that this affects every military in the world too, and that a lot of people are going to die in the fighting that establishes whatever the next world order looks like. We've built up a lot of karma with our oil-powered military industrial complex, and I don't think it can be unwound painlessly.

428:

We'll have to agree to disagree on that one. All the ones we see on screen come across to me as taking hours, not days or weeks. The only exceptions were the trip in Phantom Menace from Naboo to Tatooine (which they were doing either with no hyperdrive or a back-up hyperdrive), and maybe the trip from Hoth to Bespin in Empire Strikes Back.

The fluff novels in the Expanded Universe had trips that took longer, but they've overriden by what's on screen in a clash.

@Ken Chiacchia

God, I love Slashdot some days:

Hehehe. "Answer in search of a question" strikes again!

429:

What NASA wants in terms of shorter-time-lag telepresence isn't really constant control in real-time by an operator. They like the whole "program everything into a sequence in advance" model for robotic space exploration, because it keeps power and control over the mission in the hands of ground control (and allows for stop-and-go investigation of stuff). If we do a "humans in orbit
controlling robots on Mars" mission at some point, what will happen is that the astronauts will be just sitting there waiting to trouble-shoot rovers executing pre-programmed sequences of tasks as they happen.

Shorter versions: NASA ground control really, really, really likes being in control of every aspect of the mission, and would be very resistant to allowing astronauts to do their own investigations and scientific discovery decisions.

What that means is that you don't need telepresence with unnoticeably short lag-times. You just need it to be much better than what it is now - seconds instead of minutes or worse.

430:

Your future was cancelled due to all the money being pissed away into the sands of Iraq and banker's pockets.

431:

And on the "We Are All Doomed" front...


"COP21: Carbon emissions 'to stall or even decline' this year"

432:

I'm doing this off the top of my head, but here's what I think is going on with your scenario.

Something like half of Earth's oxygen comes from oceanic phytoplankton, and it's generated by metabolizing the CO2 in Earth's surface waters.

Even assuming the chemistry and energetics work out on your proposal (and I don't think they do), what you're talking about is depriving the phytoplankton of their carbon dioxide and sequestering it in the deep ocean in a relatively inaccessible form.

Probably that's a bad idea. To be a little more specific, this is similar to what some people (Peter Ward and company) think happened at the beginning of the Triassic, and the earliest Triassic was a much nastier world than what we're looking at with global warming.

Now, assuming your carbon precipitator works, and you have a magical energy source that can convert the gigatonnes we'd need to convert, I'd suggest building a bunch of them on the continental shelves of the Arctic Ocean and capturing the CH3/CO2 coming out of the sediments there and depositing it in huge aragonite pyramids or some such. Sure it's one of the most hostile oceanic environments on the planet for built structures and the energetics of your system probably don't work (or work efficiently), but you do want to save life as usual, don't you?
The first mention I recall of raising a generation that doesn't know what it's like to be lost is the *Shaping the Future* lecture, which still (deservedly!) has a place in the Specials sidebar. With regard to storing excess CO2 as stable calcium carbonate: that's a key part of accelerated silicate weathering schemes. But not by direct artificial manufacture of aragonite from seawater. Instead you try to increase the pH of seawater by accelerating the natural weathering of silicates rich in calcium and magnesium, most easily by increasing the surface area of mafic rocks (e.g. crushing them). The weathering of mafic rocks is thermodynamically favorable at seashore conditions, e.g. \( \text{MgSiO}_3 + \text{CO}_2 \rightarrow \text{MgCO}_3 + \text{SiO}_2 \) proceeds without human-supplied energy inputs. But the kinetics are terrible with common bulk minerals like basalts. The fresh rock surface rapidly forms an ion-depleted rind of a few microns that protects the bulk underneath.

The kinetics can be improved by crushing the rock into fine enough particles that it only takes decades for the whole particle to finish weathering. It's also accelerated by putting the particles in an environment where phytochemicals enhance weathering, e.g. agricultural soils; crushed olivine can be used to reduce soil acidity, provide some nutrients, and bind atmospheric CO2 all at the same time. The shallow near-shore ocean environment can enhance weathering also as wave action mechanically abrades the ion-depleted rinds.

Increased alkali and alkaline earth ions in the ocean counteract ocean acidity and enable increased oceanic absorption of CO2 without harming marine shell-formers. Over the long term, formation of stable magnesium and calcium carbonates as solids binds the excess CO2 in geologically stable forms.

Based on the energy and capital costs of existing industrial rock crushing operations, I believe that accelerated silicate weathering is cheaper (not to mention less at risk of catastrophic rapid reversal) than schemes like underground CO2 storage. It's still more expensive than cutting anthropogenic emissions though. It also can't scale up enough to reach negative net emissions until gross emissions fall drastically. It is still a large-scale undertaking even if "all" we had to do was clean up the emissions of 1815-2015. And, finally, it is a slow process by human standards, though rapid compared to natural silicate weathering. It won't appeal to people who hold out hope that humans can somehow stabilize things in the next couple of decades without resorting to geoengineering.

---

**434:**

*what you're talking about is depriving the phytoplankton of their carbon dioxide and sequestering it in the deep ocean in a relatively inaccessible form.*

Isn't the idea, though, that CO2 from the atmosphere will continue to dissolve in the ocean? The ideal being a system that precipitates carbon out of the upper ocean at a rate equal to how rapidly CO2 enters the ocean...
One that always used to get me until I worked hard to train myself to ignore it (or in some cases headcanon it away) was "color vision" and "color displays".

Basically: *our* eyes have R/G/B receptors, so we can fake up a lot of what we can see by just using R/G/B emitters. But even on Earth, animals with color vision don't all have the same number of color receptors and they're not all at the same wavelength. So a light-emitting display made for one set of eyes *will not* look the same (or, really, sane) for another set of eyes.

If the species have enough frequency overlap in total, the monochrome image can be right. The overall intensities can be right. The colors will often be *really* wrong. Almost no fiction "pays attention" to this (with the lone exception I can think of being "The Mote in God's Eye").

...and I just had to stop myself from elaborating for another six paragraphs of ranting. This one gets under my skin. I mostly have to "pretend" that high-tech displays actually recreate every single frequency (and even the polarization) of light that high-tech cameras capture, so that the light coming out of a monitor is literally indistinguishable from the light that entered the collection surface (lens, whatever).

---

436:

James White's Sector General universe had a passing reference to the issue of colour reception, in that there was a "universal written language" which was not in much favour. One of the reasons being that there was a large appendix dealing with colour mapping between species. (First story, "Medic," and then -- as far as I can recall -- never mentioned again.)

---

437:

"As for our future, what happens when/if most science and technology is done via (say) genetic algorithms? The end products we can use but almost certainly no Human could ever understand."

This is actually one of my particular shibboleths; the advancement of mechanistic machine learning leads to things "no human could ever understand".

There's a difference between the products of a process being *unexpected*, and the products not being understandable. Take the Google neural-net-generated "slug-dog" pictures. Certainly, they wouldn't have guessed that outcome, but given that outcome, understanding it at both a gestalt level ("there were a lot of pugs in the training set") and a technical, specific level (the cumulative decision functions going on) isn't even the hard part.

Broadly speaking, I think this cliche is related to a very common (some primate studies may indicate innate) flaw in intuitive estimates of probability and its consequences. For example, any particular ordering of a deck of cards(*) has an equal and astronomically-low probability of occurring, and you can't predict it in advance. But once you shuffle the deck, you have one of them, and it's no more alien than any other result.

(*) or position in chess, go, etc. Or particular formations of sentences, word choices, and so on.
438:

I want to reinforce one point: The problem (for me) is not lack of realism but that this is used to retell very old stories with no change. The whole ... recycled in space! trope, instead of going with what ... space actually would imply and using that to make your story more interesting, and less like stale bread.

For me, neither the Algebraist nor the Culture stories by IMB where that realistic (duh), but the Algebraist had a Universe that at least made a show of trying. The funny thing is that the story, basically set in one gas giant, felt as grandiose as the biggest Culture extravaganza.

KSR mars or Sterlings Shaper/Mech solar system or the solar system travelled by Freya also each felt huge. The things that make SF what it is like sense of wonder don't need everything or anything from the space opera playset.

439:

Isn't the idea, though, that CO2 from the atmosphere will continue to dissolve in the ocean?

Yes, but Heteromeles is right: if you deplete the carbonic acid concentration in the upper ocean too far you starve the phytoplankton and you end up with an anoxic upper ocean, then probably a sulfide-metabolism bloom underneath and the sort of hideously toxic H2S bursts that kill of 98% of life on Earth ...

You've got to be really careful about how far you push a buffer solution: go just a bit too far and you end up flipping into an unfavourable state, and by unfavourable I mean "lethal on a global scale".

440:

Assuming the algorithms are good enough to run the mining side with some human control I think the keeping the meat sacks on earth will still be the cheaper option. I'm not sure that remote repair would be impossible at least for general service jobs but even if you needed to be hands on I suspect it'd still be cheaper to be launching some unfortunate tech every three or six months than to build a base and support for a team on the moon and then supply it and keep them entertained and rotate the staff regularly so they don't get too badly damaged by the low gravity and train their replacements. On top of which you've got all the extra training needed for space travel and survival, maintenance of a habitat etc - that's starting to push your staff costs up rapidly and getting into some highly specialist skills. For Mars I think you're right, the rovers are pushing the edge of what we can manage from earth (still compare the cost of the rover missions with the estimates of manned Mars missions).

441:
I suggest you work your way through the thousands of pages of computer generate proof of the 4 color theorem - and that's the easy one.  
https://www.maa.org/external_archive/devlin/devlin_01_05.html

Or take this simple antenna generated by a genetic algorithm:  

How do you propose a Human analyze it in order to understand whether it is optimum?

Then let's move on to a genetic algorithm generating complex code for an AI task. Who do you think could wade through the potentially millions of lines of interlinked code (no nice clean top down design)?

---

442:

I'm not sure the rock grinding capacity on earth right now is up the challenge to trigger a deadly all around H2S release.
One could start by dumping the rock powder into an area that's anoxic allready, I hear there are acraily manyo of those. Or, you know, quit fossile fuel consumption.

---

443:

*Sigh. You're confusing national foundational mythology with reality again*  
Attempted sarcasm, not confusion.

Or, if you prefer, another shibboleth that really bugs me (along with most national mythologies). More so than any SF shibboleth, to be honest.

---

444:

Not one of his best, but a nice little shaggy dog story.

---

445:

If I ever get round to writing another space opera, one of the angles I'm going to have to cover (in addition to the no-world-governments rule) is the polities-with-strong-values where the aforementioned values they hold dear are routinely violated in the interests of expediency. (Because that *never* happens in real life. Liberté, Egalité, Fraternité, oh and by the way we're going to ban VoIP and Tor because a cell of dipshit terrorists coordinated via SMS and word of mouth.)

---

446:
I was suggesting it more as a counter argument to the suggestion that any aliens encountered must obviously be able to make fire manually.

As far as 'big brains' go I'm not sure we have enough evidence that bigger is better - whales and elephants both have bigger brains and they don't seem to be running rings around us intellectually on the other hand we don't really know what else they're thinking about.

Reproduction - if you're specifically designing your race for space travel relying on two members of opposite of sex to find each other attractive and mating to reproduce seems messy - if we're going with a thought experiment of a race radically redesigning per the suggestion it would seem reproduction would naturally fall into the domain of lab work, possibly performed in the home system.

Body dimorphism - absolutely, for humans anyway but again assuming a radically modified race this is surely something they'd deal with in the redesign - I mean if you can create a brain in a bag it shouldn't be impossible to fix the psychology side of it.

Anyway mostly a thought experiment as to why an alien doesn't necessarily need to make fire. Assuming space travel is as difficult as it currently looks I personally think its pretty unlikely that you can ship a whole ecosystem around at all. But if you were planning to shoot a bunch of people across interstellar space with a system where every kg counts... well I seem to remember someone shipping decapitated heads about in Saturn's children.

---

447:

> My question is what could possibly be physically traded that couldn't be created at home once the informational pattern is known? Presumably, the same elements exist everywhere in the galaxy.

Alien artefacts, alien technology.

---

448:

if you're specifically designing your race for space travel relying on two members of opposite of sex to find each other attractive and mating to reproduce seems messy

The logical shortcut if you're looking to re-engineer humans in particular to colonize a new world (subject to it having an amenable biosphere) would be to hack us so that hermaphroditism is the norm. We've already got the basic components in our genetic toolbox: it lets you retain sexual recombination while allowing all individuals to give birth; your TFR for static population (replacement only) is 1.05 and a TFR of 2.0 actually gives you rapid population growth.

We're a way away from being able to do that, but given that intersex conditions including actual true hermaphroditism occur in our species we've at least got a condition to study.

---

449:
To extend that answer a bit in light of some of the stuff on QM above...
The no cloning theorem means no two artefacts can ever be the same. You *might* somehow be able to "scan" it and transmit the qubits that describe it, but at that point physical transport looks more attractive. If the item in question consisted of deliberate unique quantum states, you have your "unobtanium".

450:

Indeed, a lot of animals seem to have problems with TV images. Pigeons don't react to images of a hawk on the screen, but they do say "oh shit" (which is "whu" in pigeon language) when it makes a hawk noise. And differences in persistence of vision come into it too: see cats trying to catch the scan line on a CRT.

451:

Status Goods. You trade in rare items from other solar system as a way of showing that you're the type of person with so much influence that you can literally command starships to be built and sent.

452:

"The US grew to be a world power on the back of petroleum, which still powers our military"

It's a good point there are theories of history that say each hegemonic world power, at least the sea based, trade hegemonies, partially became so due to the early mastery of a new form of energy (Dutch = wind, British = Steam, US = Oil / nuclear) however it's doubtful that renewables like wind and solar and electric are going to replace oil /nukes for military stuff. Too dependent on a complex infrastructure to ship around, and not energetic enough for things like jets

now their effects on the economic infra underlying the military engine is a really good thing to think about

453:

Here's a nice handwave: the field lines of the negative gravity emanations repel each other. So if you try and make it affect more than a small area you end up only affecting a ring around the outside and the middle gets left behind. You could back it up with mention of the skin effect with alternating current, which does the same sort of thing and is unbeatable.

Here's another limitation: it's not negative gravity cancelling the positive gravity, it's just positive gravity but pulling the other way. But to balance the forces and stop the anti-gravity machine plummeting to earth itself you have to generate a double-ended beam, so above the machine it is
pulling downwards. This causes a massive downward-directed gale which blows the machine downwards and above a certain size you can't win.

454:

My thinking is that re-engineering your species more or less implies that you think you've already thought of everything and the random evolutionary aspects of sexual reproduction would be undesirable when you can do it all in a test tube (200 LY away in prenatal engineering station V-61).

455:

On the other hand, it's surprisingly easy to fool frogs with relatively low-fidelity video: https://www.youtube.com/watch?v=wSsqk_27vL0

Or even with animation (though the frog gets its revenge on the human in the end): https://www.youtube.com/watch?v=WCOqLdDlbwE

456:

In other news, this argument is following the same script it always does.

Grumble 1: We don't like rubber forehead aliens. Aliens should be alien, and damn the CGI budget.

My rebuttal: Well, species that make technology like ceramics and metals needed fire before they could do so (and kilns, but that's another issue). It increasingly looks like making and using fire is a major driver in human anatomy (see Richard Wrangham's Catching Fire: How Cooking Made Us Human for the detailed version of this theory). Because of this, it's not stupid to expect to see humanoid aliens in high tech settings. It is, conversely, very stupid to expect to find starfaring aliens that look like earthly animals with human-sized brains tacked on, because the earthly species lack the anatomical structures necessary to make a fire. So yes, starfish aliens are more stupid than klingons, but long-tailed dinosauroid aliens are just fine, assuming their shoulders and hands are up to dealing with a fire drill.

Inevitable response: Hey, you just violated my ideology. You must be wrong. Let's see: Oh yeah, I can come up with an uninformed argument that rebuts yours. Take that, meanie!

The usual version is some techie droning on about how humans will be stupid enough to engineer machines that are better than they are in every respect, and these machines will conquer the galaxy. This is, of course, the Apocalypse of the Machines (as opposed to the Rapture of the Nerds, which is the same thing with brain uploading under Google patent) written by people who don't really want to understand other people very much, and who are really enamored with simple linear projections.

The real point here is that, if you want to posit humans being able to visit other stars as humans, that in turn says a lot about what kind of starflight is possible. It also strongly suggests that being able to make fire is a really, really good precursor to biological entities going to the stars. This in turn
suggests that any starflight-capable aliens we meet will likely also have evolved around making fire.

Given that humans have come up with a dozen-odd ways of making fire through friction, we can deduce that humans are anatomically really good at making fire. Therefore, it's not stupid to guess that fire-making aliens may well look kind of human, and they almost certainly won't look like starfish. The key thing here is that, if you're designing an alien, you have to know which parts of human anatomy are involved with making fire (hand, shoulders, weight, and mouth), and to make sure that there are alien analogs for each of these functional structures and a bit of pyromania.

If you want to design starfaring aliens that weren't designed by an engineering committee, the above is a really cheap guide to doing a reasonable job.

If you want to design intelligent aliens who are planet-bound, of course none of this applies. I'd expect to see far more structural and cognitive diversity in planet-bound aliens than in starfaring aliens.

Have fun coming up with next round of "you can't be wrong because you're violating my beliefs, you meanie."

---

457:

If, as it seems to be, the evidence is against hidden variables and Copenhagen relies on a magic wand, what's left other than many-worlds?

Try taking a good, close look at Quantum Bayesianism, which (short hand-waving oversimplification) treats the quantum wave function as a sort of Bayesian prior probability distribution. The result of the measurement is the posterior probability distribution. The only thing that "collapses" in the course of a measurement is the relevance of the prior distribution once the observer computes their posterior.

---

458:

As a counter example, I give http://www.damninteresting.com/on-the-origin-of-circuits/ which describes (in a portion of it) the result of using genetic algorithms to produce an FPGA. So we already do have machines producing results we do not understand.

We have software and hardware projects that are so complicated that, no, no single human being can understand all of it. Portions of them, sure -- and you can have the large projects sustainable by ensuring that only small portions of it are worked on, and that they have to work with the other portions.

But that does not describe, to pick an example, a brain. And there's no reason to think that a machine-generated project could not be that complex.
On the other hand maybe the types of species that are well adapted to space flight don't look anything like a human being. So any alien that looks humanoid is some extremely rare passenger or cargo.

It might be convenient to travel at large accelerations as a distributed jelly which can recombine into the complete organism, possibly with mechanical assistance from the ship's infrastructure to provide a hardened skeleton/base for any part that needs those properties.

460:

It's funny how few people realize it, but modern financial oligarchs are highly dependent on the state - more so than they were before the industrial revolution. Pre-industrial aristocrats had their bulk of their wealth in land, which is a concrete asset and usually had a lot of employees who were personally connected to them. He might even have an estate that was largely independent of the greater economy. The wealth of today is largely an abstraction - a rich man owns a percentage of an asset but he depends on the state to enforce his clams and most of those who effectively work for him may not even know it. Likewise his lifestyle depends on a vast network of infrastructure and suppliers. Going Galt won't end well. If the state really wants and needs something from a rich man, it will get it.

461:

Most Americans know they were British rockets. It's a song of defiance, not celebration of a victory. And most Texans know that everyone died at the Alamo (possibly due to the lack of a basement.) Not that this negates your general point, but still, jeesh, we have a smidgeon of a grip on reality.

462:

I believe (per New Scientist, can't find the ref -- it was a year or so ago) the US Navy is getting serious about nuclearizing its surface fleet over the next 50 years or so; not the current generation, but in future it won't just be the CVNs and sub fleet, but the Marine assault carriers, cruisers, and possibly destroyers/frigates that need reactors.

(As modern ship classes seem to be bloating up -- 22,000 ton "destroyers", anyone? -- and switching to electric drive via CODAG or similar, there's room to stuff a reactor or two inside as generators. Nuclear power also means less dependency on local basing permission for resupply, and if combined with current development work on lasers and railguns, and biofuels for high-speed aviation, it'd permit them to stay relevant in a post-fossil-fuel age without going back to sails.)

463:
Which is of course why modern oligarchs make sure they are pally with plenty of politicians and the laws of the states they like are skewed in their favour. Which at a reasonable level of abstraction is no different from the behaviour of medieval nobility.

464:

Er, no: the point of hermaphroditism is to retain the random gene reshuffling mechanism from sexual reproduction while minimizing the overheads (half the individuals in the species being special purpose non-incubators).

465:

This is the likely scenario. We'll see how well it works. This has some interesting side spins if the world gets more pro-nuclear in the wake of a successful COP21 meeting and increased pressure for decarbonization.

And yes, I'm shocked, shocked at how much bloat there is in the military, including those ship classes.

466:

US President Grover Cleveland asked American banker J. P. Morgan to loan $65 million in gold to the US Treasury during the Panic of 1893 (a gold shortage caused a devaluation of the Dollar). J.P. Morgan lent the gold to the US Treasury and saved the Dollar.

467:

How about monomolecular string which is NOT stable at high heat (that being its only weakness)?

468:

One of the interesting side-effects of a hermaphroditic lifestyle: penis fencing. In flatworms. What were you thinking of?

I don't know if something similar would happen in the posited hermaphroditic humans, but since there's a substantial metabolic drain on the mother, there is some incentive to be the obligatory dude and get everyone else pregnant, then to take care of them and your offspring, rather than bearing kids yourself.

Actually, the bigger issue is that humans don't raise their kids by themselves, because kids are simply too resource intensive. It really does take a family, if not a village. If you're trying to set up a colony on an alien world, if you want it to survive, you've really got to get a lot of people there.
surviving together. At that point, I don't think it particularly matters whether they're all hermaphroditic or not.

469:

"The real point here is that, if you want to posit humans being able to visit other stars as humans, that in turn says a lot about what kind of starflight is possible."

So, two points "Humans visiting other stars as humans" is unproven and possibly impossible we don't at this stage have the information to answer I don't think its unreasonable to answer your fantasy humans in another star system with "well my fantasy squid fish use pyrokinesis so there"

Second, your argument was specifically that you couldn't tolerate a species unable to physically make fire because it's needed for technology - which I agree to a point (given case size 1 and I have no way of evaluating some of the more exotic suggestions others have posted) however that completely ignores the fact that a lot of us don't make fire by hand even now and you're presupposing an alien species retaining the morphology needed for a specifically redundant skill over potentially millions of years evolution and probably extensive genetic engineering (really we're looking at starting that now and we barely have a clue what we're doing).

470:

Apologies for the pedantry, it was written as a poem which someone later realized could be sung to an old drinking song.
I alway liked Laurie Anderson's take on it: It's a bunch of questions.

471:

From where I'm sitting, the idea that spacefaring humans implies some particular human property in spacefaring aliens seems like an example of affirming the consequent, one of the classic formal fallacies. In other words, the following logic:

If a race can make fire through friction, that race can become starfaring.
Race X is starfaring.
Therefore, race X can make fire through friction.

falls flat on its face even if the premises are valid.

472:

Yes, I'm positing exactly that. You seem to think that, because you don't spin up a fire when you cook, that you can live indefinitely off of uncooked food. The evidence says (read Wrangham if you want to see the studies) that you cannot. Compared with even chimpanzees and gorillas, are mouths and GI tracts are simply too small to deal indefinitely with a raw diet. We have to have fire to cook,
and even though we haven't made our own fires for, um, about 200 years or less (my immigrant
wife made cooking fires as a young girl), I don't think our morphology has changed all that much.

Otherwise, I agree. starflight is probably impossible, starflight with humans aboard is even more
impossible. This doesn't stop people from making billions of dollars around films based on these
silly ideas. All I'm saying is that the rubber-forehead alien shibboleth may not be as stupid as some
people think, and it's really fascinating how much vitriol that saying this produces, especially
among so-called science geeks who might otherwise be interested in evolution.

473:

There actually were several attempts at nuclear powered escorts in the late 20th century, failed due
to cost. Most recent being the Virginia class cruisers

https://en.wikipedia.org/wiki/Virginia-class_cruiser

Nuclear power is godly for a navy, as you point out it massively increases cuts the supply base
dependency and gives unlimited endurance. The needs to resupply has been the Achilles heel of
international navy's since steam power, was a big issue for the British Empire as well

474:

AFAIK any mammalian individuals that display hermaphroditism in adult form are infertile. There
are some vertebrate species that can change sex depending on population pressure (some fish
species spring to mind, mediated by chemical pheromones in the water) and, I think, axolotls and
some other reptiles but that's about it.

A technical/social solution that utilises the existent v1.0 human/mammal bisexual infrastructure
would be to cull most male babies by abortion once the sex of the fetus was determined, keeping a
few "rams" to service the mostly-female population who only have to have one-and-a-bit babies
each to maintain the population. Alternatively the clade can have a few "breeders" as in John
Wyndham's short dystopian story "Consider Her Ways", encouraging multiple births by implanting
fertilised ova to save on time and labour (pun definitely intended) along with the sex-selective
abortion process mentioned above.

475:

Last round of debates about nuclear shipping ended with a pretty hilarious possibility. - For obvious
reasons, this isn't really something you want to hand over to the civil sector, never mind terrorism,
parts of the maritime fleet are horrible irresponsible when it comes to proper maintenance. But all
freight ships can be towed. That's a standard feature.

So you can have a navy that contains a very large number of small "warships" with absurdly
oversize engines. Then pay for them by renting out long distance tow services. Don't have to deal
with local port authorities at all, you meet your customers off shore, they toss you a cable and a
wire transfer, turn their engines off, and you haul them across the pacific/atlantic/whatever. This is potentially very profitable because the fuel expenditure of freight-ships is very bloody expensive.

For extra hilarity, all of this doesn't depend on you otherwise being a global power- all it really requires is the ability to educate the crews of the tugs to the required standard, and the shipyards to build them.

476:

I just think it's unlikely. Our ancestors were already bipedal apes when they discovered fire, so fire shaped what they already had and maybe accentuated it further.

Whereas, an alien that looks like a six-legged land crab that discovers fire isn't going to look anything resembling humanoid after utilizing it for generations.

477:

"You seem to think that, because you don't spin up a fire when you cook, that you can live indefinitely off of uncooked food."

You're projecting, I don't spin up a fire I press a button and a technological alien doesn't need to use flint and tinder to make fire on their spaceship either. So long as the presumptive alien can control the technology it doesn't need to start with gathering wood shavings. Of course we haven't evolved much in the past 200 years but if we're looking at possible body forms for space faring aliens the time ranges can extend dramatically and that's before we even look at intentional space adaptation. Species adapt to their environments and making fire by hand on a spaceship is not only redundant but potentially hazardous.

478:

The problem is, what do the crews eat? I read of an extended deployment by a nuclear submarine that, as an experiment, stayed submerged for over six months with no resupply. At the beginning of the cruise the passageways were floored with cases of canned food and everyone had to walk hunched over to avoid banging their heads on the frames. At the end of the six months underwater they were running short of a lot of stuff including spare parts, soap, clothing etc.

The great advantage of nuclear propulsion for large carriers is the hull space it saves, not just in propulsion but in bunker fuel storage. A carrier is big, yes but every cubic metre of space is dedicated to its raison d'etre of operating a lot of aircraft, maintaining them, fuelling them, flying and recovering them. It's a compact floating version of Heathrow and just like any large establishment it needs regular inputs. In a fighting situation it eats an amazing amount of munitions and aircraft fuel every day and a nuclear reactor or two won't replace them in any way any time soon.
US CVNs spend a lot of their life tied up alongside quays or in drydock getting rebuilt and refitted. Their operating pace is not that much different to other conventionally-fuelled ships.

479:

Sometime in the 1970s, as I recall, Stephen Hawking gave a talk, entitled something like "On the Breakdown of Physics in the Vicinity of a Spacetime Discontinuity", in which he showed that a black hole could spontaneously emit ANYTHING AT ALL.

Jerry Pournelle wrote it up at the time.

Since then, Hawking has shown that the black hole may spontaneously emit anything at all at ANY distance from the center of mass of the hole, potentially far outside the putative event horizon.

To me, this has ALL of the earmarks of an indirect proof. Something is wrong with this picture. From private communication, Jerry does not disagree with me on this view.

480:

Um, check your assumptions about time spans. I realize you want me to be wrong, but you need to realize that you're saying that, in order for me to be wrong, doubly hypothetical humans flying in starships (or aliens, for that matter) have to be living with artificial ranges for something like a million years before they figure out starflight, and that this will so shape them that they will be structurally incapable of lighting a fire.

That's what you seem to be saying, even if it's not what you mean.

481:

The Russians already do this with their nuclear icebreakers, all of which are configured to tow large barges when necessary. Mostly though when they're actually breaking channels through sea and eastuarine ice they're being followed by conventionally-powered bulk carriers which can manoeuvre into ports by themselves once the breaker has got them to where they need to be.

482:

There's an interesting hypothesis about the ZUMWALT class DDGs representing a faction fight in the USN about how to approach surface nuclearization.

(Very short form; fusion power + directed energy weapons renders naval aviation obsolete. The carrier admirals don't like that.)

The empire can do just fine on being good at being an empire; the US has the potential to get through climate change with a functioning agricultural sector. Nobody with dependencies on
monsoon rains does. The US is not being run for the good of the empire; it's being run for the good of the current elites' current business models. Not the same thing at all.

(Other very short form; the US military can run fine on any pumpable and reasonably energy dense storable fuel. There are non-fossil-carbon pumpable fuels available at reasonable prices. Said military know there are; Congress is trying to prevent them from treating this knowledge as factual.)

---

483:

Pretty late to this party, but Star Trek teleporters annoy the hell out of me. Humans as a species have access to a technology that can manipulate matter on a molecular level.

I headcanon this by supposing the transporter is tunneling the particles elsewhere; not just disassembling and reassembling your body but actually just moving it.

Later Treks started including phrases like "transporter pattern buffer" in their technobabble, though, and I found this irritating because it undermined my headcanon.

The real solution to annoying Treknology, I suppose, is to assume the whole thing is based on the principle of quantum deus-ex-mechanics and move on.

---

484:

It's really tough to come up with theoretical molecular string that doesn't stick to itself and which is strong in three dimensions. (No one having come up with actual molecular string as such just yet.) If it's not strong in the directions other than the long direction of tension, it's not going to do the "cut through anything" tropish thing.

---

485:

You're right but confused.

Yes, humans were bipedal before we adapted to fire. You can see that by looking at the ribcages and jaws of early hominids. Our earliest known bipedal ancestors had the jaws and guts needed to eat food without fire. Somewhere around or before Homo erectus (and the fossils of this period are crap, so it's hard to say), our ribcages lost that flaring ape shape (meaning that our GI tract started shrinking) and our jaws started shrinking too. That's most likely when our species started depending on fire to cook food, and we've been evolving smaller guts and faces ever since.

To do a fire by friction, you need four things:

1. Weight. I *think* someone the size of an eight year-old boy can spin up a fire IIRC, so the minimum weight for a firemaker is around 20-25 kilograms, give or take.
2. precision gripping ability. This is required to make a tinder bundle and to transfer the coal to the tinder. Chimps don't seem to be able to do this, but I could be wrong.
3. Shoulders and hands that are capable of spinning a drill (or something similar) in a strong, precise motion. This is actually hard for a lot of species, turning reciprocal back-and-forth motion
into something that can cause heat through friction. Humans came preadapted for this through our shoulders. Probably chimp shoulders are good enough, but it's totally unclear whether they have the dexterity to hold a drill vertical or do something similar.

4. mouth and breath control: once the coal is sitting on the tinder, you've got to be able to very gently blow it alight. Apparently, chimps lack the ability to coordinate their breath with this level of precision, although this may be due to lack of training as much as lack of anatomy. This may also be coordinated with speaking ability in humans, although no one's done that study.

And that's the point: humans are specially adapted to making fire. Our closest relatives appear to lack two of the traits that we use, even though Konzi the bonobo is perfectly capable of lighting a campfire if you give him a lighter. It's a matter of anatomy, not brain size.

Now, can a six-legged land-crab do this? Possibly. You've got to make the crab big and heavy enough (weight adds substantially to friction), you've got to give it a grip that's both precise and powerful, so that it can hold a drill, or a fire plow, or use one or more of the other methods, as well as making and fluffing up a tinder bundle, then you've got to give it a way to consistently blow the resulting coal alight in the tinder bundle. None of this is impossible, but the critter you end up with isn't going to look much like an earthly crab. They're missing on every count, from weight to grip to blowing ability.

---

486:

Carrier admirals have been carefully ignoring what well-handled blue-water nuclear submarines can do to their Presidential Preciouses. Carriers are basically obsolete in a war of equals or near-equals, in the same precarious position battleships were in the Pacific war of the 1940s. They're useful for asymmetrical wog-stomping operations but in most cases the US has basing rights almost anywhere except Antarctica that allows land-based aviation to do the same job at less cost and more flexibility in terms of numbers and types of aircraft operated. See for example Diego Garcia in the Indian Ocean, where Google Earth or Bing Maps shows an American airbase hosting C5As, B-52s and C135 tankers.

---

487:

caveat: if that Lockheed project for container-sized fusion reactors ever works, then maybe...

I believe (per New Scientist, can't find the ref -- it was a year or so ago) the US Navy is getting serious about nuclearizing its surface fleet over the next 50 years or so

Not sure about that. Unholyguy @473 mentioned the increased running costs of the Virginia-class, but they all fall foul of the real problem, that is manpower. As soon as you stick a reactor on a ship, you can add several hundred sailors to the crew; and that's a huge drain over the service life of the vessel; every extra hundred sailors is third of a billion dollars onto the total cost of the ship.

Compare the complement of HMS Queen Elizabeth against the smaller MN Charles de Gaulle; or the cost of HMS Queen Elizabeth against the USS Ford...
Nuclear power also means less dependency on local basing permission for resupply

That's actually a self-fulfilling prophecy, because countries tend to be nervous about nuclear plant tied up alongside in their major port cities. And it rules out lots of ports in the more contested or twitchy parts of the world, see USS COLE.

Diesel-electric means you can lock the doors and sod off down the pub on your run ashore (exaggeration). A reactor means 24/7 manning for the life of the ship...

(As modern ship classes seem to be bloating up -- 22,000 ton "destroyers", anyone?)

Where? The Type 45 is 8,500t, the Virginia-class CGN was 12,000t, and even the Zumwalt-class is 14,500t...

22,000t got you HMS Invincible (a light carrier), so that's a fairly large ship :)

---

488:

The idea is that, depending upon how rare intelligent life is in the galaxy, and how difficult it is to design GAI with high IQ, that our industrial capacity could actually add significantly to what is available to the aliens. Even adding an additional 1% to overall manufacturing, agriculture or R&D, all to spec, could be a valuable resource to somebody. So my thought is that a small group of aliens contact us with a proposition- They will find us clients if we can extend our delivery capability to at least a few nearby stars. I'm imagining that we are well of the beaten trail, and if we want to play, we have to hook up with them, they wont come here. So it isnt a trade "item" they want from us- it's the additional labor pool and the ability to respond to customized orders.

---

489:

Sounds like I'm being unclear - I don't have any particular stake in alien body shape, as I read it you're the one insisting on 'fire making or bust'. My two big assumptions are (1) that space travel will be slow (possibly on the order of hundreds of years system to system) giving time for evolution as the species travels across the galaxy and (2) at least some adaptation is needed if a planetary species is going to use space travel - that might be just a few survival adaptations per Charlie for humans further up the thread but could be much more extensive particularly if (1) holds true implying mass limitations and therefore big advantages in cutting down on your environmental support needs (replace a kidney with a dialysis machine and you don't need the extra plants growing in the bio section to support - extend that out over the rest of the body and cut down to the absolute minimum).

Either way none of this says they absolutely can't look like Klingons or dinosaurs or whatever you like - frankly I'd think they're much easier to write interesting fiction about and certainly a lot easier on your movie budget than CGI squid hermaphrodites.

---

490:
Carriers are basically obsolete in a war of equals or near-equals

I disagree with that statement; but even so, the famous quote springs to mind:
"That may be true; but it is also irrelevant".

Who else has carriers? There is exactly one global superpower, and one other navy that can deploy and sustain worldwide. Everyone else is essentially a regional power.

Fortunately, the USN and RN work rather closely with each other...

491:

This applies very well to fire making based on mechanical strength, but as mentioned earlier it may be possible to get naturally occurring lenslike shapes made out of quartz. A low-strength but high-dexterity species might* bootstrap from tending wild fires to glass lenses. Even ice lenses could work in a region that gets cold enough (though the person in this video cheats with gunpowder tinder, he also uses a suboptimal lens shape). A handheld lens can concentrate the sun enough to make small dry twigs burst into flame without any breath control.

Or you might have a species with high dexterity and low strength exploit the autoxidation of unsaturated plant oils to build "fire nests" that undergo thermal runaway until bursting into flame.

*I don't think it's especially likely, but I would consider the solution plausible enough for SF.

492:

Grumble 1: We don't like rubber forehead aliens. Aliens should be alien, and damn the CGI budget

I don't object to humanoid aliens per se, although giving them extra limbs or say evolutionary pressures from different gravities wouldn't hurt.

I usually object to them thinking and acting like a strawman political target. I want my intelligent aliens to be Intelligent, so they know how to use tactics as well or better than the humans in the area, and Alien, so they simply don't think like we do.

The Starship Troopers hordes should have annihilated the MI half an hour into the battle, all they would need is one of those big spaceship shooting aliens to fart in the direction of their base.

C.J. Cherryh still is one of the best for that - her Atevi are physically similar, but they really think differently, and that causes most of the conflict. I also really liked how the High Tech humans landed, acted cocky, and promptly got obliterated in the ensuing war. Primitive doesn't equal useless.

493:

Not to mention carrying coals for fire making isn't unknown either - if you have a tree equivalent lightning strikes can give you the source material.
I should also mention, if the aliens' ancestral planet has a higher partial pressure of oxygen in the atmosphere than our own, either due to higher O2 percentage or higher atmospheric pressure, that will make it easier to start fires than it is on Earth.

5. Sentience achieved just by making a network bigger and more connected — "the internet wakes up" trope. In fact pretty much any "accidental" sentence.

I hate that too, but here is a question -- has any SF writer ever explored not "accidental sentience" but "accidental goals"? That is, the network starts reacting to stimuli in the ways its designers never expected? It is still no more sentient than an insect (stimulus/response), but an insect with resources of the internet is pretty frightening.

Lately I've been stumbling across a lot of books with really bad orbital mechanics

This sort of thing seriously damaged Frederick Pohl's "Eschaton" trilogy for me. Not to the point of throwing them down, but glaring errors jarred. The bit in the last book about methane being so much denser than air that people suffocate in a cloud of it did not help either (methane is LESS dense than air).

The Astute class subs mass the same as a WWII light cruiser, a bit over 7000 tonnes (I like to call them submersible cruisers for that reason -- see also "through-deck" cruisers). The new Type 45 destroyers are a little larger. In comparison HMS Dreadnaught, the mightiest battleship ever built at that time weighed just over 18,000 tonnes.

The big change is in the manning levels -- an Astute sub carries a crew of a bit over a hundred and a Type 45 about two hundred whereas a WWII light cruiser of similar size would have a complement of about a thousand.

Or there was Jack Vance's solution, which was to support a large, semi-transparent membrane of biological origin on poles and fill it with water to produce a plano-convex lens. Not a very good one, but big, so it still managed to collect enough energy that its inefficient concentration thereof was useful.
Vulcanism is another source of ignition. As is lightning. Then you just take care to never let it go out. Which people do; after all making fire by friction is bloody hard and plenty of people can't manage it even if they know how to do it at all.

Or there's natural chemistry. Pyrites - the clue is in the name. Iron - available in metallic form from meteorites - also makes good sparks. Natural nitrate deposits can be used to make things more flammable. The origin of a civilisation might be a matter of the local geology.

499:

The Soviet submarine fleet would have comprehensively dealt with the US carriers in a shooting war much as the less-capable diesel-electric subs on both sides of the Pacific war racked up a fine score of large capital ships. For example the four carriers sunk during the Battle of Midway were all sent to the bottom by Japanese subs (the three Japanese fleet carriers were scuttled by Japanese subs, the Yorktown was caught and sunk after it was crippled and under tow). The carriers sustained major damage from bombing but stayed afloat proving that blowing holes in the top of a ship won't necessarily sink it but holes in the bottom are more certain.

Modern subs are scarily good -- Astute went to play with the USN during trials a few years back, going up against their fleet ASW Top Guns as well as playing hide and seek with their ageing LA-class type 688s. The USN sonar people said afterwards that the 688s kicked back a signature the size of a dolphin and in contrast the Astute was a baby dolphin.

500:

No one ever learns from past mistakes.

That one absolutely killed for me Heinlein's "Time Enough For Love". Lazarus Long and (very few of) other immortals are the only ones who learn anything at all from history -- and in their case, only because they lived through it.

501:

Eyes are a very useful adaptation that have independently evolved on Earth over a dozen times. It stands to reason that any carnivorous or omnivorous species is likely to find itself well supplied with focusing lenses.

I imagine a caveman version of Doc Brown: "Great Scott, Marty! Look what this part of the buffalo can do!".

502:

We learn from history, but the half-life of that knowledge is fairly short. The lessons of the last eighty years or so are fairly well remembered, but the farther back you go the dimmer it gets.
503:

Re fire sources other than friction,

A first-rate intelligence would be able to work out how lenses in eyes (with lenses) work, and scale up to focusing light from the hot small angular diameter source in the sky to a smallish area to start a fire, either with convex lenses or maybe concave mirrors. I agree with commenters who have argued this.

Another possibility is an intelligence working out how to cause compost heap fires.

Another possibility is an intelligence working out how to significantly increase the probability of a lightning strike.

504:

5. *Sentience achieved just by making a network bigger and more connected* — *"the internet wakes up"* trope. *In fact pretty much any "accidental" sentence.*

Not to mention, it's been done too many times. The first time I read it was a Clarke story (in *Wind from the Sun*, maybe?). Haven't seen anyone add much to the idea since.

505:

No, the movie *Moon* had a company which *claimed to the protagonist* in an obvious propaganda film to be mining for helium-3. All he knew for sure was that he went out periodically, picked up canisters, and fired them off to Earth. Who knows what the hell was in those canisters, but given that the company lied about everything else, went to extreme lengths to prevent news ever getting back to Earth by any means whatsoever, and that its claims are energetically ludicrous (a couple of canisters a day *will not* power 70% of the Earth as stated), it's fairly clear it was lying about that too. God alone knows what they were actually doing up there. DOWNLOADING COMMUNISM probably.

506:

*The Soviet submarine fleet would have comprehensively dealt with the US carriers in a shooting war*

Which was why, at least back in the mid-'80s in SECNAV Lehman's day, the US naval war plan was

1: US carriers scoot way south, hopefully out of harm's way.

2: US SSNs destroy the Soviet navy. Not an unreasonable expectation at the time.

2.5: Soviet land-based antiship aviation, notably Tu-22 and Tu-22M, get taken care of somehow.

3: US surface forces return and carry on.
I note that proton-boron-11 fusion is insanely difficult: we're talking a slow fusion rate and 6-billion-K reactor temperature at *least*. This is not the stuff that anything but nightmares are made of. Nobody sane would want to use this reaction if anything at all else were possible.

(All your other points stand, however.)

---

Scifi shibboleths zombie apocalypse edition:

Assuming the zombie producing mechanism is not from a supernatural source (Alien Space Bats, Hell Is Full, etc):

- The zombie effect kicks in far faster than any real world infection, or indeed, far faster than a bite or sting delivered toxin.
- Civil defence response is universally too little too late
- Days after the civil defence response fails, the power is still on
- Zombies have relentless endurance and are able to withstand massive injury and blood loss, rather than having a half life of a few days before succumbing to dehydration, starvation, injury and blood loss, opportunistic infection etc

Curiously enough, the film comedies and several of the computer games are a lot better at avoiding these faults than the serious dramas.

What I'd like to see is a book or series that uses some sort of zombie infection as a modern stand in for the Black Death: deadly, but not universally so, belligerently resistant to treatment and immunisation, and with a poorly understood transmission vector. Exploring the social consequences of living through the plague in the modern world — and in particular, the psychological, social and legal ramifications of survivors needing to deploy field expedient euthanisation of the victims to contain outbreaks — could be quite interesting.

---

"One thing no one (to my knowledge) has ever tackled is the possibly symbiosis between a failing human colony and an intelligent but non-technological alien..."

CJ Cherryh's *Foreigner* series starts with a human colony ship that goes wrong and strands its colonists on a planet with an intelligent but less-advanced species that almost wipes out the humans but decides to keep them alive for their tech. (That's the prologue. The POV character is the human diplomat charged with preserving the truce.)
And then we have the history of our species, where we've been using fire for over 1,000,000 years at a guess. We probably used fires from volcanoes and wildfires for a *long* time before we learned how to make them (given that the East African Rift Valley has both in abundance, this shouldn't be surprising. Additionally, a number of animal studies show that animals prefer cooked food over raw food, so there's an incentive to learn how to make wildfire food).

We've been playing around with quartz crystals for, I don't know, 10,000 years or more? 100,000 years? Probably the reason few start fires with them is they're seldom all that clear.

The oldest known "burning glass," which was a concave mirror, not a lens (forgot about that one, I suspect), probably is about 2600 years old, and the oldest semi-functional lens, the Nimrud lens, is around 2700 years old. Mirrors, incidentally, are far older than that.

This is always the second line of why I have to be wrong, which is because lenses! Or volcanoes that always produce useful lava when something needs them to cook dinner. Or compost piles, which are notoriously unpredictable, somehow get magically made to produce flame on command. Ditto linseed oil and cellulose fibers, which I'm sure someone was about to bring up.

I'm not even going to point out that you need a fire to make glass and some decent chemistry and technique to make clear glass.

But the bigger point, again, is to look at the time scale. We were playing with fire for a very long time before any of these other techniques popped up in our history. Why no dissected mammoth eyeballs in the fire kits? I don't know, but I'd speculate it's because sticks are way more common and don't fight back.

511:

Ah, yes.

As ever, the first layer is obvious. A test.

I could now throw in any number of studies showing the benefits of owning a "pet" and child development (your search terms are: 2015, empathy, growing up, development - you'll see the pitter patter, lots of recent activity). The upshot is that cross-species empathy is a learning process for young minds, and young minds benefit from learning from minds that aren't able to deceive, harm or harbour hidden malice (in big-girl terms we call this something. I'm sure you know what it is - "unconditional love in non-familial circumstances" is a search term worth using).

On a more fundamental note though, all posts have missed the point. Sadly, I'm not surprised.

We'll try this three ways:

#1 Complexity of environment and temporal arcs to species show that the world you live in has exogenous externalities that cannot be removed. The proof of the pudding, as it were.
#1 - Empirical Note - "My grandfather told me that these waters were so thick with fish you could walk across them". The lesson is not that the grandfather is lying, but that humans are fundamentally crap at modal experience shifts. (Hint: this is a base line 101 environmental lesson).

#1 It is an vaccine against solipsism.

#2 The loss of "plush fauna" (call it what you want - again, we have a specific term for it, but hey, I'm making a joke about merchandising) usually equates with loss of interest from the majority view. Which will, necessarily, lead to less funding and less concern about the rest of the ecologies that supported them.

#2 - Empirical Note - There's a reason the WWF or Greenpeace or whoever focus on the plushies - it's about empathetic engagement and marketing.

#2 Consider feed-back loops. **IF** you have a population unable or unwilling to engage without strong empathetic hooks, removing said hooks will result in total loss of engagement.

#3 If you consider the Earth (Gaia, life) a refrain, removing complexity is the worst thing you can do.

#3 - Empirical Note - We sing, we sing, we share our song, beauty and joy in everything. YOU KILLED EVERYTHING THAT SINGS YOU FUCKING PSYCHOTIC BASTARDS.

#3 No, really. You want Patrick Bateman's? That's the world you're creating.

Meh.

Anyhow, the greatest shibboleth is that your minds can do space.

They can't.

Closest anyone's got to this is probably how deeply odd, perverted / broken / Other that A. Reynolds does in the "Revolution Space" universe. It's not perfect, but it captures the deep-creepy vibe that you'd get.

Squids, compared to this, are just like puppies. I mean, come on: any real advanced mind that saw what we did would be screaming right now.

You utter utter utter - well. You know the ending by now.

p.s.

"If I got it wrong, I'll just arrogantly tell the person who points it out that they're the only person who noticed that I screwed up."

Jerry Pournelle actually literally did that to me one time, via email.

I had sent him a nice fan note about one of his collaborative funny fan-service books starring various Tuckerized convention-goers. But in it he'd had some people conversing in detail while roaring over a glacier on snowmobiles. As the most minor of nits, thinking that as a matter of professionalism to avoid making the same mistake in a notional sequel he'd want to learn more about a technology he probably wasn't familiar with there in Southern California, I let him know that such conversations aren't feasible due to engine noise.

He took it ... not well.

Working authors everywhere will be thrilled to know that I learned from this not to email them. Unfortunately a few years later commenting on blogs was invented and it sort of became moot, because the authors who care to hear from fans all started blogs anyway.

513:

Why no dissected mammoth eyeballs in the fire kits? I don't know, but I'd speculate it's because sticks are way more common and don't fight back.

Sure, for humans. We have the right musculature to make fire with sticks. The question was what a species could do if they didn't have the right musculature to work the sticks. Lenses are probably the best approach if variables in the alien environment like oxygen concentration, incident sunlight, frequency of dry conditions, cloud cover, types of available fuels and tinder, etc. work out.

It's worth mentioning that these aliens would probably have some of the same problems that we have. Deforestation to feed our fires is thought to have caused the collapse of several human civilizations, and might have collapsed ours centuries ago if we hadn't switched to fossil fuels.

514:

I think this particular trope got lampshaded in one of Man-Kzin Wars book -- I forgot the number, but it is the one which covers Kzinti invasion of Wunderland.

Kzinti land their infantry and armor, and there is massive battle which would not be out of place in 20th Century. Couple hour into battle, Kzinti wipe out all remaining human forces in an eyeblink with tactical nukes (or maybe kinetic orbital weapons -- no big difference). One human character asks "Why did they not do this from the start?" The other one answers "They wanted to have some fun. Then they tired of it."

515:
And I would add to that: stability and social evolution on board the ships themselves. It seems to me a very big assumption that the ideals, motivations, customs, religion, and so on, of a society that has spent several entire generations in total isolation in what is effectively a high-class prison, would retain more than the most minimal degree of compatibility with the ideals under which the mission was conceived. I think an awful lot of the ships would never arrive or else arrive in an uncooperative mood, having decided to change course and do something else, or had one or some of the crew go mental and sabotage the ship, or develop some wacky religious belief in service of which they do unscheduled things... Even without such a catastrophe it would be hard to maintain stability.

Maybe I read different books than you did, but pretty much EVERY generation-ship story I can think of is based on the society degrading in exactly the ways you describe. In fact, if by some miracle a generation ship managed to maintain social continuity, it would not make an interesting story :)

516:

Personally I'd like to see a story where the Empire exists to give the ruling class something to do rather than any practical reason.

"Mote in God's Eye" and its sequels.

517:

You're not alone, although since the people who've done that to me are still alive, I'm not going to out them for being idiots. Charlie is not one of that number, incidentally.

518:

From where I'm sitting, the idea that spacefaring humans implies some particular human property in spacefaring aliens seems like an example of affirming the consequent, one of the classic formal fallacies. In other words, the following logic:

If a race can make fire through friction, that race can become starfaring.
Race X is starfaring.
Therefore, race X can make fire through friction.

falls flat on its face even if the premises are valid.

I think your logical system is missing most of the information it needs. Therefore your comment is invalid.

519:
That might make an interesting story - about how an alien trading network is willing to give us occasional baubles of ultra-high technology or scientific insights in return for artifacts of our culture. Has anyone written a story like this?

"Narbedla" by Frederick Pohl. Although the ultra-high technology gets sequestered by the very few humans who are in on the racket.

The original proposal and the core book came from David Pulver. Several other people got brought in on the supplements; I believe Cascio was involved in Broken Dreams and Toxic Memes, though Toxic Memes was an anthology of small contributions (I have two or three in it, I think). I find it an admirable setting for near-future SF; I've run two campaigns in it, a private detective one based in Montréal and a cosmic horror one based in the San Francisco Bay area—though the latter went to several other countries and even out to the Jovian moons.

The closest thing I personally have seen to that was a very shortlived TV series, Century City, focused on a law firm in midcentury Los Angeles. There was a particularly memorable episode where a child star, who had looked up the statistics on how badly most child stars' adult careers tanked, wanted to receive hormonal treatments that would prevent puberty and prolong his career, and when his parents refused he sued for emancipated minor status. . . .

Okay, but if it's the surface, shouldn't the number vary as the second power of the radius? A linear increase still seems too small.

I was taught whose rockets they were in elementary school, when we learned "The Star-Spangled Banner." Of course that was in the 1950s.

...here is a question -- has any SF writer ever explored not "accidental sentience" but "accidental goals"?

Why yes; a guy named Stross wrote a whole novel which, the reader eventually discovers, revolves around that exact situation. You should look him up.
I imagine a caveman version of Doc Brown: "Great Scott, Marty! Look what this part of the buffalo can do!".

"Wait until I get this buffalo carcass up to 88 miles an hour!" "...uh, Doc, are you sure you know what you're doing?"

Agreed that there are several routes to the end of making fire. We humans took many thousands of years to figure out any of them, having a well developed fire using technology long before we worked out fire making. We're pretty good at rubbing sticks together and usually live near large supplies of sticks; it's not too surprising that this was good enough for most of our ancestors.

It seems unlikely that no way of creating fire on demand would ever be invented, assuming that fire was considered desirable at all. (Somewhere I've got an old Boy Scout handbook that basically says, "So you're stranded in the wilderness without matches. Here are fifteen ways to make fire anyway.")

The solution space is known to include dry sticks, springy sticks, flint, pyrite, ice lenses, water lenses, mirrors, decaying vegetation on land (tricky), decaying vegetation underwater (messy), and some rare chemical reactions of biological or natural materials. I'll happily accept a group not using any one of those routes, particularly the trickier ones, but how long can a Stone Age species miss all of them?

(Reality suggests "tens of thousands of years," so maybe humans are unusually dumb about this.)

525:

Not so sure about "dumb", really; it strikes me that most of the possible methods are pretty hard to luck onto just by messing about with stuff. Flint and pyrites are about the only thing where a chance event can get you something that looks like fire - ie. sparks - that would suggest the possibility of getting something better from it. Frictional methods may have the most universal applicability if you know what you're doing, but they're a dead loss if you don't - it takes a lot of time and effort with the right materials and the right technique, and if you don't get it spot on nothing happens. I do wonder if the discoverers were in a way the first scientists, having managed to work out that the possibility existed, or simply people who had partaken of some interesting mushrooms and thought that rubbing wood together with considerable force for hours on end was a fun way to pass the time.

The repeated suggestion of bits of eyeballs I must say I don't think would ever fly. They are too small, for a start, even from big animals; and they lose their optical properties very quickly with death and dissection. You end up with something that is about as useful as a blob of snot, which is what it looks like.

Wild thought: one class of fire-making devices operates by means of adiabatic compression. Interesting to imagine primitives on a world with a better version of bamboo developing the idea into firearms, or even engines :)
Wild thought: one class of fire-making devices operates by means of adiabatic compression. Interesting to imagine primitives on a world with a better version of bamboo developing the idea into firearms, or even engines :)

Modern machined aluminium versions with very good seals and carefully prepared tinder fungus or char aren't easy to use. (There are very practical reasons matches caught on with such thoroughness and speed, even the horrible early ones dis-recommended for people with weak lungs.)

Fire drills are simple and effective and painfully fussy. You also have a hell of a time making one if you haven't got an axe or string. Straight up fire-plow style is merely exhausting — "The first time we ever got this simple fire starting method to work, we had twenty 3rd graders and six adults to provide the muscle" — and fussy and the kind of skill suitable for robust young men to compete at. And it works best if you happen to have a whole log.

Flint and steel, well, aside from needing steel, and char, and a theory of combustion, there's a reason it gets associated with gods because it gets to feeling like divine favour is absolutely required for success.

"Primitive" fire lighting is pretty darn hard.

527:

Piston starters (a tube the size of a cigarette lighter, with tinder at the bottom, and you shove a piston down a bunch of times till the tinder ignites) were a thing in Orion Shall Rise and some other 1980s SF. I'd think an underwater civilization would have a huge skill set for using pressure chambers, say starting from inside swimming bladders.

Niven's wife was a figure in the Georgette Heyer Society when Niven and Pournelle wrote the Mote. According to Pattison, Heinlein pushed them to use a lot of 1920s military social manners. I'd say it was a huge help to the novel- Georgette Heyer wrote good. But then I think the Forever Amber stuff in Zelazny's first couple of Amber books was a huge boost too.

528:

NO
My future was cancelled some time between/during 1970 & 1980.

529:

Ah, but CD will come along with some apocalyptic rant, telling us we are "all doomed" anyway & stating ... I know not what, but I'm tempted to replay Lear on the "terrible things" front, actually.

530:
British Sail AND Steam
And, as Charlie repeats, often, we are NOT going to run out of "petroleum" - it will be synthesised, if necessary - particularly if "we" have a world-wide alternative set of energy supplies.
Expensive, yes, unobtainable, forget it.

531:
Niven's "Outsiders" ??

532:
Yeah
See today's revolting news from the USA?
Trump wants to declare the USA Judenfrei oops. Mussulmanfrei.
No-one seems to have noticed that it would be "unconstitutional, yet, at any rate.

533:
Resupply at sea.
A problem solved by the RN 1795-1815, actually.
And re-used by the RN & USN, especially in the Pacific theatre of WWII since.

534:
Are you aware that a very famous railway locomotive, Stephenson's "Locomotion No 1" had it's fire lit by a "Burning-Glass" from one of the workmen tasked with its delivery & setup?
( Reference from LTC Rolt's book on the Stephenson's )

535:
Re: fire and talking past each other...
Heteromeles seems to be saying (much condensed and paraphrased) that any species who managed to become spacefaring on their own would have needed to be physically capable of starting off the whole engineer tools to explore the (world, solar system...), discovering that they needed better tools to discover more generally applicable scientific theories (and hypotheses for where to look next) and... ... ...
eventually find their unassisted way out of planetary and stellar gravity wells and possibly encounter humans.
It's not that aliens would need fire to cook with - it's that toolmaking and instrument making and endless, fussy, engineering detail seem implausible to achieve without being able to reliably make and control fire from a technology-free start.

Having said that, others on this thread seem to be arguing that if a species has only lived in spaceships (or habitats, or...) for many millennia, then, although their ancestors were physically capable of making fire, they have adapted their bodies (or are pets who had another species do it to them, or...) to function bet in low to micro gravity, and have machines of unlimited reliability to do all possible heavy work.

A (very) rough summation might be:

"How do you even start to climb the tech tree without a certain minimum manual dexterity+strength?"

vs

"But if you're a meat-passenger who never leaves the starship, why do you need to cling to your ancestral physical body-plan?"

I hope that this post doesn't offend or misrepresent anyone too badly, and maybe even helps a discussion happen where both (at least) sides feel their point has been comprehended, even if disagreed with.

536:

On a more fundamental note though, all posts have missed the point. Sadly, I'm not surprised. WRONG

TRANSLATION:
"None of the posters are doom-filled apocalyptic & Nihilistic cries of desperation & only I am correct"

NOT buying it.

Now, then

#1 "Complexity of environment..."

Assuming I've correctly translated that into simple English, then probably correct.

#1 Empirical note - no - a simple maker that "things" were different then, to what they are now.

#2 Plush Fauna. Does it? Really? People are not interested - got any evidence for that?

#2 Empirical - maybe, but they are also exited about things like bees ( There's a major fight going on here about neonicotinoid pesticides, for instance )

#2 Feed-back loops. This is a failure of education, bad in itself, but not what you appear to claim it is.

#3 Okay after the comma - the prefix part of the sentence is noise.

#3 Empirical - Simply completely untrue, & you should know this is untrue, shouldn't you?

But it feels SO MUCH BETTER to pout your nihilistic rant, doesn't it?
3# I had to look up "Patrick Bateman"
Yes, but it's FICTION, & I can't imagine someone like that evading the "authorities" for very long, not really.
Do grow up.

*any real advanced mind that saw what we did would be screaming right now.*
SPECIFY & stop posturing.
*You utter utter utter - well. You know the ending by now.*
Tu quoque

---

537:

I suspect that the occasional m/39B round won't to appreciable damage, but if you're in the habit of using overloaded ammo and do a lot of long-distance paper-punching, you will, sooner or later, be very very sorry.

---

538:

They already tried banning encryption by any civilian citizen (late 90s, if memory serves me right), no matter in the world they were.

---

539:

*I imagine a caveman version of Doc Brown: "Great Scott, Marty! Look what this part of the buffalo can do!".*

I forget how they invented fire, but *Evolution Man* is along those lines.

---

540:

YGBSM!!


---

541:

Yeah, pretty much. It's why I don't think fusion will be a major power source for electricity generation - the aneutronic version is just incredibly difficult, and even the very difficult version we might be able to do in a few decades for net positive power generation has major draw-backs (such as waste).

By the time that happens, we'll be well on our way to adapting our power grids/storage for using solar and other renewables. Fusion power will be mostly a curiosity, especially if it's only achievable in giant plant form.
Whereas fission power will probably linger on in parts of the world, and will probably have a life off-world for better outer solar system probes.

542:

"Greg Egan respects physics: in fact he builds half his plots around concepts from theoretical physics. (I'm never sure how well they work for someone who hasn't got a physics degree...)

I have no degree of any sort. He's my favourite author by far (Sorry Charlie). He's the only one who *consistently* gives me that sense of wonder I got when I started reading SF as a small child. I've never had that 'oh, yeah, have I read this book before and forgotten?' feeling. Everything is absolutely new, fresh and shocking. It makes me wonder what it means to be human, what 'alive' really is, what 'reality' really is and what ideas are.

543:

Eeee... figure out the catalyst that allows you to photosynthesise it from atmospheric CO$_2$ and water vapour under ambient conditions. Or the microorganism whose metabolic processes you can hijack to do it for you. There are people looking into this, but not nearly enough IMO.

As a means of storing and transporting energy, for ease of use and handling, for high power/endurance-to-weight/volume of the things that use it, you can't beat it. Nothing else comes close.

And it is the only thing that doesn't require a whole new infrastructure and complete replacement of everything that runs on it.

544:

On big-ass destroyers -- okay, "destroyers" -- the Japanese Hyuga-class ships take some beating.

Okay, they're 19,000 tons loaded, not 22Kt, but they're still ... okay, they're classed as destroyers but they're really STOVL carriers because the JSDF has an unaccountable aversion to operating anything called an aircraft carrier, but still ...

Let's remember the class "destroyer" was originally short for "torpedo boat destroyer" and meant something in the 200-500 ton range, back in Jackie Fisher's day. What we call "destroyers" today -- things like the Zumwalt class, or the RN's Type 45 -- would have been clearly marked as battleships back in the 1890-1914 era.

(AIUI the ship class marker that comes with the name relates to the size of the crew, and implicitly the rank of officer in command of that many sailors.)

545:
I can't speak for anyone else, but my thoughts on the whole thing is that I agree on "a starfaring species need to be able to cause fire at will", but I don't agree that the method for that necessarily need to be "by friction".

I could easily see circumstances where there's enough lenses around to allow for "make fire by focusing light" as the primary fire-making route.

Or simply a culture that collects natural fire and keeps it alive, in enough places that fire simply was available at will, until enough technology is in place.

---

546:

That sort of myth builds a nice cultural self-image that people like to see themselves reflected in, but it's not necessarily very accurate (the "rockets red glare" and "bombs bursting in the air" were British Congreve rockets during the bombardment of Baltimore).

You're missing the point of the song.

And the rocket's red glare/ the bombs bursting in air,
Gave proof through the night/ that our flag was still there.

Of course the song is about suffering a British bombardment--it's about fortitude under long odds. You may pretty easily argue the US hasn't faced long odds in a long, long, time but you're waaay off base in suggesting we don't get what the words to the song mean.

---

547:

has any SF writer ever explored not "accidental sentience" but "accidental goals"? That is, the network starts reacting to stimuli in the ways its designers never expected?

You haven't read "Rule 34", have you?

---

548:

Was this plan drawn up before or after HMS Conqueror "ran south" during the Falklands War faster than an aircraft carrier plus supporting ships could manage? The Soviets had radar ocean surveillance satellites specifically to detect large capital ships like the American carriers so knowing where they were was not a problem for them.

I think there was a lot of wishful thinking involved in that "plan" along with the understanding that the Great White Elephants would be useless in a real shooting war and as a bonus they'd absorb large amounts of other men and materiel to keep them safe, just like battleships during WWII.

The Conqueror's sinking of the Belgrano was a classic example of what a well-handled sub could achieve even against a decent anti-sub operation -- the Argentinians had British-made ASW frigates and knew a British sub was on station in the area. The Conqueror had shooting solutions on the Belgrano for a long time before it got permission to sink it. Conversely a single small Argentinian
diesel sub operating in the area, the San Luis was considered a serious threat to the Royal Navy's surface ships which were optimised for antisubmarine warfare, ranked as some of the best in the world at that time. They never got it and the San Luis actually launched a couple of attacks which failed for technical reasons.

549:
"alien trading network is willing to give us occasional baubles of ultra-high technology or scientific insights in return for artifacts of our culture"

Other commenters have given examples, but the one that came to my mind was the Outsiders from Larry Niven. They trade information. Human scientific insights are completely worthless, but they will trade for this and that as required for story telling reasons.

https://en.wikipedia.org/wiki/Outsider_%28Known_Space%29

550:
Beat me to it.

551:
That's a very interesting hypothesis, re: internal feuding in the USN. Do you have any links on that?

552:
Yes. Needing about 100 devices when increasing the radius by a factor of 10 (50m to 500m in the original comment) is a square law.

553:
The lessons of the last eighty years or so are fairly well remembered, but the farther back you go the dimmer it gets.

Because, well, it's just got to be true that since we have smart phones and apps the old lessons just do not apply in any way. [sarcasm]

Watching (and being somewhat immersed in) the computer industry for 40 years and reading the history before that we seem to repeat mistakes every 10 years or so.
That war plan sounds very much like an Underpants Gnome plan to me. (Not totally implausible, but the "... ??? ..." of point 2.5 sounds like they're counting on a Hail Mary pass.)

555:
Nix, the point is that a D-3He reaction is barely any easier. (D-3He fusion only hits the same reaction rate as D-T when the temperature is in the 1-10 billion kelvin range.)

Aneutronic fusion looks to be a lot harder than just building a regular D-T or D-D fusion reactor and figuring out how to deal with the secondary activation products -- we have 70+ years experience in managing that general kind of waste (and unlike the "waste" fuel rods, it can be tweaked for a shorter half-life, thus not needing a choice between the deep storage or reprocessing and a MOX/Pu fuel cycle).

556:
These days, destroyers tend to have a primary anti-aircraft role; frigates tend to have a primary anti-submarine role.

The Conqueror's sinking of the Belgrano was a classic example of what a well-handled sub could achieve even against a decent anti-sub operation -- the Argentinians had British-made ASW frigates and knew a British sub was on station in the area.

Nope. Firstly, the Argentinians had bought a pair of Type 42 Destroyers (AAW ships), not frigates. Secondly, both of them were with Task Group 79.1, in the north, with their aircraft carrier. Task Group 79.4 with the Argentinian Navy's frigates (Guerrico, Drummond, Granville) was also in the north.

Task Group 79.3 was the Belgrano (WW2 cruiser), Piedra Buena (WW2 destroyer), and Hipolito Bouchard (WW2 destroyer). No ASW to speak of; Belgrano sunk, Hipolito Bouchard struck by a torpedo at the end of its run that didn't go bang.

557:
That's a very interesting hypothesis, re: internal feuding in the USN. Do you have any links on that? How can you not find anything on this? If nothing else find an ex-USN officer and get them to talk.

Aircraft created issues in the USN which really blew up big in WWII and have been there ever since. Ditto subs.

As a retired naval pilot has said to me "You really don't have a career in the Navy unless you fly something that shoots or drops large hunks of iron." He left about 30 years ago so replace the word iron as needed.

And there are very few admirals who have not captained a carrier. And you don't get to caption a carrier unless you have flow carrier warplanes.
Sub officers have their own strange carrier paths.

Historically look into why US torpedoes were an issue for the first year or so of WWII.

558:

AIUI the ship class marker that comes with the name relates to the size of the crew

It's more the role of the vessel; destroyers have a primarily offensive / anti-aircraft role, frigates have a primarily defensive / anti-submarine role.

559:

I can assure you that "The Star Spangled Banner" wasn't taught in British schools in the 1970s through early 80s, to the best of my knowledge.

(In fact, the history curriculum -- pre A-level -- basically covered classical antiquity through the Tudors, then leapt straight to the 1860s in Europe, entirely overlooking the very existence of a certain absent-mindedly misplaced British imperial possession, at least until they showed up late to World War One. Can't think why.)

560:

Really? I thought that the dream of the 80s was for the CVBG to head north, into harm's way - to protect the whole REFORGER effort. The main effort is to hold the line in Central Europe... and to get politicians to start talking before the little drops of instant sunshine start to grow.

The RN was going to be busy finding and killing Soviet submarines, cued by SOSUS across the GIUK gap; and the Tornado F.3 and Norwegian F-16 were going to be taking on Soviet Naval Aviation (with the British and Dutch amphibious forces being deployed as necessary to protect Denmark and defend the Baltic, or protect Norway and defend the northern flank, as required).

Remember also "nuclear depth charges". Makes life awkward for submarines; so the later Soviet effort was to create SSGN that killed with cruise missiles, not just torpedoes, in an integrated system (called Granit, IIRC) that cued them from RORSAT and Maritime Radar Reconnaissance.

For its many sins, Tom Clancy's "Red Storm Rising" does give an insight...

561:

The Type 45 is ~9,000 tons, depending on your preferred measure, which is 1900-1950 cruiser tonnage. Even with the deck armour stripped out, a pre-Washington Treaty battleship would be around 5 times that.
Modern subs are scarily good

A quote I heard was "the Americans build them to go fast, the Russians build them to go deep, and the British build them to be quiet".

The problem was that most Soviet submarines of the Cold War were a bit rubbish, and rather noisy. Claiming that they could comprehensively defeat the USN and RN is an ambitious statement...

Anyway, the USN hired a Swedish diesel-electric boat so as to train up against modern SSK; and had real trouble finding it on exercise (a bunch of Scandinavian conscripts? With [gasp] women on board? How can this be?)...

"Red Storm Rising" loaded the deck in soooo many ways just so Clancy could have warporn tank battles in Western Germany unencumbered by the use of chemical weapons or tactical nukes, both of which would have been used freely and generously by day 2 or maybe day 3 in reality.

Part of that deck-loading was to presume US/RN antishubmarine efforts would have been super-effective just so that there would be some carriers and (God help us!) an Iowa-class battleship left at the end of the book for the Good Guys to win in style.

Saying that the subs-vs-subs running fight near the end of the book was quite good with the RN riding to the rescue in the nick of time (and Stingray for the win!).

I picked my time frame carefully; battleships inflated wildly from about 1880 through 1945 -- HMS Dreadnought was the biggest battleship afloat at 18,000 tons in 1906; by 1912 the Orion class were displacing 22-26,000 tons, and the 1913 Iron Duke class were in the range 25-29,500 tons. Go back to the pre-Dreadnought era and as late as 1903 the UK was laying down hulls in the 13-14,000 ton range (e.g. the Duncan class). The USS Texas, laid down in 1889 and the USN's first remotely modern battleship, displaced 6300 tons -- less than a modern destroyer.

I have not. Looks like I should.

And speaking of tonnage inflation...

Modern brown-water subs in brown water are quite effective bits of kit (absent the Lada, the Kilo-class successor) but mostly in defensive roles such as keeping a CVBG away from your coastline and reducing its strike capability inland. The brown water conditions helps them hide from inquisitive folks -- the San Luis was operating around the Falklands/Malvinas coastline where the bottom is littered with wrecks of whaling ships and such and the captain pulled the old-but-gold trick of sitting on the bottom among the junk when it was being hunted. Sonar is also more difficult in shallow waters with currents, surface conditions, rocks, shoals, tides and the like noising up the big picture.

Blue-water subs are needed to do the deep-water jobs like boomer escort, intelligence gathering and sinking the Other Guy's capital ships when called upon which requires an offensive stance, and in today's world only nuclear boats will do that job properly. However they operate in a clean environment with nothing except a thermocline to hide behind so quiet is a good thing.

The key for successful submarine operations appears to be having the right kind of mentality in charge, the sort of aggressive over-achiever who will push in and press home attacks. The RN doesn't do The Perisher any more but it was a great example of the sort of thinking behind their personnel selection process. I assume Ivan also put their best in command of their own subs.

The Chinese are building both nuclear attack boats (in part because they'll need escorts for their small fleet of operational strategic missile boats) and a lot of smaller AIP-quiet conventional subs for coastal defence to keep the US carriers out of effective range.

Re: 'You seem to think that, because you don't spin up a fire when you cook, that you can live indefinitely off of uncooked food. The evidence says (read Wrangham if you want to see the studies) that you cannot.'

Traditional Eskimo/Inuit diets were mostly raw fish, sea mammals and the occasional polar bear -- including innards (source of veggies). One of their traditional fire-making strategies was to use hot (sun-heated) rocks and moss because there just weren't (still aren't) that many trees around. Apparently the flash-point of moss is pretty low. FYI - a raw fish/meat diet is also how this human tribe sourced its Vitamin C. So, an excellent reference group to study for extreme adaptation. (Ditto for testing equipment for lunar/Mars rover missions.)


On the down side, one ounce of raw polar bear liver can kill a human (a Westerner, anyway) via overdose of Vitamin A. Here's a 1943 report on this topic.

Oops! hit the post button too soon.

Eskimo/Inuit (cont'd)
Fuel was primarily animal (whale, seal, bear, etc.) fat plus occasional/seasonal splurges of animal
dung, mosses, wood debris.

The RN doesn't do The Perisher any more
errr..... Yes, they do. In fact the recent TV documentary following it included a USN officer doing
the course...
https://en.wikipedia.org/wiki/Submarine_Command_Course
http://www.channel5.com/shows/submarine-school

Not to mention the Australian Collins class subs which have repeatedly penetrated US battle group
formations to score kills in both deep water and very shallow.
Diesel Electrics are no longer the cold war era noisemakers of fiction.

Built in the Bath Iron Works? Skippered by Capt. James Kirk? Yeah, right, pull the other one!
(One of those cases where you can tell it's real because no self-respecting writer would dare invent
those names for the story.)

David Weber does grow as a writer. But the first half of the Honorverse suffers from this. It does get
better, especially after he start working with Eric Flint whose better able to argue the virtues and
flaws of communism.
Otoh, the first half of HH is horatio hornblower including the Rue Britannica, so what you'd expect?
The RCN series at least has the main characters be a cynic and a political outsider such that it's clear
their government is not much different than their Napoleon Analogue.
Red Storm Rising did stretch things to avoid nuclear and chemical weapons, but then it was also a long term play test of Harpoon, so no real surprise. The military side was well thought through, even if the geopolitics were horrifically bad. Nukes and chemical weapons were going to be used towards the end though as a last resort as everything escalated.

The ASW side of things was definitely shown to be pretty balanced though - both sides lose ships and subs.

On the carrier front, the US carrier groups get owned initially, then they slowly reclaim the Atlantic, and the later convoys get through with heavy support and removal of the soviet rorsats. The replacement carriers and battleship are from the Pacific Fleet, smuggled through the Panama Canal. The battleship is used to shell positions on Iceland, which makes perfect sense given the ship was only mothballed, not fully decommissioned *at the time*, and it was used for the same role in Korea and Vietnam.

I also liked the use of the Spearfish torps - "can we buy some of those!"

---

575:

... much as the less-capable diesel-electric subs on both sides of the Pacific war racked up a fine score of large capital ships. For example the four carriers sunk during the Battle of Midway were all sent to the bottom by Japanese subs (the three Japanese fleet carriers were scuttled by Japanese subs, the Yorktown was caught and sunk after it was crippled and under tow).

Well, in the case of the Yorktown, it helped a lot that it had been thoroughly bombed and torpedoed by Japanese carrier aircraft, to the point that it was abandoned for several hours. When the I-168 attacked, it had been reboarded by salvage teams and was under (very slow) tow. Much easier for a submarine to find and attack in that case.

As for the Japanese carriers -- they, too, had been comprehensively demolished by (American) carrier aircraft. So it would seem to be a similar case of "it's easy for submarines to sink aircraft carriers -- if airplanes cripple the carriers first and leave them dead in the water". That hardly counts as "a fine score"...

... except that none of the (four, not three) Japanese carriers were sunk by submarines. They were all scuttled with torpedoes fired by Japanese destroyers.

Capital ships actually sunk by submarines in the Pacific: six carriers (including Yorktown), one battleship. Not bad, but not as impressive as the tally from aircraft: fifteen carriers, ten battleships and battlecruisers (or twelve if we count those sunk but later refloated).

---

576:

It's hardly tonnage inflation.

"Destroyer" is from "motor torpedo boat destroyer" which, well, hardly applies today. It wandered through "blue water torpedo boat" and "fleet escort" into "anti-air and anti-sub" (with "cruiser")
meaning "anti-air and anti-surface") into "two-screws and a lot of VLS cells" because there isn't much of a threat and certainly not a concerted sub threat and most of the anti-submarine focus gets pushed off on to the helicopter.

That century of change gets you from 800 tons displacement to ten thousand or so; the ten thousand tons is toting around anti-satellite capable radars with monstrous cooling and power requirements and a lot of missiles. (A Standard 3 missile is about a tonne and a half; a 21'" torpedo is about a tonne and a half... ten times the tonnage, ten times the self-propelled projectiles, it seems to work out.)

ZUMWALT is a prototype battlecruiser but you can't say that for procurement reasons; stealth hull form, repositioned VLS cells so they don't consume metacentric height and the midpoint of the ship, and rumoured to intend directed energy weapons. Considered as a heavy cruiser, smaller than the last gun-armed class. Class probably curtailed because it's so astonishingly ugly. Class possibly curtailed because of a big old faction fight about the desirability and utility of directed energy weapons platforms, either "at this time" or "at all".

577:
Re: 524 – Scott Sanford – I’d forgotten about ice lenses. As a kid did try using water lenses.
Re: 527 - bruce
Re: ‘…underwater civilization would have a huge skill set for using pressure chambers…’
OTOH, they’d have a serious problem discovering/putting effort into developing pulleys and levers since on our planet’s surface these mechanics get a huge assist from gravity. There isn’t that much obvious gravity underwater – overshadowed by compression/pressure - so levers and pulleys would probably be considered interesting but useless.
Re: 535 Ian Mackenzie ‘Talking past each other’
Not offended – good summary. I was trying to communicate that in an (alien) underwater scenario the to-the-stars road map would be quite different and might even omit some steps. Also, I’m using octopus for my reference underwater sentient because they are quite bright, have interesting distributed central nervous system processing capability, make tools (drill rocks with other rocks), build habitats, have superb sensors, i.e., tactile, olfactory/gustation, etc. And, disturbingly, they may get fished out of existence.

578:
I expect he had hopes to command the next USS Enterprise -- when they finish decommissioning the current one and get around to building the next CVN -- but as it won't be ready for sea trials for around a decade or more that's a pretty remote possibility these days.

579:
I've been thinking about personal and social life aboard my interstellar cargo ship/hab scenario. The first thing that occurs to me is that, although they are limited to about 150-200 people, these ships aren't truly isolated. In addition to the shuttles flying up and down the line (which takes about 6 months between ships, see my conversation with Charlie), there's also electronic communication. Every ship will, of course, be carrying their own version of the internet, including web pages and social media to keep everyone connected. The young people on board are likely to be esp. engaged. Certainly immersive interactive gaming will be a thing. I imagine each ship's community will have their own policies regarding their youth and what interactive experiences they can have- some will be more restrictive than others. In any case, ships will surely share data- including online interactive experiences. Each ship's database will be updating continuously, although the updates are 20 days old. I can see the news that someone in another ship unlocked a previously unknown level in a popular game becoming a huge event. Considering the shortage of real-time humans to interact with (and they will always be busy anyway) I would think that advanced simulations for training, education and recreational purposes will be in high demand. With experienced programmers on board, the ship community may well be leaders in this technology- a skilled programmer could make some bucks for his/her ship long before arriving at their destination.

The ships are spatially isolated from other ships in their line by 1/20th of a light year, but nothing prevents the two lines (departing Earth and approaching Earth) from passing very close to each other. The main isolating barrier is speed- they are passing each other at .1c Some enterprising individuals may set up permanent habs in between the two lines, stationary with respect to the Earth-Target system, which would halve the delta v any one shuttle would require to match velocity. So personnel and resources could pass between the lines as well. I see these as independent self-organized habitats, so I'll just call them "Freeports". The way it would work would be: an individual or a group saves up credit via some economically productive activity, buys the delta-v it requires to grab space on a departing shuttle, arrives at the Freeport, and either stays or buys space on a ship heading toward Earth. I could see a freeport a year out from Earth, which would allow people with cold feet a relatively quick way home. Others would be spaced up the line. I believe they will be popular places for romantic encounters.

Legally, I envision each ship as an independent corporation. Each has their own governing structure, each under contract to deliver some cargo to the target system (something manufactured for an alien under spec), and bring something else back (alien manufactured products).

This lifestyle involves a degree of physical isolation, but I think it's well within human psychological parameters. Each ship is basically a technologically advanced village. The life is relatively comfortable, the work is exceptionally challenging, and somewhat dangerous. There will be a non-trivial mortality/injury/illness rate. Automated medical devices, expert systems, and labor saving tech in general will be in extremely high demand- there will likely be a secondary manufacturing sector devoted to meeting that demand. Occasionally entire ships will get wiped out. Shuttles will act as scavengers- recycling parts and supplies will be a high priority. As long as the loss rate is kept manageable- maybe 10% per trip?- the psychological stress shouldn't be too high. There will be no lack of replacement volunteers. Soliciting and accepting new personnel to join your community will be a very intense and emotional process. Likely there will be some sort of ceremonial ritual involved.
And yes, Cantina, most if not all of these people will be born, grow up and die without ever once laying eyes on a live animal. Something could be done with robots, I suppose, and they could easily manufacture plushies, but I don't know how the children would relate to them. More likely they will mostly be attracted to fictional character- my own kids already do this. Human imagination will have to serve, as it ever has- dinosaurs went extinct tens of millions of years ago yet we still have Barnie. I don't think human empathy is at risk of going extinct.

580:

News to me! I thought us Australians were all meant to be ashamed of that class of subs. Curious if you have further info.

Not skeptical, honestly I just tend to avoid all knowledge of military hardware. Mostly because I mix in history circles, and military historians intimidate me. Once you've seen the bloodlust that rises in their eyes after you ask them about their current project, you learn to avoid them. Fuck, some of them walk around with visible erections while they talk about casualty rates. (That last bit was hyperbole, but only mildly so.)

581:

Heh. The project was outrageously expensive, riddled with problems, and suffered greatly from manpower and maintenance issues causing only a few working boats. On the other hand the boats themselves when they can sail are actually pretty good kit, most all the initial production issues were sorted by 99.

Ironically due to the lengthy maintenance cycles they are projected to last a lot longer than planned, the engines will die before the hulls reach the stress limits.

I think they can still safely be classed as white elephants since the main usage these days is stealth insertion of covert operations, but that does prove their ability.

582:

Don't joke...

There was a Scottish Regiment where the Regular battalion was commanded by a Lt.Col Kirk, and the Reserve battalion by a Lt.Col Pickard - and yes, they had been Captains together in the same battalion :)

My money is on a Regimental Colonel with an well-hidden geeky side, and a long-term sense of humour

583:
That war plan sounds very much like an Underpants Gnome plan to me.

We, thank Ghu, never had a chance to find out how well it would have worked. However, at the time in question (up through the mid-1980s), US submarines had a truly enormous acoustic advantage over the Soviets. US SSNs routinely pulled off startlingly bold feats of sneaking up to Soviet ships and submarines. That, in turn got factored into naval war plans.

584:
And a real world (sea) ship called "Flying Enterprise", actually commanded by Captain Kirk (Carlson).

585:
I want a reactor that fuses everything lighter than iron, into iron.
Hey, if stars can do it, so should we. :-)

586:
Might be a tad energetic ...

587:
Good, it should function as a fission reactor as well. Basically, throw in any element, get iron and energy out. The universal furnace.
Then throw the iron into a black hole to get even more energy.

588:
"I'm not going to out them for being idiots.
Heh -- in my case, JP is already pretty widely known as a -- well, let's say curmudgeon -- so I don't think I outed anybody. ;-)"

589:
Actually, most stars can't do it: our Sun will give up after helium fusion. And most stars are less massive than the Sun.

Given that fusion into iron produces, a couple of days later, around $10^{44}$ J of energy in one lump, you may wish to rethink this particular ambition ...
@557 David- 'Historically look into why torpedoes were an issue for the US in WWII.'

The story I heard in the Navy was that torpedoes were fueled by alcohol, drinkable if you filtered it through a piece of bread (helped to be an alky with dead taste buds and dying liver). Result- US torpedoes kept running out of fuel instead of hitting their targets. This was also a factor in JFK's torpedo boat navigation issues.

Amusing since Heteromeles had already mentioned 40,000 in Gehenna - probably the only Cherryh I haven't read.

Also Serpents Reach by her fits the bill of Humans being kept as pets/queens for their tool using capability.

As much as I like the ever expanding foreigner sequence oh how I wish she was still producing other novels. Truly one of the greats and a very low Shibboleth count - even including the Cat/Spider aliens.

Off topic - I do wonder if she is as much a victim of the "Women in SF should only write certain genres" affliction as some the other bloggers Charlie has had on here.

The Collins were based on a Swedish design but the range was too short so some bright spark came up with the idea of "just make it bigger" which unfortunately caused all sorts of production and maintenance troubles such that keeping an effective force in the water was a problem. That said Mayhem is right that they're considered quite good once they actually get out there.

They're currently looking to replace them and the process has been fraught, so much so they've just hired an American to run the program.

US Mark 14 torpedoes had a bunch of problems, notably contact pistols didn't work with square hits. BuOrd had tested two (2) and wrote the failure off as a fluke, rather than the success.

They also didn't run reliably at set depth or in straight lines as initially deployed.

Cute story, but no.
US submarine torpedoes had three problems, compounded by the continuing tendency of the Bureau of Ordnance to strenuously deny there was anything wrong with them.

1. A tendency to run about 10 feet deeper than the specified depth setting. This was the first problem to be identified. The fix was simple -- subtract 10 feet when setting the depth -- but didn't really help, because the other problems remained.

2. A fancy magnetic trigger (designed to detonate the warhead when passing under a ship, creating an explosion that would "break its back"). This had actually been designed and deployed without any live testing; it's therefore not too surprising that it just didn't work. This was the second problem to be identified; unfortunately, removing the magnetic triggers didn't really help, because of the third problem. (The Germans, as it happens, also developed torpedoes with fancy magnetic triggers that didn't work.)

3. An badly designed mechanical trigger which would fail to detonate the warhead unless the torpedo hit at an oblique angle (the closer to 90 degrees the impact was, the more likely the trigger would fail).

---

595:

Yeah, but I don't want it in a star. I want it as a controllable process in a reactor. It should be theoretically possible.

Seriously, Dyson spheres are just not enough. Enclosing a star and then waiting for it to release the energy? What kind of hippie thing is it?? We should be able to burn through the available fuel in the universe as fast as we want!

Fuse, baby, fuse!

---

596:

Some pet peeves (not throw-the-book-at-the-wall stuff, but stuff that irritates me enough to make me consider it when the story isn't otherwise exceptional):

- Non-stable time loops. Hint: if your time travel doesn't work with stable time loops, you imply that time travel has some kind of 'special' relationship with causality. Hint: MWI requires parallel universes to *never* interact, even with regard to time, in order for the math to add up.

- The Consistently Competent Man: a lesser category of the Heinleinian hero who is a genius at everything, this character never makes mistakes. The sub-breeds of SF that function as competence porn are filled with these characters. You don't want your characters to be unreasonably incompetent, but a good rule of thumb is that if the character's mistake in judgement isn't noticeable to a reader reading his or her first person narration of the decision-making process then it's OK because the reader is complicit in making the mistake.
A couple things that aren't huge pet peeves but get in the way of deep analysis and also can be interesting if actually addressed, specifically in space opera:

- Far future SF where language and culture hasn't particularly changed much since the present. Some positive examples: in Seveneves, the far-future setting's language and culture is justified in being fairly static because the near future setting's events are heavily recorded and are being used constantly as education and entertainment materials for the far-future setting (much like Icelandic schoolchildren can read norse epics in the original language because of an effort to keep the language similar); in Crest of the Stars, while there is a fairly alien language and culture belonging to the space-faring race that forms the basis of most of the action, the main character is from a planet that had been uncontacted until his childhood and so the narration is from the perspective of someone who had to learn the language and culture as a teenager. Fringe cases: at least in Consider Phlebas, the Culture seems way too close to a late-20th-century western liberal culture with hedonism machines. Failures: any far-future setting where people make puns that make sense, because whatever language those people are speaking is *not english*.

- Huge intergalactic alliances composed mostly of humanoids. If we only see ambassadors, then at least some of the 'monoculture' stuff is justifiable, because an ambassador presents some idealized version of some dominant culture for the purpose of presenting a sanitized version of it to other ambassadors (in addition to having legitimate political duties regarding representation); however, having a roughly humanoid body plan isn't really justified, particularly in books (where makeup doesn't cost as much as it does in movies). Earth is full of birds and squids and sea cucumbers and slime mold; we have no really convincing reason to believe that intelligent life will have arms and legs and heads. Fringe cases: the Culture, again. While Banks makes an effort to include oddities like trilaterally symmetric body plans and aquatic intelligent life, rarely does a conflict directly involve a species that doesn't have arms and legs and a head.

In terms of the whole gun thing... To be honest, I'm surprised that guns are used as much as they are *now*. They are good at hitting single stationary targets when wielded by experts, but they just don't have a sufficient cost-to-kill ratio. Guided bullets would make for a slight improvement at the cost of making the bullets more expensive and probably also less dense. Basically, if you're throwing a slug, it makes sense to throw a big slug or throw a slug with appropriate properties for maximizing the casualties, because slugs and slug throwers are not typically cost-effective compared to shrapnel throwers or poisons. (Forget laser-based weapons too, obviously.) The weapon of choice in SF should be poison (and, maybe, poison darts): you get all of the benefits of bullets in terms of targeting without the drawbacks of having a hot noisy expensive slug thrower that's heavy because of the need to hold up against intense pressure, and then the very same set of compounds (which is absolutely huge) can be used against a larger group by poisoning food or air.

Guns. Yeah, sounds like the Mega City One Justice Dept. Lawgiver, a handgun firing a range of ammunition (incendiary, ricochet, heat-seeker etc) and biometrically linked to to the authorised
user, with a small explosive anti-theft device. It's standard procedure to say the ammo type out loud when selecting it ...

598:

Black holes and people mixed just fine in Geoff Landis's _Approaching Perimelasma_.

OK, they were such remote posthumans that they did things like diving into stars for fun, and even there an extremely heavily modified and stripped-down copy in a wildly nonhuman near-microscopic hyperstrong synthetic body was needed. But still, he thought like a person. It *can* be done, with enough effort.

599:

In terms of the whole gun thing... To be honest, I'm surprised that guns are used as much as they are *now*. They are good at hitting single stationary targets when wielded by experts, but they just don't have a sufficient cost-to-kill ratio. Guided bullets would make for a slight improvement at the cost of making the bullets more expensive and probably also less dense. Basically, if you're throwing a slug, it makes sense to throw a big slug or throw a slug with appropriate properties for maximizing the casualties, because slugs and slug throwers are not typically cost-effective compared to shrapnel throwers or poisons.

If you had a machine vision guided firing system, and the soldier in the loop just does high level target designation, it seems to me that bullets would be pretty cost effective at hitting the enemy. I've seen a number of toy implementations using paintballs or other fake guns plus open source machine vision software.

Ideas about why this doesn't show up on real battlefields, in order of ascending cynicism:

1) It's already hard enough to make a gun that is reliable given the way they get treated in war. Adding optics/sensors/actuators/batteries of the sort needed, that can endure everything the old dumb-gun could, is beyond the current state of the art.

2) The component state of the art is up to the task given a budget to do the integration, but the air power focus of the world's #1 military spender bends R&D spending priorities away from innovations for infantry.

3) It could be developed fairly easily, but once it's proven possible everyone will be cloning it or buying clones. It would make poorer irregular forces deadlier in a way that large, organized military forces of major powers do not want. This is the same motivation that I suspect of nations that agree to outlaw blinding laser weapons but not cluster munitions, chemical weapons but not nuclear weapons. The dreadful weapons that are in easy reach of tiny states or even non-state actors are outlawed. The dreadful weapons that need a large, expensive industrial base are retained.

600:
My deal breaker with SF (at least newer SF, I can tolerate it in older stuff) is often pilots.

That is, while I can just about cope with the implausible notion that human spaceflight, whether interplanetary or interstellar, will be common, if the author then decides that a space ship will have a pilot, a gunner, and so on, then I start to have major issues.

Space, being mostly empty and even predictable using mathematics known 300 years ago, is ideally suited to being automatically navigated. Our interplanetary spacecraft for the last 50 years have already been mostly automated. So when a science fictional spacecraft has pilots and gunners and engineers and all the rest of it, I feel the urge to throw the book away.

Space Ships with the same social hierarchy and functions as a 19th century ship of the line, that's bad enough. I was reading a book yesterday (January Dancer by Michael Flynn) which also threw in terminology from the 19th century. Characters on space ships talk about things being "bristol fashion", say.

Another thing - sometimes SF with future societies make a commendable attempt to avoid the "monocultural, everybody seems to be an american and speak something called anglic" problem, but they do so in implausible ways. In the January Dancer, somehow gaelic has become a lingua franca of the spaceways. How it managed to avoid near death at the end of the 20th century and become dominant on an interstellar scale is left unexplained.

But somehow ancient gaelic culture has also been revived and become dominant in space. Perhaps Wiccans are poised to become a dominant ruling class? Maybe a teenaged wiccan who dabbed in spellmaking and gaelic finds a teleportation spell that *actually works*? How else to explain it?

The future is different - not better or worse, but it probably isn't going to be populated by cultures from the 19th century with added ray guns.

601:

@John: You might want to read the whole "fire by friction" thread, because it starts with an argument about how humanoid the aliens we meet are, and why.

- Far future SF where language and culture hasn't particularly changed much since the present.

This is another one that can start a fight. I wholeheartedly agree with you, but the function of a story is to sell copies in our culture, and it has to be understandable within our context, rather than within an alien one. I'm pretty sure this is one reason why fantasies take place predominantly in medieval knock-off lands, rather than in, say, Medieval Burma or Micronesia. There's no reason you can't write the latter stories, except that there's no obvious audience for them to be sold to, so you've got to conquer that hurdle before you can tell your story. With medievaloid stuff, you've got everyone's school history lessons to draw on (castles and kings and courtesans and cockatrices), so you can play with known tropes without spending precious pages not describing your world.

As for language, the few linguists who have thought about seem to have come to the conclusion that languages "evolve" (churn and change randomly over time) to the point that, after 5,000-10,000
years, their descendants are effectively unrelated to their ancestors. Proto-Indo-European is only around 5,000-7,000 years old, and while we can deduce about 200 words from analyzing its copious, written descendants, that's about it. Modern humans are around 200,000 years old, and if the linguists are right, we'll never be able to know what languages were spoken during the last ice age 10,000-plus years ago, let alone 200,000 years ago. Language changes too fast for it to be reconstructed on that scale.

Going into the future, you're absolutely right, languages should change to become unrecognizable, and alien languages should be alien. But what is a novelist to do about it? If we write wholly in a made-up language, no one will understand it, so we might as well write in whatever language we like, and simply pepper it with a few new words and ideas to make it interestingly exotic.

I totally agree that this is suboptimal and a waste of wonder, but then again, so is an unread story. Authors have to strike a balance between the two.

602:
"Re: 'You seem to think that, because you don't spin up a fire when you cook, that you can live indefinitely off of uncooked food. The evidence says (read Wrangham if you want to see the studies) that you cannot.'

Traditional Eskimo/Inuit diets were mostly raw fish, sea mammals and the occasional polar bear -- including innards (source of veggies). ..."

The Inuit have some genetic adaptations to survive that diet, and get most of their calories from animal fat (also see the article). Most of us couldn't do that, and we couldn't do it from vegetables unless we have an evolutionarily implausible over-supply of high-calorie ones. And hunting for survival is HARD - the only easy form is gathering aquatic invertebrates (and fish in a few favourable ecologies), and the calorific return is miserable, because they are almost fat-free.

603:
Antibodies are actually inheritable, in one specific and short-term sense -- babies get antibodies in their mother's milk. (But they don't get the B cells, so they can't make more -- it's a stopgap, not inherited immunity.)

604:
Yeah, Cherryh also wrote "Wave Without A Shore" which is, hmm, a hard science philosophy novel? It's a science fiction setting with space travel and aliens, but those don't really matter, it's all about people and society. Closest thing to Le Guin I've read.

As for why she continues to write the Foreigner series, her usual response is something like "Don't tell ME you want more books about X, tell my publisher!" As pointed out by Heteromeles, stories have to be sellable.
There are plenty of ways to form minerals only in one solar system -- or, rather, only under one set of conditions. Earth has literally *thousands* of minerals which don't exist anywhere else in the solar system, because they require hydration and an oxygen atmosphere to form. It has even more that require life, because they are the consequence of biological processes (e.g. oolitic rock).

I would be astonished if other worlds with different biospheres and/or planetary chemistry did not have unique minerals. The ones that depend only on variations in chemistry might be buildable by us here on Earth, but not the ones that depend on life.

Who's to say that unobtainium didn't depend on processing by some Pandoran bacterium that we have no idea how to culture? (Yeah, yeah, they said it was an element, *that* is obvious nonsense.)

---

Hermaphroditism

I think to achieve this we would have to merge the X and Y chromosomes into a single functional chromosome. However after a reasonable population size has been achieved the doubled fertility could cause problems.

---

Agree about the adaptations ... humans have accumulated many adaptations that help or hurt survival, therefore it's likely that new adaptations will show up down the road. Ability to digest cellulose would definitely be good as well as any ability to filter out salt in briny water. (Our fresh/sweet water is disappearing.) Meat sensitivity is another interesting case ... I don't know anyone with a meat allergy but have heard of serious issues due to a wonky copper metabolism and lysinuric protein intolerance. Any negative adaptation re: meat digestion would play to the vegetarian movement.

About the Eskimo/Inuit specifically ... What had caught my eye was the Vitamin C bit because for the longest time it was assumed/taught that humans got their VitC only from plants and that the Eskimo/Inuit were the only humans able to manufacture VitC. (Therefore two longstanding errors or myths.) The nose bleeds info was also interesting.

---

Heteromeles wrote: languages "evolve" (churn and change randomly over time) to the point that, after 5,000-10,000 years, their descendants are effectively unrelated to their ancestors

The past may not be a guide to the future here, due to film, video, DVDs, MPEG-4... We've never before had the technology to preserve speech exactly in the original form. If alphabets and
pictograms change much more slowly when they're widely printed (Roman? Chinese traditional?), then I'd expect that re-runs of Star Trek and Happy Days would likewise slow down linguistic churn.

A high-tech future with languages very similar to those of today seems plausible to me.

609:

Meat sensitivity is another interesting case ... I don't know anyone with a meat allergy but have heard of serious issues due to a wonky copper metabolism and lysinuric protein intolerance.

There's actually a very very interesting case related to this, and no-one is really sure why a parasite would accidentally induce this type of behaviour.

Well, unless you're like me and think... well... lice / fleas do such a good job on mammals [we type the split between hominids by virtue of their public / hair lice variations, fyi] that the ticks got forced out of a niche, until... wow... you're forcing them to forage for vegetation instead? This is one for Host's particular interests:

Serious tick-induced allergies comprise mammalian meat allergy following tick bites and tick anaphylaxis. Mammalian meat allergy is an emergent allergy, increasingly prevalent in tick-endemic areas of Australia and the United States, occurring worldwide where ticks are endemic. Sensitisation to galactose-α-1,3-galactose (α-Gal) has been shown to be the mechanism of allergic reaction in mammalian meat allergy following tick bite. Whilst other carbohydrate allergens have been identified, this allergen is unique amongst carbohydrate food allergens in provoking anaphylaxis. Treatment of mammalian meat anaphylaxis involves avoidance of mammalian meat and mammalian derived products in those who also react to gelatine and mammalian milks.

http://www.ncbi.nlm.nih.gov/pmc/articles/PMC4313755/

The real question, of course, is how long this effect has been hidden by "popular wisdom" (refer further to Irritable Bowl syndrome, fecal transplants and so forth).

I'm sure most here are up to date with the rather stunning news recently as well:

The last drug has fallen. Bacteria carrying a gene that allows them to resist polymyxins, the antibiotics of last resort for some kinds of infection, have been found in Denmark and China, prompting a global search for the gene.

The discovery means that gram-negative bacteria, which cause common gut, urinary and blood infections in humans, can now become “pan-resistant”, with genes that defeat all antibiotics now available. That will make some infections incurable, unless new kinds of antibiotics are brought to market soon.

And, Greg - the above should really start pushing your Doom Scenarios [Tm] buttons, but:

I had to look up "Patrick Bateman"

If you move a few steps past that, you'll realize I'm not a nihilist at all.

Personally, and without the Masque, I'm deeply deeply disturbed by the types of Minds being produced at the moment.

The last four Doctor Who episodes are free on bbc.co.uk/iplayer Give them a whirl, you might see other facets being revealed. Or not.

Likewise, knowing the cannon of Revelation Space helps immensely.

Hint: the space farers (Ousters) are deeply amoral compared to their planet bound fellow (ha!) species.

Reynolds is also hard SF: The novel reflects Reynolds's professional background: he has a PhD in astronomy and worked for many years for the European Space Agency.

~

One more shibboleth (inspired by Greg): the cultural ingénue or young mind who needs everything explained to them (usually as adjunct to crap world building).

Yes, looking at you, Young SkyWalker.

610:

And yes, that was a cruel trap.

Apologies.

Just ignore the line in Doctor Who #11 about gardeners being dictators, I don't share the sentiment. Although...

No, I'm not that cruel.

611:

And, the tie-in.

Forgot to explicitly show the workings:

American Police Unions recently (late 2014?) had to release guidelines on why shooting someone's dog will lead to an emotional backlash from the suspect / public. Literally. No joke. Not even being funny. Lizard People mixed with Monty Python levels of abhumanity (and yes, I'm using that for a particular reason - it's not adaption, it's abaption, silly apes!)


And yes, P K Dick got to that story a loooong time ago.
You'll find three things hidden in this reveal btw. Four if you're a smart bear. Five if you're cruel.

612:

Bacterial resistance
Due entirely to US stupidity & greed.
But, there may be ways around this - provided we can persuade greedy idiots to stop feeding antibiotics to animals in their feed.
"dr Who" - a replay of the Orpheus legend, actually.
I'm going to ignore all the other crap, but you are starting (part-time) to make sense again.
And no, I don't need things explaining, when they are in plain English.
Pythonesses' I can do without, & so can the rest of us.

613:

I wonder if this will trigger a larger investigation into phage research instead of hunting narrower and narrower antibiotic paths

614:

The past may not be a guide to the future here, due to film, video, DVDs, MPEG-4... We've never before had the technology to preserve speech exactly in the original form. If alphabets and pictograms change much more slowly when they're widely printed (Roman? Chinese traditional?), then I'd expect that re-runs of Star Trek and Happy Days would likewise slow down linguistic churn.

Actually, that 5,000-10,000 years is from studies of glottochronology, which have worked mostly on Proto-Indo-European, as deduced from its written daughter languages. The "proof" is that researchers were able to deduce probable cognates in dead languages, and those cognates were subsequently uncovered by archaeologists.

However, when they've tried doing glottochronology on unwritten languages in North America and Australia, they've utterly failed. Partly this is due to large-scale borrowing to get around linguistic taboos (like not mentioning the names of the dead), and things like migrations and mergings of people.

Mostly it's because unwritten languages appear to change far more quickly than do written languages. With the notable exception of ritual stories in Polynesia, which were documented to not change over 200 years, there is documented evidence of substantial change on a linguistic level. One example of this is where Indians reading linguistic studies of their grandparents or great-grandparents affirm that the language is not spoken that way any more.
Even today, linguistic changes are still impactful. Who would have said awesomesauce in the 80s, when everything was, like, totally rad, or in the 60s, when it was hip to be cool, or in the roaring 20s, when being gay and being queer were two different things? How many people today use the letter thorn that appeared in Beowulf? We've had a continuous literary tradition in English since Beowulf, but things never stopped changing.

Going forward, even if we somehow manage to keep a digital tradition alive for a few millennia (google "digital dark age" for the counter-argument), it's just as likely that they will be indecipherable without translation. Few normally read the Iliad in its original Greek for fun, and, as John Scalzi noted, few kids even read the SF of the 1950s for inspiration. Why should the future be different?

615:

In the video above, Nicklen explained how an encounter with one particular female leopard seal was especially poignant. The animal had a head larger than a grizzly bear's, and it took his camera and his head into its mouth.

But instead of harming him, the seal began to "nurture" him. It began to bring him penguins, first alive, then dead, perhaps assuming that he was a "useless predator in her ocean."


But it goes the other way as well:

Kirsty Brown, an experienced diver, was overwintering with the British Antarctic Survey (BAS) at Rothera research station on the Antarctic Peninsula when she was dragged underwater by the seal and drowned during a routine mission to check on scientific equipment.

Normally diving is suspended if leopard seals are seen in the area. The seal was not seen before it attacked.

http://www.theguardian.com/uk/2003/jul/24/science.highereducation

Oh, and it's not Orpheus they're doing.

It's a little bit more modern than that.

*nose wiggle*

~

Oh, and if you want me making sense:

Recent discussion in Cambridge about the topic, phage stuff [there's a company there & very smart young woman making waves] my point rather floored the debate:
MRSA? Don't be scared about MRSA, be scared about what replaces it.

If you look at type IV bioweapons labs, and the amount of research done that's non-commercial, it's suicidal to allow [redacted] and phage treatments to be released the general populace.

Sadly, the species requires countermeasures that cannot be annulled by the evolutionary war that would result in their commercialization.

It was a little bit more refined than that, but for a nihilist, it's a fairly Humanitarian stance.

And no.

Not even joking about MRSA being the light end of the spectrum for these things. Type IV's are really scary. I think weaponized small pox is a type III, or might even be a II by now.

But yes Greg: I'm not a nihilist. A realist, perhaps.

---

616:

Heteromeles said:

"At this point, there are two geoengineering methods that look like they'll (cough, cough sort of) work:

--Capture what's in the atmosphere in the soil, and, to a lesser extent, in wood.

Getting carbon in the soil sort of works, but the problem is keeping it there for more than a few decades. Ditto with growing lots of trees. Still, these are being deployed now and they don't take huge amounts of tech..."

Cough cough is right.

I always try to do a quick order of magnitude calculation, just to see if it makes any sense.

CO2 emitted so far, a bit over 10^{12} Tonnes. Wood is to a first approximation solid CO2 by weight (yes there's some hydrogen and and, but to a first approximation)

So to pull that CO2 out of the air and oceans, you'd need to grow, cut, char and bury deep underground in complete anoxia about the same mass of wood as the mass of CO2. World wood production is a bit less than 2x10^9 cubic metres per year. A cubic metre of wood is a bit less than a tonne but close enough. So were we to devote the world's entire production of wood to this process, it would take roughly 10^{12}/2x10^9 years. That's 500 years or in other words, about 495 years longer than an election cycle which to any political group equals worse than never. If the wood isn't charred and buried deep then it will just oxidise back into CO2 in a time frame far less than 500 years. Like bailing a boat but throwing the water back in the boat instead of overboard. You might move the water around but the boat is still sinking. We haven't even looked at the cumulative effect of intensive logging followed by removing the nutrients from the biosphere for 5 centuries.

---

617:
Oh, and @ Host.

If you want a real, hard-nosed shibboleth that caused genocide, a world burned and extractive psychosis to pervert an entire species, take a look at why Adaption rather than Abaption came to fruition.

Be sure to check out your Anarchist thinkers along the way!

Hint: it wasn't Darwin, it was politics and Capitalism.

~

An entire world built and destroyed upon a Latin prefix.

Now, that's cruel.

618:

*Pythonesses' I can do without, & so can the rest of us.*

Who are you to speak for all?

619:

Smart bears will tie in Semen and the semantics of "Coming" (ad) and "Going" (ab) and start to ponder. (And yes, I can attach some heavy-weight German words to the concepts if it pleases you).

I'm dying, alone, as a Judas Goat. It's not fun. Might as well do it properly.

But, and this is funny: I'm going to make sure that pr0n secures your future.

The shibboleth is the manufactured plasticity that the US produced. The antonym is Amateur reality (yes, many consent issues, looking @ Reddit and the Fappening: not-an-organic-hack btw, entirely produced, without the consent of those in the pictures, but with full knowledge of the Illusion Factory) and reality.

The organic has wrapped its tendrils and rhizomes around the space and is driving the professional into recession. (And, Mr James Deen is just a symptom - the US market for violent / abusive / domination / misogynistic hierarchical pr0n is well known).

Ah, you wonder! Greg demands sense! (Even when this is formatted in a logical fashion).

Drum-roll: Squids get to go to space. Humans don't. At least, not in your present form.

And if pr0n can be organically hacked, we're fairly sure the rest can be to.

Translation: the simulacrum is easily defeated.

~
Horny little bastards.

620:

A cubic metre of wood is a bit less than a tonne but close enough.

Not after you char it, it's not. That calculation is BoEing buring actual wood. Be interesting to find that much of an anaerobic hole...

Biochar in soils is a good idea from a "carbon cycle without massive forcing inputs" perspective and a "soil replenishment" perspective, and it does sequester some carbon, which is a nice bonus. As a means of salvation?

Given that the immediate problem is erratic weather breaking agriculture, stopping forcing is very important. That includes forcing in either direction.

621:

I have a peeve, mostly with respect to some popular science presentations that can bleed into "hard scifi". It bugs me when respectable scientists and science media personalities go on about gee whiz implications of multiverses and/or string theory in its ever multiplying dimensions. Its ok that they talk about those possibilities more than they deserve, because anything that gets the kids excited about "science" is swell, but they also tend to talk about it like its gospel. Evidence is actually kind of mounting on the other side of the ledger, certainly for supersymetry, and I haven't heard anyone in popular science or scifi point that out. Anyway I feel like parallel universes/alternate timelines were already a tired scifi cliche when Everett was writing his phd thesis in the 50's. Scientists giving those ideas a veneer of plausibility just encourages bad behaviour in otherwise scrupulous (ie hard) scifi writers.

Maybe I'm a crotchety old conservative, but I just can't believe in that multiverse/time travel stuff at all. Of course in fiction, you can suspend disbelief and its less worrisome, but you might suspect a scifi concept is played out if it has its own twilight zone episode (more than one). Unless there is a really original or amusing spin as a payoff you have to question whether its worth forking off universes. I demur from calling such metaphysics "hard scifi" even if its still good fiction. I enjoyed the quantum thief trilogy even though I had to grit my teeth to look past the stringy, supersymetric particles and parallel universes toward the end. When the laundry series repeatedly states "we live in a multiverse" I only cringe a little bit, because I think of those stories more as Lovecraft satire or even fantasy (magic, right?), which is no fun without extra dimensional horrors from beyond space-time. I mean that's just fun to say. Probably the parallel universe stuff is what keeps me from the merchant princes. You can't please everyone all the time, and you probably shouldn't want to!

622:
That's hardly surprising; I didn't learn the lyrics that begin "God save our gracious queen" in the 1950s either (I did learn the tune, because we stole it for "My country, 'tis of thee"). I just thought you were making a remark about American ignorance of American history.

In *Starship Troopers* Heinlein's viewpoint character remarks in passing on "one of the brushfire wars that sprang up on the fringes of the Napoleonic Wars." That was a nice bit of historical decentering, because he's talking about what we call "the War of 1812"—but Americans don't consider it a minor footnote to the big war that was going on somewhere else; it took me a long time to figure out what Juan Rico was talking about.

623:

The density of wood seems to average around half that of water, though there are exceptions such as ebony and teak.

624:

Ugh. Again, I am forced into the role of Gargoyle.

"Forests" and "Trees" aren't singular entities.

There's a reason why the Deep Green people are so upset about the destruction of ancient forests / rain forests.

Tree plantations are not a substitute.

Reason: biomes.

The CO2 uptake is radically changed with an active ecosystem; forest plantations (especially conifers - hello Germany and the disaster in the 19th C that happened there to soil quality) really cannot replace ecosystems that took ~10-50k years to develop. (And yes - the argument over Brazilian managed types in the Amazon is interesting, but relies on the surrounding biome, as does per-Colonial forest management in the Northern USA).

Seriously.

Is this uncommon knowledge or are you all just trolling?

TL;DR

Trees and CO2 is a fucking muppet land if you don't understand the ecologies that they support. There's a massive difference between a conifer forest (acidic soil types, active bio-defense by the trees themselves to reduce ground cover competition), mycological rhizomes in symbiotic
relationships and so on, not to mention the long term variants of ancient, rain forest (and no, not just tropical there) and so on.

"I AM 12 AND WHAT IS THIS".

I **HATE** that your society produces such ignorance as the base level.

Oh, wait. Democracy and Trump.

Utter, Utter, Utter, .... punts?

---

625:

In similar vein, when one of the characters in *The Moon is a Harsh Mistress* (I think Wyoming, but I may be wrong) mentions "American Revolution" as an example of successful revolution, Manny replies "The South lost, didn't it?"

---

626:

Oh yeah, that reminds me. I've been thinking some more about the likely cultural attitudes of people who live out their entire lives on board slow moving space ships. It seems highly likely to me that, living on a ship which is in essence a large set of interlocking systems, and which is itself a component of a larger production/delivery process ("Amazon in Spaaace") that this will have a powerful effect on how they see themselves and their relationships to each other. Everything is part of a larger whole, everything has a function within a process, and that includes people. It kind of forces systems thinking as a habit. Yet they surely won't be able to get away with compliant conformity- life may be fairly predictable on a day by day basis, until suddenly it isn't, and then it can be brutally capricious. Everything has to be optimized for it's purpose, yet be prepared to multi-function anything at any time- within parameters set by survival. The attitude might best be described as "disciplined creativity"- you have a responsibility to both optimize yourself as an added value component to the ship, yet think outside the box in an emergency. Astronautics (that's a word, right?) isn't a profession, it's what you are, as a person. Likely they won't have words to describe this, because it will seem so obvious as to be taken for granted. They will look at us Terrans and not understand how we can be so stupid.

Culture change might be fast or slow, I could see it going either way, or both. A certain amount of behavioral compliance would simply be mandatory. No one could afford slackers, troublemakers, or malcontents. Yet anyone who invents new useful stuff would surely become rather popular. That includes entertainment. Of course, these people would be just as exposed to externalities as we are: Earth behind them, aliens in front. That's quite a meme pool to choose from.

Of course, alien contact is the big wildcard here. No way of knowing what effect that might have. Better be mentally flexible is you want to keep the customers happy. If they even feel an analogue to "happiness".
627:
Oh, and Cantina: See like a state. I was introduced to that here.

628:
Oh, I agree that the magnitude is insufficient. The advantage of these methods is that they're deployable now and they work in known ways, unlike, say, carbon capture and storage or grinding a mountain range into dust to try to fertilize the ocean. Given that we're decades behind the curve right now in our response, we need to get stuff working.

Biochar is one of those technologies that needs to be demonstrated on the monster scale, I'm afraid. Yes, I'm quite aware of terra preta, but the modern industrial methods are basically hobby scale, and they need to be scaled up to megacity-greenwaste scale for me to believe the technology will put a serious dent in GHG emissions.

629:
Due entirely to US stupidity & greed. But, there may be ways around this - provided we can persuade greedy idiots to stop feeding antibiotics to animals in their feed.

You need to go stop the Chinese now.


630:
So on the one hand, you caterwaul about the loss of ancient forests, one the second hand you caterwaul that they're ten times older than they actually are, and on the third hand you caterwaul when someone proposes planting lots of trees as part of a way to heal the Earth.

That's quite a back fence aria you've got going there.

631:
Late to the Party, but the latest Hamilton Void novel features aliens that can perfectly mimic Humans apart from their blood color, failed at reading
Secondary fail at time of writing comment if your blood is red you can't mimic humans, blush response etc
And welcome back CiaD, finally beginning to get some deeper sense of the Pythoness styley
ABICR in my reading.

And to top it off there exactly 2 test fires in the early 30s. From a dock I think. Declared a success then Navy equipped with them fleet wide. Subs, destroyers, whatever.

But no one was allowed to fire any more due to costs of each one. So 10 years went by with nothing but pretend practice.

WWII breaks out and US subs and other things can't sink anything with their torpedoes. Navy in DC says is a training issue and sub captains and such need to suck it up. After a while the Admiral in charge of the S. Pacific strung a bunch of fishing nets across a harbor in north eastern AU. Fired at it with warheads removed. Hauled up the nets. Measured the hole and wrote a non too polite note to the brass in DC telling them to fix the damn torpedoes.

I'm pretty sure it was Prof rather than Wyoh. But yes.

There are several tropical hardwoods that sink

I was out in the secondary growth woodlands of NJ today, (side note the ticks are still prowling) and some one pointed out to me that the acidification that pine needles create (never thought about it before) so it is a little weird to see you point this out, ignorance is funny, and I think I am smart

There's a very definite correlation between rate of growth and wood density. The best you can do is something like rock elm, which grows reasonably quickly for a hardwood and has a density of about point eight. If you're just trying to capture atmospheric carbon, you are probably better off charcoaling lots of maple or popular even so, and certainly so if you're considering lignum vitae or teak or boxwood.

The thing with forests as biomes is that you need the right trees for the bugs; trees have landraces and invasive or just plain non-native trees support effectively no bugs and thus don't manage to participate in the local food chain as anything, including habitat. So setting out create tree plantations of non-native trees isn't a lot better than paving in ecological terms. (Somewhat; fewer issues with runoff.)
And it's still no substitute for ceasing fossil carbon extraction. (Which will cease, one way or another.)

637:

If the species have enough frequency overlap in total, the monochrome image can be right. The overall intensities can be right. The colors will often be *really* wrong. Almost no fiction "pays attention" to this (with the lone exception I can think of being "The Mote in God's Eye").

I do not recall "The Mote in God's Eye" paying attention to this, but it has been a long time. One book which definitely pays attention is "First Contract" by Greg Costikyan. Different color perceptions are a minor point, but quite explicit.

638:

We've never before had the technology to preserve speech exactly in the original form.

OTOH, we never had the ability to transmit new language around the world in days before, either. (How long did it take for "quiz" to go from graffiti to word, compared to, oh, "selfie"?)

639:

Spelling and grammar checkers, try. (And the grammar checkers are starting to get useful.)

So we've got an active mechanism to maintain certain rules for the formal form of the English language; keep that up for awhile and you get a spoken language that's entirely distinct from the written language. (Look at Irish orthography; that was all pronounced, once. Only rather faster.)

640:

I think you've got the correlation somewhat backwards. First off, the densest woods are all denser than water (1.2-1.3 on your scale. They're from all over the world, but I suspect that most of them are fairly slow growing.

Basically, photosynthesis per unit area is pretty close to a constant (a field of corn lays down about as much carbon as a rainforest in the same area). All other things equal (which they most certainly are not), dense trees should grow more slowly than light woods, because they have to lay down more carbon per unit volume. Since growth doesn't depend just on sunlight, but also on temperature, water, nutrients, shade (many dense trees are understory midgets), and many other factors, growth rates of dense woods vary quite substantially.

The key cool factor about wood is that it's more-or-less metabolically inert, which means that, once it's laid down, it's not going anywhere until something metabolizes it or it burns. Corn may fix as much carbon as a nearby tree per unit area, but most of the corn's carbon will be back in the air
fairly quickly, while a reasonable chunk of the tree's carbon can stay in the wood for decades to centuries, depending on conditions.

641:
"best you can do" in terms of optimizing the combination of growth and density. While the sunlight's constant, the growth rates aren't a nice linear relationship between density and sunlight. Boxwood or lignum vitae or anything else with the specific gravity around one point two are painfully slow. Fast growers like poplar aren't very dense. So something like rock elm, where you get a dense durable hardwood, and it grows fairly quickly, looks like your best bet for wood-based carbon sequestration.

I suspect but could not prove that the rate has something to do with both porosity (ring-porous hardwoods are generally quicker growers than diffuse-porous hardwoods, especially when you get into the "no discernable grain structure and dense" woods; basswood/tulip tree hasn't much grain, but it's not dense; boxwood hasn't much grain and is way dense and grows slower than the factor of three difference in the density directly applied) and the metabolic cost of making whatever preservatives go into the heartwood. Dense hardwoods tend to make more and more complex of those this is presumably what slows them down. Though they do rot slower in consequence.

642:
Actually, in terms of carbon sequestered per hectare, the best I know of are doug fir and redwood. There may be some tropical trees that do as well, but the problem is that tropical heats means that the trees respire more, which takes away from the carbon they can turn into wood. It doesn't stop them, for there are some giant figs and such, but this is the reason why temperate rainforests tend to have taller ancient trees than do the tropical forests.

643:
Irish orthography comes from trying to spell Gaelic in an alphabet that is not suited to its sounds and its phonemic distinctions. The spelling never really worked; it was just the best that could be done with the Roman alphabet.

644:
In their climate zone, I can well believe it. Douglas Fir doesn't produce your typical softwood. Pretty hopeless in Southern Ontario, which is where my unconscious bias resides with the rest of me. :(
Going to be a lot of need to identify locally preferable sequestration species, although "plant more native trees" is not bad general advice for a lot of reasons and would be a tiny amount net-carbon-helpful even with a regular cycle of rotting in the forest.

645:
That's why I said "though there are exceptions such as ebony and teak."

646:
That's a very peculiar definition of "best", then. It looks to me more as if it was the creation of someone who had half an idea what a third of the letters were supposed to do and just made up any old shit for the rest of them. And wasn't even consistent. I can just about cope with "Siobhan" being "Shivorn" because "si" for "sh" is familiar from Welsh, "bh" for "v" isn't too bad after reading all the linguistic stuff in the appendices of Lord of the Rings, and vowel sounds are highly mutable anyway. But then that same "bh" crops up in "gobha" which is pronounced "gaw". No v there. And on top of that there are so many words where once you knock out all the strings of several consecutive letters that don't do anything at all there is hardly anything left. "Dun Laoghaire", for instance. WTF is that "aogha" doing there? Get rid of it completely and make it "Dun Lire"; for that to be pronounced "Leary" at least looks reasonable, whereas "Laoghaire" being anything other than "lay-o-gare" does not.

I have heard it said that Gaelic is a very easy language to learn because every word is pronounced exactly as it is spelt, unlike any other language. But that was the view of a Hebridean for whom it was a first language and English very decidedly a second one. If your first language is anything else that uses the Roman alphabet, and even more so if you also know any others, Gaelic spelling, far from being a help, is a massive hindrance because every word is pronounced absolutely nothing like it is spelt.

647:
Does that really help, though? The media on which those formats are recorded are not renowned for their longevity (except by people who either don't know what they're talking about or are making up shit to try and make money). Books exist that are several thousand years old and although they are severely degraded, they can still be read. The same amount of degradation on a hard drive platter would render it nothing but junk.

The usual argument here is along the lines of "well, I still have some floppy disks but I don't have a floppy drive any more..." and it misses the point. You could still read the floppy by means of any lab gadget capable of detecting small areas of magnetisation, but that is likely to become impossible long before the pencil writing on its label becomes illegible.

It is possible to pick nits over the relative durability of digital formats but it is also irrelevant; the fundamental factor is storage density. The smaller and more subtle the change that represents a
"mark" the lower the energy required to alter it and the more likely that random chance will supply that energy. It takes far more energy to decompose or disperse enough of the pigment molecules in an ink mark on paper than it does to change the magnetisation state of a few hundred atoms on a hard disk, and far more than that again to level the surface of a stone enough to remove a mark incised into it.

648:

Hmm?

Ancient forests as 10-50k old is fairly supported in terms of placement, local weather and species spread. We make allowances for the Americans, but really: California has single surviving trees about 2 - 4.8k old.

Not sure why you imagine otherwise, and of course, that dating has a specific time-line to it.[1] i.e. before your lot turned up.

But, arguing that all forests left have been impacted by H.S.S, that's not scientifically in doubt.

https://en.wikipedia.org/wiki/Forest_dynamics

Feel free to saunter in with why you imagine that ancient forests are younger than 10k old though. (A warning: "Dis is going to be good about da wood" applies)

[1] Oh, but I do: seeing the wood for the trees and all that.

649:

Oh, and then there will be a slap about Space and general travel times as a perspective shift.

TIME. YOU'RE NOT GOOD AT IT.

650:

Culture changing, yes, absolutely. Far future scenarios which still adhere to the moronic present-day assumption that "everyone must do something" regardless of whether it is actually useful or not, which still adhere to the money/economics rationing system which is completely shit on any significant scale, but which do not have the long-term history of the culture concerned involving a succession of moves from one planet to another as this system transforms them one by one from functioning ecosystems to poisoned, stripped and ruined desert. Current modern humans may think that behaving like that is necessary to maintain their food supply and ignore the blindingly obvious point that it can only do so for a little while after which it has the reverse effect, but any culture that survives must necessarily have thrown it out long ago.

Language, though, I give a free pass to for purely practical reasons. I could go back in time a thousand years and still find a city here, although my house would be well outside the walls; but I
wouldn't be able to understand a bloody word anyone in it said, nor they me. Chaucer is regarded as a literary great but he is unreadable in the original because the language has changed so much since he was writing. The assumption of a perfect translator is so essential that I just don't think about it. (Puns... aside... Lord of the Rings is full of puns and wordplay. Not just obvious things like "Atalantë" which was accidental anyway, but much more obscure things that only language nerds even notice. I have been amused by a few instances, but most of them have gone completely over my head.)

651:

Don't forget Format rot. Not to be confused with OGH's Bit Rot of course.

652:

Space, being mostly empty and even predictable using mathematics known 300 years ago, is ideally suited to being automatically navigated.

Until your navigation computer breaks down. I can't remember the title, or whether it was Asimov or Clarke, but one of the 2 wrote a story where the ship's computer (used for navigation calculations amongst other things) broke down, and they self-rescued into radio range of Earth using the navigator's knowledge and crew who'd been taught to us abacuses.

653:

Yes

Also, I am told that ... going back to "old" antibiotics, that were used some time since ... the bacteria have lost their resistance to these ( "use it or lose it", remember? )

Plus, there is re-starting of investigations of the pre-penicillin antibiotics (sulfa drugs, so-called) ... wierd side-effects, but very effective.

[ My mother had a bad blood infection in the late 1930's & a slufa-dosage nuked the bastard ]

All of this is merely a stop-gap, of course, until we can persuade US agribusiness to bloody grow up.

654:

Your para 2 - As a UK citizen who didn't study the Napoleonic wars at all (beyond a vague idea of things like the dates of Trafalgar and Waterloo), the reaction until I started looking at sail warships would have been "What war of 1812?"

655:
Shakespeare, Goethe, Dante & Moliere say you're wrong, probably.

656:
Catina - you are definitely an entertainer!

657:
You may *think* you are a realist.  
I disagree.  
Your permanent shouts of "we are all doomed & there is no escape, ever" are a bit of a give-away.  
Same as the bit about bioweapons labs & nameless threats .. all very terrifying, as intended.  
No facts or solid evidence to back it up - no, thought not.  
Ghosts to scare the children - ever thought of becoming a priest?  
You'd do well in a Calvinst setting.  
If not Orpheus, where Capaldi cannot ever reconnect with Clara/Euridice, then what - do tell, or shut up?  
I really, really hate deliberate obscurantism, or had you, perhaps noticed?

658:
Which is entirely understandable and also almost completely wrong.  
Written Gaelic words are made up of 2 parts; the letters that make up the word, and "spelling rules" which tell you how to pronounce that word. This is not the place for a Gaelic language class, and I am very much not the person to act as teacher even if it were.

659:
Agreed, but if you can decode CD's random obscurantism, perhaps you could enlighten the rest of us?  
I have a hard-enough time making out an understanding of the rational world, without priestly obscurantism.

660:
I got about half of that, in between the self-pitying & the "we're all doomed" usual stuff.  
P.S. Are you suggesting that my past-&-long-ago training & the training of every physical scientist on the planet is a waste of time & we'd be better off with mysticism?  
Physical evidence suggest otherwise, as does history.
'Proto-Indo-European, as deduced from its own daughter languages.'

I wonder how sure linguists are about whether PIE existed, or if it's just an artifact of hindsight, superimposed on a bunch of guys who traded and raided with each other. Is it widely trusted, or just a useful alternative chapter title for Hic Draconis?

I still remember/"hear" my first German teacher ( Dr Warschauer - fled the nasty men in black leather in 1933 - ended up in an English Grammar school - & Berlin PhD's were NOT thick on the ground then ... ) saying:
"The German writes as it speaks & speaks as it writes"

He was korrekt & it is still true - though, of course my spoken German sounds very old-fashioned, since I'm speaking 1930's RP, usually with really bad grammar!

Ancient forests in UK - often less than 1000 yrs old, but quite a few of them, & some much older - dating back to the end of the Younger Dryas, I expect.
Of course we have our re-forestation & re-wilding projects, all progressing, some better than others.
P.S. Did you know that London is a Forest
Then there's the "official" forest that goes across the outer boundary of London:
The great forest of Epping

But the point of a Judas goat is NOT to... well, anyway, good to see you back here again.

It's a passing comment when the expedition visits a Motie art gallery, that the pigments are wrong to human eyes, but the authors don't dwell on it.

There are at least three 'native' British species, too: yew and the hawthorns.
667:
There are actually very few really ancient forests in Britain, and none go back as far as the Younger Dryas. The first trees were birch, aspen and sallow; pine didn't replace them until c. 8,500 BC and the broad-leaved forest trees followed later. So there are probably no woodlands older than 10,000 years. Britain is populated by recent immigrants, whether in terms of the flora, fauna, or human subgroups, and has been changing more-or-less continually for the past 11 millennia.

I am not sure what Heteromeles is on about, though, as planting trees is NOT the converse of deforestation. CatinaDiamond is quite consistent, even if a little incoherent.

668:
I thought it was along the lines that even though planting trees doesn't undo deforestation, it still isn't a bad thing to do. In turn that doesn't mean we can't mourn the lost diversity, so it's a bit confused.

669:
My understanding is that the problem with Irish spelling is that it's extremely conservative -- that is, it was probably a fairly accurate representation of the Old Irish spoken in the early Middle Ages. Changes in the spoken language since then aren't reflected in the spelling.

This is similar to French, which is full of previously-pronounced-but-now-silent letters, but (I believe) is similarly consistent in terms of which letters are no longer pronounced, in which contexts. (The trick is that the contexts aren't immediately obvious if you don't know the language.)

It's also similar to English -- think of all the silent "gh" examples, which indicate that the word in question originally had a consonant like German "ch" there, or the "silent e" at the ends of some words -- except that English is arguably worse because it mixes etymological spellings (spellings that reflect older forms of the word rather than present-day pronunciation) and (partly updated) phonetic spellings, as well as etymological French and Latin spellings for borrowed words -- so it's terribly inconsistent.

670:
Well for a start because "Dún" isn't "Dun"; it's "Doon" (and in some accents "Dhoon"), and a lot of people pronounce that "gh" in the middle of "Laoghaire" - "Laehra" is the closest transliteration I can think of.
Irish is richly provided with pronunciation modifiers - h-as-second-letter is actually an accent, not a letter - and part of the trick is knowing which letters are part of the word and which are telling you how to pronounce the word.
At base the problem is you're arguing with a language with 3 distinct accents and a pidgin form, each of which has specific words they disagree with the rest over how to pronounce. There are entirely consistent rules in each accent, but woe betide you if you cross over.

671:

The far-and-away biggest problem with Irish spelling is the alphabet change. The proliferation of 'h's and confusion about pronunciation can be more easily explained when one understands that sometimes 'bh' is 'bh' and sometimes it's \textit{lenited} b'. The 1963 switch to the Roman alphabet was not a consequence-free decision...

672:

Shibboleth: physics.

Admittedly, only this example comes to mind, but there appears to be one author who built an imaginary world by starting with a language. Yes, He Who Must Not Be Named In Fantasy.

Trees (and associated greenery): if you want to take CO2 out of the air, thou doth need woodland. (tried reading "The Faerie Queene" once upon a time. if you can get accustomed to old spelling it's not that hard; the content, however, is something else.)

Ps. first comment here, ever.

673:

\textit{I wonder how sure linguists are about whether PIE existed, or if it's just an artifact of hindsight, superimposed on a bunch of guys who traded and raided with each other}

It's extremely secure, probably more so than any other reconstructed proto-language of similar antiquity. Lots is known about its phonology, morphology, and grammar (syntax, inflections, cases, genders, etc.); the complexity of the grammar alone rules out the possibility of, say, a trading pidgin.


An excellent book on the subject -- with a focus on archaeological connections -- is David Anthony's \textit{The Horse, the Wheel, and Language}.

674:

Question for those who'd know - assuming tree planting and sequestration could be ramped up to a level that actually made a dent in atmospheric carbon would we not be stripping essential minerals from the soil in alarming quantities?
I suspect its a matter of degree's. If its replanting cleared woodland its probably sub-optimal given what's gone before, however its going to be a massive improvement over say a cash crop were a significant amount of the stored carbon is either released by product processing or by a yearly cycle of slash 'n' burn or a modern equivalent.

Welcome Revalk

The 1963 switch to the Roman alphabet

Umm... I think you mean a change in script or type/typeface, not a change in alphabet! (Turkish is an example of a language which really did switch alphabets, from Arabic to Roman in the 1920s; Irish has been written with the Roman alphabet since the Early Middle Ages...)

And I would still suggest that, for those completely unfamiliar with Irish, the strong etymological emphasis, leading to many now-merged or unpronounced letters in the middle of words -- is a stronger barrier than things like "h-as-diacritical-mark".

Well, keeping in mind that there's no substitute for not extracting fossil carbon and that soil sequestration is orders of magnitude away from a solution and worthwhile mostly for the positive effect on soil quality, the good form of carbon sequestration by trees is to plant appropriate native species, pyrolyze it to get the carbon out, and stick the carbon in the soil in a loose form where it appears to act as a matrix for other beneficial stuff.

So imagine coppicing for fuel only (in effect, conceptually) fertilizer instead.

The bad[1] form is to plant a non-native monoculture, pocket the subsidy for allegedly doing something good, and to let someone else figure out what to do with the trees in a couple-three decades.

[1] Do Not Crash The Biome. Simplify it enough and something breaks. Big swathes of discontinuity -- roads, urban development, monoculture agriculture, etc. all cause discontinuity -- make all the disconnected bits increasingly fragile simply because they're statistically small. So non-native monoculture contributes to that fragmentation.

Your permanent shouts of "we are all doomed & there is no escape, ever" are a bit of a give-away.
If neurotypicality wasn't typical -- that is, in the position of being the condition of a large majority of the population -- it would be called something like "deranged optimism syndrome". (For precisely the reasons that the investors who do best, statistically, are those who forget about their investments.)

Can you read a graph? Not in the sense of getting numerical values by reference to the relevant axis, but so that graphs have emotional impact as indicators of patterns of meaning?

Go take a look at Figure 2. Recall that given whose work this is, and what it's about, that's a very robust result; if peer review could have kicked holes in it, they would have been kicked.

So, leaving aside the personal scale at which we are indeed all doomed to die, there's entirely reasonable grounds to consider the prospect of seven billion excess deaths the good scenario; that's the scenario in which humanity does not go extinct and not all the libraries burn or rot into nothing.

Absent the cognitive armor of neurotypicality's blithering optimism, and given the entirely lackadaisical political response to the sheer scale of the obvious emergency, it's very easy to see how someone -- especially someone young enough that they have a strong actuarial expectation of living to see 2050 -- could be both greatly distressed and attempting to convey the magnitude of the threat.

---

680:

You're right, sorry. The uncial-script derived orthography, to be precise.

Quite possibly; I just remember how much less confused I got once someone explained that séimhiús used to be dots on a letter and are now h's following. My education in Irish was slapdash and awful, though (AKA I am a product of the state Irish curriculum).

---

681:

ABICR in my reading.

Sorry -- "ABICR"? (Googling turns up nothing useful.)

After a while the Admiral in charge of the S. Pacific strung a bunch of fishing nets across a harbor in north eastern AU. Fired at it with warheads removed. Hauled up the nets. Measured the hole and wrote a non too polite note to the brass in DC telling them to fix the damn torpedoes.

Right, but that was, as I mentioned, just the first problem to be correctly identified; fixing it didn't actually improve the success rate.

---

682:

You're broadly correct about linguistic drift, but I will note that two things seem to "pin" a language, making it relatively slow-changing: firstly, widespread distribution (for example, becoming a trade lingua franca -- sic) and secondly, recording (be it writing, audio, or video).
Latin is a "dead" language today but was widely used as a language of scholarship until a couple of centuries ago; a huge body of written work remains, and it's still spoken in some areas (cough, the Vatican). If you magicked a literate Roman citizen from the 1st century up right now, while there might be initial huge difficulties in understanding their accent an unrecorded/non-classical colloquialisms, they'd be communicating in basic writing (chalk-on-blackboard) the same day, and someone would be probably be talking to them reasonably fluently within a couple of weeks -- and they'd be able to pick up conversational Romance languages fairly rapidly (although English might be rather painful for them with its extensive Germanic roots).

Again, Mandarin Chinese: we don't know what it sounded like more than 150 years ago, but the written system is comprehensible going back a lot longer.

Even today, it's really strange listening to BBC recordings of spoken English from the 1930s, or early Talkies -- the favoured accents back then were weird -- but it's not particularly difficult. (I have more trouble understanding the characters in "South Park".)

We're currently going through a period of mass-extinction of minority languages, coinciding with the pervasive media-driven spread of the big trade tongues, and we have recording technology for audio/video as well as just written forms. I'm willing to bet that something called "English" will be widely spoken a thousand years hence, and moreover, assuming no global collapse of civilization, enough records will have survived that a competent linguist would be able to chat with a 21st century American at least as fluently as said 21st century American could talk to a non-Anglophone immigrant who's been living in the USA for a few years (grammatical whoopsies, thick accent, but basic vocabulary and structures would be there).

Beyond a thousand years, though ...

We're really crap at building structures that outlast a human lifespan. If anything, our sprawling trade languages may turn out to be among our most enduring creations -- assuming we don't lose writing and audio recordings.

---

Salt/brine filtration isn't as simple as it sounds. Firstly, we'd need gross anatomical changes to the kidneys (longer Loop of Henle, cells with lower ion permeability and K-Na-Cl and Na-H exchange transporters able to operate at higher concentrations, for starters). All of which works fine in sea-dwelling mammals, so it's not obviously impossible ... but then we'd also need an epidermal layer that's better at holding up to long-term immersion in seawater. Yes, shipwrecked sailors sometimes survive for days to weeks in the sea with something to cling to and something to drink -- but it ain't good for them, and more to the point, we don't know enough about the shipwrecked sailors who don't survive.

Ability to synthesize vitamin D without sunlight or with restricted light would be handy; we could dump this annoying depigmentation trait which leaves those of us descended from northern latitude ancestors prone to radiation burns and skin cancer.
But. Ability to digest cellulose and lignin, even marginally? That'd be a life-saver in times of famine, even if we don't go the full ungulent route -- just making 5% better use of available nutrition could be a matter of life or death.

684:

The antibiotic resistant thing is ... well, I think (hope) it's a short-term issue.

1. Looks like malaria parasites are losing their resistance to Chloroquine. Resistance was near-universal by the mid-80s, so we stopped using it; 30 years later, P. falciparum seems to be losing its resistance. So we might be able to survive by rotating through our existing antibiotics and rigidly enforced fallow periods.

2. The cost of gene sequencing is crashing, and we should -- thanks to the Russians -- have a huge library of strain-specific bacteriophages. So we might end up with a situation where people who are fighting a severe infection end up in a hospital isolation ward where the pathogen can be sequenced, its vulnerability identified, and a phage specific to the infection applied. (Like going from random machine gun fire to a targeted missile: much more expensive, but it still gets the job done.)

3. Our inability to culture the annoying 90% of bacteria that stubbornly refused to grow on plated media seems to finally be getting the attention it deserved, and AIUI about 30 wholly new candidate antibiotics (including entire new families) are in early-stage testing. If we can hold back from adding them to animal feed and throwing them at idiots who think they're a cure for the common cold, this might actually turn out to be a breakthrough.

If it was just one of these three aspects, I'd be hopeful but not optimistic. But with all three of them showing promise, I think that we're not out of danger yet but antibiotic abuse may turn out like the lead-in-petrol crime wave: a creeping crisis that we'll nevertheless manage to fumble our way out of, not without bloodshed and heartache along the way.

685:

ABICR

As best I can recall.

Right, but that was, as I mentioned, just the first problem to be correctly identified; fixing it didn't actually improve the success rate.

But at least they started hitting something. Which made the other issues much easier to point out and attempt to deal with.

686:

Bacterial resistance. Due entirely to US stupidity & greed.
Nope. The Americans started adding antibiotics to animal feed, but we followed suit (although we stopped a while ago). It's now common practice around the world -- especially in the developing world where regulations are patchy and ill-enforced, and in poorer/more crime-ridden parts of the EU. (I'd be unsurprised to hear about an antibiotic animal-feed scandal breaking out in southern Italy, Greece, or the Balkans. Much more surprised if it was the UK, Germany, or France.)

687:

@599

Matt: Chemical and nuclear weapons, though not completely banned, are extensively regulated by treaty; the Chemical Weapons Convention (https://en.wikipedia.org/wiki/Chemical_Weapons_Convention) and Non-Proliferation Treaty (https://en.wikipedia.org/wiki/Treaty_on_the_Non-Proliferation_of_Nuclear_Weapons) apply, although there are known and suspected cheaters (i.e. Syria for chemical weapons, North Korea and Israel for nukes).

Cluster munitions are a bit more complex issue. Given the need to deny the transit of territory, do you emplace land mines or drop cluster munitions on need. Also, what are your cluster munitions intended to do? Most of the US inventory in the 1980s/1990s was focused on anti-armor use against massed formations (the Red Army). Note that Finland refused to sign the Cluster munitions treaty exactly because they'd just given up on land mines (see https://en.wikipedia.org/wiki/Convention_on_Cluster_Munitions).

688:

Yep, exactly. (In fact, from a British historical point of view, the entire US War of Independence and the War of 1812 were side-shows to the real thing, which was World War 0.1, the conflict between the French and British empires that ran (modulo some short-lived cease-fires/truces) from about 1754 through to 1815 (starting with the Seven Years War, ending with Napoleon's hundred day come-back tour.

689:

I HATE that your society produces such ignorance as the base level.

Watching the drift in core school syllabus subjects over the past 30 years has been an eye-opener and a half.

Not that the core school syllabus was much better when I was a young 'un -- lots of "British Empire, Rah!" in history, total lack of environmental science outside of Biology at A-level, that sort of thing -- but at least it gave me a baseline to keep an eye on so I could see what's being systematically debased, devalued, and dropped.
(Hint: most British schools don't teach art, music, non-commercial foreign languages -- or indeed much of anything that isn't about manufacturing nice little conformist Consumer Production Units -- any more. You can probably get the full gamut if your parents can cough for the £20,000-plus it takes to get a place in Eton or an equivalent top-tier school, or are lucky enough to go to somewhere independent and eccentric that isn't god-ridden, but for the most part it's education-for-work (and leave policy-making for your betters) rather than education-to-be-informed-and-effective-citizens, because IAECs might Vote The Wrong Lizards In.)

690:
I think you're right. For me, at least. And it does make it somewhat frustrating since I kind of like stuff like that, but feel shut out by inability to relate the appearance of a word to even an approximation of its pronunciation.

691:
Para 2 - Things were maybe a little better in Scotland; We had "Geography - Alternative" as a subject, which focussed on things like physical geography, land use, how towns change over time (My sister's Higher project did how our home town changed over 300 years).
Para 3 - And when all 3 (in England) choices are "the wrong lizards"? ;-)

692:
Back to the Shibboleths that need to die:
Future Food ain't what it used to be. Thank goodness.
The Past Is Littered With Foods Of The Future

693:
"Ability to digest cellulose and lignin..."
Absolutely. Any land creature that evolved that, as long as it didn't live in a desert, would effectively be living in a world made of food, and would surely be wildly successful - at least for a time. But AFAIK nothing ever has, and everything that does eat such foods only manages it by having symbiotic microorganisms to do the hard bit for them. And this is true of creatures as different as cows and termites. That something so useful has never made its appearance in so many hundreds of millions of years in the whole range of macroorganisms makes me wonder if it is for some reason not actually possible - is there some fundamental difference in prokaryote and eukaryote biochemistry that prevents one class from being able to cleave beta glycoside linkages but not the other, or what?
Maximum lifespan of digital media is currently unknown -- we simply haven't had them long enough; 1945 is still less than a single human lifespan behind us -- but we can speculate about much more robust digital archival media that get close to the maximum volumetric packing density and which have durability measured in millions of years: read for my take on memory diamond as a substrate, for example.

Yup. Lignin and cellulose are stable polymers and it takes a lot of energy to crack those bonds. But I'm not convinced vertebrate development of lignin and cellulose digesting enzymes is impossible. I think it's more likely that eukaryotes never went down that evolutionary path because the ancestors of today's herbivores already supported complex gut ecosystems that predigested a lot of their food, and the rate of evolution in microorganisms is way faster than in multicellular beasts. Why bother evolving a trait when you can offer a welcoming environment for a symbiote that already provides that capability? Shades of the eukaryotic co-option of chloroplasts and mitochondria as endosymbionys.

(I'm not convinced that allowing us to pump beta glycosidase into our guts is going to solve all our problems, though. Look at the sheer amount of energy ruminants put into breaking down their food, and bear in mind the oft-made point that we are dependent on cooking to predigest our meals because we need a lot of energy to support these big brains. It might give us a marginal edge in famine conditions, but turning genus Homo into an ungulent without losing other key traits seems kind of unlikely to me.)

Um. We always have to watch out for the mythology here. One great example is how many people are fluent in Latin. The great example was when Pope Benedict announced he was retiring in Latin. Precisely one person, a reporter, understood what he was saying, and she broke the news from the Vatican. In the heartland of Latin, at that time only two people were communicating fluently about a critical point.

In other words, Latin today is where Hebrew was a century ago. It's mostly understood in writing. No child learns it as a native tongue, and as learned in adulthood, it's a largely liturgical language where its speakers know (I'm guessing here) 1,000-2,000 words. Outside of a few monasteries, it's seldom if ever used as a language of daily conversation.

Now you're right that languages in this state can be revived. Hebrew was almost dead in the 19th Century. It was a language read by scholars and spoken only in synagogues and temples, in a ritual context. Then Zionism happened, Israel was born, and Hebrew was revived as the national language of Israel.
As for Latin as a spoken language of everyday people, again going from memory, it "died" in the 8th Century, when people speaking "Latin" in France (I believe under Charlemagne) found they couldn't understand people speaking "Latin" from Italy, and they started to acknowledge that they no longer spoke the same language.

With English, it's hard to say what its future will be, because we've also rocketed through French, German, and Spanish as international languages in the last few centuries. Most English today is spoken by people as a second language, for business purposes, and they reportedly know around 2,000 words. That's not enough to keep English around as a major language if politics change or society crashes.

Randall Munroe's *Thing Explainer* is actually dead on track. If you want to send information into the deep future, you've pretty much got to limit yourself to a 1,000-2,000 word vocabulary that can be learned as an academic language by adults. This is a huge problem for doing things like preserving scientific knowledge, because science thrives on esoteric jargon, and jargon is typically among the first things lost when a language starts dying.

---

697:

They also don't teach such things as critical thinking, statistics (except for Maths A-level, and probably not so much now) and particularly emphasis on the human lack of valid intuition about it and the consequent difficulty of avoiding being fooled through exploitation of that lack, the disparity between people's stated and real motives, the prevalence of lies in the public and commercial arenas, and all the other things in the class of useful tools for spotting bullshit and avoiding being manipulated. And the science syllabus was never noticeably successful in teaching people how things work (the only pupils who did understand anything of that nature were those like me who took an interest anyway, and it tended to put us ahead of the field in physics) and is doubtless even worse now.

Not sure you're right about "top-tier schools" being any better. I went to one, for three years (and still suffer from nightmares about being sent back there). The quality of the teaching was excellent, and gave me a solid foundation without which I'd not have done so well at the next school I went to, but the syllabus was bog-standard public-exam-driven stuff, and (in the later years, which I left before reaching) learning German was considered exotic.

---

698:

I am one of the small army (200-2000) observers who log climate-change-as-monitored-by-plants- &-animals (Phenology) in the UK
I'm well aware of the magnitude of the problem,
I also think we can hold the world temp increase to 2.5 deg C, & hopefully to 2, provided "people" get on-side.
Current events in Paris are much better news that we've had for some time.
Yes, it's going to be tough, yes, we are going to have "small" disasters, but I don't think the whole thing will go smash.

699:

OKAY
GENERAL stupidity & greed, then!
P.S. Agree re, your 3 possible/combined routes out of th said problem, though.

700:

Started with the War of the Spanish Succession, actually ....
Blenheim / Ramilles / Oudenarde / Malplaquet etc...

701:

Charlie,
I haven't seen much of the way in movement in this direction from the commercial sector and/or popular press; do you know the state of commercial or archival adoption of longer-lived archival media?

702:

Agreed
As a (short-term ex-teacher, the general level of ignorance is frightening, & that included some of my fellow staff members (!)
NOT including music is a disaster, IMHO - it's a universal language like maths & should be "in. [ I can't read music, nor play an instrument, but I can recognise a hell of a lot of tunes.... ]

703:

Effectively, we already use fire to digest lignin and cellulose to provide energy to heat our bodies, cook our food, and do all sorts of other things. Why engineer an internal enzyme based system that would be less versatile?
Incidentally, we're not the only species that performs external digestion. Earthworms do it too, which is the principle behind a worm bin.

704:
Greg,
I strongly agree, but I'll go further. Learning basic music theory assists in learning mathematics, and gives you a different appreciation of music both in creating and consuming it. I'm a crap trumpet player, but I can appreciate what a GOOD trumpet player does much more than someone without training.

705:
you want a scary virus?
there were some experiments into mousepox that added some extra genes, 100% lethal

706:
Yes, I liked that idea when I first read about it. (And I note that a few paragraphs further up you pretty much agree with me on the life of current media :) ) Probably just about possible to do it in the lab now, too, on a very small scale and if you have a very good lab - for writing, at any rate, though reading is going to be a lot more difficult.

In a way it is a return to ancient recording techniques but on an atomic scale - it operates by moving atoms about and then locking them into place with a high thermodynamic barrier, whereas most current media rely on changes of energy state rather than positional state, and all of them fail to achieve the height of barrier. The difference is simply the number of atoms per bit - and there is the additional advantage that being three-dimensional the outer layers protect the inner ones from chemical and physical gross attacks. Of course it is not completely degradation-proof (particularly against radiation damage) and will also, after a very long time indeed, revert to graphite, but - especially if you didn't go right down to one bit per atom density, and used a suitable error detection scheme - it might still be possible to recover something even then.

707:
Whales and dolphins are not thinking with those bigger brains. If all else is held equal, brain size tends to scale with body surface area, because surface area means more skin to have a sense of touch on, more or less more muscles to move, etc etc. So that bigger brain goes in the sensorimotor cortex (not used to think about anything other than physical motion and the like) and the cerebellum (which has a weirdly regular structure and probably has something to do with motion or large-scale coordination of some sort, though nobody knows quite what and people can survive without one to some degree: an embarrassing hole in our knowledge for something that comprises two-thirds of our total neuron count).

Whales and dolphins are more or less exactly on that curve, with no larger brains than would be expected for their body mass and surface area. Humans... humans are freakishly far above it. Whatever whales and dolphins are doing with that extra brain mass, they're not thinking with it any
more than any other social mammal. Which is to say, they're probably doing all sorts of complex social interaction stuff and outright cultural stuff with it, but so do wolves or horses.

708:
Random speculation: of course, now we know about a bunch of other allotropes of carbon besides graphite and diamond -- and not just buckeyballs/buckytubes! It's possible there'll be something even more durable but also more readable than memory diamond that we can come up with. I'm wondering also if there are ways of designing in resilience against radiation damage (besides storing the memory diamond lumps in a thick-walled jar of 204Pb and an inner container of unordered non data-storage-grade 12C).

709:
Aye, but we are the only species on the planet that uses fire and we have existed for an evolutionary eyeblink, as the cliche goes. Also, we gained another string to our bow as regards the energy problem by eating meat, and liking it fatty. It's all the non-human herbivorous species that make me wonder.

I don't know enough biochemistry to have any useful thoughts on the relative energy costs of symbiotic vs. native capability for digesting cellulose. Certainly ruminants are highly devoted to being walking fermentation vats, and I guess it is the kind of compromise you can afford to make when food is so easy to find. But is it a necessary compromise, or is it a consequence of inefficiency of the symbiotic method which would not apply to a native digester? If a pre-human anthropoid had evolved a working native cellulase, could that have given it a comparable energy advantage to eating meat and cooking food? (But at the same time stifled the intellectual development bit and it ends up as a tree-dwelling cow anyway...)

Lignin is a tougher problem as not only is it harder to break down but there is the problem of all those aromatic rings, which AFAIK tend not to get broken down (though they are used as Lego) and so don't make much of an energy source; it'd need a significant change to the metabolism as well as to digestion to make use of it. AFAIK even the animals which do digest it don't manage it very well.

710:
Graphs and data. The problem with extrapolating a graph is often past performance does not indicate future gains

Graphs have inflection points that are hard to predict

There is a lot of reason to be very very worried about climate change and fossil fuels but doom is not inevitable

For instance if I look at and project /extrapolate solar power adoption (which is still increasing exponentially ) everything is fine. Also not true of course
My personal feeling is humanity is at a crossroads where we get to decide whether we are going to be dumb/divided/dead or smart/united/alive. I do not believe smart/united/alive is at all impossible. If we want to achieve that, despair is as much an enemy as disinterest.

711:
Also talking about old forests there is an aspen grove in Utah that researchers think is 80k years old. https://en.m.wikipedia.org/wiki/Pando_(tree)

712:
It's my understanding that some species of dolphin (but not larger whales) have unusually large encephalization quotients -- larger than those of chimpanzees, but less than humans. Since EQ's are usually computed using observed (nonlinear) correlations between brain and body mass for all mammals, the effects of surface area should at least partly be accounted for. (The ratio between surface area and volume goes down as animals get larger, all other things being equal.)

I don't know how much of a typical dolphin's brain is devoted to generating and processing sonar, but that's something that would require a certain amount of extra brainpower.

713:
I think diamond is going to be hard to beat for stability. Atomic migration in the sp$^3$-hybridised tetrahedral lattice is difficult and its chemical stability is high. Aren't all the exciting new laboratory allotropes all based around the sp$^2$ fused-aromatic-ring structure of which graphite is an example? So essentially two-dimensional rather than three at the base level. I think the place to look would be other super-hard diamond-like materials such as boron nitride.

For readability it seems to me the problem is one of focussing. Distinguishing $^{13}$C from $^{12}$C is easy - NMR - but separating the returns from individual atoms and/or localising the excitation to individual atoms is a bit different. If it can be done, though, it can be done in three dimensions. I have some faint ideas regarding possible methods but as yet not even sufficiently formed to generate useful search terms, let alone conversation.

For radiation damage I think it comes down to building in sufficient redundancy and error-detection-and-correction. A mole of anything contains a bit of everything. There will always be some contamination during fabrication and allowance will have to be made for the errors (both immediate and long-term) so caused; some of the contaminant atoms will be radioactive so even perfect shielding wouldn't prevent all damage. The energies involved are millions of times greater than those involved in lattice bonding so no structure is possible that would be immune to damage. The thing to do would be to optimise the error correction method for the likely spatial pattern of damage (as optical disks do) and apply it to a degree appropriate to the intended longevity.
714:

Re: 609 ‘... lice / fleas do such a good job on mammals ... that the ticks got forced out of a niche, until... wow... you're forcing them to forage for vegetation instead?'

Very interesting ... would also wonder whether local indigenous people have any knowledge/record about such occurrences to check whether this is in fact novel. (The report says this occurs primarily in Australia.) I'd be really leery of new/increased imports (esp. animals) from new trade partners in case the ticks hitched a ride. The article doesn't say anything about the people infected apart from a few immune labs/tests. Crappy ironic headline: Australia's love affair with the barby coming to an end - Aussies no longer able to digest red meat.

Shibolletth and Rant: From personal - via family/friends' experience with low incidence/rare conditions - some of the medical research lit is dismally uninformative/frustrating. Sure, focus on 'relevant' variables, but until the results are in (and verified), you don't know what the relevant variables are, do you? Negative results can also be informative.

715:

Latin isn't the only language that is going that way - Arabic is surprisingly similar.

Outside of the Middle East, it is widely spread through Islam, yet in most of the Islamic countries, the masses don't understand Arabic, they learn passages from the Koran by rote, along with a local language instruction as to what it means, which leads to variations in interpretation.

My flatmate is Pakistani, and he can read and pronounce Arabic letters quite well, but has no understanding at all what the words mean unless they match something he knows from the Koran. It's quite fascinating to see someone at the same time be highly proficient and completely ignorant. It feels the same as reading a highly jargonised piece of marketing - the letters are english, but the words make no sense.

716:

Watching the drift in core school syllabus subjects over the past 30 years has been an eye-opener and a half... but for the most part it's education-for-work (and leave policy-making for your betters) rather than education-to-be-informed-and-effective-citizens, because IAECs might Vote The Wrong Lizards In.)

Scotland always had a more broad-based education system than England; in the early 1980s I was studying six subjects at Higher Grade (Maths, Physics, Chemistry, English, French, and Latin) whereas an English school pupil might have been sitting three A-levels. The trade-off was breadth against depth; Scottish universities do a four-year undergraduate degree, compared to the English three-year degree.
It's been interesting seeing the SNP's attempt to change things to suit its agenda (education in Scotland being controlled from Holyrood). The history syllabus got a bit of meddling a couple of years ago, with the introduction of "The Scottish Wars of Independence" as a new theme - no hint of an ulterior motive there, then...

What's interesting about our kids' school is that on entry to secondary education, rather than trying to salami-slice all of the subjects into a single timetable, they do some subjects in one year, and others the next; until it's time to choose which exams they're going to sit (with core subjects throughout including Maths and English). They've got a language choice that is "you will do at least one of French, Spanish, German, or Mandarin in secondary" (compulsory French and Spanish in Primary).

I'm not concerned about "dumbing-down" - the teachers set the standards, and there are only so many hours in the school day (for instance, you won't achieve language fluency if you're only doing three or four hours a week - but you will get a basic capability).

I've seen some impressive efforts around philosophy, debate, and reasoning; and around technology and computing; not just the basic Maths and English stuff.

You can probably get the full gamut if your parents can cough for the £20,000-plus it takes to get a place in Eton

Overpriced, and driven by the accommodation costs (apparently, everyone at Eton gets their own room from the start; my state boarding school experience was sharing a room with twelve other boys, reducing to "just me" only in my last two years of secondary education).

Round here, the fee-paying day schools have a price point that is "cheaper than full-time pre-school childcare" for Primary 1 (well under £8k per year). If both parents of a pre-school child are working, and you're already paying for childcare, then you've become accustomed to the cost, and the quality of education is frankly impressive... What you're also paying for is the additional learning support for those who need it - at both sides of the bell curve.

This all comes from the Merchants of Edinburgh deciding in the 17th Century that if they wanted well-educated recruits for their trading firms, the younger the better, and why leave it up to politicians? So the local council collects the council taxes for all the children, but only has to pay to educate two-thirds of them.

This is of course an Edinburgh where house prices are driven by school catchment areas, to the tune of roughly "two kids, six years fees" difference between (say) a good secondary and a less-good one. The middle classes are effectively paying for that education regardless, either through the nose or through the mortgage...

717:

Re: 695 'Cellulose digestion'

Just looked this up again on Wikipedia ... hadn't previously noticed the bit saying that 'Cellulose is derived from D-glucose units'. The D-glucose is the problem. You'd previously mentioned that our
biochem is levo (not dextro), so from the bits I understand this means that cellulose is probably a fundamental point of divergence for life on this planet.

Medical physiology text book says that 'dextro amino acids are absorbed by diffusion only'. Not sure what/if this means: a) we do in fact have a very limited capacity for digesting/using d-amino acids; b) this 'absorption' is just a filler - doesn't do anything, just a smaller version of 'rougheage/fiber'. The paper below suggests more rather than less d-amo acid possibilities in our future.

Analysis of Endogenous D-Amino Acid-Containing Peptides in Metazoa

http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2871709/

Excerpt: Abstract

'Peptides are chiral molecules with their structure determined by the composition and configuration of their amino acid building blocks. The naturally occurring amino acids, except glycine, possess two chiral forms. This allows the formation of multiple peptide diastereomers that have the same sequence. Although living organisms use L-amino acids to make proteins, a group of D-amino acid-containing peptides (DAACPs) has been discovered in animals that have at least one of their residues isomerized to the D-form via an enzyme-catalyzed process. In many cases, the biological functions of these peptides are enhanced due to this structural conversion. These DAACPs are different from those known to occur in bacterial cell wall and antibiotic peptides, the latter of which are synthesized in a ribosome-independent manner. DAACPs have now also been identified in a number of distinct groups throughout the Metazoa. Their serendipitous discovery has often resulted from discrepancies observed in bioassays or in chromatographic behavior between natural peptide fractions and peptides synthesized according to a presumed all-L sequence. Because this L-to-D post-translational modification is subtle and not detectable by most sequence determination approaches, it is reasonable to suspect that many studies have overlooked this change; accordingly, DAACPs may be more prevalent than currently thought. Although diastereomer separation techniques developed with synthetic peptides in recent years have greatly aided in the discovery of natural DAACPs, there is a need for new, more robust methods for naturally complex samples. In this review, a brief history of DAACPs in animals is presented, followed by discussion of a variety of analytical methods that have been used for diastereomeric separation and detection of peptides.'

Re 626: 'The attitude might best be described as "disciplined creativity"- you have a responsibility to both optimize yourself as an added value component to the ship, yet think outside the box in an emergency.'

So, basically you're saying that humans are not one-dimensional, contrary to a lot of crappy fiction and all of the current POTUS (rep) slate?
Actually, D-glucose is the normal optical isomer occurring in our biochemistry; it's L-glucose which is unheard-of. (Glucose is not an amino-acid ...)

720:

If you notice the link in 629 and do some searching you'll see where folks found out that the Chinese were adding an antibiotic to animal feed that the western world was holding out as the drug of last resort as there were no known bugs it couldn't handle. Now that's going away.

721:

The ultimate reason no animal has cellulase or anything similar is historical accident of evolution. That said, why haven't all the animals (from termites to earthworms to ruminants) not embedded an endosymbiotic bacterium in their gut walls to do the work directly?

I suspect the simple answer is surface area. When you have hundreds trillions of microbes digesting in your guts, the membrane surface area that is doing the digesting is enormous. In a brief calculation, using simplifications, the combined surface of 100 trillion bacteria is on order 10,000 square meters, while the surface area of a human intestine is on order 250 square meters. Since enzymatic activity depends in large part on how much membrane surface is holding the enzymes, it's more effective to grow bacteria with the desired metabolic pathway than it is to try to produce the equivalent surface area with your own tissue.

722:

>>> Hint: most British schools don't teach art, music, non-commercial foreign languages

LOL.

How long ago did you finish school, Charlie?

Nothing puts children off the things you just mentioned (art, music, languages and in fact any other subject) more than them being crammed down their throats in school.

I suspect that school as an institution has a total-negative value. I mean, it fails at the basic requirement of turning children into members of wider society.

Just think about it for a second. You want to introduce group A to life inside group B. Does locking group A away in a building where they are mostly interacting with group A members sound like a good idea? (See also: prisons.)

723:

Well, humans do two interesting things.
One is fire, which is our unique innovation. I put that on par with O2 synthesis by cyanobacteria as an ecosystem disrupter. Since cyanobacteria and their descendants run large parts of the world, I don't necessarily think that having a unique innovation is a bad thing. It doesn't mean we won't go extinct (sauropods also had some unique innovations), but it's a change we should take seriously.

The other weird thing humans do is that we're total nuts about acquiring symbionts, except that we call it domestication and try to make it look special and different than what, say, ants do. Right now, we're on a bit of a domestication binge, with people trying to domesticate everything from bluefin tuna to industrial fungi to edible insects. Given the state of the planet, I don't think this is necessarily a bad thing, but it has a lot of *really* interesting implications for the future of human life and life on Earth. It's worth reading up on the geographic mosaic theory of coevolution if you want to see what I'm talking about.

724:

>> In a brief calculation, using simplifications, the combined surface of 100 trillion bacteria is on order 10,000 square meters, while the surface area of a human intestine is on order 250 square meters. Since enzymatic activity depends in large part on how much membrane surface is holding the enzymes, it's more effective to grow bacteria with the desired metabolic pathway than it is to try to produce the equivalent surface area with your own tissue.

Well, theoretically, you could have your own free-floating cells instead of bacteria. A "tissue" doesn't have to be solid, you know.

725:

Well, the surface area to volume ratio means that the smaller the the is, the proportionally more surface area it has per volume mass.

Given that bacterial cells are on order around 4 cubic micrometers in volume, and gut cells are on order 1400 cubic micrometers in volume, bacteria have about seven times greater surface area per unit volume. So if you invest in making bacteria instead of gut cells, you get seven times more membrane with which to do enzymatic reactions for the same amount of tissue.

726:

You can have cells with lots of protrusions. :-)

727:

Antibiotics in animal feed is just one source of resistance. Inappropriate use of antibiotics in humans is another. This can take many forms. Self administration is one of them. It was the main driver of resistant gonorrhoea in prostitutes in the Vietnam war and then spread throughout the
world. GPs prescribing them for virus infections is another. There are also more subtle causes. In the UK GPs tend to provide short courses of cheap antibiotics for infections. These may be the correct antibiotic but the course can be too short or alternatively the patient doesn't take the whole course. It may be the wrong antibiotic in which case the GP will send a swab to the local hospital microbiology lab for culture and sensitivity. It's not well known that until the wrong antibiotic has cleared from the patient's system the offending "bug" may not grow even if it's resistant to the drug. This delays or even prevents treatment and encourages resistance to the original antibiotic.

The Internet has of course made self treatment easier. Sometimes you don't need the internet. My wife suffered from a recurrence is sinusitis after we both caught bad colds on holiday in Greece. She was a microbiologist and knows the organisms affecting her. The local pharmacist just sold us the specified antibiotic over the counter. It worked.

728:
I thought I'd remind you that Charlies first degree/job was in pharmacy...

729:
Of course you can, internal and external. I'm just lazy. Bacteria evolve faster than I do in any case, so I'd rather pay them to do the heavy digesting for me.

Incidentally, this is one thing I've played with in my books, that Bruce Sterling messed with in Schizmatrix, but which doesn't show up nearly enough in SFF:

If you want to adapt life to an alien world, one good place is to start engineering the bodily flora of people, animals, and crops to deal with it. It's simpler to work with bacteria as an interface to an alien biosphere on the molecular level than it is to re-engineer humans to deal with that biosphere.

This is also true of time travelers. Writers rarely talk about how bad time traveler's diarrhea would be in different eras. Perhaps we should call it Chronos' Revenge?

730:
Darwin to the rescue. Humans who do not acquire the ability to assess their place in the environment as a set of inter-locking systems are quickly removed from the gene (and meme) pool. Unlike Earthbound humans, the feedback loops are fast and local. The only problem is that if everyone gets iced, and it wasn't recorded, the lessons may be lost.

731:
I'm aware of that. I'm not trying to teach my grandmother to suck eggs. But The failure of GPs to use microbiology services correctly is a cause of antibiotic resistance. The failure of bacteria to
grow in sample from patients previously treated with the wrong antibiotics is not widely appreciated.

732:

A reason some people don't take the full course? To prevent (what they think is) antibiotic resistance.

733:

'In their gut walls'? That sounds hard work. Picking up some of the symbionts from termites (a common food, after all), or at least some of their genes, makes much more sense. After all, the requirement isn't to digest the cellulose, but merely to break the cell walls to get at the contents. However, I agree. It sounds a no brainer, and it's unclear why it has never happened.

God alone knows what would happen if we engineered an E. coli to break cellulose apart, because I am damn sure that it would not stay within Homo sapiens.

734:

"You can probably get the full gamut if your parents can cough for the £20,000-plus it takes to get a place in Eton or an equivalent top-tier school, or are lucky enough to go to somewhere independent and eccentric that isn't god-ridden, ...."

Perhaps. I can assure you that many less prestigious public schools give a considerably worse, and less broad-based, education than the better comprehensives. Mine wasn't particularly god-ridden but, oh! god!, was it dire! More pupils in the England under-20 athletics team than got into Oxbridge - and neither was an accident.

To Vanzetti: more children than you think really want to learn such things as drawing and music, but don't get the opportunity.

735:

I liked the earlier Foreigner books, but I feel like newer ones are stretched pretty thin. I think the last one I read had a plot that went:

1. Bren visits a noble to persuade him to come to the capital and sign a treaty.
2. Noble agrees, comes to the capital, and signs the treaty.
Along the way, Bren worries incessantly about every imaginable thing that might go wrong, but nothing actually does. The climax is when they eject a single malcontent from the signing ceremony.

There's also a B plot where Cajeiri obtains a pet without his parents' knowledge, then the pet gets loose and damages some furniture.

736:

Yes and no. You don't lose half a continent every day, particularly one that's fairly empty and the half that's better at growing stuff than the half you kept. If we believe (British) films, George III, at least, was very upset about the whole thing. Plus it taught the British how not to lose their settlement colonies in the future.

And decades later the British were even more dependent on some of that land than they were at the time of the wars. Possibly this is one of the reasons why they fought hardest to retain the South at the end. Plus there were more Loyalists in the South. (Coincidence? Possibly. I am not an expert in that area, but someone probably knows.) We do know the financial and cultural ties remained stronger with the Southern aristocracy than most other strata of American society.

Even if the British had eventually gotten rid of de jure slavery, it's a pretty fair bet they would have kept a de facto exploitation system in place to feed Sauron's mills, I mean Lancashire. (Remember Britain entertained the idea of giving Haiti back to the slaveowners, after the latter had been thrown out, in return for sovereignty over the island.)

You also have to consider the American Revolution's effect on France and on other colonies. Since the American Revolution helped start the French, that gives it a little more weight. The American Revolution indirectly exacerbated the impetus for the Polish Partitions and the rise of Prussian and Russian expansion.

Still they were side shows to the man/baron in the street at the time and things may have actually worked out better for the UK in the long run than winning might have.

737:

"The density of wood seems to average around half that of water, though there are exceptions such as ebony and teak."

You're quite right but it doesn't matter. That's the beauty of the technique of first order approximation. We've emitted X amount of CO2 in the last 100 years. Someone proposes a solution and on the face of it it might work. Without going through all the details you can quickly include it or exclude it as a subject for proper evaluation. We know we've done this much in 100 years and most in the last 50, so whatever undoes that must be able to reverse that amount of damage in 50 years or less. Throw in some quick numbers, ignoring pretty much all but the number of zeros. You get an answer of "about" 500 years. That's plenty good enough to know the solution won't work. It won't even keep up with emissions, even if we managed a 90% reduction let alone fixing the mess
we've already made. We can very quickly see that it's just pissing in the wind. A more accurate estimate is certainly possible, but tells us nothing more. Radiata Pine density is 0.48 not 1. The amount of CO2 emitted so far is 1.1x10^12 not 10^12 and that represents 3x10^11 tonnes of carbon. Wood production is 1.8x10^9 cubic metres not 2x10^9. The carbon content of wood is 47.21% to 55.2% (w/w). Do the maths and that comes out as up to 735 years 176 days 22 hours 56 minutes and 14 seconds. That tells us nothing more or less than the first approximation. It's far too slow to be of the slightest use.

738:
"God alone knows what would happen if we engineered an E. coli to break cellulose apart, because I am damn sure that it would not stay within Homo sapiens."
Even probably-impending conservative modifications of the intestinal biome for improved digestive efficiency (most of the world) and/or reduced digestive efficiency (the over-eating regions of the world) will be interesting.

739:
Actually, it's quite useful. If we don't get the atmospheric CO2 under control and civilization collapses, the survivors will need that wood for their campfires, and it will provide other services, unlike carbon squirted into the ground with CCS.

740:
The mill owners of Lancashire may have supported slavery but their workers had other ideas. 
http://www.theguardian.com/theguardian/from-the-archive-blog/2013/feb/04/lincoln-oscars-manchester-cotton-abraham

741:
*Humans who do not acquire the ability to assess their place in the environment as a set of interlocking systems are quickly removed from the gene (and meme) pool. Unlike Earthbound humans, the feedback loops are fast and local.*

I think the feedback loops might be pretty global, for values of global that apply to a generation ship. One idiot who starts a fire or pokes a hole can consume a lot of oxygen in a hurry. It gets worse when you figure in how many delicate, necessary things there would be on board, and how few spares.

742:
And then there's the Orthodox Singularitarian response: (a) develop strongly superhuman AI. (b) shAI figures out how we can do aneutronic fusion for power easily using Boron-11. (c) Using power from Boron-based fusion the shAIs build lotsa magic nanotech factories for drawing down atmospheric CO2 and turning it into diamond-substrate computronium. Result!

(At least until the shAI runs out of cheap carbon and decides to dismantle the lithosphere for all that nice compute-friendly silicon ...)

---

743:

"Local" = "Global" when 200 people are your entire world (at least in face-2-face terms). Communities who do not enforce disciplined systems thinking among their members run a significant risk of never reaching the destination.

---

744:

And on cue, Google's huge announcement turns out to be what everyone expected:

*We found that for problem instances involving nearly 1000 binary variables, quantum annealing significantly outperforms its classical counterpart, simulated annealing. It is more than 108 times faster than simulated annealing running on a single core. We also compared the quantum hardware to another algorithm called Quantum Monte Carlo.*

[http://googleresearch.blogspot.ca/2015/12/when-can-quantum-annealing-win.html](http://googleresearch.blogspot.ca/2015/12/when-can-quantum-annealing-win.html)

General feedback from the tech-heads seems to be all "meh" though.

What was more interesting was the Nov. 16th announcement:

*D-Wave Systems Inc., the world's first quantum computing company, today announced that it has entered into a multi-year agreement with Lockheed Martin (NYSE: LMT) to upgrade the company's 512-qubit D-Wave Two™ quantum computer to the new D-Wave 2X™ system with 1,000+ qubits. This represents the second system upgrade since Lockheed Martin became D-Wave's first customer in 2011 with the purchase of a 128 qubit D-Wave One™ system. The agreement includes the system, maintenance and associated professional services.*

*The installation of the D-Wave 2X system will be completed in January 2016.*


(I'm experimenting using full links for a bit, to aid people in evaluating them as I witnessed the horror of an vanilla browser recently. I'll return to nice formatting if preferred and/or when aesthetics force me to).

The interesting bit being that it's going live Jan 2016, which means the working system was
probably online in March - June (MIC contracts take a bit of haggling over, usually, even with the vast sums being thrown at it).

~

Anyhow, System Shock 3 was just announced (http://www.theverge.com/2015/12/8/9870696/system-shock-3-announcement-teaser-countdown) on the same day.

~

Anyhow, for a real shibboleth -

Political / Economic Ideologies espoused by characters that are single tonal (c.f. Chris Rock on Politics [Youtube: Comedy: 0:59]), or as a worse general category error, assuming that Ideologies would even work like that in the future (c.f. Hegel (the real Hegel, not the internet version), Whigs & Tories etc).

p.s.

For Greg, Host's OP stated to be familiar with another list of shibboleths (which I've skirted near with Star Wars). Look up my responses, notice the squids reference, which is a nod to both host's work, but also this:

_Squid in the Mouth_

_The failure of an author to realize that his/her own weird assumptions and personal in-jokes are simply not shared by the world-at-large. Instead of applauding the wit or insight of the author's remarks, the world-at-large will stare in vague shock and alarm at such a writer, as if he or she had a live squid in the mouth._

I was taking the piss out of myself in a very meta way.

---

**745:**

I would consider Lancashire to be another colonial territory under occupation. And yet the 9th Doctor did nothing to help liberate them.

---

**746:**

_I also think we can hold the world temp increase to 2.5 deg C, & hopefully to 2, provided "people" get on-side._

Nope.
2oC has already happened. Voooom, Whooosh, already gone.

You're looking at 4oC being the threshold now.
Smart people are looking to lock @ 3.5 if they can.
4oC gets nasty.

And claiming that Paris was good news?

I might have missed the part where BRICs and Saudi Arabia refusing to pay / buy into a climate fund was good news and major NGOs being locked out of discussions was progress.

Was too busy watching the French use Laws designed for counter-terrorism to house arrest environmental activists.

[Serious Note: I can do pessimism and Realism a whole lot more hard-core, I choose not to. As friendly warnings go, heart-warming tales of Leopard Seals is about as fluffy as it gets.]

---

747:

Well, he did try.

His contract not being renewed was largely due to his protests against the higher-ups in the BBC and working conditions for the crew on set, so you can't say he wasn't being true to his roots.

Still waiting for the latest Doctor to do that spoof where he mixes in the character from "The Thick of It" to "save the world" from the Daleks.

That's not happened yet, so *spoilers*.

[Yes: Olive Branch]

---

748:

"I should also mention, if the aliens' ancestral planet has a higher partial pressure of oxygen in the atmosphere than our own, either due to higher O2 percentage or higher atmospheric pressure, that will make it easier to start fires than it is on Earth."

Tendency for fire to start or propagate depends completely on percentage rather than partial pressure. You can have divers living at a PPO2 of 0.7 for months where the pressure is high and you never have to worry about fire. When you start bringing them up to lower pressures while maintaining a constant 0.7 PPO2, fire starts to become an issue once the O2 percentage goes above 20%. Most sensible habitat operators won't allow anything above 25% despite the fact that slows down decompression and costs money. At that point clothing and bedding has been washed in fire retardant, no synthetic fibres as static discharge can start a fire, no electrical equipment at all of any sort. Lighting is all external lights shone through ports. No electrical communications gear.
Everyone gets pretty paranoid. The rule of thumb is that fires get twice as bad for each percentage point over the normal 21%. It's hokum of course, but that's the way it seems to people.

Compressed air in cylinders is perfectly safe with a PPO2 of 60 bar. Being in a pure O2 atmosphere at any pressure is just unbelievably dangerous.

749:
The entire point about a Judas goat is that at some point it becomes the last of its species.
It's the rather harsher reality to the "Last Unicorn" mythology (previously referenced).
You can also tie it into the *Elric of Melniboné* myth cycle; remembering that Moorcock was heavily into his Sumerian mythology also helps.

TL;DR
"Judas Goat" as a concept is far far older than Christianity.

There's a recent Metafilter thread on an interesting man who died recently. (Linked because it has good .pdf links in). His name was René Girard.


~

And, since we're missing some fun.

*A new religion formed in Iceland has one primary objective: “that the government repeal any law that grants religious organizations privilege”, which includes refunding Icelanders' “parish fees”.*

*The faith in question, the Zuists, ostensibly worship the ancient Sumerian gods.*


*nose wiggle*

There's front running and there's front running and then there's having fun.

750:

*This study* found substantial variations in time-to-ignition and surface temperature at ignition depending on pressure, even while holding oxygen concentration fixed. Admittedly their endpoint is right around atmospheric pressure; perhaps I was wrong to assume that increasingly higher pressures continue to have an effect.

751:
I'm still catching up so this may have been answered:

"Why no dissected mammoth eyeballs in the fire kits?"

Water based lenses are not transparent to infrared light. While much of the energy is in the visible range, much isn't. Also an evolutionary step that includes your face catching fire if you glance at the sun seems self limiting. Well to me at least.

752:

Sorry, I didn't read your comment re Niven Outsiders before posting my own.

=)

753:

Ugh.

Sea Mammals don't need fire due to biology and the way it works. Unlike wood / four stomachs, they've never had this problem.

Hint: the sea is ALL FUCKING CARNIVORES on the higher chains. (Orca development and split between fish and flesh is a different matter).

It's like suggesting we invent handy sticks with claspers on because our thumbs aren't enough.

You have been eaten by a Grue.

p.s.

Anyone stating they know anything about higher order mammal minds in the sea are cunts.

You kinda wiped out 60-95% of their species out before you even considered talking to them. And then blasted them with sonar and nuke tests.

It's akin to wondering if that kid who was sexually abused by her uncle for 15 years is going to have a normative love life.

Muppets.

754:

Oh, and if it makes you feel better:

The Songs are multi-tonal, and change with TIME, with additional refrains.
It's the definition of language you psychotic cunts.

755:
Go play with a Dugong, cat.

756:
They are also vocalized exclusively by males.
So humpback whales are kzinti.
And you definition of language has as much validity as you definitions on physics, history, and pretty much anything else you ever posted on this blog that was even halfway comprehensible -- screaming ignorance.

757:
Months ago I came to two conclusions about CD:
1. 80-90% of what she posts is incomprehensible. Whether it is the product of mental illness, magic mushrooms, or performance art a la Sasha Baron Cohen is unimportant.
2. On rare occasions when her posts can be parsed into some semblance of information, they are invariably, screamingly, WRONG. That is the case whether they are about biology, physics, history, or anything else.
For a long time, whenever I see word "CatinaDiamond", whether as poster name or name being responded to, I hit "page down". The only reason I am responding right now is because her post (and Heteromeles' response) are at the bottom of the screen, and there is no place to page down further.

758:
It's proportion of oxygen in the atmosphere rather than absolute quantity of oxygen? I had been wondering about that in relation to comparative planetary atmospheres. Can you point to a source of more information—either a Web site or a Library of Congress subject classification? (I pay for book borrowing privileges at a nearby university library; this would be something I could look for there.)

759:
You might find *How the Dismal Science Got Its Name* worth a look; it has a lot of material on nineteenth century British debates on slavery. I think it may be where I found a discussion of the "Am I not a man and a brother?" design, which was Wedgewood's best seller for many years.
760:

Getting back to shibboleths...

Let's see, there's all the information in the world is readily available on the internet. Never mind a lot of data hasn't been added to the web or isn't easily available. Local newspapers and such if you're very lucky might have scanned pdf files. Local and even state (USA) governments rarely make information easily accessible - partly not wanting to make things easy and partly not caring enough to make the effort.

A related gimmick - erasing all the information about a person to make them disappear. Again, a lot of files simply won't be easily connected online. Not to mention depending on age many records will only exist on paper. And it's not like everyone who knew the person will forget them or not get suspicious if someone disappears completely from the web. Much easier just to create a new id.

On the subject of space opera, I think one assumption that may be incorrect is that colonizing space has to make a profit. You could have an alliance of governments terra-forming Mars or doing some other big project with the deliberate intent of blowing through trillions of dollars as a Kenynesian stimulus. It's no sillier than a world war. Likewise, if you had various ethnic groups that were unhappy in their current lands, giving them a place to move to might be cheaper and more humane than going with violent oppression. I sincerely believe the state of Alaska exists in part to absorb people who might otherwise wind up in asylums or prisons. A space colony could serve the same purpose.

So to originate our space opera setting, assume we actually get a good outcome in the 21st century and by the 22nd century or later we have a reasonably prosperous and sustainable planet. Now let's assume we've also got displaced populations due to climate change, many of whom are unhappy in their new lands. And we also have an economic depression. The various governments of Earth decide to kill to birds with one stone and invest trillions to colonize space and not coincidentally stimulate the economy and recruit colonists from various refugee populations unhappy with life on Earth. Of course this works a lot better if you can figure out some kind of FTL so you're not limited to one solar system.

761:

I think you'll want Star Gates with that particular recipe, so that people can walk to new worlds. Absent cheap anti-gravity, it's cheaper to keep huddling the masses on Earth and send spaceships out effectively as spores of the Terran biosphere.

Still, this is the traditional recipe for space opera: we solve our problems and move to the stars. If you want the alternative, try out the idea of unsustainable colonies, where the goal of colonization is to build a big enough tech base to build two (or more) starships before the whole thing collapses, and to then take off for the next star to repeat the process unsustainable colonization process ad infinitum. After a few hundred million years, you come back to Earth and start the process over again.
762:

Apropos of nothing, if you want unholy mashups, you could do climate opera.

Here's the idea: with severe climate change, the Earth keeps warming up for a couple of centuries after we blow our GHG wad, leaving the planet to cope without fossil fuels.

Additionally, it will probably be possible to predict in advance which areas will have the best climate once the weather settles down (my personal prediction is the great lakes of each continent, but others may disagree).

The opera part is actually the saga of ten or so generations of a family trying to get to and/or hold onto what will be good land in the sweet spot, as the climate changes, things get unpredictable, migrants come and go, and so forth.

There's room for an arbitrarily large amount of drama there, especially when you consider what having good land and the equivalent of an expanding city-state means as the climate stabilizes in its new, hot regime.

763:

I was thinking more space based wormholes. Send out a first wave of star wisps as probes and then when you find something interesting send out a second wave with seeds for wormholes. And part of the idea is that the government is willing to burn through money in part for political stability. Tunnels in the Sky would make things simpler.

Frankly I don't really find the whole idea of sending out generation ships as the last gasp of a dying civilization very plausible. It's hard for me to believe we could have the technology to build an artificial ecosystem that lasts for centuries but not repair ecological damage on Earth. And if you could build the generation ships it would be easier to just build arcologies on Earth that serve the same purpose. Maybe that's the back story for the Caves of Steel.

The Climate Opera concept is interesting - kind of an update of Maurai & Kith, or a more hard science Dying Earth. A little depressing though - if there's any knowledge of the past the educated people will know they can never match the achievements of the lost golden age. Reminds me a little of the ending of the Pursuit of Power.

764:

It's equally possible that the people who survive the collapse will be more motivated to live with the Earth, in direct opposition to what The Consumers did to wreck it all. There's almost inevitably quite a lot of hypocrisy in this kind of thing, which makes it even better for storytelling.

Still, there's a tremendous amount of frustration around, with people knowing what they could do better, if only they got a chance. It's a widespread attitude among the architects and
environmentalists I know, and there's a whole generation of people studying sustainability in college who have been unable to find careers in that field. I'd love to give them a future to play in.

---

765:

"This study found substantial variations"

Wow, that's really interesting. Thanks.

---

766:

@673 Peter Erwin -Thanks for the book recommendation. I've got *How to Kill a Dragon* on my shelf and sometimes I reread that.

---

767:

I've tried to find something on the net and I can't. There seems to be a bit of hypobaric research by NASA, which is interesting and basically indicates that I was wrong, or mostly wrong. [http://ntrs.nasa.gov/archive/nasa/casi.ntrs.nasa.gov/20070005041.pdf](http://ntrs.nasa.gov/archive/nasa/casi.ntrs.nasa.gov/20070005041.pdf)

The source I had for the rule of thumb was proprietary training materials from my commercial diving course that prepared me for my hyperbaric chamber operators ticket. There might be something in AS/NZS 2299 but I can't remember for sure and it hides behind a $400 paywall.

However anecdotal evidence seems to strongly support percentage over partial pressure as the primary influence on fire propagation. [https://www.uhms.org/images/Safety-Articles/hyperbaric_and_hypobaric_cha.pdf](https://www.uhms.org/images/Safety-Articles/hyperbaric_and_hypobaric_cha.pdf)

On the other hand some experiments point to what I said being right.

McAlevy III, Robert F.; and Magee, Richard S.: A Criterion for Space Capsule Fire Hazard Minimization. J. Spacecraft, vol. 4, no. 10, 1967, p. 1390. Simple tests with polystyrene and poly(methyl methacrylate) (PMMA) in oxygen-diluent atmospheres give V = YO2mPn, where V is flame-spread velocity, YO2 is O2 mole fraction, P is total pressure (4 to 415 psia), m > 1 and a function of the diluent, and n < 1 and constant. Flame-spreading rates were highest with He, then Ar, then N2. Note that to increase the O2 partial pressure while retaining fire safety, increase P rather than YO2. The diluent of choice is N2.

---

768:

*It's quite fascinating to see someone at the same time be highly proficient and completely ignorant. It feels the same as reading a highly jargonised piece of marketing - the letters are english, but the words make no sense.*
I cannot resist the double-snark to that:
One: What do you expect - it's religious claptrap & lying, with it, though that is probably an oxymoron
&
Two: Ask Catina to write some more, then, as a free sample (!)

769:
The SNP are also trying to control & edit & censor the output of the Scottish Universities.
There's a first-class fight going on, I'm told.
"Scottish Wars", plural?
Apart from the usurpation from the Red Comyn, (Who really did have a good claim to the Scottish throne) his murder & subsequent power-grab by the Bruis, which was an independence war; when were the others supposed to be?
All the fighting in the middle 1500's was internal & on religious affiliations & the wars 1640 - 1688 were civil wars that engulfed all three of the kingdoms of the Isles.
If they are talking about the '15 & the '45, again there was a purely internal Scottish faction-fight, coupled, in the latter case, certainly, by French shit-stirring.
I find the whole thing very dubious.

770:
*Even if the British had eventually gotten rid of de jure slavery,*
You are missing the point entirely.
The two Mansfield decisions were made just before the "US independence movement" started.
To someone long-sighted & determined to protect his property, like one Geo Washington, the writing was on the wall from that moment.
Slavery was made illegal in England as a result of one of those decisions, trading was banned from 1807 (?) & through all the colonies (though it had gone from everywhere except the W Indes & S Africa long before then) in 1831-3.

771:
Thank you.
Said "feelings" in the UK are one very good reason "The South" was never given diplomatic recognition.
The other "support" idiots from the slaveowners' area misinterpret is the building of CSS "Alabama" & others.
THAT was because of US guvmint stupidity, one they are still repeating.
They won't sign treaties that bind them ...
The US had refused to sign the treaty that banned Private Ships of War & the S was prepared to pay in gold.
Not illegal - so "how big a ship did you want"
It was, like the Assassins Guild, for the money.

772:
And also #744.
(744)
Thank you.
The announcement that D-wave have got 1024-bit Q-compute "sorted" is interesting, to say the least.
I note that Lockheed-Martin are the customers.
Oh dear, but ....

(746)
NO
1 deg C has already happened, 2 is almost certain, so can we hold it below 2.5 is the question.
Remember that most of the "alternative" sources of power & most importantly power-storage are gaining fast at the moment.
You are doing your nihilistic doom-laden enjoyment of other people's deaths again.
Please stop it.

773:
Ah, you noticed?

774:
@Charlie: 689
No Art or Music? In general I find little to disagree with in you assessment of curriculum drift (being an old fart myself, growing up single digit miles from where you grew up, about the same time).
But my teenage louts (14, 16, 17), at a good but normal Comp (*Ahem* *cough* Sorry, Academy *cough* *bullshit*) have all received quite thorough lessons and opportunities in music, including GCSE curriculum music, extra-curricular school Orchestra, Jazz band, Uke-ladies, Guitar Ensemble (to get boys to at least pick up an instrument even if they can only play 5 notes - dear $deity, when 30 of them strum together it drones like out of tune bees).
They are not great musicians in these things, but the music department (hats off to Ossett Academy Music Dept) are passionate and involved.

775:
Re: heteromeles: Eh, if the weather goes non-liniar enough to wreck agriculture, and food production isn't brute forced past that problem there wont *be* a nature to be close to after. Because during the great dying, Everything gets eaten. Look at what's happened to Haiti, now scale that globally. That's the overwhelmingly likely outcome of the scenario you are predicting. Only worse.

Fortunately, I think it far more likely that more productive capacity will simply be allocated to food production until the problem goes away. Historically, 90 percent of all human effort was directed at food production. It's currently sub 2 percent. That's a lot of safety margin. Basically, growing all food in storm-proof automated greenhouses in petra using desalinated water might seem ridiculous/implausible, but it would still leave more economic surplus than giving up on industrial society, and would have lower ecological footprint that the collapse would incur as well.

776:
My flatmate is Pakistani, and he can read and pronounce Arabic letters quite well, but has no understanding at all what the words mean unless they match something he knows from the Koran.

I'm a little confused -- an educated person from Pakistan will of course be able to read and pronounce Arabic letters but not understand the Arabic language, just as you or I can probably read and (partly) pronounce something like Croatian or Turkish (or, to make the analogy a bit more exact, Latin), but not understand it. Pakistani languages are written with a slightly expanded version of the Arabic alphabet, after all.

(Or maybe you meant something analogous to a [non-Israeli] Jewish person who has had enough religious schooling to be able to parse the Hebrew alphabet, but doesn't know Hebrew itself apart from a few religious phrases?)

More generally, there are a number of languages that survive primarily or only as liturgical entities: Coptic, Aramaic, Pali, Ge'ez, Church Slavonic, Sanskrit, etc.

777:
"growing all food in storm-proof automated greenhouses in petra using desalinated water might seem ridiculous/implausible"

You mean this?


Not sure how you'd power large scale farming under lights.

778:
Why would you? It isn't like the sun will go out. I mean you could, but it seems needlessly complicated. Nor is there really any need to stack them. The emergency plan is that you start with a field that isn't viable anymore or predictably won't be viable in the near future, then you force it to be so by hardening it against weather.

There are escalating options to do this depending on how bad things get - The early levels are pretty conventional farming techniques - plant more windbreaks, build water management infrastructure, soil remediation. The next step is glass and steel.

---

**779:**

What units are you using for PPO2? (I'm sure it's standard in saturation diving, but the rest of us haven't necessarily gone there ...)

We know that the atmospheric oxygen percentage has fluctuated over medium-deep geological time; vertebrates didn't show up on land until it was over 5%, it peaked in the low 20s (up to 24% IIRC) a couple of hundred million years ago, and it's fluctuated in the 15-20% range over the past 60-70 million years; my understanding is that there's a hard limit on our biosphere, imposed by the fact that waterlogged organic matter (trees, humans) will burn pretty much uncontrollably above 30% -- so once you get close to that, lightning or vulcanism induced forest fires become uncontrollable except by geographical barriers and you suddenly get a lot less biomass and a lot more atmospheric CO2.

(See the Apollo 1 pad fire, for a worked example of why working in pure oxygen is generally a really bad idea, and see also the design philosophy differences between the Russian ORLAN series of space suits and the American Apollo/Shuttle suit lineage).

---

**780:**

And yet an international tribunal decided in 1872 that Britain owed $15.5 million in damages to the US for having allowed the construction and sale of warships to the Confederacy.

... & the S was prepared to pay in gold.

... It was, like the Assassins Guild, for the money.

So 19th Century British respect for international law was basically "No violations on credit, but for cold, hard cash, anything goes!" ...?

I'm not sure your keen desire to assert British moral superiority is really helped if you equate 19th Century Great Britain with murderers for hire.

(If I had more of a paranoid inclination, I could point out that the American merchant marine was in direct competition with the British merchant marine. Thus, it was in the economic interests of at least some of Britain's elite to surreptitiously aid in the destruction of American shipping.)

---

**781:**
"Re: heteromeles: Eh, if the weather goes non-lier enough to wreck agriculture, and food production isn't brute forced past that problem there wont *be* a nature to be close to after. Fortunately, I think it far more likely that more productive capacity will simply be allocated to food production until the problem goes away."

Don't bet on collective sanity - the historical record does not support you. We are very, very close to World War III, as several informed commentators have pointed out - and remember that the first was started by a loose cannon followed by an imperious response from a superpower that thought it was still pre-eminent. We came damn close to that just last month. And it needs only one organisation (not necessarily even country) to release a biological superweapon that gets out of control.

If we avoid that, the most likely scenario is that the USA will occupy all of its critical sources of supply, using its dominating military superiority. But that won't help in a case of complete collapse, because it and its vassal states (we know who we are) don't have the grunts needed to hold down a location and keep it producing while 90% of its population is desperate.

So, something would survive, though Homo sapiens might not, but it could easily be the worst of the great extinctions.

---

782:

We do. Villi. No, I think Heteromeles has a very good point regarding surface area - and one I really should have thought of myself since the same thing crops up in one of my personal projects :)

---

783:

And kids. I am told that I managed to sabotage someone else's central heating system and render their house a most uncomfortable place to live, at some age too young for me to have any memory of doing it. A generation ship would have to be proof against the diabolical ingenuity and persistence of toddlers in pursuit of innumerable aims so pointless as to never even occur to the adult mind. Poking holes and starting fires - probably in places that an adult wouldn't believe a toddler can get to, as well - is only scratching the surface.

---

784:

"more productive capacity will simply be allocated to food production until the problem goes away. Historically, 90 percent of all human effort was directed at food production. It's currently sub 2 percent."

It's not human "productive capacity" that's the problem, it's that of the land. And the moronically stupid rationing system that forces the remaining 98% of people to do something in order to be allowed access to the food produced by the 2%, regardless of whether that "something" is actually
useful or not, and furthermore ensures that not only is it nearly universally not useful, but actively harmful to the efforts of the 2%.

785:

A reason some people don't take the full course? To prevent (what they think is) antibiotic resistance.

Ah, no. At least in the US most people stop taking their meds because they feel OK and don't understand that feeling OK doesn't mean the bug is gone.

Then they flush them down the toilet the next time they clean out their medicine cabinet.

786:

The linked article is discussing a study of people's understanding of antibiotic resistance and communication methods to improve it. One thing they found was some people thought "antibiotic resistance" was human resistance to antibiotics - a built-up tolerance that meant they stopped working - and so cutting your course short meant you were helping prevent this build-up and lowering resistance.

Some commenters were seeming to blame people's evil or laziness - (secular) sin, basically; as a counterpoint I was pointing to people attempting to do their best, betrayed by a false picture of the situation.

787:

Though yes, there definitely is a larger problem of communicating the proper use of drugs to patients.

788:

My flatmate is Pakistani, and he can read and pronounce Arabic letters quite well, but has no understanding at all what the words mean unless they match something he knows from the Koran. ... It's quite fascinating to see someone at the same time be highly proficient and completely ignorant.

You see this a lot with staff in technical areas/businesses. They know the words, can handle the equipment, type up the letters, etc... but really can't join the conversation or break out from the formal procedures.

789:
When a thread gets this long, it becomes too hard to read all the preceding comments to make sure that yours isn't duplicative of an earlier one.

Just sayin'.

790:
A question for Heteromeles.
What do you think of the Germans and others on that side of the pond dropping coal burning for wood pellets as the pellets are said (by the burners) to be better for the environment.
I have deep reservations that cutting down forests in eastern North Carolina and Virginia and shipping the result to Europe to replace burning coal makes any sense unless you have a outsized fear of coal and nuclear.

791:
I used to feel more that way. But the longer I live the more I feel some (maybe a majority of people) live most of their lives on emotional instead of logical thinking. And trying to teach them something that contradicts "what they already know" is a big waste of time.

Not that I have a better answer.

792:
Greenhouses are rather fragile, especially if you cover a largish continuous area.
They do nothing for your soil problems and in fact create more. (You're scaling down; the rate at which things can go wrong goes up. You've isolated yourself from pollinators, a problem traditionally solved by harvesting nests of bees which is another landscape input tough to replace.) So every current greenhouse has an associated large area for inputs and outputs upon which the productivity of the greenhouse is dependent.
The folks looking at the high-rise version are looking at how to ship fruits and vegetables shorter distances, so you get a different kind of other-large-area dependency with inputs from the surrounding city, and are going up for durability. They still need concrete and glass which is legit not their problem but certainly net carbon in the atmosphere as presently practiced.
One of the really hard conceptual steps with climate change seems to be recognizing that there isn't anything much to do except stop extracting fossil carbon. There certainly isn't a technical fix for the weather or agriculture's dependence on the weather. (There are agricultural practices less dependent on fossil carbon.)

793:
I have heard it said that Gaelic is a very easy language to learn because every word is pronounced exactly as it is spelt, unlike any other language. But that was the view of a Hebridean for whom it was a first language and English very decidedly a second one. If your first language is anything else that uses the Roman alphabet, and even more so if you also know any others, Gaelic spelling, far from being a help, is a massive hindrance because every word is pronounced absolutely nothing like it is spelt.

By that definition, Mandarin Chinese using pinyin with the diacritical marks should be dead easy. If there are any exceptions to the pronunciation rules, I haven't encountered them. And yet, I found French far easier (and I suck at French)...

794:

I can't remember the title, or whether it was Asimov or Clarke, but one of the 2 wrote a story where the ship's computer (used for navigation calculations amongst other things) broke down, and they self-rescued into radio range of Earth using the navigator's knowledge and crew who'd been taught to us abacuses.

"Into the Comet" by Arthur C. Clarke, I think.

795:

Apropos of nothing, if you want unholy mashups, you could do climate opera.

Is that going to be your next book?

796:

Cheers, although my point wasn't wanting reminded of the title but that "a navigator" is not supernumerary on a self-navigating spacecraft just because it has a computer than can do the sums faster.

797:

German coal tends to be the low-grade brown stuff -- very high in sulphur and particulates, very dirty and polluting.

The German fear of nuclear is transference from the cold war, and from having been bombed then stomped flat by the Red Army within living/word-of-mouth memory. (American/Russian jokes about "how far apart are German villages? About five kilotons" aren't funny when you live in said villages.) They showed some signs of getting over it ... and then the Fukushima Daichi mess reignited all their angst.
Looks like technology capable of reading memory diamond might be less far away than I thought. Some adaptation of this technique looks like it ought to do the trick:

Exactly. Any more than pilots are supernumerary on airliners with fly-by-wire, autopilots, and autoland.

(Pilots are there to set policy -- to tell the autopilots, FBW, and other automation what to do -- and for exception handling. But that doesn't mean those planes can "fly themselves" any more than a Tesla Model S with adaptive cruise control, lane tracking, and other automation features "drives itself".)

It won't be my next project, because I want to finish the project I put aside to work on Hot Earth Dreams first.*

But yes, I'm thinking about it. It's the kind of thing that Hot Earth Dreams makes it easier to write about. It's less a dystopian post-apocalyptic doomy-gloomer and more along the lines of Kim Stanley Robinson's Aurora or Mars trilogy--a multigenerational survival tale. After all, post-collapse Earth does a better job of filling the "an alien world colonized with reduced technology" trope than almost all extrasolar worlds would.

The other oddity is that, given how fast climate models are improving, I suspect that clever people who can cross-reference data sets (say, soils maps and deep time climatology models) will probably figure out where the best sites for settlement are going to be after the climate stops warming. Those lands will likely be the sites of intense conflict, because climatic stability and fertile soil will be wealth and power in the future. And some people will know where these lands will be hundreds of years prior to the fact. What will they and their descendants do with that knowledge?

*This other project is closer to the Laundry, although more adventure than horror.

Years ago a light airplane tried to land in the schoolyard of an elementary school near where I was working. At recess time. When the children were there.

The airplane had mechanical difficulties, and the pilot (part-time recreational pilot) tried to land in the open field. Fortunately she ended up in a tree, rather than squashing a few children.
An acquaintance of mine (helicopter pilot) was scathing about her decision of where to land. In his view, part of being a pilot was being ready to crash somewhere that will minimize casualties. He said that if you aren't ready to auger in rather than kill someone else, you aren't ready to be a pilot.

Rather like the truck drivers who choose to head over the cliff rather than hit the family parked in the road enjoying the view…

802:

Re: Greenhouse ... a new spin on greening the high-rise urban landscape - several awards and (so far) no problems.

https://en.wikipedia.org/wiki/Bosco_Verticale

Excerpt:

'Bosco Verticale (Vertical Forest) is a pair of residential towers in the Porta Nuova district of Milan, Italy, between Via Gaetano de Castillia and Via Federico Confalonieri near Milano Porta Garibaldi railway station. They have a height of 110 metres (360 ft) and 76 metres (249 ft) and will host more than 900 trees (approximately 550 and 350 trees in the first and second towers respectively) on 8,900 square metres (96,000 sq ft) of terraces. Within the complex is also an 11-story office building; its facade does not host plants.[2]

The towers were designed by Stefano Boeri,[3] Gianandrea Barreca and Giovanni La Varra. It also involved input from horticulturalists and botanists.[4]

The building was inaugurated in October 2014.'

803:

@Heteromeles (762): I have often thought that you could set up an automated "Climate Collapse Warning System" keyed to real estate prices in middle Canada. Property values rising along the routes north from Ottowa would indicate that certain people "in the know" are quietly preparing for the future (or rather, their descendents future). Dont be surprised if a lot of them are oil industry exec's.

@764: Hmm, that's an interesting idea- providing such people with a "playground". World-building is fun, esp. if it has real world implications. Do you have any idea how you could contact an recruit such people?

@Pidgeon (783): Yes, toddlers. I remember locking up the prescription meds securely using a toolbox and a padlock. I felt very responsible and relaxed- then the next time I needed to access the meds, I discovered they were inaccessible because "someone" had broken off the wrong key inside the padlock. We ended up taking it to a locksmith.

One thing they will probably do is electronic tracking of all kids all the time. And complete 24 surveillance of all areas.
804:

I'm not sure this would work because nuclear magnetic resonance only detects carbon-13. However other techniques could be used in conjunction with MRI. Since my knowledge of NMR dates back to the 1970s I could easily be wrong.

805:

"Yes, toddlers. I remember locking up the prescription meds securely using a toolbox and a padlock."

I used the methods of the late Professor Pavlov, and taught them the difference between "That will piss your father off" and "Really, really, don't do that". It isn't feasible to child-proof a house without locking them in a padded room with no toys or clothes, and then they are liable to kill themselves as soon as they are let out.

806:

Thinking this through, I have to note that even if I am correct that the collapse of conventional agriculture will be solved by means of "Lots of hands and machines turned to the problem" you are still correct that the sites which will be good for it in the future would be valuable. Possibly even more so.

Because imagine for a moment a future in which industrial society does make it through climate chaos mostly intact. Cities armored against storms, rooftops glassed over and growing vegetables, billions of people are now living on hydroponic rice, protein is mostly fish raised in vast tanks, and in the bad years before the infrastructure was entirely finished, cellulose got converted to sugar on a vast scale.

This is a world in which food is *expensive*. Available, sure, but it consumes a lot of everyone's budget, because the total percentage of the population working to keep it so is much higher than at present. And on the Canadian shield, or wherever you can still grow wheat by tossing seeds on the ground. Whoever owns that patch of soil will be rich. Absurdly, staggeringly rich. It's the future equivalent of the Saudi oil fields where oil costs very, very little to extract, while the market price is high.

807:

Pilots are there to set policy -- to tell the autopilots, FBW, and other automation what to do -- and for exception handling. But that doesn't mean those planes can "fly themselves" any more than a Tesla Model S with adaptive cruise control, lane tracking, and other automation features "drives itself".
I'm strangely reminded of discussions elsewhere (probably Peter Watts' blog) about the point of human conscious, given the capabilities of the unconscious bits of the mind.

---

**808:**

If food is expensive in the west it's going to be out of reach in the east. A big factor is going to be population density to arable land and ability to fence off from migrant swarms

The smart thing for countries that are relatively endowed in those areas will be isolationism

The big unknown is what happens to India and China and what are the ripple effects from that. The population of humanity is super concentrated right now

---

**809:**

Actually, areas in Central Canada are already booming, with the whole tar sands debacle. As with other such communities around the world, they're building gated communities, malls, and everything's imported. I'd suggest heading up there on a junket, just so you can describe the ruins survivors trek north through, in yet another "what were they thinking!" chapter. If you don't want to do that, check out Laurence Smith's *The World in 2050*.

Predicting a good site in the future is rather more tricky than heading north, because the Canadian Shield isn't all that fertile, and a lot of it is covered by bogs. People who successfully farm there will have to build the soil that sustains them. On the other hand, Greenland will have increasing amounts of fertile soil in near future (loess from the glaciers), but if they're stupid and strip-mine that rather delicate mineral soil by planting without fertilizing, it will be gone in a century or less. If they're thoughtful and start using that fertility to build the soil, they'll have a bonanza that lasts for millennia, but the few reports I've read show no sign of that kind of intelligence.

Right now, my two choices for good future spots in North America are the Pacific Northwest and the Great Lakes. Note that for both, the transition into the future is going to be rather brutal, with forests dying and the like. At the other end, I suspect they'll become increasingly good places to live, absent the occasional catastrophic earthquake, tsunami, volcano, or tornado, but that's just an educated guess at this point.

The Arctic Riviera will almost certainly develop in the future, but it's not the next Mediterranean, unless you're using a 7th Century BCE map of the Mediterranean. The Arctic Ocean is about five times bigger than the Mediterranean, and given lower temperatures, less sunlight both timewise and in terms of W/M2, and poorer soils, I suspect that future Arctic polities will be more like the city-states and colonies of the early iron age in terms of size (not technology), and the Arctic will never be a bustling, cosmopolitan Mediterranean 2.0. The Antarctic has analogous issues, although a saga of its colonization would also be worth writing.

---

**810:**
Yes, that was my point. In Pakistan, all the copies of the Koran and other religious tracts are in Arabic. When he was growing up, *everyone* rote learned the Koran, then was told what it meant. They explicitly were not taught Arabic so can't interpret for themselves, because the words formed by the letters don't make sense in Urdu or Pashtun. It's partly a means of keeping control amongst the higher classes and the mullahs, who are taught Arabic. I also suspect it is a reason that Islam has had fewer schisms than Christianity over the same time period.

Can you think of any long lived languages that are not liturgical? - there really isn't any other reason to have preserved a continuity of writing over the last millennium other than religion.

811:

_The big unknown is what happens to India and China and what are the ripple effects from that. The population of humanity is super concentrated right now._

I suspect that someone will (if they haven't already) write a novel where someone uses military means to reduce those surplus mouths. Rather like the British government did in "No Blade of Grass".

Baen would publish it, as long as it's China and India getting nuked…

812:

Yes, no & maybe

The firms building the ships thought they were clear, because the USA (North) had not signed the treaty, even though Britain had.

The tribunal, afterwards, thought otherwise …

813:

You are not allowed to do that any more - which is a pity.

I hate to say it, but a child that does something terminally stupid, but is lucky enough to survive, needs a sharp, actual painful physical lesson.

And ONLY under those circumstances, I may add …

Pauses, whilst everybody calls me a criminal child-beater, which is NOT what I'm saying.

814:

Well, in roughly 100 year term, you can see a really big problem in Sherwood and Huber's PNAS paper "An adaptability limit to climate change due to heat stress." The tl;dr version is that the heat index gets so high that the Pearl River Delta (around Shanghai and those fertile farmlands west of it) and most of the crop-growing regions of India get so hot and humid in the depths of the summer
that large mammals won't be able to survive without air conditioning. I suspect the crops won't do very well either.

Both Shanghai and India are getting close to this kind of weather already, and it has been seen in the Persian Gulf and Red Sea, both of which will become seasonally uninhabitable (absent air conditioning) in coming decades.

That's two billion potential migrants right there.

Other places that face the same killer weather include northwestern Australia, Egypt, the Sahara, Central South America including the Amazon, and the American South (not the southwest). The grim irony on that last bit is that the Americans who most strongly believe that climate change is a hoax have the (sub)culture that's most endangered by it. But they are right in that it's not the heat, it's the humidity.

---

**815:**

Nuking doesn't help anyone, though I could see nuclear extortion playing a role. My guess is the people that are doing well pull back, hunker down and hope the rest starve.

Either China and India figure out a way to squeak by or one of them collapses

If either of them collapse the migrant swarm is going to be insane and seriously raise the odds of the other one going under

You could easily have a billion people in motion spilling around Asia and Europe

It's also important to remember that nation states exist for a reasons, economy of scale, diversity of resources and mostly to protect their people from other nation states. , the reason why you are imo not likely to see a "people's republic of Cascadia" anytime this side of a full collapse is it would immediately get gobbled up or over run by California

I don't really buy a full collapse. There is so so so much fat in the western world today that if things are boiled down to essentials, the essentials will get delivered even if the whole system is under massive stress

---

**816:**

No, you're quite right, but I saw that as an advantage. The scientists in that article have demonstrated (a) that it is possible to get a return from single atoms, and (b) to locate the atom giving that return in space. In a diamond lattice, you know where all the atoms are, so you can address each bit by its spatial position, and then see whether you get a return from an atom in that position or not.

---

**817:**

Nah, I just think her laptop needs a breathalyzer key. That and a better work environment perhaps.
BTW, for the curious, the Chrome Extension Blog Comment Killfile works beautifully here and has allowed me to hush CiaD unless I want to see her comments.

---

818:

Migrants from India, China, and the Middle East (and the American South) are going to be going everywhere, with the more educated and connected going for the worldwide diaspora, while everyone else heads north or uphill. As the climate warms, Siberia and the Russian Far East are going to be the scenes of a lot of conflict, given the number of potential immigrants, and it will be interesting to see if it stays Russia or becomes the next China under the Mandate of Heaven, with Harbin as its new capital. In the south, Tibet's going to have real problems, as is the whole Himalayan massif.

This is another theme that SF writers can tackle, the Age of Migrations and the conflict between people struggling to find a place to live and the Nation-State ideology and everything that depends on it (like land tenure, international law, etc.). There's room for a lot of futuristic exploration here, whether or not you want to throw in rogue AIs, mercenaries, megacorps, and cyber implants.

---

819:

*I don't really buy a full collapse. There is so so so much fat in the western world today that if things are boiled down to essentials, the essentials will get delivered even if the whole system is under massive stress.*

We'll agree to disagree, and for everyone's sake, I hope you're right. Perhaps it's because I live in southern California, and I've been inculcated in the idea that any of the big ports on the US west coast can be taken out in about five minutes by a major earthquake, this will eventually happen in all cases (although not at once), and each one (L.A, SF, Seattle) would be an economic disaster for the US that would dwarf the effects of Katrina or Sandy. That's given me this notion that, however we see things as "fat," there are hidden weak points in our system, and when we break the wrong ones (Los Angeles especially), a lot linked systems will shatter, and rebuilding will take years.

---

820:

You know those big storms that involve various regional electrical authorities swapping power poles around?

The year two of those happen isn't going to be a good year.

The first year we get a major agricultural pest not get frozen out over the winter isn't going to be a good year, either.

Just how much warming makes the food supply drastically unstable is an open question; I figure 1.5 C might well do it. But that's not going to be a good year, either.
Complex systems that work necessarily arise in stepwise fashion from simple systems that work. The oft-disregarded corollaries are that the simple system doesn't necessarily remain in the complex system and that the complex system would not have arisen if the simple system sufficed. Complex systems generally do not have the ability to fail gracefully to something simpler, retaining maximal capability as they go. They generally collapse into a big heap of dysfunction.

821:

SFReader 'Underwater civilizations] would have a serious problem developing levers and pulleys since on our Earth's surface those get a huge assist from gravity. . .'

I'd like to think that right now some octopus is using kelp nets as complex as a bowerbird nest to funnel prey into his tentacles. An early-stage underwater society might start from nets and the lasso from kelp fronds the way we started from chimps with pointed sticks.

822:

*Either China and India figure out a way to squeak by or one of them collapses*

If either of them collapse the migrant swarm is going to be insane and seriously raise the odds of the other one going under

Is there any reason to assume that China will not simply machine-gun migrants until they stop coming?

823:

*The big unknown is what happens to India and China and what are the ripple effects from that. The population of humanity is super concentrated right now*

Nope, that's not unknown.

China is heading over the hump into demographic transition stage 4, declining, ageing population with fewer (higher value, better educated) children -- about 70 years behind Japan, but on the same curve. India is undergoing considerable slowing of growth; they seem to be nearing peak projected population.

The real bubble is in Africa, where per-capita GDP has gone from 17th century European equivalent to mid-19th century European equivalent in about 20 years. Within the next 20 years Africa could hit mid-20th century European equivalent ... subject to climate and biosphere issues. And their population is still zooming up: in some countries growth is already slowing, but overall Africa's population is projected to double this century, while China and India will be in absolute decline by 2100.
Actually, several people (including me) think that we probably DID start with nets rather than pointed sticks, but that they have not survived! I could explain why it makes more sense, but it's off-topic. I also don't find the arguments that levers need gravity convincing. The problem with underwater technology isn't at that level, but with the difficulty of moving on to chemistry, metallurgy, or anything microscopic. One can easily see scientific biology up to Mendel and Darwin, but beyond?

Is there any reason to assume that China will not simply machine-gun migrants until they stop coming?

Yes. China in the Cultural Revolution era was crazy enough to go there. But that was then, when China was run by demented revolutionary ideologues: China today is run by technocrats. The next generation of leaders -- the ones who'll face this issue -- are likely to be lawyers and administrators (see also M. Gorbachev) and basically generations removed from the sort of brutal struggle for survival you're attributing to them.

This isn't to say the machine guns won't get used -- but by the time the crisis bites, they'll be no more (or less) likely to use them than the US eastern seaboard or Pacific states will be to use their machine guns against the refugees from the Deep South and Texas.

Meanwhile, here's a nice big yellow card for dehumanizing, demeaning, xenophobia.

When I was looking up some octopus-related info on something else, found these. Disney/Pixar couldn't have come up with a cuter critter. (Both videos are at least a couple of years old. The second is a CNN video and shows how this critter moves.)

Shy Dumbo Octopus Hides Inside Its Own Tentacles | Nautilus Live
https://www.youtube.com/watch?v=pxuBwfNp2wk

'Cute' octopus may be new species
https://www.youtube.com/watch?v=BAuMg2h_sDk

The biggest obstacle to an octopus empire is the octopus reproductive strategy: mom and dad aren't around to teach their kiddies. Plus, octopode tend to be solitary creatures, and have a very short life span (3 to 5 years).
The difficulty with octopodes is that they are distinctly short-lived, and, as far as I am aware, generally solitary creatures apart from mating (and with risk to the male of being eaten). So while they do have interesting intelligence, anything that one comes up with will soon die with it, and aftercomers will have no advantage from it. The magic needs to grant them both longevity and sociability, it seems, before they could get anywhere.

828:

_the Chrome Extension Blog Comment Killfile works beautifully here_

If anyone knows something that will work with Safari…

(I won't install Chrome. Google's policy of forcing updates kills it for me — I need the option of *not* updating until I have spare data capacity.)

829:

And China has just promised $60 billion for infrastructure development in Africa. Would be nice if this improved overall standards of living, reduced warfare incidence, etc.

830:

I might check them out from later in the series, then. I see a lot of HH cosplay at my local convention each year, and it's one of those things where a passionate fandom makes me *want* to like the series.

831:

I suspect I really should sit down and read Gibbon's *Decline and Fall of the Roman Empire* to see what the classics say about how they dealt with migrants on their borders.

As for Chinese politics, good grief have they had a lot. I suspect it's more useful to think that the best parallel for the history of China isn't the history of England, but the history of Europe. The tl;dr version is that I know what demographics say should happen to them, but they've got as many papered-over structural crises as the US does. What I really hope in the short term is that we don't get into a shooting war because some jackass thinks that a short, victorious war will take everyone's mind off of something that they consider worse and/or harder to solve.

Actually, if I knew of better sources for Chinese history, I should probably read up on how they dealt with all their barbarian invaders over the years too.

832:
The Archdruid John Michael Greer is apparently starting a whole new SF subgenre that rejects the main shibboleths of science fiction: the Religion of Progress and the Apocalypse/Star Trek dichotomy. His latest blog post has more: http://thearchdruidreport.blogspot.com/2015/12/the-flutter-of-space-bat-wings.html

833:

Is there any reason to assume that China will not simply machine-gun migrants until they stop coming?

Is there any reason to assume it will?

Where and when has that happened, in history? (Serious question: I haven't researched massacres of migrants. I know of way to many massacres, but they are mostly of the 'invader clearing living space' variety.)

834:

I suspect it's more useful to think that the best parallel for the history of China isn't the history of England, but the history of Europe.

Yup. Just as it's better to think of "Chinese cuisine" as "European cuisine" rather than "French cuisine". And the "dialects" of Chinese are separate languages which share a common writing system. (Calling Cantonese and Mandarin the same language is like calling French and Italian the same language.)

I'll try to dig out some decent reference books for you. If you like audio, the Great Courses series "From Yao to Mao" is a pretty decent overview. Heavy on politics and events, light on ecology, demographics, technology etc — in other words a typical old-school history course — but a useful place to start to get an idea of the political landscape.

835:

We know that the atmospheric oxygen percentage has fluctuated over medium-deep geological time; vertebrates didn't show up on land until it was over 5%, it peaked in the low 20s (up to 24% IIRC) a couple of hundred million years ago, and it's fluctuated in the 15-20% range over the past 60-70 million years; my understanding is that there's a hard limit on our biosphere, imposed by the fact that waterlogged organic matter (trees, humans) will burn pretty much uncontrollably above 30% -- so once you get close to that, lightning or vulcanism induced forest fires become uncontrollable except by geographical barriers and you suddenly get a lot less biomass and a lot more atmospheric CO2.

I would have guessed that too, but it seems currently accepted that Earth's atmospheric oxygen actually peaked around 35%, e.g. Evolution Of The Atmosphere: Composition, Structure And Energy says
According to recently developed geochemical models, oxygen levels are believed to have climbed to a maximum of 35 percent and then dropped to a low of 15 percent during a 120-million-year period that ended in a mass extinction at the end of the Permian. Such a jump in oxygen would have had dramatic biological consequences by enhancing diffusion-dependent processes such as respiration, allowing insects such as dragonflies, centipedes, scorpions and spiders to grow to very large sizes. Fossil records indicate, for example, that one species of dragonfly had a wing span of 2 1/2 feet.

836:

Nuking doesn't help anyone, though I could see nuclear extortion playing a role. My guess is the people that are doing well pull back, hunker down and hope the rest starve.

In "No Blade of Grass" ("Death of Grass" in England) the British government nukes London, as a way of removing a large number of mouths it can't support.

Having just read "Ghost Fleet"*, I dread to think of the 'solutions' the milSF crowd would come up with. But an author who portrays the SS as good guys in an alien invasion could no doubt find a way to justify using nukes to reduce population to a sustainable level.

*Recommended by Brin, so I struggled through the cardboard characters and jingoistic moralism. I must have missed what he liked about it, because ll I got is a disinclination to read any more of his picks in fiction.

837:

The further north you go the less sunlight in total there is per hectare of land and all crop plants rely on photosynthesis for energy input. It may be warm on the Arctic Riviera but don't expect to be able to grow high-energy crops like maize or rice there. I'm trying to think of a high-calorie foodstuff that is a good cropper in high latitudes and failing. We might up being dependent on animals which can eat mosses and sedges; reindeer steaks anyone?

838:

Thanks Robert, I'd always appreciate more sources.

Incidentally, I'm not totally untutored on Chinese history. It's more that I've read just enough to realize how totally fucking ignorant I am on any of the details. Even trying to pull the focus away from the imperial court is hard (at least for books in English), although it's obvious that such books exist in Chinese.

839:
"What units are you using for PPO2? (I'm sure it's standard in saturation diving, but the rest of us haven't necessarily gone there ...)

Bar

0.7 is equivalent to 70% O2 on the surface (which is taken to be one bar). If a chamber atmosphere got to 70% O2 there would be a good deal of shouting and freaking out. Humans have been known to burst into flame at 40% by taking off a synthetic jumper (that crackle sound is tiny sparks)

So divers are generally held at 0.7 bar PPO2 as that's the highest O2 level they can stand for days without coughing up their lungs. Even though the percentage is very low (as little as 2% [*]), the body seems to only notice the partial pressure. (the exceptions to this are heat loss, each breath pulls more heat out of the diver, and work of breathing) The advantage of high O2 level is that you get more window for doing excursion dives to deeper or shallower than the storage depth. Divers are more productive and make more money.

During decompression they're held at that 0.7 and the pressure is taken off slowly at a set amount per day or per hour. The speed slows down as you get closer to the surface. They stay at 0.7 until they get to the point where the O2 percentage equals 25% and then they don't go over that. Fire precautions go beyond extreme to some sort of new level.

* 2% would rarely be the O2 percentage fed to the diver or as the breathing medium in the habitat, but pure inert gas is no longer allowed on site after a couple of nasty accidents where the diver in the water had pure helium sent down the umbilical. Breathing pure inert gas is non habit forming. 2% is enough to support life at the lowest pressures where divers using helium are likely to be working and not enough to kill them with oxygen toxicity at the highest pressures. The trade off is that when you want to increase the pressure inside the habitat without increasing the PPO2, well you can't. In the old days you could just add pure helium. The oxygen pressure stayed the same and the total pressure went up. Now you have to wait for the divers to breathe the O2 level down (time is money) or vent helium (helium is *lots* of money) or play games with the helium reclaim system (which costs money).

---

840:

You could go the other way and see if you can hit ALL the tropes, but do versions of them that are actually excusable. Like doing space pirates etc in Neptune's Brood.

---

841:

Got it, thanks for the clarification. (IIRC you may get the shudders from one particular scene in "Red Mars" by Kim Stanley Robinson. Where a Martian city is sabotaged by ramping the pO2 ...)

---

842:
You know, you're welcome to write me a Lunar 3He mining colony novel ... just as long as you've got some use for bulk quantities of 3He that isn't as stupid as burning them in an unobtainium reactor that we probably don't need because there are cheaper/better alternatives.

(3He forms a Fermionic superfluid below 1 kelvin; surely someone must have hand-waved an FTL space drive that relies on whacky quantum effects in a Fermionic condensate? Ergo, instant commercial 3He requirement in bulk ...)

But how are we to know that she's Better Than Us without the pointless obfuscation and vaguely directed verbal abuse? Come on man, think of the big picture.

I remember 0.5 ata (atmospheres absolute) ppO2 as the limit for pulmonary (whole body) oxygen toxicity. My cross-check is the Project Tektite habitat, which ran on compressed air and was at 45 feet. As I heard it, they chose that depth because it was as deep as they could go in sea water, run the habitat on air instead of mixed gas, and not run into pulmonary oxygen toxicity problems.

Is there any reason to assume it will?

China is governed by technocrats, and this is a purely technical solution to a massive uncoordinated migrant wave?

"maximum of 35 percent"...because big dragonflys

I've read that too and had a good belly laugh.

I think that's more a symptom of the problem of education becoming too specialised than it is a guide to early atmospheric composition. 35% oxygen? pure class A bullshit. I'd invite anyone who thinks otherwise to step into an oxygen tent and light a match. I've blown 36% oxygen onto a burning match and I had purple after images for half an hour. I seriously thought I'd permanently damaged my eyes. Conifers would behave more like Niven's stage trees than anything else.

What *might* have happened is that the pressure might have gone up by 50%. If that happened then the PPO2 could be .35 bar, which as far as the dragonfly is concerned would be like 35%.

Additionally the thicker air would make it easier to fly. Where all that extra nitrogen came from and where it went I don't know. However the counterflow breathing system of the surviving dinosaurs makes me think that they evolved in a much lower pressure environment than the one we have
today. I've seen pigeons flying around (which is very hard work) at an altitude where I was hard
pressed to remain sitting and not fall over. That seems, to me at least, to indicate previous
fluctuations in air pressure.

847:
A technical solution with massive unintended consequences. China isn't softer and cuddlier these
days; but it is savvier and more thoughtful. They're staking their 21st century plans on being the
place for business worldwide, and customers often do not like to do business with mass murderers.

848:
There's one historical circumstance under which I can conceive of atmospheric oxygen hitting
>30%; one in which continental drift brings the continents into a single equatorial or polar
supercontinent surrounded by shallow seas. Interior is desertified (either hot or iced-over -- I think
equatorial is more amenable to this scenario), so there's not much plant growth on land to be
incinerated by the firestorms, and meanwhile there's a lot of phytoplankton pumping out O2 that's
staying near the surface waters.

A second scenario is a future one: Frank Tipler (before he went totally bugfuck) pointed out that the
sun is slowly getting brighter (see also Main Sequence), and a side effect of this over deep time is
that before we lose our hydrosphere to solar UV splitting, we're going to get more insolation -- and
a gradually rising atmospheric O2 level, until life on land becomes untenable.

NB: this assumes that photosynthesis can persist in a high sunlight/high temperature regime, but
AIUI phytoplankton can cope better with global warming than land-based plants.

849:
China will probably resettle its own citizens in Manchuria and Mongolia (both Outer and Inner),
and just divert the rivers North. As for refugees from further South, they'll open (unofficial) safe
passageways into Siberia so that the refugees become Russia's problem. Manchuria alone has about
a quarter of the land area of the EU.

850:
Towards the end of Star Wars (before they did the expanded universe reboot) they had basically
done that. Had an astrophysicist come in, figure out all the technical specs, then worked back
different handwaves to make them work. Neutrino radiators to deal with the waste heat, fuel
restrictions on why some battles weren't as heated as expected, weird low interacting repulsor
particles for antigravity, exponential production curves for clones vs droids, etc etc etc

It was interesting, in an incredibly overthought way.
"0.5 ata (atmospheres absolute) ppO2 as the limit for pulmonary (whole body) oxygen toxicity."

Quite right, it is. At 0.5 you will slowly recover. 0.7 is not particularly pleasant but won't kill you. Given the cost to get divers to site and the money to be saved, "won't kill you" becomes the defining limit. Remember that people are often given pure O2 in hospital for long periods. Much longer than I'd be game to feed it to someone.

You can run an air based saturation dive down to about 80 metres if you really want to. It used to be done in the 60's but it was pretty terrible for a variety of reasons which added up to not making as much money so nobody does it any more. The high percentage of O2 in air isn't an issue, you just let the divers breathe it down to something reasonable. I'd say Tektite chose 45 feet because they didn't want to pay the money to do it right. Doing it right includes being able to get sick divers to hospital under pressure the whole way. At 45 feet you can put someone on pure O2 for a couple of hours and get them out. You'd probably even survive a direct ascent to the surface from saturation at 45 feet. Sure beats having a helicopter with a built in habitat and a hospital with a saturation habitat as far as cost goes.

These kinds of whacky things are always being done. Everyone wants to re-invent the wheel every time. The industry worked out that there's no point in a 45 foot saturation 50 years ago. If you want a diver on site for 8 hours, feed them 50/50 nitrogen/oxygen from the surface and bring them up at the end of the shift. Of course no-one would do that anyway, they'd feed them air and just change divers after 100 minutes. Divers aren't all that productive beyond 2 hours anyway. Get them doing something useful on the surface, swap the surface support crew into the water and Bob's your uncle.

India is undergoing considerable slowing of growth; they seem to be nearing peak projected population.

But, they have another problem, their ridiculous shortage of women & the treatment that the remaining women are getting, right now.

The Delhi bus rape is the tip of a very nasty iceberg - & it's getting worse. If they don't do something about it (Including dowry murders as well) they are going to go under before the Chinese do.

Funny, isn't it, that again & again the treatment of women as sub-human seems to get ignored - until it's too late?

[See also similar issues in GB, where the "authorites" are far too namby-pamby about it, for fear of being labelled "racist"

Gah]
err..
Tiananmen Square?
Or was that the "previous lot" ???

854:
"There's one historical circumstance"
Yep, I agree. Of course Tatooine and Hoth aren't compatible with giant dragonflys.

855:
Re: Climate change ... food crops
Is there a specific reason for not considering mushrooms as the potential go-to food crop when/if climate change hits? They're loaded with protein and vitamins, fast growing, grow in damp dark places, versatile as a food, decompose readily, make excellent fertilizer, etc.

856:
One point: hospital patients on oxygen are usually suffering from pulmonary incapacity and their blood oxygen saturation is being measured -- if it goes below about 90% they're in trouble, so supplementary oxygen is supplied. Stuff that can cause this ranges from acute carbon monoxide poisoning to lung diseases, both chronic (emphysema, terminal lung cancer) and acute (pneumonia). They're very unlikely to end up saturated, except in unusual circumstances -- hyperbaric therapy is occasionally used for some conditions.

857:
Oh, the dragonflies were real enough -- but attributing them purely to a high pO2 seems a bit dubious. (I'm wondering what the most recent thinking on the subject is?)

858:
Ahhh, I was wondering if this would show up. I claim my 5 Yuan, you're from the expected clique.

Time For Tea.
It's also totally false.

Hint:
This reports the usual guff about only males singing and linking it to mating, both of which are incorrect.

Both male and female whales can vocalize but only the males produce these loud, long and complex melodies within the humpback whale species.


But, Science:

Humpback vocalizations, including the complex and wide-ranging “whale song” performed by males, typically have an audio frequency between 80 and 4,000 hertz (Hz). But the newly described pulse sounds were found to have a significantly lower frequency of around 40 Hz. The low limit for human hearing is 20 Hz. (See "Can You Hear Me Now? What Whale Ears Have That Ours Don’t.")


December 7th 2015

Paper:

During studies of humpback whale song and social sounds in Hawaii, bouts of low frequency (ca. 40 Hz) pulses were periodically recorded. One example was made near an active group of eight adults (included 22 bouts, 2–13 s long, over 90 min); another close to an adult male-female pair (12 bouts, 9–93 s long, over 22 min). The mean peak and center frequencies (39 to 40 Hz) and bandwidth (13 Hz) were similar in both, but the organization of the pulses differed. Song components, social sounds, bubble trains, or other species do not provide a ready explanation for this sound.

http://scitation.aip.org/content/asa/journal/jasa/138/5/10.1121/1.4935070

Hint:

Females sing, but (ironically) at much lower frequencies.

So, three things:

1) While I understand your position and claims about my scientific understanding, and your desire to undermine my "credibility", you're dealing with out of date information

2) Don't walk into Bear Traps. Greg has an excuse, you do not. Especially when I know where you're from. *sniffs the sulfur*

3) The joke about men not listening to women is preserved

How's St. Petersburg, товарищ?
1 deg C has already happened, 2 is almost certain, so can we hold it below 2.5 is the question.
No.
You're being Human again.
CO2 effects temperature 50-200 years (complex discussion here) after it is released.
We're @ 400+ ppm atm, so.

This is one of those topics where I'm actually (weee!) a scientist.

So 19th Century British respect for international law was basically "No violations on credit, but for cold, hard cash, anything goes!"...?

At its heart, the Empire was a Commercial Entity (c.f. City of London, nutmeg, East India et al).
To stop slavery they spent something like 40% of total GDP in a year to buy everyone off.

If you want to judge effectiveness, then I’d suggest that this had better results than the American 'solution'.

Ah, and Mr. Man.
Yes, you totally just got eaten by a Grue.
7th December 2015.
Timing and everything...

You're not even close to being that good, although I'm happy to move into real shows since the puppetland theatre style is so 'in' in Moscow at the moment.
A slightly less polite warnings since you missed the friendly Leopard Seal metaphor.

Got it backwards, I think.
Here's the short reference: You can read Peter Ward's Out of Thin Air, where he postulates that variations in atmospheric [O2] were critical in the evolution of different phyla. He's not the only
one saying this, and it looks like most of the relevant papers came out in the 1980s and 1990s, just at a quick glance.

The Carboniferous (~350 million years ago) was supposed to have much higher [O2] than today, and that's when there were giant insects. The Triassic (~250 million years ago) indeed, the whole Mesozoic, was supposed to have had proportionally lower [O2] than today, which is why dinosaurs evolved with bird lungs, and birds have better lungs than mammals, which evolved in the Permian under higher [O2].

Still, the Carboniferous probably had more oxygen in the air than today, the early Triassic (ca 250 million years ago) probably had lower [O2], and there's no reason to think [O2] is constant over deep time.

The Carboniferous had a lot of split-up continents and ice caps, almost exactly as we see today. It was the carboniferous because there were a lot of plants growing in a lot of coastal swamps (which goes with having a lot of coast). What that world was missing were termites and wood-rotting fungi, so a lot of dead trees ended up being buried in swamps, where it rotted slowly if at all. That's the coal that powered the industrial revolution, and which gave the Carboniferous its name. The conventional story is that somehow (and this is where I'm starting to get confused), with the carbon getting buried, a lot of oxygen ended up in the air, with [O2] getting up to 35% (they all know that things burst into flame at that point, so it's generally considered to be less). How the plants managed to produce a tremendous amount of atmospheric oxygen while the carbon ran down is something I don't quite understand, but that's the story.

Conversely, the P-T extinction event (leading into the early Triassic) happened on something that was pretty close to Pangaea, so a hothouse world with pretty much one, large continent, and an enormous Large Igneous Province. The story there is that this fat LIP (the Siberian traps) burned through a bunch of carboniferous coal, dumped a huge amount of CO2 into the atmosphere. Adding insult to injury, ash from the volcano possibly also fertilized the ocean, which was probably warm, layered, and anoxic in deep waters. This hypothetical fertilization may have spurred the growth of methanogenic bacteria, which further added to the atmospheric hell, dropping early Triassic [O2] to about 15%, making it impossible for anything with a mammalian lung to live in high mountains, and spurring the rise of anything that had a more efficient breathing apparatus, such as dinosaurs and crocodile ancestors.

The problem is, if you run this scenario by other paleontologists (I tried it with Darren Naish at Tetrapod Zoology years ago), they'll tell you that Ward's reconstruction of Earth's atmosphere is pure BS, at least for the Mesozoic. The general problem is that there's no direct measurement for historical [O2] in the fossil record, so you have to rely on measurements of other chemicals in the rocks and modeling. The model Ward depended on for his story was apparently wrong in at least some details, if not in total. I'm not sure if there's a better answer, or whether the giant dragonflies breathe high [O2] is totally discredited or still accepted, but I'm starting to get lost on the part where photosynthesis splits water into hydrogen and oxygen, and then doesn't use that proton to fix some carbon, because the carbon isn't available. Something's weird here.
No, that's investment.
Totally different games.

Serious answer?
Quantum stuff with structure and pulmonary functions (not that insects have a heart).
This is a serious answer.
I will produce the paper once Greg has shouted "BOLLOCKS" at me enough.

I thought that a 35% O\textsubscript{2} atmosphere was surprising too, but if you search the last 25 years with Google Scholar for Permian oxygen atmosphere there are a quite a few references to 30% and up. I went through 5 pages of hits without spotting a challenge to that apparent orthodoxy or getting the sense that it was particularly controversial.

In fact I found this experimental paper [Burning of forest materials under late Paleozoic high atmospheric oxygen levels](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3695684/) that examines the idea that 35% oxygen is incompatible with forests. It seems that land based plant communities could survive such conditions based on ignition and fire-spread experiments with forest materials under enriched oxygen.

I won't provide the killer paper yet, but a teaser to the puzzle:

5. Paradoxically, though, DGE results in a comparatively high water loss for a given metabolic rate in insects compared with other organisms. Thus, the pattern itself may not have evolved to limit water loss under xeric conditions. Rather, variation in the components of the DGE cycle, which has formed the foundation for much debate concerning the ecological and evolutionary advantages of this gas exchange pattern, may have evolved to do so, accounting for associations between these components and environmental conditions.

[Discontinuous gas exchange: new perspectives on evolutionary origins and ecological implications](https://www.nature.com/articles/513664a)

You'll find that moisture (all dem swamps n all) has a large part to play.
Oh, wait.
Apparently my biology is non-existent[tm].

It's because of:
1) High Temp (relative to weather)
2) High Humidity
3) High Oxygen Levels
4) Wings / Leg joints working in really fucking kinky ways (both for spiders and insects, but only a minority of insect paths used it)

#4 is where you find the new Science. Hint: it's brand spanking new (2012+).

I suspect not many noticed it's publication, but hey.

---

868:
well migrants from the American south will just move to some other part of america. There will be some disruption but a lot of americans move every year on their own
You may well see China expanding northward, but I'm not sure where the indians are going to go
It's actually more like 3 billion people then two billion if you count south east asia
I am a little confused how 4 degress centigrade turns into "i cant live in texas" though, seems like you would need more like 10 degrees C to get that effect?
I'll read your book on of these days...

---

869:
You might check F W Mote's Imperial China 900 to 1800. About 1000 pages to cover 900 years. It has several chapters on each dynasty. Typically, a chapter on the history of the dynasty, a chapter on the bureaucracy, a chapter on the arts (poetry, painting, literature, etc). Not necessarily an easy read, with a lot of unfamiliar names being thrown at you. After that you could look into the Cambridge History of China, but that is ten volumes or so now, and is not complete.
If you want to look into science and technology Needham is the standard source, but that is about 15-20 volumes now, and not complete. For you the six volumes of Part 6 would probably be of most interest.
Enjoy!
Frank.
870:

Haven't you heard of The Dust Bowl and the Okies? At that time California police departments ran anti-Okies checkpoints. If it gets as bad as some postulate, it will be national guard and barb wire.

871:

You're probably right.

The essential problem with the heat stress is that Sherwood and Huber used an exceedingly hot model, and I'm not sure the world will actually get as hot as they propose. Then, as a friend pointed out, parts of the world are already in that range (on the coast of Iraq this year, in coastal Sudan in the record books), and Shanghai came extremely close to the death zone in 2013.

So my guess is that the future will be somewhere between Sherwood and Huber's model and what we have now, which is less than comforting, because we don't definitely know who will get stuck in the death zone or how long it will last.

So far as the wet heat goes, it looks like Alabama, Mississippi, and Georgia are in the cross-hairs for the US, more than, say, El Paso.

872:

Hetero is doing an epic job, and is correct, but:


Compare with


And other places.

46°C is your "trees can no longer exist". (NASA has a handy chart of where vegetation is precluded by temperature)

40-44°C is reaching Dubai (current) standards. Which are problematic for human survival.

However, the real issue is ecological.

Aquifers etc take 40k+ years to develop. (LOL - try millions)

They also only exist due to geology and biomes locking water in.

It's more a case (c.f. California) of the "one shot" issue we have with fossil fuels.

Once they're used up, and the conditions to create them no longer exist, you're never going to see them again.
So, it's more a case of triage. Unlike the Sahara which has a 28k cycle (based on axial tilt of the Earth) that replenished its aquifers, no such mechanism exists (largely due to the pinch effect between N / C / S America) in the West.

~

Basically, you're fucked.

873:

I am a little confused how 4 degress centigrade turns into "i cant live in texas"

4 C is the change in the global average temperature relative to the baseline. (It can pay to check what's being used as the baseline; not everybody publishing on climate uses the same one.)

Both "global" and "average" are important there; different regions warm in different amounts, and if the average goes up it means the excursions go up more than the amount the average moves.

People are automatic endotherms; the metabolic heat engine runs at a stable temperature, and it runs continuously. Core temperature is 37 C. Surface temperature is 34 C. It's essential that you can shed heat; if you can't, you overheat and die. We shed heat by sweating. So if it gets too hot, eventually we can't sweat enough. "How hot?" is a function of "how humid?", because the effectiveness of sweating is a function of how humid the air you're sweating into is; the more humid, the more water it's got, and the less it's inclined to accept more.

So if the local weather goes over 34 C at saturated humidity for any length of time and you have to be out in it, you die. ("34 C wet bulb temperature" is how this is traditionally measured. 34 C is the surface temperature you're rejecting heat from.) It can be rather hotter than that as a thermometer temperature and survivable as long as the air is dry (and you have no shortage of drinking water); there's a complex curve involving how well people can shed heat based on both temperature and humidity that defines the effective temperature for metabolic purposes.

Given current Texas weather, and it having come near that 34 C wet-bulb habitability barrier already, there's an expectation that picking up another 3 C (for a total rise from baseline of 4 C) will lead to temperature excursions over that 34 C wet-bulb temperature.

If your air conditioning holds, or you have a deep cave to hide in, or similar, you can survive weather like that, but you must have those. There's been a study done about cooling people (rather than the volume of their environment) and one of the conclusions was to the effect of "not naked under a fire hose in a hurricane".

874:

OH, and you Americans.

Hug each other. Social exclusion is little boy land.
The real issue is that the Elite in Britain have four examples (yes, four) of the hoi poloi rising up and creating blood baths.

You have a myth about defeating an Imperial Power all alone (France and local tribes are perplexed) and your Civil War was two opposing Elite Factions.

So, yeah.

It's gonna be messy.

875:
Thanks Frank!
Frank (L)

876:
For the Mogwai / Younglings:
REKT.

Also, a lesson in temporal propaganda and mimetic weaponization [c.f. Reddit discussions, over-use of "Humpback" and "male" only singing, prepared and used today].

We're only allowed to use 'historical' sources, but we're still faster.

That should inspire some confidence (and yes, "ANONYMOUS" hacking Japan for Whaling, total cover move last night).

p.s.

That Iceland shit was gold though.

877:
I should probably just read Heteroneles book but why do we hunk the American south is going to be black flag territory again ? 4degree c is not going to get you there need more like 10C

878:
* Rolls eyes *
That 4 celsius rise? Is a *global average*. Some places get hit far worse than others. And sometimes the rise is less than 4 celsius, and sometimes more -- much more.

The problem with the US south is that the 4 celsius *average* rise translates to several days a year when it spikes to 10 celsius above normal. And when "normal" is 34-35 celsius with high humidity, that means spiking to 45 celsius with humidity. *Which is lethal.* Lethal to humans without air conditioning; also lethal to trees and vegetation. It means the currently-fertile areas end up with rapid desertification as perennials die off, and anyone who isn't protected from the heat will be killed, and there'll be periods when it's unsafe to work outdoors.

---

**879:**

Herp Le Derp.

[http://droughtmonitor.unl.edu/](http://droughtmonitor.unl.edu/)

Hint: 2008-2014 Texas was in the red.

Water isn't a static entity, it's either in aquifers or H.S.S. storage. It also (unlike fossil fuels) evaporates under temperature.


2020 - 2050 Texas isn't going to be just red, it's going to be bright fucking royal purple.

Buy a tent. And some white robes. And introduce some Worms.

---

**880:**

So it basically comes from climate models that are trying for a pretty fine grained prediction of both humidity and temperature rises a hundred years in the future

I like my models as much as the next man but i wouldn't buy real estate based on that just yet

That's also the first I've heard that high humidity is lethal to vegetation

---

**881:**

2) *Don't walk into Bear Traps. Greg has an excuse, you do not. Especially when I know where you're from. *sniffs the sulfur* *

If I trap Greg Bear, should I demand a short story before letting him go?

---

**882:**

*That's also the first I've heard that high humidity is lethal to vegetation*
Not sure you understand how biology works.

Try growing a cactus in a humid CO2 rich hot-house, see how that goes. [Evolution: "I am 12 and what is this" again]

But yeah, you're essentially trolling right now with reference to climate models. Just linked you real data.

Fun Fact: Mogwai and Pacts / Contracts / Covenants. We're allowed to break them if (and only if) our kind will get hurt.

Which, *ahem* Whales, Mimetic Warfare and Anti-Terrorism fall under in this case. [Hint: Japan PM Hack].

Sooo.

Ho-Hum.

Options, always keep your options open.

---

883:

*So if the local weather goes over 34 C at saturated humidity for any length of time and you have to be out in it, you die.*

Yeah, you're going to want to avoid that.

I was in Salt Lake City about a year and a half back, allowing me to enjoy their lovely 36C summer weather. But there was basically zero humidity the whole time and as long as people stayed hydrated it wasn't nearly as bad as you'd think from the thermometer.

Let the humidity go up, as in Florida, and things get much worse surprisingly quickly. Then again, sea level rise will probably put most of Florida under water. Problem solved, maybe?

---

884:

I'd go for the hug and subtle manly slap to the bottom, see how it goes.

Depending on physique / gender, go for a beard rub and gentle forehead knock.

Disclaimer:

Rule #1 Be attractive
Rule #2 Don't have a better beard (c.f. J. Scalzi on meeting T. Hanks and removing beard)
Aaaand before Tumblr.
No, not serious.
But it would be a better world if you hugged more. Don't go for the bottom pat, that was satire.
Non-Sexual hugs?
Moar plx.

Just don't break down and cry about how novel X was the most important moment in life story Y and how it totally made you rethink the world and now ideology Z is everything to you.

That's weird. And totally beyond the remit of an author.

And if you've sent more than a single email and haven't got the pull for a reservation at the Dorsia, just accept it's never going to happen.

Oh, and Mogwai.

You'd be surprised at some things.

---

Given your preferences for ecology, start with The Retreat of the Elephants:

http://yalepress.yale.edu/book.asp?isbn=0300101112

Winner of the Stanislas Julien Prize sponsored by the Académie des Inscriptions et Belles-Lettres in Paris

This is the first environmental history of China during the three thousand years for which there are written records. It is also a treasure trove of literary, political, aesthetic, scientific, and religious sources, which allow the reader direct access to the views and feelings of the Chinese people toward their environment and their landscape.

Elvin chronicles the spread of the Chinese style of farming that eliminated the habitat of the elephants that populated the country alongside much of its original wildlife; the destruction of most of the forests; the impact of war on the environmental transformation of the landscape; and the re-engineering of the countryside through water-control systems, some of gigantic size. He documents the histories of three contrasting localities within China to show how ecological dynamics defined the lives of the inhabitants. And he shows that China in the eighteenth century, on the eve of the modern era, was probably more environmentally degraded than northwestern Europe around this time.

Indispensable for its new perspective on long-term Chinese history and its explanation of the roots of China’s present-day environmental crisis, this book opens a door into the Chinese past.
Mark Elvin is professor of Chinese history at the Research School of Pacific and Asian Studies, Australian National University, Canberra. Author of The Pattern of the Chinese Past and other works, he has taught at Oxford, Cambridge, Paris, and Heidelberg, and been a visiting research fellow at Harvard.

887:

"I've blown 36% oxygen onto a burning match and I had purple after images for half an hour."

Conversely, my anecdotal data point is on the opposite side of the graph. I have experimented extensively with an oxyacetylene welding set at all possible mixture ratios trying to find some set of conditions under which I could get it to ignite off a cigarette. (It would be far more convenient when welding in a contorted and awkward position to be able to relight an extinguished torch from the cigarette which is already in my mouth, rather than having to uncontort and wriggle out of position to get at a lighter.) Frustration at total lack of result encouraged me to progress to silly things like jamming the nozzle of the torch into the filter of the cig and blowing pure oxygen through it. It glowed a noticeably brighter red and that was the most I could ever get it to do no matter how I rang the changes on relative or absolute concentrations.

888:

Reading between the lines, unofficially acknowledged to be a mistake. Not everyone involved had blighted careers, but much guanxi was expended dodging the blame.

One of my least-favourite shibboleths is the idea of a monolithic Chinese government with population marching in lockstep. The Chinese political system is as decentralized as the American one, with power blocs and disagreements within the Party — the main difference is that these aren’t widely reported, especially in the English press.

889:

"...not naked under a fire hose in a hurricane"

One of the difficulties with motorcycling is that the practice of encasing your entire body in thick leather to prevent large scale skin and flesh loss if you fall off also effectively prevents heat loss even in weather a fair bit cooler than Texas. When urban conditions deprive you of the forced convection available at speed it can get pretty horrible.

I have seen at least one set of photos from someone who lined his gear with coolant pipes like a whole-body Detritus helmet. I'm not sure what his heatsink was. A bucket of ice strapped to the back of the bike perhaps. These days you could use Peltier coolers and fans for a less cumbersome version. The bike's electrical system can power it while you're riding; when you're not, or for people who don't ride motorbikes, a battery pack of sufficient capacity to easily last between charging points isn't too bad these days.
A more elegant version though rather more difficult to make would use an absorption cycle powered by solar heat collection (come to that, all aircon ought to be able to do this). You could have an automatically tracking parabolic reflector to concentrate the rays onto the absorber mounted on your helmet; Detritus would love it.

890:
I'm honestly not sure what plants do at high wet bulb temperatures. Yes, plants do die when they exceed their heat tolerance, which varies by species. It's not clear why high humidity should matter, because outside really wet habitats, plants normally have a problem with too little water, not too much.

I do know that I grew prairie plants in a greenhouse that I could only work in for about 10-20 minutes at a time (it was ~40oC and humid), and they showed no harm from it. The problems with high heat are well known.

891:
Thanks Robert!

892:
And here we have the problem with a Dune-style still-suit. Really, the fremen should have had silver parasols, silver suits, and jumping stilts.

893:
You can totally build a cooling suit, yeah. And living somewhere where it gets hot and humid, I can totally comprehend the impulse.

During the concerning kind of temperature excursion, they become like a pressure suit in space; if it fails, you die. Consider the poor souls in emergency services who are going to need these things, another ten or fifteen kilos of kit under the firefighting suit. Or EMTs on ambulance cooling umbilicals, or, well, it's not a fun thing to contemplate.

894:
@Elderly Cynic #805: Actually, within the paradigm of behaviorism, you aren't supposed to rely on punishment, even Skinner remarked on that.

@Heteromeles #809: Well, there's another idea shot down. Who knew that the road to paradise would be littered with ruins? Anyway- I'm glad to hear about the Great Lakes, since I live next to one. Wouldn't it be funny if London, Ontario, became the next seat of an empire? It could be a lot
worse than you imply, however, if several million US refugees start trying to move into the area, under the mistaken impression that there is food to eat. I think it unlikely that the locals will be numerous enough to defend themselves- so that "Arctic Riviera" might start looking pretty good, or at least the shores of Hudson Bay. What you might see is a chain reaction of population movements, not unlike Europe after the fall of the Roman Empire, except with population decline instead of increase.

Not exactly a happy, upbeat story with a heartwarming ending.

895:

Best way for humans to survive in one of these new black flag zones is probably to retreat underground during the worst parts of the day. Hobbit holes for the win

If it really does become a major thing those areas are too big and valuable to permanently abandon, will probably be some major cultural adaption

896:

They're not valuable areas if you can't grow food there.

Which is pretty much guaranteed by temperatures in those ranges.

This is one of the things that makes predicting where might have good agriculture in a hundred years pretty pointless; we don't know where the deserts are going to appear, or what that does -- it does something -- to the weather patterns and an already really tough job collapses into chaos.

Of course, "can farm in a hundred years" isn't really relevant; it's the year nobody can farm anywhere that's the pressing challenge.

897:

They start teaching about the numerous people who helped us win the Revolutionary War in elementary school and never stop. If they haven't learned it in school, then Assassin's Creed III sets them straight, but then they get all kinds of funny notions about the Templars. (Are their Templars? You would know, right? Give us a few hints.)

I am not sure about the elite factions in the Civil War. I imagine the Northern elite would have preferred to slowly crush the South "peacefully." Open war with the South invited the wrath and possible intervention of their natural allies, who must be said did the right thing despite some strong economic incentives to get proactive. Plus the Northern elite did not like free "white" people all that much; so why would they want a whole new class demanding their tiny piece of the pie.

Unfortunately you cannot stop "certain" members of the middle classes from having unrealistic ideals and scaring the already paranoid plantation owners. On the other hand Bismark made the whole thing much more cost effective and less socially disruptive by thoughtfully driving boat loads of new troops to our shores each month.
I remember when the English used to complain about Americans hugging too much. I think it was last year. Maybe we came off as cuddly and sweetly dreamy because Canadians always played us on the BBC. But certainly G W Bush had a problem with personal space and unwanted contact.

By the by, I never thanked you for helping me realize how many problems I have understanding time!! :) I still don't do time very well, but at least I am aware I have a problem and that's half the battle right there, don'tcha know. Anyhoo, I should let you get back to your epistemological warfare and what not. But remember you have to dress in layers and take a scarf.

---

898:

I beg to differ, there are plenty of predictions about the spread of deserts. The problem is that they're in the technical literature, so you need someone on the inside to let you know where the good stuff is. Even the IPCC 5 physical basis includes a lot of this information, out to 2100 CE or so.

---

899:

"In fact I found this experimental paper"

In which we discover that wood with 23% moisture content (20% is considered to be well dried seasoned wood) is non-flammable in air.


Really? I mean really? Is that really what they wanted to say?

They do say that fire in pine needles spreads 3 times faster. They also say that at 35% O2 wood that's non-flammable in air burns as well as wood that's been baked in a kiln (no wood exposed to normal air gets down to 2% moisture, wood is hygroscopic)

They also say that wood at 61% moisture (double what they say saturated dead wood would be) is non-flammable in 35% O2, just like well dried wood is in air.... We know from experience that well dried wood burns just fine in air. Perhaps wood that has been soaked in water (which is what 61% wood would be) is just as flammable at 35% O2 as well dried wood is in air. For some reason they didn't test wood at 30% moisture.

Then having shown all that, their conclusion is the exact opposite of their results.

---

900:

There are indeed plenty of predictions. I'm not inclined to think they're going to be especially accurate predictions.

They have to get the climate shift right for rate and extent (very tough; not managed yet, not clear we've found all the variables and feedbacks yet) and then they have to get the consequences of consequent deserts right (exceedingly tough; not much in the way of examples, and look what a little bit of dust from the Sahara out over the Atlantic does!). I don't have any confidence that the
models are even close to good enough to pick where you're going to be able to farm eventually. (Or that any such place will already have appropriate dirt.)

Agreed that people are surely going to try.

901:

I agree with your points, to some extent. The areas I'd pick for good agriculture have endogenously good soils, so you don't have to depend on imported dust for fertility. The basics of where deserts are located is fairly simple too: it's where transpiration + evaporation exceeds moisture inputs.

Classically, this is where you get some combination of the Hadley Cell plus mountain rainshadow effects. The models now create Hadley Cells as emergent effects of their inputs, so I'd put some confidence in them saying that Hadley cells are moving north--but that's a northward movement of only a few hundred kilometers. They won't shift to Canada or 45oN, for example.

What does get weird is that the tropics outrun the deserts, so our successors might see a desert bracketed on both north and south by tropical forest. The northern tropical forest will consist of garden escapees and unlikely survivors, but there you have it.

902:

That was 40% of annual government expenditure, NOT 40% of GDP. It was more like 4-5% of GDP. In scale it was like the Obama stimulus package - big but not that big. It went to paying off the slave owners, who were in many cases part of the British ruling classes themselves. Slavery was never that big a part of the British economy and happened a long way from England. So the British aristocrats didn't make much of a sacrifice.

In contrast, slavery in the US was a much bigger part of the economy and slave plantations were the backbone of the economy of the Southern United States. Southern plantation owners were among the wealthiest men on the planet and enjoyed their lifestyle. Even if they were willing to be bought out the price would have been far more than Northern taxpayers were willing to pay. And Southern slavery was efficient and unlikely to fade of its own accord. Some things need killing. And in the end I go with Lincoln:

"Yet, if God wills that it continue until all the wealth piled by the bondsman's two hundred and fifty years of unrequited toil shall be sunk, and until every drop of blood drawn with the lash shall be paid by another drawn with the sword, as was said three thousand years ago, so still it must be said 'the judgements of the Lord are true and righteous altogether.'"

Anyway, it's not like the Brits were all that squeamish about racking up a body count for profit. Less than a decade after freeing the slaves (at a profit) they were happy to starve out a million Irishmen and drive out a million more. Not to mention the mess they made of India or the millions more who died in famines there.
If most of the US is livable climate wise, that should be manageable. The United States has a much better track record than the European Union and the only people who object to helping out regions in need are from the deep South itself - kind of a self solving problem. Taxpayers of New York are a lot more willing to help out people in Alabama than Germans are to help out Greeks.

Of course, a lot of those deep South refugees are likely to be cranky in their new homes because they won’t be in charge. There might be stories there.

Seconding the part about the American Revolution. My teachers also pointed out we needed French support to win and that a lot of the colonials remained loyal to the crown.

I am a little confused how 4 degrees centigrade turns into "i can't live in texas" though, seems like you would need more like 10 degrees C to get that effect?

4C would make some summers a bit unreal. About a decade or so ago there was a summer where it was over 100F/38C for something like 45 days in a row. Bump that by 4C/7F and being outside gets really really hard.

5 or 6 years ago I was in the area for a week when it was over 100F each day. It was dry enough you can be outside and do light activity without AC. It was a vacation week for me next to a lake and you could spend the day outside if you had plenty of water. But any kind of real work would put down most people. Hard. Do the 4C/7F bump and people would be dying. And outdoor work would shut down except for emergency purposes.

What does get weird is that the tropics outrun the deserts, so our successors might see a desert bracketed on both north and south by tropical forest. The northern tropical forest will consist of garden escapees and unlikely survivors, but there you have it.

If we continue to get climate banding, yeah. If we get the unbanded circulation patterns that have been seen some of this year, we get an Oligocene-style desiccation of the Mississippi and odd coastal belts.

Not what I'd bet on, but not impossible.
Plus not all moisture in trees is created equal. Many pine trees have a sap that is more of a fuel than a fire suppressant.

908:

*Let the humidity go up, as in Florida, and things get much worse surprisingly quickly.*

If you're near the Mississippi River from north of St. Louis down to the gulf in many ways you already have the Florida humidity. It's not just the deep south in the US with issues. I grew up mid way between St. Louis and Memphis. We would talk about breathing water in August.

909:

If you're heading for great lakes in the centre of continents, you'll probably want to avoid the Aral Sea. I wonder how Lake Baikal is going to hold up? And the Road of Bones will probably lay down another layer. The Black and Caspian seas have some nasty people with guns around them. There's a lot of water, rivers and lakes in Russia but some hard landscape and borders to get to them from outside and especially from China, India and SE Asia.

Migrating out of India on foot is really hard. Doing it with a Jeep or a Toyota Flatbed isn't much easier and it's not going to work because you won't be able to get fuel. I can well imagine Pakistan, Myanmar and Nepal shutting the borders and China shutting the 3 17,000ft passes. Escaping by boat, even coastal hopping, is not easy with nowhere really to go. The Indian sub-continent looks like a pressure cooker to me. Stick a lid on it and watch it blow.

If mankind's migrations end up colonising the arboreal sub-arctic forests, how long before they cut them all down for fuel and poor quality agriculture?

So, this future where we're all fucked. We haz it. But how far away is it before things really come to a head? I still don't know which generation of my descendants get to watch the FLIEGENDE KINDERSCHEISSE!

910:

Don't believe you, not on previous form

911:

Ah magic "quantum stuff", yeah.

And, yes I do know about Geckoes ....

912:
No in one respect
The Sahara does emphatically not have a 28k-yr cycle based purely on axial tilt.
Read Brian Fagan on the subject - "the Long Summer"
Incidentally, he also covers the back-&-forth climate & therefore "botanical" changes on the edge of what is now Syria/Turkey

913:

WRONG
Peasant's revolt - maybe / yes
The two/three civil wars of the 1640-1688 period?
NO
Entirely led by ultra-protestant middle class, suspicious, especially given 30 years war at the same time, of autocratic catholic power
Four?
( "daddy, what are those for?"
"FOUR?"
)
cough

914:

"Mogwai" are a "Scottish post-rock band" it says here.
WTF are you wibbling about now, assuming you are sober?

915:

Today's news for those who think Moore's Law had reached its limits:

"N3XT high-rise chips are based on carbon nanotube transistors (CNTs). Transistors are fundamental units of a computer processor, the tiny on-off switches that create digital zeroes and ones. CNTs are faster and more energy-efficient than silicon processors. Moreover, in the N3XT architecture, they can be fabricated and placed over and below other layers of memory.
...
"When you combine higher speed with lower energy use, N3XT systems outperform conventional approaches by a factor of a thousand," Wong said."

Which nicely complements the work IBM announced with its proof of principle CNT stuff at the 1.8nm node (we are currently at 12nm).

So not only are we probably going sub-nm but we will be getting 3D stacking tech as well.
At a guess, I would say that for a given cost we still have a factor of about 10,000 increase in
performance to come over the next couple of decades. Which means petaFLOPS performance on a desk (or in a phone maybe).

916:
Mangroves?

917:
I think the umbrella term you're looking is chronic obstructive pulmonary disease (COPD). Not uncommon at all in the elderly and the reason why many people get oxygen therapy at home. Silicosis and asbestosis are common underlying conditions. Light-based sat readings are unreliable and you really need oxygen-challenge blood tests periodically. It is not unusual for COPD patients to have become habituated to low sats for many years before diagnosis. My (at the time) 88-year-old grandfather wasn't picked up till he passed out in the garden one day, and his GP had only just allowed him to renew his driving licence. He'd become habituated to around 80%. Most people pass out below 85%.

Therapy is usually enabled via an electric concentrator with 2-3 cylinders as a backup for power outages. In Queensland there are fully-state-funded packages available that supply all of these (if the power is off for more than a couple of days you call an ambulance).

Oxygen concentrators are interesting pieces of kit. They rely on substances that absorb nitrogen under pressure. Air is pumped into the chamber and pressurised. The O2 enriched air is pumped out and into the patient's nose via a cannula. Then the pressure is dropped and the nitrogen is released to the ambient atmosphere. The cycle isn't that different in frequency to normal breathing.

918:
Yes, I thought that little bit of bathos would stir the pot.

You're more than likely correct, I was teasing (actually I was being savagely satirical, but there we go). Is Trump still Trolling? [the answer to that one is more complex than on first poke]

_Are their Templars? You would know, right? Give us a few hints._

Well, recently there was a Swedish man who thought there were who ended up swallowing a lot of guff about "Cultural Marxism" and was awfully organized about his application of theory. Apparently playing WoW unlocks an achievement that grants access to military grade explosives. He certainly got his notions from somewhere. Oh, wait, sorry: total 5GW lone wolf, apparently Sweden grows military grade explosives on trees.

(And, of course there are: _you get shiny medals and everything still_ Torygraph link).
Or you could try the [Masonic and Military Order of the Red Cross of Constantine and the Appendant Orders of the Holy Sepulchre and of St John the Evangelist](http://www.sciencedaily.com/releases/1999/07/990712080500.htm)

*The Sahara does emphatically not have a 28k-yr cycle based purely on axial tilt.*

Oh dear.

Yes, it's dependent on things like the Congo being tropical rain forest (past tense), but you're very much mistaken.

*The resulting loss of the Sahara to agricultural pursuits may be an important reason that civilizations were founded along the valleys of the Nile, the Tigris, and the Euphrates. German scientists, employing a new climate system model, have concluded that this desertification was initiated by subtle changes in the Earth's orbit and strongly amplified by resulting atmospheric and vegetation feedbacks in the subtropics. The timing of this transition was, they report, mainly governed by a global interplay among atmosphere, ocean, sea ice, and vegetation. Their research is published in the July 15 issue of Geophysical Research Letters.*

http://www.sciencedaily.com/releases/1999/07/990712080500.htm

1999.

There's been work done since, it's largely sound.

*Don't believe you, not on previous form*

Play *Waking Mars*, it'll give you some hope about the younglings.

http://www.tigerstylegames.com/wakingmars/

Or just watch some videos of it. [Youtube Let's Play](http://www.youtube.com/watch?v=SomeVideoID) (Note the ethnicity of the main protagonist, and the name of the video's author. Both are comments)

---

**919:**

*we don't know where the deserts are going to appear*

Don't we?

I would have thought that studying (re. B Fagan reference earlier) previous climate cycles & even say 4-10 million year back, pre the ice ages, looking at vegetation cover would give you a very good idea as to what conditions are going to be like.

I can see Geologists salaries going up!

---

**920:**

Og Greg, you're awfully easy to prod.

Yes, four. Go back a bit. Popularized on the Beeb atm.
For discussions about %humidity and plants, please think a little more holistically or ecologically. Higher %moisture allows lots of other uglies (notably fungi) very favourable living conditions.

Greg knows this, he's just being distracted at the moment.

921:

And ... a lot of slavery in the Brit EMpire had already gone, by attrition & "Nibbling"
No slavery in Britain from 1772
No slave-trading in Brit ships from 1807/8
Thus, effective end of slavery, except S Africa & W Indes from then on - what little there was went into steep decline.
W Indes "merchants" (slaveowners) like the antebellum S of USA were very rich, formed a strong pressure group & very vocal, but 1808-1832/3 they were fighting a rearguard action - they knew that slavery was going to end, eventually.
As you say, the remainder were bought off.

Note:
With the end of trading, in 1808, the slaveowners HAD, whether they liked it or not, to start treating their human property a little better - no resupply.
Though as G Macdonald Fraser points out in the "Flasaman" series, this did not entirely stop trading to the USA.

922:

And later... err NO
It is quite deliberately forgotten (because it's so much easier to blame the Brits) that 1847-48 were appalling years for harvests across the whole of Europe, it was NOT "just" Ireland.
That is not to say that amazingly incompetent & short-sighted admin decisions (c.f “Trevelyan”) were made & that it could have been handled a lot better, but it was not deliberate.
Ditto "India" where serious attempts were made to alleviate famines - the people who did best at it as local administrators got promotions & medals, which tells you that "The authorities" were aware that they had a serious problem on their hands.

923:

DON'T BELIEVE YOU
I think you are trolling. Chapter & verse, or I'm just going to ignore your nonsense, or until you start taking in PLAIN ENGLISH

924:
That sort of depends on the climate and the relative humidity. The warm and wet places usually indicate high-set, lightweight structures that catch breezes and don't offer thermal mass to store heat.

Northern Australian and Southern US architecture of the late 19th and early 20th century are the main anglosphere examples. Timber houses on stilts.

Geo-coupled, high-thermal-mass structures are traditional only in drier places, but work here too (I'm a fan). Modern solar passive design will utilise this formula, but also provide a reflective, insulating, lightweight outer layer to keep the sun off the thermal mass.

925:
Mogwai are also creatures in https://en.wikipedia.org/wiki/Gremlins and a quick check on Wikipedia also confirms that the band are named after said creatures.

926:
De Excidio et Conquestu Britanniae

The Works of Gildas and Nennius, London: James Bohn — English translation PDF via Google Books - not sure this link will work, and probably has some terrible tracking stuff attached.

927:
You know that 1337ish stuff like "N3XT" in the same sentence as an acronym like "CNT" makes for inevitable pronunciations that take too much away from the general message. Because some of the sentences are unintentionally humorous. Or intentionally, who the far Kinnell knows.

928:
Maelgwn Gwynedd

Last hint. You were warned to go back a bit.
And for those keeping score, I did just link in the Irish Potato famine to %humidity.

In 1845, the summer weather in Ireland suddenly changed to a very wet and cool climate—the very conditions needed for Phytophthora infestans to infect the potato crops.


The summer of 1845 was especially wet, with high humidity – ideal conditions for the spores of the blight to develop on the leaves. Persistent rain then washed them into the soil, where they infected the growing potato tubers.


Fun!

experimented extensively with an oxyacetylene welding set at all possible mixture ratios trying to find some set of conditions under which I could get it to ignite off a cigarette

Forget mixture ratios; did you adjust the flow rate right down? A stream of cold (because expanding) gas is a great way to blow out a flame, especially if it's travelling fast enough to carry the heat away before the local volume can reach ignition temperature. Hint: fuel/oxidizer ratio isn't the only thing you need to control to achieve ignition.

More pertinently:

According to Chinese tradition, mogwai are certain demons, which often inflict harm on humans. They are said to reproduce sexually during mating seasons triggered by the coming of rain. Supposedly, they take care to breed at these times because rain signifies rich and full times ahead.

https://en.wikipedia.org/wiki/Mogwai_%28Chinese_culture%29

*nose wiggle*

(Although I'm also using the term to refer to something else).

No arguments there; my point was that there are at least 3 possible meanings of "mogwai" which relate to very different pieces of legendary and popular culture, so without clear context your meaning can be lost.
I'm assuming that high humidity and temperature will shut down transpiration eventually? Make it very difficult for diffusion to drive gas exchange through the vascular bundles?

The Peasant's Revolt and the similar Kett's Rebellion were middle class. Peterloo was working class.

I once spent a month in Tokyo after a summer heat wave ended -- while I was there it was averaging 35 celsius in the daytime. I could cope, with hydration. But the week before? It hit 40 celsius routinely, and joggers were dropping dead in the streets from heatstroke.

Ahem -- there were three or FOUR civil wars in the 1640s alone! You're thinking of Englandshire, which got off lightly with just two-and-a-bit (and then the thing in 1688). Go as far as 1745 and we can add in two more.

The British isles, circa 1635-1745, were not somewhere I'd have wanted to go into the home insurance underwriting business.

Anyone who works in the NHS has annual mandatory fire lectures which always include details of fires involving cigarettes and oxygen. Usually these are due to saturation of bedclothes with oxygen which are then ignited when the patient removes the mask or tube and then brings the lighted cigarette close to the oxygenated cloth. It's enough of a real problem to have extensive risk assessments.

E-cigarettes are now also causing fires in the same way.

http://www.eastcheshire.nhs.uk/About-The-Trust/policies/D/Domiciliary%20Oxygen%20for%20patients%20who%20are%20known%20smokers%20and%20or%20users%20of%20e-cigarettes%20ECT2071.pdf
"Actually, within the paradigm of behaviorism, you aren't supposed to rely on punishment, even Skinner remarked on that."

Sigh. I said that I used Pavlov's methods, and I meant that I used Pavlov's methods. I ensured that the first mistakes they made of potentially lethal or permanently damaging classes were under secretly controlled conditions so that they were painful but led to no permanent harm. Probably now illegal, as someone says.

939:

That "joggers dropping dead from heatstroke" thing is certainly an exaggeration. 40C and higher is not at all unusual here, nor is 80% or higher relative humidity (at the same time). Yes, this does make things problematic for the elderly and people die from complications. But healthy people who stay hydrated don't have a problem.

940:

"Try growing a cactus in a humid CO2 rich hot-house, see how that goes."

May I choose a Rhipsalis?

Yes, you are quite right about the reason that humidity is a problem for plants. One of the standard myths propagated by our transpondian friends is that we can grow XXX (let's say citrus) in the UK because much of the UK is in USDA zone 9. Yebbut, the relative humidity at ground level can remain at 100% for weeks, or even months, and a frequent cycle of short frosts (to damage plant cells), damn-all light (preventing growth) and very high humidity is heaven for fungi, bacteria, phytophthora and similar organisms.

I don't know if any vascular plants can survive cell temperatures of over about 45 Celsius, but there are a fair number that can take 50+ Celius air temperatures with if they have some access to water and there is SOME potential for evaporation. And there are plenty that are happy with 100+% humidity at anything up to 35 Celsius. Above 50 Celsius at very high humidity, I would expect the bacteria from hot springs to rise up and overthrow the invaders that replaced them as the world's dominating life forms!

I do find the quoted humidity figures for the USA puzzling, and suspect that they are being reported differently from what they seem to mean. As someone says, 40 Celsius at 100% humidity is death for humans in 8 hours or so. The response that people die there from heatstroke doesn't make sense, because that means death for everybody without artificial cooling, not just the first deaths. Even the White Man's Grave is not that bad, and was (and is, without air conditioning) a LOT more lethal. From vague memories of second-hand information, 30% of people from the USA and Europe had to be invalided out after mere days on those grounds alone.

941:
Exaggeration? Two deaths were reported in the newspapers while I was there. (Hint: it was north of 80% relative humidity -- more like 100%)

942:

Erm. Wood doesn't spontaneously burn in air unless the heat source is sustained for some time. Even with dry wood, lighting a log on fire is tricky without an accelerator or manipulation of the wood to make it more exposed to oxygen.

The conclusion in the paper is that in a high O2 environment, fires would have been relatively frequent, but wildfires much rarer. Trees would have burned relatively easily, so developed fire resistant traits, plus the fuel burden of deadwood etc would have been much lower due to regular fire cycles. The large carbon deposits are most likely tied to naturally fire resistant wetland areas that would have a large fuel burden which dried out in periods of drought and made the wetlands vulnerable.

It's like Australia, which has had a dry climate for so long that the majority of species are evolved for a fire rich environment. Provided the fires are frequent, the trees themselves don't actually burn because the fire doesn't stick around long enough to ignite the trunks, while the seeds heat germinate. The fires today are far more severe because the fuel burden accumulates over time and a highly reactive fire service traditionally stamped out the little fires that would clean out the deadwood. Ironically the big fires that follow are so intense that the trees themselves start to burn, and it burns the seeds as well instead of heat germinating them.

The overall conclusion was that a 35% O2 level would not have been inimical to the development of forests, which is borne out by the presence of lots of carbon in the ground, meaning lots of stuff was growing then.

943:

A quote from that same Trevelyan:
“the greatest evil we have to face is not the physical evil of the famine, but the moral evil of the selfish, perverse and turbulent character of the Irish people.”

And a quote from Churchill, who refused to release shipping to bring aid to India:
"Starvation of anyhow underfed Bengalis is less serious than that of sturdy Greeks."

You can see how people who were notionally British subjects (and in Ireland's case at the time, ruled from Westminster) might feel aggrieved by these attitudes in their governments.

(An aside: there's circumstantial evidence of that old saw that the Ottoman Sultan had to be persuaded to reduce his donation to Irish famine relief so as not to embarrass Victoria being true.)

944:
"I am a little confused how 4 degrees centigrade turns into "I can't live in Texas" though, seems like you would need more like 10 degrees C to get that effect?"

In comment 679 Graydon linked to an interesting set of graphs. They showed that temperature ranges flattened out as the average temperature rose. The range of temperatures grew. The outliers on the cold side got very slightly colder, or stayed similar, while the outliers on the hot side moved twice as much or more. So if that trend continued, yeah, 8 C increase in the hottest days could happen. I don't think that would be the end of life for well protected humans any more than lethal temperatures in arctic towns means everyone dies. However poor people in poor countries would all die. They're not going to be well protected. Of course most agriculture can't exist at those temperatures. Stock dies, crops wither. Austin hit 47C. Add 8 to that and you get to 55C. People will live through that with airconditioning. I was in Delhi when it hit 47 and reports at the time said 5000 people had died.

945:

*the Pearl River Delta (around Shanghai and those fertile farmlands west of it)*

A nitpick, and one that doesn't affect your point. I've been out on the Pearl River Delta a handful of times and can assure you that it's nowhere near Shanghai, being the area of Hong Kong. Macau and Shenzhen among others.

Did you mean the Yangtse?

946:

One of my non-SF Shibboleth's, Moore's law is about the number of transistors you can cram into a given area, rather than the "performance" of a device. In general, these do not scale linearly with each other. We may get a ten thousand fold increase in transistor density over the next few decades, that doesn't necessarily mean a 10K increase in performance.

Furthermore, Moore's Law as initially posited was that the density at which a transistor was cheapest would roughly double every two years. The result is cheaper integrated circuits that could do do more. A win-win. Yay. It's really about the cost, not absolute density.

One of the current worries about integrated circuits is that while we may be able to come up with exotic new technologies that can shrink the size of transistors, the cost per transistor will actually go up. In which case, the original formulation of Moore's Law is broken and you won't get ten thousand times as many transistors in your phone twenty years from now.

Moore's original paper.


Which brings me onto my SF Shibboleth, The Singularity, along with computronium and associated tropes. Projecting current photolithography trends N years into the future is effectively handwavium magic and leaves me cold.
Slight thermodynamic digression, flipping 1 mole of computronium bits at 20C costs you around 1.2kJ at the Landauer Limit (the theoretically minimum energy cost per bit flip). Assume that computronium bits have an atomic mass of 55 (iron), if you convert the Earth to computronium you end up with $1.2 \times 10^{26}$ moles of the stuff. Doing a bit of arithmetic, if each bit is flipped once per second on average, the surface of the ComputEarth would be radiating $3.5 \times 10^{11}$ W/m^2. A tad warm that.

[first post!]

---

**947:**

Ah yes, Gildas.
Also Geoffry of Monmouth & Giraldus Cambrensis ...
Completely unreliable & full of "miracles" though not quite as full of romantic bullshit (highly enjoyable romantic bullshit) as Morte d'Arthur

---

**948:**

Depends on how you want to keep count, I suppose ...
There were lots of extreme punch-ups during that period, over which religious & which "business" faction would control all of the countries.

---

**949:**

OTOH, you can grow citrus in a frost-free environment (i.e. a minimally-heated greenhouse, with min temp of 4C ...) in the UK.
But, being in a greenhouse, you are also directly controlling the water-supply
I should know, since my Indian Limes (yellow not green) are doing quite well....

---

**950:**

Trevelyan was a somewhat bigoted ultra-protestant, which didn't help ....
( i.e He'd "gone native" & joined the third side in the perennial 3-way Irish fight, that represented toady by people called, for example: "Paisley" )
IIRC Churchill's comment was during WWII, when it was thought we had, err.. other problems.
Not that I approve, I hasten to add.

---

**951:**

"It's really about the cost, not absolute density."
No, it's really about processing power for a given cost. And, almost all of the interesting future applications are parallel processing oriented.

Landauer Limit does not apply to reversible computing (which is also a "post Moore" technology sitting on the back burner).

952:

Thus, effective end of slavery, except S Africa & W Indes from then on ...

That "except in..." is doing an awful lot of work there, since the West Indies is where most of the slavery in the British empire was, and certainly the most brutal forms (e.g., sugar plantations). Circa 1780, for example, the slave population in the British West Indies was roughly equal to the slave population in the N. American colonies.

... what little there was went into steep decline

Really? Kenneth Morgan's Slavery and the British Empire (p.18) gives the slave population in the West Indies in 1830 as 685,000, up from 489,000 in 1780. That's hardly a "steep decline".

(And slavery in territories under the control of the East India Company was permitted until 1843.)

953:

Absentee landlords had been extracting ~1/4 of Ireland's GDP a year for the previous century. Any Irish industry got disabled by the English Parliament (see: the Cattle Acts, the Woollen Acts, the Corn Laws). Ireland exported food throughout most famines of the century and a half leading up to the 1840s famine. This is what being a colony means.

Trevelyan wasn't special.

954:

Welcome!

Doing a bit of arithmetic, if each bit is flipped once per second on average, the surface of the ComputEarth would be radiating $3.5 \times 10^{11}$ W/m²

Yeah; that's why the more sensible prognostications of the singularity fan-crowd don't make computers with the minimum achievable ratio of cooling surface to volume -- Matrioshka Brains (hollow free-flying Dyson swarms of tiny-ish lumps of computronium, PV-cells for power on the sun-facing side, radiators to dump waste heat on the outside) are more plausible, FSVO "plausible".

955:
Until a few months ago the man in the apartment next to ours was only staying alive by using oxygen, because he had destroyed his lung capacity by smoking. He was still smoking; we would hear him shouting at his wife because she wouldn't buy cigarettes for him (though she bought them for herself). We worried about having to evacuate our cats in a hurry some night. It was a huge relief when he moved out.

He was scary in another, quite different way: He and I are within a year of the same age, but he looked at least ten years older. Thank the gods my adolescent experiments didn't lead to my acquiring that particular vice.

956:

"In fact, there is no known limit to the efficiency of reversible computing."

957:
OK, I agree with you here. Gildas and Geoffrey of Monmouth have absolutely nothing to do with the original claim of there being "four" cases of "the hoi poloi rising up and creating blood baths" in British history....

958:
The original conservatories were precisely to keep plants like citrus alive over the winter (hence the name), and you don't need heat unless it gets very cold. Most citrus can take some frost, and do in many places they are grown commercially, and a few can take quite a lot; the key is keeping them dryish over winter.

959:
Back in the 1950s, I first read Kipling's story "William the Conqueror," in which two British people in India fall in love in the course of working on famine relief. I was particularly struck by Kipling's description of the people in the famine area turning away from the relief effort to die—because they were rice eaters and they had been provided with wheat. Or swapping a basket of wheat for a few handfuls of spoiled rice.

960:
As you say, people misquoted Moore's law to be about clock rate, but that ceased increasing in 2003 because of heat problems, which is why the solution since then has been increasing parallelism. I
agree that Moore's law for silicon doesn't have long to go, and my crystal ball fugs over when I try to look beyond that.

961:

"Absentee landlords had been extracting ~1/4 of Ireland's GDP a year for the previous century. Any Irish industry got disabled by the English Parliament (see: the Cattle Acts, the Woollen Acts, the Corn Laws). Ireland exported food throughout most famines of the century and a half leading up to the 1840s famine. This is what being a colony means."

The last sentence is nonsense. There were plenty of well-run colonies in both the British and French empires. Like all forms of government, colonialism can vary from being excellent to being appalling, with a bias towards the latter. Ireland was one of the worst.

962:

To sum up: Moore's Law is dead but computing power for a given price will probably continue increasing exponentially for decades. Using tech that is already in the labs, and discounting any further discoveries/inventions. Not even mentioning graphene.

963:

My BBC reference was to The Last Kingdom (BBC) which is about the formation of the British nation. (It even, rather oddly, has a real witch in it: 100% a Morgan le Fay reference). It's fun, just don't entertain notions of historical accuracy.

Slightly later, but related: Alþingi.

Peterloo Massacre

But anyhow:

Back in the Welsh borders, however, there was an uprising of the local peasantry, and Mortimer and Hereford were forced to return south to deal with the problem.[27] Edward marched to Cirencester in December, preparing to invade the Welsh borders

The Despenser War 1321-22

But if you want technicalities over class disposition (real hoi-polo, not small opportunist revolts during periods of 'anarchy'), of course we reference The Enclosures:

One of their targets was yeoman farmer Robert Kett who, instead of resisting the rebels, agreed to their demands and offered to lead them. Kett and his forces, joined by recruits from Norwich and the surrounding countryside and numbering some 16,000, set up camp on Mousehold Heath to the north-east of the city on 12 July. The rebels stormed Norwich on 21 July and on 1 August defeated a force led by the Marquess of Northampton that had been sent by the government to suppress the uprising. Kett's rebellion ended on 27 August when the rebels were defeated by an army under the
leadership of the Earl of Warwick at the Battle of Dussindale. Kett was captured, held in the Tower of London, tried for treason, and hanged from the walls of Norwich Castle on 7 December 1549.

Kett's Rebellion

Midland Revolt 1607

My honour and chastity defended from TrollHood, I shall wander off.

~

Totally unrelated:

Wikipedia is using artificial intelligence to get more actual humans writing articles Wired - 1st Dec 2015

Not that Wikipedia hasn't already been having issues of this matter owned by others.

---

964:


We're basically milking the last incremental improvements out of performance gains; it's now taking up to 5-7 years between lithography scale steps, rather than 18 months, and stacking circuit tracks deeper is going to add to the cost linearly with number of levels and run counter to the other established trend of reducing power consumption in a near-exponential (Koomey's Law).

What we might see is the cost of fab lines at the ultimate lithography scale begin to drop. For a while they also went up in line with Moore's law (cost of each line doubled from the previous, 18-24 months earlier) but once we've hit the limits there's no reason to suppose that the equipment vendors who supply them with workstations won't try and cut costs/streamline, so that it'll eventually be possible to buy a 3.5 nm fab line for not very much money (tens to hundreds of millions rather than tens of billions or dollars). But that's going to be the final climax move of the existing chip foundry industry. By which time we'll be paying as much attention to it as we paid to improvements in steam locomotive design in the 1950s (when those fascinating jet-things were showing up in the sky).

---

965:

But healthy people who stay hydrated don't have a problem.

But many don't. In many ways you feel more comfortable at 105F/40C than at 90F/32C in a dry situation. At 90F/32C you're sweating but it doesn't evaporate all that quickly and you get all sticky and realize how hot it is. At 100+F/38+C your sweat evaporates so fast you don't get uncomfortable until you go too long without drinking. Then you suddenly have big issues. This is what takes out joggers.
I've sat outside in 105F in Texas for a few hours at a time and been fine. But I was drinking the entire time. And my skin was dry. I've also tried to work outside in a moderate to high humidity when it was over 100F a few times and that just didn't work. You're drinking constantly and your clothes are wet. Since it was for home projects I just gave up and went inside to do something else. Not every one has that choice.

966:
"and stacking circuit tracks deeper is going to add to the cost linearly with number of levels"

No, for the simple reason that much of the cost of the chip is not adding layers but the fab cost, which has already been paid no matter whether it's 1 or 9 layers. You really think a 12nm node chip with 1 layer is 1/9 the cost of one with 9?

"...But that's going to be the final climax move of the existing chip foundry industry."

Not really. 3D layering, chip stacking, wafer scale integration, self aligning carbon nanotube transistors, reversible computing...

967:
Are there exceptions to colonies being run as extractive economies for the benefit of the colonial power? Because that's what I meant; that Ireland's value was solely what primary productivity Britain could get out of it.

968:
100% just means it's going to rain - and isn't generally uniform in so that heteromeles' black flag applies. It's a question of drinking enough water, and it's dehydration that will have seen to your joggers. But that's an education issue rather than a problem with the climate per se. Which is sort of what I was getting at.

969:
This is only wrong on 2 counts:-
1) You can get 100% RH without it raining (for example, in fog or mist).
2) You can get rain at ground level without having 100% RH; You only need 100% RH at the altitude where the condensation forms rain drops.

970:
Jogging increases core body temperatures much like any other major exertion and that may have been a factor in their collapse.
I've been out and about in 40 deg C temperatures in Tokyo, standing around and walking slowly with about five hundred thousand close friends queueing to get in to a Summer Comiket. I drank a lot of water in the couple of hours it took me to get into the airconditioned Big Sight building but I wasn't even uncomfortable as my sweat evaporated immediately.

971:
I like Kipling but I'd take his interpretation of the famine with several grains of salt. I'd be more trusting of Amartya Sen on the subject of famines.

972:
Yes. Condensing atmospheres are common the UK, but at low temperatures; anywhere where clean, highly saturated air drops in temperature will get them to some extent. I have once had water condense on my skin when cycling with completely clear air (no fog, mist or drizzle) - a very weird experience. At high temperatures, that can mean a hot, muggy, but bearable day becomes a cooler but unbearable night.

973:
Yes, lots. In most of the British Empire, more money was spent on infrastructure, education etc. than was extracted (only a few were actually profitable) - and, despite claims, the north American colonies were treated fairly favourably. That doesn't mean that thee government was exemplary, of course.

974:
You're correct of course. Thanks.

975:
That aspect is well-documented - indeed, I have seen lesser forms of it. Communities and individuals vary on what they will regard as food, even when starving and given something as food.

976:
Eventually, transpiration will be shut down, yes. But without high humidity, transpiration would shut down even faster due to loss of turgor pressure in the supporting cells due to water loss. The messy part is that plants have to have their stomata open to get CO2 in. Losing water through stomata is a necessary and negative consequence of that, and plants put up with that, just as we lose
water vapor when we exhale. The problem is whether having high humidity is a good thing or a bad thing for a plant at high heat, because they'll have more access to carbon with less water loss and fewer nutrients coming up out of the roots, but with heat stress. How does that all work out?

I don't know much about the molecular physiology of heat stress in plants, but I do know that, even when I was in grad school, the mechanisms for dealing with it were turning out to be more complicated than researchers thought they would be. Setting up black flag weather in a greenhouse is a really straightforward experiment, albeit one that's dangerous to run, and I keep hoping that some botanists will run the experiment with a bunch of species, just to see what happens. In this case, the biggest hurdle is the safety protocols for the RAs and grad students running the experiment, not for the plants.

977:
"There were plenty of well-run colonies in both the British and French empires."

Well-run for whom?

When the epidemiology of malaria became better understood at the end of the nineteenth century, for example, the colonial government in Sierra Leone could have built up a strong public health system that would have protected the population as a whole.

Instead, they chose to build homes for colonial administrators in the hills above Freetown, which they reasoned were too high to be within range of the Anopheles mosquito.

978:
Host has already noted the snark which I've been good enough not to further point out. i.e. England not Britain.

I referenced a time when there were five Kings vying for power, when Briton vrs Saxons was the issue, pointed to the Welsh one for a reason (since I do count the case within the Despenser Wars as valid, although I'd concede that it's entirely within a framework of two Elite groups fighting) but was being oblique enough not to rub noses in it.

But since pressed, I presented a case that satisfies all conditional: England, Class Revolt vrs Elites, indisputable (e.g. two or three or four Civil Wars after James I/VI's execution?).

With sources.

It's me being a leopard seal without being rude.

Your opinion on the success rate is your own.

979:
Mangroves?
Yep. It's worth realizing (or remembering) that there are fossils of mangroves from the Eocene in the London Clay. If we go full hot Earth, in a few thousand years London Sound (where the Thames and southeast England used to be) will likely be a mangrove swamp of some sort, or at least have the climate for it, whatever's growing there. If the Paris talks fail, perhaps Kew should start a mangrove greenhouse in preparation?

980:

It's always worth double-checking reports of 100°F/40°C and 80%+ relative humidity, because that's actually in record-breaking territory for heat stress, and it does get reported in the international news when it happens (as in the Persian Gulf last summer, Shanghai in 2013, and that miserable Sudanese airport that set the record a whenever the record was set). The critical question is whether the two numbers were measured at the same time and place or not.

981:

"""There were plenty of well-run colonies in both the British and French empires."

Well-run for whom?"

For the local inhabitants, even if you exclude those that had settled since the colonisation. In both empires, there was a significant proportion of the population in many colonies who did not want independence.

And you seem to have confused malaria with typhoid, or perhaps cholera. If there really were a way for a public health system to reduce malaria significantly, I suggest that you tell it to William Gates III. And please note that I was born and lived in West Africa round about 1950.

982:

If there are any non-miserable Sudanese airports, things have massively improved since I was last there.

983:

"... reports of 100°F/40°C and 80%+ relative humidity ... The critical question is whether the two numbers were measured at the same time and place or not."

And the second one is how long that lasted for.

984:
So I understand the link to the NASA research. It effectively says the bell curve for temperature variances is flattening at both ends and the average overall becoming hotter.

They are not making any statements that some latitudes are heating more than others to the contrary they seem to be observing this in all latitudes. They are also not doing any modeling just stating what they have observed.

So if you are in an area that is close to black flag today you might actually hit it, especially in an extremely hot year.

If someone has data that indicates the actual average temperature increase caused by global warming is more centered on hotter latitudes I would be interested in that. Anecdotally what I have heard is if anything that the reverse is actually observed and that the poles are in fact warming faster than the equator.

I also seem to remember that the last time geologically the earth was this warm the temperature was remarkably uniform with only 10c variation from pole to equator.

985:

You might also be surprised to learn that the % of the populace who are not fit and healthy is greater than 0. Moreover, these people are generally the ones who can't afford decent air con and a place to live that is designed for the climate.

986:

‘... dropping early Triassic [O2] to about 15% ...’ I've heard that fires cannot be sustained below about 15% O2 – which is why smothering a fire with a blanket or putting a lid over the flaming saucepan works.

890: ‘I'm honestly not sure what plants do at high wet bulb temperatures. Yes, plants do die when they exceed their heat tolerance, which varies by species. …’

Sounds like a topic for a grad thesis ... BTW, in my neck of the woods the local TV gardening experts keep ‘reminding’ folks to not overwater. The soil here is very clay-y.

896: ‘Of course, "can farm in a hundred years" isn't really relevant; it's the year nobody can farm anywhere that's the pressing challenge.’ – Canned foods – processed and stored on some type of reasonable schedule?* Once it's been harvested (i.e., dead) as long as you can protect it from the elements – esp. O2 and H2O – the food stuffs will retain their nutritional value for quite some time. Foods ‘preserved’ in oils can really last long such as oil-packed sardines canned over 30 years ago which, BTW, are currently fetching very high prices indeed. More critical is saving and protecting seed for the future. (* This would even appeal to Fundies: rehash/update of the Joseph 7-fat-cows-followed-by-7-lean-cows-Pharoah’s-dream story.)
937: E-cigarettes are now also causing fires in the same way. – Good grief, how – ethylene glycol coating – but you’d surely still need a spark to start the fire?

Re: Heat stroke/black flag …

Here’s the headline for Japan heat stroke deaths in 2015: age range affected is infants ‘through’ (not ‘only’) 80+ year olds.


Isn’t part of the problem that people drink only water (H2O) and what the body needs is more (or a different mix of) salts/minerals in such weather? Apart from a mid-60s US Army article, can’t find any scientific research on this. (Truly a magnificently stupid situation this if climate change is heading toward increased black flag weather.)

987:

Canned foods – processed and stored on some type of reasonable schedule?

You appear to have confused "farming" with "eating". Hint: a year when farming crashes everywhere is a year when, even if we've got stockpiled canned goods, we're going to be f***ed the following year because all the stockpiled seeds went into the ground and died the year before.

988:

I'm not sure the temperature math supports a simultaneous global farm crash. What you are likely to see is staggered regional ones, where regions either get unlucky or where operating at the edge of crops tolerances

Of course there is another set of math around humidity, rain and soil...

989:

"No, it's really about processing power for a given cost. And, almost all of the interesting future applications are parallel processing oriented."

Linking density to individual transistor costs are what Moore's law is about.

General purpose processors, DSPs, memory, I/O controllers, etc... are currently all made out of transistors at the moment. The cost of the individual transistors affect the cost of the devices. If a new process costs you more than twice as much to make twice as many transistors, the resultant devices will be more expensive. Parallelism is neither here nor there. That is unless you can invent a new magic parallel compute architecture where doubling transistors more than doubles device performance.
I'm not up to speed on Reversible Computing, though I gather it's far from practical at the moment. Reversible Computing is about decreasing energy expenditure rather than transistor density, I'm not sure what your point is bringing it up in relation to Moore's law (WRT computronium, fair enough). Given that we are quite a few orders of magnitude away from the Landauer Limit at the moment, I don't think we'll see much on that front for a while yet.

990:

New formula oral rehydration salts

A new formula for oral rehydration salts (ORS), has been released by the World Health Organization. The new formula ORS, a sodium and glucose solution, is widely used to treat children with acute diarrhoea. Since WHO adopted ORS in 1978 as its primary tool to fight diarrhoea, the mortality rate for children suffering from acute diarrhoea has fallen from 5 million to 1.3 million deaths annually.

The new improved formula is the result of extensive research sponsored by WHO's Department of Child and Adolescent Health and Development and supported by the United States Agency for International Development (USAID). The latest study was conducted in five developing countries among children from one month to two years old with acute diarrhoea and dehydration.

WHO

Product page: 

http://www.h2ors.com/ors-science/

Another competing product, using same tech:

In 1960, American chemist Dr. Robert K. Crane discovered the sodium-glucose co-transport system. Crane noticed that the body's absorption of glucose was dependent on sodium.

Thus, when glucose is present in the small intestine, sodium is absorbed more quickly. In turn, the sodium draws additional water into the bloodstream. The right ratio of glucose and sodium in a solution can accelerate the rate at which water is absorbed by the body.

Crane's discovery was put to use in 1968 by a research team in Bangladesh led by David Nalin. Nalin's group fashioned a crude version of ORS, mixing electrolytes, sugars and water that proved effective in treating cholera-induced dehydration. The small field test found that an “oral solution containing glucose and electrolytes helped reduce the intravenous fluid needs for 80 percent of adult cholera patients.[ii]” It was a breakthrough discovery.

http://dripdrop.com/history-ors/

You won't see many improvements barring in specific clinical treatments. i.e. if patient is on chemo, if patient has X syndrome etc.
Nope - I'm saying that if you can forecast it, then you should be preparing for it. My response remains: can and stockpile foods on a regular basis to see humanity through the lean years. At present, it is estimated that something like 30% of all food in the US is thrown out. IOW, we have more than enough food hanging around to begin proactive food storage.

Welcome!
Thank you. I've been lurking for a bit.

Thanks - amazing stuff this!
Definitely needs some awareness building among gen pop folks (like myself). In fact, this should be the new consumer product for Coke/Pepsi. Also - this suggests that companies specializing in mining/processing and manufacturing these products would do well financially, therefore franchise opportunities.

I'm sure the US military has a pretty sizable stockpile of MRE's and things, if you wanted to ramp that up, it would only take money.

A fair amount of stuff thrown out is canned food that has hit its expiration date. I rotated through my earthquake supply this year, for example. First time in a while.

That said, you're right, we should be stockpiling more food.

There's a bit of a problem with that, though.

The problem is that we've got more mouths to feed, and less farmland of less quality to feed them on. The general root of this crisis is historical. Historically, settlements popped up on good farmland. Where the farms succeeded, settlements grew up, then cities, and as time passed, all the good farmland went under buildings (In California, one old professor called this cycle of intensifying development "the cow, the plow, then the bulldozer"). Now we're stuck with huge cities on what was once good farmland and with feeding all those mouths with the land that's left.
This is a system that, unfortunately, doesn't favor food storage. What we've done instead is to use global shipping to move food from where there's a surplus to where there's a demand, and that works so long as we've got things like weather satellites to keep too many ships from being sunk by major storms.

But still, I agree that while worldwide crop failure isn't incredibly likely (and if it happens, the few survivors will have been cannibals anyway). However, the more likely problem, which is already hitting east Africa, is chaotic weather. If the rain arrives in a few big storms that show up more or less randomly, with no respect to what season it is, it's very hard to do productive agriculture. Good yields depend on semi-predictable weather. A simple drop in yield from chaotic weather can wreak havoc across the globe, and I suspect we'll see more and more of it unless we get GHG emissions under control.

996:

"No, it's really about processing power for a given cost. "

(386ing!)
If the 'it' you are refering to is Moore's Law, you are dead wrong. The key phrase from his paper is...

The complexity for minimum component costs has increased at a rate of roughly a factor of two per year.

997:

"The problem is that we've got more mouths to feed, and less farmland of less quality to feed them on."

I don't believe this statement, do you have a link? City's by land area in the US at least are not going to put a dent in available farmland, the loss is more then offset by efficiencies and better yields from crops.

You can make an argument that the current farming practices are not sustainable, but the current american farm industry is a MACHINE, it could probably feed the entire world if it wanted to, it's easily capable of socking away a couple years of reserves in a reasonable timeline, without even breaking a sweat

998:

The Corn Laws fucked with England, too - hence the push for "Corn Law reform" from about 1816 onwards. The general dearth + Irish famine led to their complete repeal in 1848.

IIRC England also exported food, when we were not at war with Boney (etc)

Agree re the absentee landlord problem, though
999:

Global crashes have happened before, but usually due to some major geophysical insult like a volcano eruption -- the year without a summer for example, or the little ice age (possibly caused by anthropogenic die-off effects in North America, as mentioned up-thread of here). Incremental global climate change probably won't cause one on its own, but augmented by an additional once-per-century catastrophe like, say, Mount Etna blowing its top big-time ...

1000:

Re: 'Now we're stuck with huge cities on what was once good farmland and with feeding all those mouths with the land that's left.'

I live in a large urban area surrounded by farmland, so understand what you're saying. At the same time though, whenever another 40-floor condo goes up downtown it seems that the bulldozers are excavating about 5-7 floors down (below street level). That's good soil. So it would also make sense to sell that soil to enrich fields elsewhere. Or is this where things got/broken down - the good soil doesn't get recycled?

1001:

I'm not clear on what you are suggesting here. That we start a global long term food storage program, store several years worth of food for billions somewhere, in order to try and smooth out climate change induced ups and downs in food supply?

Also the USA couldn't feed the whole world. That's just silly. Have you noticed how it is going re. water supplies for instance?

1002:

Yes & No - because, certainly after 1840, Ulster in particular was quite into heavy industry esp Shipbuilding usually for export, of course - the oldest aircraft co in the world is just about still in existance, Short's of Belfast - used to make beautiful flying boats ....

Some colonies became so, because they were being so badly (i.e. muderorusly) misgoverened that they were taken over - I can think of three examples: Uganda, non-coastal Ghana & most of Burma. With benefical results for the inhabitants.

Large parts of the (Brit) empire trade with each other, as well as Britain to everyone's mutual benefit, as one does.

In India, certainly factories were set up to manufacture not just for local consumption, but for export.

How does one characterise those countries that gradually became self-governing, before the 1950's (+1948) "give-away"? Aus, NZ, SA, Canada?

Were they "exploited", or not?

There was a large body of opinion that India should have become a "Dominion" in approx 1938-9,
but was screwed by three factors, which in increasing order of importance were:
Resistance of old-fashioned "admin" types
Internal dissention & faction-fighting (note)
We had, other, more "urgent" problems, like the NSDAP to deal with.
(note) This came back in spades in the run-up to independence & the disaster of partition, 1948.
Over a million dead, because of religious intolerance & refusal of the local politicians to behave
even half-ways reasonably, always excepting M K Ghandi, of course.

1003:
The process you describe may go back a long way. From Sherratt's *Economy and Society in Prehistoric Europe*, it seems that the big change at the start of the Bronze Age was that instead of
having scattered settlements in places with naturally fertile soil, people started manufacturing fertile
soil, through cultivation, irrigation, and fertilizing. So nearly everything since the start of
civilization has been human beings occupying artificially improved soil. (This includes
"improvement" that maintains the quality of soil degraded by repeated cropping—because most soil
degraded in a few years; the exceptions are soil enriched by volcanic ash, as in Sicily, or by alluvial
deposits, as in Egypt.) The process intensified with the Industrial Revolution, but it had a long
history before then.

1004:
Comment from an Indian recently ( & I've heard it before ) & it goes like this, in paraphrase:
"In spite of cock-ups & famines etc, you gave us three things that have made our nation, & we
couldn't have done it ourselves: Railways, binding the nation together, the telegraph ( the latter
updated as time went by) & a common language, which has no regional or local power-
base/overlordship implications."
Subsidiary benefits: Suttee/thugge eliminated, clampdown on race prejudice (Dalit/Untouchable) &,
even with christian missionaries (euw) a move towards a secular state, which India became.

1005:
The problem I see is that the worldwide food industry has moved towards high yield products that
are consumed within a short time period.

Effectively I mean that what is readily available in the supermarkets simply doesn't last as long as it
used to - it is picked and packed to last a certain time in prime appearance for selling, but not picked
and bred to last for a duration when stored, presumably because that interferes with the appearance
criteria.

Best examples in the UK are potatoes, which I could buy a bunch of sacks of back home that would
last a winter season at the ski lodge. They'd sprout a bit, but you'd get 2-3 months with only light
softening. The ones for sale here are lucky to last 2-3 weeks. Farmer's markets can supply better ones, but the common food stocks are very poor.

A major food production crisis will see food staples running out faster than conventional wisdom would think.

1006:

"Rehydration Mix"
Is what you are looking for
Salt + Glucose + Sodium Bicarb + Cream of Tartar
in proportions 4, 4, 2, 1 is one such.
There are other formulations

1007:

BBC News piece on GW
http://www.bbc.co.uk/news/world-africa-35054300
Interesting graphics

1008:

Without going to links, here are a couple of things to realize:

1. The US doesn't have any of the world's biggest cities. They're now in the developing world. What goes on here is not indicative of what's happening elsewhere.

2. American Big Ag has strip-mined a lot of stuff: prairie soils, California and central plains aquifers, phosphorus supplies, to name a few. Back in the 1990s it used 14 calories of energy input (almost all in the form of fossil fuels and their chemical derivatives) for every calorie of energy that went out as food. I don't think it's much better today.

This is not sustainable. Americans do, in fact, feed much of the world, it's a major source of American soft power, and it's probably a reason why Al Qaeda never tried to get into the business of spreading crop plagues, because they'd starve before we did.

So far as good farmland goes, here's an example. In 1900, the best farmland in California was in the Los Angeles Basin, Orange and Riverside Counties, and along the Sacramento River, especially downstream from Sacramento. There were subsequent farms installed in the San Joaquin and Imperial Valleys that were kept fertile by flushing river water through to prevent salt buildup, since both sites are former seabeds.

In 2015 in California, the farmlands around the Los Angeles basin and in the Sacramento-San Francisco corridor are gone under development, Imperial Valley is selling increasing amounts of water to San Diego and Los Angeles and putting solar plants in on former ag lands, and the southern San Joaquin is increasingly too salty for agriculture, and there are now proposals to develop it with
a mix of monster solar plants and new cities (google Westlands Water District). Oh, and they've mined so much groundwater out of the Central Valley that, in the worst places, the ground sank 18 inches in 2014 (https://www.revealnews.org/article/9-sobering-facts-about-californias-groundwater-problem/). This is what Catinadiamond has been sniping about.

When I lived in Wisconsin, similar urbanization problems were starting to happen around Madison. While I doubt they'll happen in Iowa, there they've got the problem that their formerly rich soil is now basically a medium to hold plants upright while they pour fertilizers and pesticides on, and that's even less sustainable. Once the farming stops, it'll be a nutrient desert for awhile, even if the climate tries to turn it into tropical savanna.

1009:

Thanks - everything already in my pantry ...wouldn't have guessed cream of tartar.

1010:

I totally agree. There's nothing stupid about building up settlements on good farming soil, until there are too many people around. At that point (for whatever value of "too many people" reality happens to inflict on you) it turns out to have been a bad idea, but it's too late to do anything then.

For what it's worth, we've been pretty good at increasing the carrying capacity of farmland for at least four thousand years and probably eight thousand years. How much of that has been due to a mostly stable climate, and how much of that has been due to technical improvements, I have no clue.

One of the nasty bits about severe climate change is that, once the climate stabilizes, we'll probably have to start the improvement process all over again, because climate, soils, crops, and pests will be mismatched enough that we'll have to work hard building new systems. It may well take 4,000-5,000 years after the climate tops out for decent-sized civilizations to rise again, just because of the need to build decent farms that provide predictable surpluses comes first.

1011:

The International Potato Center ... this is a global body doing research on and mainstreaming improvements on potatoes. Reads as though this is a sensible bunch.


Excerpt: About CIP

'The International Potato Center (CIP), headquartered in Lima, Peru, was founded in 1971 as a root and tuber research-for-development institution delivering sustainable solutions to the pressing world problems of hunger, poverty, malnutrition and the degradation of natural resources. CIP houses the global in-trust potato, sweetpotato and Andean root and tuber crops collections and contains the
world’s largest collection of potato diversity. CIP has regional offices in Peru, Ecuador, Kenya, India and China and is active globally with projects in 30 developing countries across Asia, Africa and Latin America.

---

1012:

*I’m not sure the temperature math supports a simultaneous global farm crash.*

Farming is dependent on temperature and rain and its environment -- soil (which is alive, which is why paving kills it), insects, all that stuff.

Temperature is, well, temperature; what we're seeing is a greater rate of temperature excursions, those being almost uniformly hot, and and the distribution of excursions ceasing to be a normal distribution. (So more excursions, more often, and hotter than they used to be.)

Heat will cheerfully prevent crops from growing properly. Heat will allow insects to hatch sooner, with bad consequences for a crop. Heat will kill soil, if there's enough of it. (Baked dry cracked dirt is not magically equivalently fertile again if it gets wet.)

Rain is a function of a whole chaotic mess of a global weather system; throughout historical time, that's been along a general pattern that involves latitudinal banding. (Tropics, temperate, and arctic, all based on how much sunlight the regions get, with the air circulation not transferring much heat across the zones.) Due to increased heat in the system, we may be seeing a collapse of the latitudinal weather system; there have been paleoclimate periods with temperate ranges that suggest this is a possible stable outcome of the planetary weather system. If that happens, we don't know where it's going to rain, or how how much, and we'll likely get a decade or two where precipitation is effectively random. (Having watched the hay come off in September (usual month June), I may find this prospect overly emotionally convincing. So might the folks in Africa suffering from formerly consistent rains become inconsistent.)

So, certain? Of course not.

Possible? Well, this is one interpretation of what's happening now.

---

1013:

@charlie i don't think its safe to say global climate change won't cause such an event either, the probability is essentially an unknown, so it's pure speculation to put a likelihood on it one way or the other

@guthrie i actually think a national strategic food reserve is a really good idea and will probably happen the first time things get disrupted. This is precisely how the strategic petroleum reserve came about. Be a nation by nation thing though...
@hetermeloles, i agree with sustainability problems and i also agree that the high population density parts of the rest of the world are in a very different position. However if you want to make statements about the amount of farmland converted to cities in the US you need data to back it up not anecdotes. I grew up in the midwest and south and the amount of good land just lying fallow or being used for cattle is mindblowing

1014:

As an adjunct to the conversation, modern food is often not optimized for nutrition at all. (Not to mention the vast percentage of waste of "unaesthetic" specimens: given the amount of gardeners present, I'm fairly sure that will be known).

They are also a great source of vitamins and nutrients, however, a recent study by IFR EXTRA shows that "fresh" supermarket vegetables may not be as nutrient packed as you think.

The study compares nutrient levels in frozen vegetables to the nutrient levels in "fresh" grocery store vegetables. Their findings are that "fresh" vegetables can lose up to 45 percent of their nutritional value between being picked and landing on a grocery shelf.

The Institute of Food Research UK specialists in the field.

Nutritional comparison of fresh, frozen and canned fruits and vegetables. Part 1. Vitamins C and B and phenolic compounds PDF - page 5, table 7. Of particular note is the temperature variance. The warmer the produce, the quicker the loss (thus the vast energy usage spent on refrigeration, which is the real reason the Western world works as it does).

Couple this with industrial processes (e.g. corn fructose as a replacement for sugar) and you've got a very nasty supply chain disaster in the making. Refrigeration is the key here. Think of all those open faced supermarket fronts, but the supply chains are the key.


Translation: even if you GMO things (golden rice, which there's much debate about), doesn't matter if by the time it arrives it has lost a huge % of nutritional value.

"5 a day becomes 8 a day becomes 20 a day".

TL;DR

At some point canning becomes the only solution barring the ultra wealthy.

[1]Mentioned higher up by Elderly Cynic I think - I was going to comment about media & recent French outrage at immigrants throwing away donated food that was past its sell by date, but stopped myself. i.e. the media frenzy of Indians throwing away wheat would have been used for all the same old wrong reasons.
It serves here well though, showing that "even" African / Middle Eastern immigrants have been conditioned to BBF dates (as opposed to expired).

1015:
Error above: *Canning or Freezing*

1016:
Life tip:
Keep an eye out on your Big Chain Supermarket's selection of fresh fruit / veg. When you start noticing things are missing, start thinking ahead. (Seasonal is largely immaterial here - the chains break if you stop using them globally anyhow).

Bonus Pic:

[*pretty fruit display* from *Supermarkets in Dubai*.

*Afghanistan exports its fruits and vegetables to several countries across the globe, including four African countries. Kabul province was ranked the top exporting province for fruits by the EPAA.*

*However, some fruit exporters in Kabul have expressed their concerns over issues related to market pricing and storage facilities, and criticized the government for not being able to sort out the matter. “*We do not have any cold storage facility*, which is a big issue as the fresh fruits begin to rot after a while,” said a fruit vendor in Kabul.*

[Ten Percent Increase in Fruit, Vegetable Exports: Officials]

~

I've highlighted where the chain breaks first.

1017:
If you want a depressing read on the subject, Mike Davis' book *Late Victorian Holocausts* makes for some nasty reading. The dead stacked like cordwood along the Grand Trunk Road, while India was exporting grain to Britain; the Viceroy who made it a crime to give food to a starving Indian, because that would encourage him to have more children, so not feeding them was kinder in the end…

1018:
Although I agree with the sentiment, I think he chose particularly poor examples. In a hypothetical world where India was never colonized, they would have gotten the railway and the telegraph the same way continental Europe did: through trade. To look for the benefits of an empire, you have to look at things that the empire did that could not have been achieved by independent Indian or African countries trading with the UK.

"binding the nation together": India has historically been as divided as Europe, so I don't think a united India would have emerged sans Britain. I have two problems with this. First, India is not united right now. The subcontinent has 7 to 9 countries depending on where you draw the borders: India, Bangladesh, Pakistan, Nepal, Sri Lanka, Bhutan, and the Maldives, with Burma and Afghanistan as the disputed boundaries. Just like with Europe, I'm not sure a united vs disunited India is better for the population long term.

"a common language, which has no regional or local power-base/overlordship implications": Just like Latin was the Lingua Franca outside the Roman empire, one might have emerged anyway.

"Suttee/thugge eliminated": I don't know how long this would have lasted in a post-Enlightenment world, but I'll give the British Empire credit.

"clampdown on race prejudice (Dalit/Untouchable)": This seems something that would have happened with our without the Empire, as the world has been secularizing since the Enlightenment. Further, just like with the clampdown on racism in the West, it's hard to know how successful this clampdown has been.

"even with christian missionaries (euw) a move towards a secular state, which India became": I think the Enlightenment would have created a few secular states as it spread through trade.

This is a huge problem with counterfactuals. It's hard to know what trends were unique to the timeline as it actually happened vs those that were going to happen anyway.

1019:

Correction to my comment. Latin was the Lingua Franca outside the Roman Empire but within the Roman trading sphere, which included German tribes, the Black Sea region, Ethiopia and parts of India, but it faced serious competition from Persian in some of those areas.

1020:

OK, that raises a question.

Of that 400+ ppm, how much of that is anthropogenic, and how much of that is Mother Nature (respiration, photosynthesis, volcanic activity, forest fires (recall that forest fires are part of the normal lifecycle of a pine forest), etc.)?

The second part of the question is gnarlier, dude.

How do we know that Mother Nature is NOT adjusting her contribution in response to ours?
As CO2 is one of the inputs into photosynthesis, I would not be surprised by an increase in CO2 stimulating an increase in photosynthesis, which would tend to reduce the CO2 (by making it into plant matter).

1021:

120 of the 400, and steadily increasing. ("pre-industrial baseline" is somewhat arbitrarily 280 ppm; ice-core data gives 180 at peak glacial and between 260 and 280 for interglacials.)

There's a 3 to 9 ppm dip with the northern hemisphere summer, so there's your effects of plant growth. Note that it **un** dips as the plant matter gets consumed.

Mother Nature has no more actual agency than Boreas, the North Wind. The Gaia hypothesis is, well, vitalism. And while there's an awful lot more dissolved CO2 in the oceans than there used to be, atmospheric CO2 is still steadily climbing. (and atmospheric O2 is dropping, as you'd expect from the CO2 being a combustion product of fossil carbon.)

1022:

And the elephant in the room is an animal based agriculture. I would highly recommend watching the recent documentary movie COWSPIRACY. I know, a goofy title for a documentary movie, but here's the link to the website: [http://www.cowspiracy.com](http://www.cowspiracy.com)

These are just a very few facts brought up in the COWSPIRACY website and documentary:

**GREENHOUSE GASES** -
Animal agriculture is responsible for 18 percent of greenhouse gas emissions, more than the combined exhaust from all transportation.

**WATER** -
Growing feed crops for livestock consumes 56% of water in the US.
Californians use 1500 gallons of water per person per day. Close to Half is associated with meat and dairy products.
2,500 gallons of water are needed to produce 1 pound of beef.

**LAND** -
Livestock or livestock feed occupies 1/3 of the earth’s ice-free land.

**WASTE** -
A farm with 2,500 dairy cows produces the same amount of waste as a city of 411,000 people.

**OCEANS** -
3/4 of the world’s fisheries are exploited or depleted. We could see fishless oceans by 2048.

**RAINFOREST** -
Animal agriculture is responsible for up to 91% of Amazon destruction.
WILDLIFE -
Ten thousand years ago, 99% of biomass (i.e. zoomass) was wild animals. Today, humans and the animals that we raise as food make up 98% of the zoomass.

HUMANITY -
Land required to feed 1 person for 1 year:
Vegan: 1/6th acre
Vegetarian: 3x as much as a vegan
Meat Eater: 18x as much as a vegan

1023:
Well, that's the first time I've ever been called a gnarlier dude.
Meow?
http://www.skepticalscience.com/
Short answer:
Last time carbon dioxide levels were this high: 15 million years ago, scientists report
Direct answer: the level was at roughly 250-300 for the past 400,000 years (Source is from a denial website so probably the most 'conservative' you can find), fluctuating due to ice ages. It never rose above 300 ppm [1], so approximately 100 ppm is us (or, 25%).
How do we know that Mother Nature is NOT adjusting her contribution in response to ours?
Well, of course Gaia changes in response to inputs. The problem you're having is one of scale, both in terms of Time and Space.
Relevant XKCD for everyone.
~
Fair warning: I'm highly likely to enter full blown Bast[2] mode during any denial debates.

My nose is practically wiggling off right now.
[1]As close as we can tell, insert hoary argument over the term 'Theory' in Science and falsification principle.
[2]Yes Mogwai, it's a play on that ancient meme

1024:
Too late!
RBGK already have mangroves, little ones, inside the Water Lily House, where they also grow the giant water lily (You know, the ones you can sit a small child on)
Images HERE
1025:

No, the initial formatting of the Gaia hypothesis is not vitalism, it's purely scientific. (Daisy World).

~

And apologies for restating what you'd already stated, I had the window open doing other things, didn't refresh as I posted.

...and Gaia = Vitalism isn't anything like as good as reality.

1026:

At some point canning becomes the only solution barring the ultra wealthy.
Unless you partially-restructure your society to go the allotment route.
I run a permanent surplus of vegetables through the year, at present & give away my surplus to people - even in a foul year like 2012, when the dreaded blight got loose....

1027:

Particularly as he deliberately, if not lies, certainly skews his statements.
He deliberately ignores, or pretends that it didn't happen, when ... as previously stated:
Mid-Victorian "Indian" administrators did their best to alleviate famines & were promoted & rewarded as a result.
NOT a trustworthy source.

1028:

Congratulations, you've just worked out something that has been worked out and known about for decades!

Increased CO2 is causing something of an increase in plant life/ matter around the planet. The fertilisation effects of it are well known and have been tested many times by agricultural scientists, using greenhouses.

However, as I think has been discussed on this blog before (and on many other blogs, and scientific papers) CO2 fertilisation effects are dependent on the plants having access to sufficient water and nutrients to take advantage of them. This is of course not the case in many parts of the world.
Just to add to the fun, the resulting produce from the CO2 enrichment experiments is often of lower nutritional value with more bulk of the less useful stuff.

Then there is the small matter of how long it takes to reduce the CO2 by this method - the answer is, centuries or longer. So it isn't an answer to anything really.
"pre-industrial baseline" is somewhat arbitrarily 280 ppm; ice-core data gives 180 at peak glacial and between 260 and 280 for interglacials.

If the wigglers in the room didn't notice, my 250-300 quip was a snark at the source I used. But, even using the logic from over there, the 25% rough cut shouldn't be under dispute.

The important part is the time frame anyhow.

Oh, and since I'm doing error corrections: size of giant insect life is also heavily modified by lack of predators, especially flying ones. Once that comes in, they can never return to maximal size even with the same resources.

Maximum insect size decreased even as atmospheric pO2 rose in the Early Cretaceous following the evolution and radiation of early birds, particularly as birds acquired adaptations that allowed more agile flight.

Environmental and biotic controls on the evolutionary history of insect body size

Well yes, but surviving hot days isn't about being 100% fit and healthy - it's about avoiding excessive exertion and drinking enough water.

I'm certainly not denying that increasing temperatures are a huge problem, including for human survivability in changing conditions. But I'm also mindful that the threshold people imagine intuitively depends on the climate they are used to, and based on what they find uncomfortable. And for me in the sub-tropics, it's a bit higher than for someone who comes from a place where it snows (a condition I personally find uninhabitable and can't fathom why people would live there).

Salt Tax, Greg.

Also sub-continental de-industrialization to protect British industry's markets. It's tempting but impossible to describe the British rule of India as benevolent in its results.

Good point - local variation is always the key. There's also wind to account for. Most hygro readings are taken out of the breeze...
No, the initial formatting of the Gaia hypothesis is not vitalism, it's purely scientific. (Daisy World).

Initial formatting, sure. When someone talks about Mother Nature taking care of things? I get this reflex twitch, that lives right next to the fundies claiming God promised to never again destroy the world after Noah's Flood.

And apologies for restating what you'd already stated, I had the window open doing other things, didn't refresh as I posted.

Quite all right! You were certainly terser. :)

---

1034:

Only "wrong" in the Kantian sense that a statement of moral duty should be considered as though it were a universal law: you've shown counterexamples that refute a statement 100% humidity always means it will rain, rather than simply usually or as a rule of thumb, which was more my intent.

Not that I have any issue with your examples (or with Kantian statements about moral duty, though I'd usually water those down to the "what if everyone did it?" formulation). Heavy mist in relatively hot weather is interesting and happens here maybe a couple of times a year at this stage.

---

1035:

Also an excellent point, though in the coastal tropics -- the locations where I imagine true black flag conditions will arise on a longer term basis first -- periods of high temperature and humidity are relatively prolonged, due to relatively compressed diurnal temperature cycles (if it's 40C during the day, it lasts for much of the day and doesn't drop below 33C or possibly higher overnight).

Which is why tropical nights can be more difficult to adapt to (in terms of comfort) than the days.

---

1036:

"Which is why tropical nights can be more difficult to adapt to (in terms of comfort) than the days."

And survival, actually. Sleeplessness, prickly heat etc. are not directly lethal, but create conditions for things that are. People with no experience of the humid tropics without air conditioning etc. often miss the fact that it's the relentlessness that is a large part of the problem.

---

1037:

"Olive branch"

It's my usual practice to read all the comments here before I write anything, but this thread got so long that I stopped checking. So if I said anything overly snarky to you after comment 747, I apologize. I would have phrased some things differently if I had been on the ball and that's my fault.
1038:

When someone talks about Mother Nature taking care of things?

...

I'm behaving since I've lost the paper I promised on insect joints (which is heavily embarrassing) so

...

So if I said anything overly snarky to you after comment 747, I apologize.

I made a bad joke about Templars (the Masonic Order listed wasn't Catholic, it was a deliberate
switch to mark the historical accuracy of Assassin Creed, it's the other one, but serving the same
Saint), you didn't miss much.


1039:

"So, certain? Of course not.
Possible? Well, this is one interpretation of what's happening now."

The distribution of temperatures is still s normal distribution it's just a flatter one and shifted to the
right

This means on the average a particular geography will be hotter (by 2/4C). There is nothing
inherent in being hotter by 2-4c that prevents growing crops. What it might change is what crops get
grown where

The second thing the data suggests is more extreme temperature variation, this means temperature is
harder to predict which is much more problematic for farming as it means you may have planted the
wrong thing. However it's still a normal distribution and localized which means the variation itself
is predictable so, plant something that won't die of heatstroke 90% of the time. The 10% of the time
you get unlucky it's only your local area getting unlucky so your crops fail but assuming regional
trade is still a thing you don't die

Can't speak to rainfall effects haven't seen data however again the key is predictability . Change in
rainfall patterns can be accommodated provided they can be predicted


1040:

But the issue isn't 'average'; it's the global distribution and how that affects local climate/ weather.
+2C average will mean something like +6C at the poles and +1 at the equator. Being 2 to 4C hotter
at a lot of locations will, for instance, noticeable lower rice yield:

http://www.pnas.org/content/101/27/9971.full

It's never a matter of growing no crops, it's more losing a higher % of the crops over a wider area,
more often. E.g. Russia and the massive heat wave it had a couple of years ago.
Temperature also simply isn't the main variable; rainfall is the other, and we've just seen a massive record breaking storm in Cumbria. The interesting thing about it, symptomatic of a warming world, is that it has happened a month later than one of the previous big storms in that area. Meanwhile, in the Himalayas, rain is falling instead of snow, meaning they get more flooding at odder times of the year, incidentally harming agriculture.

Where is all this accommodation coming from anyway? You type as if we can just build a few dams for the rain, maybe add a million miles of drains to fields, and that'll be fine. It's much more complex than that. See the history of water supply for the American west for instance.

And again, high yield modern farming needs specific equipment and training and local infrastructure. You can't just plant rice one year, grass the next three, wheat for a couple of years then switch back to rice when there are two years of good rain.

---

1041:

"Linking density to individual transistor costs are what Moore's law is about."

Yes, I know. What I meant, and actually said, is that "it" (meaning users expectations) is about exponentially increasing computing power for a given cost. That's the only form of "Moore's Law" that matters. We still have decades of that to go.

---

1042:

Oh yes - I know that effect quite well. I'm usually the one who can get things to burn when other people can't :)

---

1043:

Actually, it's not the coastal tropics that are showing the possibility of a black flag, it's the hot deserts (due to temperature increases), plus the Fertile Crescent, western India and Pakistan, eastern Spain, Egypt, the western Amazon/Chaco, the southeastern US, and possibly southeast Asia and parts of PNG, although the Sherwood and Huber model doesn't show enough detail to make that clear.

I'm not sure why it worked out that way, but the tropics should experience proportionally less additional heat, compared with the poles. What's really happening is that the temperature profile of the Earth will become progressively more even, with the poles warming up towards equatorial temperatures, especially during the summer.

---

1044:

Cite? Amartya Sen criticized Davis for being too easy on Communists but seemed to think he got the big picture right. And who is considered reliable? Please don't say Niall Ferguson.
"So, certain? Of course not. Possible? Well, this is one interpretation of what's happening now."

The distribution of temperatures is still a normal distribution it's just a flatter one and shifted to the right

(One interpretation of) what's happening now -- the change in atmospheric circulation patterns. We're seeing North America split into coast-and-middle for wind patterns. (For example, We're regularly seeing winds from the Caribbean to Baffin Island, or hooking right through northern Quebec and going to Iceland. It's messing up the migration patterns for a lot of birds.)

Temperate distribution is NOT still normal. That's one of the results from the thing I linked to.

Heat doesn't just directly affect plants in terms of heatstroke. It affects development, for example "summer in March" a few years back wiped out most of the Ontario apple crop; the trees bloomed, and then freezing temperatures returned. It affects what pests have to be dealt with, and where they are found. (e.g., tobacco hornworm matching up the US east coast.) It affects how much water you need, and how fast the water you've got evaporates out of open waterways.

The increased heat means the atmosphere is more energetic, and the rain gets unpredictable. As an analogy, offered with trepidation because analogies are tricky things, consider being compelled to drive above a set speed on a road that's slowly deteriorating. Every time you make it, you have to drive back, with a higher minimum speed.

That's kinda what's happening with the weather; given time, there will be a crash.

IIRC the old DIY rehydration mix I was told about in the army is one teaspoon of salt and 10 of sugar per litre of water. However, since I never made any don't bet anyone's life on that ratio.

No, the "it" I am talking about is what people want from Moore's Law, not the original strict definition of the law itself.

India was nowhere approaching industrialisation when Britain became the dominant power there. (Agree re salt tax, though)

Actually factories were built in India during the "raj" - & at least one was exported whole, from
here to there, as they wanted to carry on using a slightly older technology for one more generation, as it was easier to maintain, especially with a large labour pool.

1049:

I don't think anyone got the big picture "right", actually.

1050:

That is a very good "basic" get you through for a day or so. The one I quoted has a better mix of other things & is buffered (I hope) I have used it, in the days when I had very bad "grumbling guts" & repeated doses of the trots etc. Personally recommended, but just 'cos it worked for me, doesn't mean it will work for everyone else, though

1051:

Perceptual speed increases are pretty much gone, though; as OGH notes about ad-blockers in browsers, pretty much all of the hardware improvement has been devoured by software bloat.

Writing good software is hard. Critically, it's slower than writing OK software, so it only happens where it really matters. This rarely directly affects users. It especially does not affect users whose smartphones are dependent on battery power sources and not suitable for active cooling.

(Also, reversible computation lacks any physical mechanism; not "demonstrated physical mechanism" or "mechanism we can build" or even "if we could build it, we think it would work", like the various exotic matter hyperdrive proposals. No one can suggest how you make a physical object with those properties.)

1052:

*There is nothing inherent in being hotter by 2-4c that prevents growing crops. What it might change is what crops get grown where.*

Every plant species is adapted to a specific combination of soil, climate, sunlight, local fauna, etc. If the climate moves, the soil stays where it is, the available sunlight changes due to differences in cloud cover, and/or herbivores (or their predators) migrate, then the optimum conditions for the species won't exist any more. Depending on how severe the differences are, the crop may have lower yields or fail completely.

1053:
The other side of the coin with farming animals is that it means you can use certain classes of crap land which would otherwise be useless, which either can't support edible plants fullstop or can't support them without massive artificial intervention. As long as something will grow there - and grass grows nearly anywhere - you can use animals to turn it into food. See earlier discussion about cellulose digestion and Heteromeles's comment about humans being total nuts for acquiring symbionts.

It is also very useful when you don't have good facilities for storing human food without it going off. Grass is much easier to store, so you can "store" the human food in a live condition until it's needed. Or with dairy animals you can keep a steady supply going. Transport, too: live meat doesn't go off on the journey.

The problem is that as with so many things we overdo it and also do it wrong. We feed them stupid things like high-energy human plant food, and fish, and antibiotics, and bits of their own predecessors' corpses. It is another case of the usual problems that arise when people optimise their methods of doing something to make the most money instead of to do the thing well.

1054:
"There is nothing inherent in being hotter by 2-4c that prevents growing crops. What it might change is what crops get grown where"

The key temperature is the point at which eukaryote biochemistry packs up - 45 degrees Celsius, more-or-less. If a plant can't keep its leaves below that, its cells will die.

However, a more critical factor for crop growing is that plants need water both for cooling and photosynthesis. If they are barely keeping the former under control, they won't do much of the latter. So the higher the temperature, the more water they need to create a constant weight of biomass.

1055:
Mangroves?

So to escape climate change we should boldly go where no mangroves?

1056:
@guthrie i agree with everything you say. I think the agricultural issues will revolve a lot more around water then heat. What happens with water globally is the thing to watch (I'm not just talking about the desertification bands moving around, it's kind of given there will be some of that) but what areas benefit or loose out

The good news around water is its a lot easier to engineer then global temperature

@Jay we have a huge ability to genetically engineer crops, which helps at least a bit
Surely people using those awful devices are more affected by inefficient software because it chews their precious battery life faster.

Writing good software may be slower than writing crap but it is also more fun. The problem is the same as with animal farming: software being written to make money instead of to be as good as possible at doing whatever it's meant to do. Optimising for the wrong result means you get something not very good at the right result. Duh. And yet despite the "duh", we run the whole world like that and wonder why it comes out fucked.

These days of course there is also the problem that not many people have been used to coding for bloat-intolerant systems. But such systems do still exist. Before moving on to PCs people should get used to making a 14-bit PIC do things it shouldn't be fast enough to do.

Reversible computing... the closest we come is in our own bodies with DNA transcription. This actually is reversible, and it does not proceed linearly from start to finish. It runs forward a few steps, then back a few steps, at random. The reason it ends up working is that energy is used to push it to do more steps forward than it does backward. It uses about 10x the theoretical minimum of energy per bit.

Mind uploading, crazy nano, massive human enhancement and any kind of persecuted sooper-awesome creature with post human abilities... Aside the probabilities of any of those things, the politics associated with such are frankly toxic.

Much of the common shibboleths of current SF. Frankly, the genre is starting to vanish up it's own arse again and is overdue for another New Wave.

Indeed. Fascinating.
older software releases of a web browser, relational database, video encoder, 3d renderer, fluid dynamics simulation, etc. Problems that took a lot of computing time on 10 year old software take equal or less time with constant hardware and newer software. For some hard problems the algorithmic speedups have outpaced even Moore's Law, so you get dramatically faster solutions with newer software.

I think this confusion is happening: web pages are loading as slow or slower than 10 years ago, I am using a newer web browser than 10 years ago, therefore software is getting slower over time. If you stuck to loading web pages with the same content and structure as 10 years ago you'd find that browsers are a lot faster now than in the past. They've just been outpaced by publisher content bloat. But that has little to do with whether Moore's Law is still on track (it's not) or whether or not computing will continue to evolve rapidly compared to e.g. passenger aircraft (it will).

1061:

Yes, I've heard that railways/telegraph/language comment before too, although I think it was some other organisational factor than language in the third place.

It is fashionable these days to decry all aspects of the imperial era and you get people on your case for supporting colonialism if you don't toe that line, but as far as I can make out the British rule in India was not really, as far as it went, a bad thing. There is no way India would have got a half decent railway network when it did without British organisation. India was not homogeneous; it was a conglomeration of individual bits each with its own ruler and its own set of violent prejudices against people from the other bits. Any kind of national famine relief would have been impossible without the British rule supervening over indigenous prejudice and apathy. The British army never put anything like enough troops in India to "crush it under the imperial heel!", and very roughly half of India by area never was under British control, but under that of "native princes" nominally under British licence but in practice pretty much doing whatever they felt like (fighting each other, and stuff). We held on to what we did by extensive diplomatic juggling and shows of force rather than outright military might. "British India" was only possible because the place was too much of a mess to combine against us; and when only a small amount of combining-against-us did happen (itself only possible because it made use of British organisational entities) we came close to losing it. I'm not saying the British rule was perfect, far from it, but it was better than what was there before.

Similarly with Burma: the way the locals treated each other was far worse than anything the British did, and notwithstanding the number of British who just couldn't be arsed to do anything about it, even if they had been arsed there was far too little manpower to do anything more than try and persuade them to keep it down a bit and hope they were too busy having a go at each other to have a go at the British, which would have been a wipeout.

1062:

I've never tried to light anything from a cigarette for two reasons, I don't smoke, and 99% of my welding/cutting experience is underwater where it's hard to keep cigarettes alight.
On the other hand, this is an example of lighting a fire. It's not me but I've done this often enough, it's easier than it looks and it looks easy. The stream of oxygen is quite fast (see Charlie's comment re gas velocity). The *only* fuel here is metal, almost all steel (I think there's some aluminium in the rod but I'm not sure). The ignition is usually from a 12 volt battery making a spark between the rod and the work but you can use an arc welder if you want. Electricity plays no part in the fireworks after the flame is lit. If surface support is on their game they turn the power off as soon as the flame starts. Otherwise the diver calls "Make it hot" in a deep and manly voice, then after striking the flame calls "Make it cold" in a trembley falsetto. (salt water, electricity...)

This may not be relevant to the discussion of ancient atmospheres, but who needs an excuse to play with Broco? I wish I was still diving for a living. I'd have paid them to work it was so much fun. Anyway, this goes to show that it doesn't matter how damp something is, if it can be set fire to at all, oxygen will let you do it.

Mid-Victorian "Indian" administrators did their best to alleviate famines & were promoted & rewarded as a result.

And the book is about the Late-Victorian period. British policy in India wasn't constant (eg. intermarriage first encouraged, then abhorred — cf. White Mughals by William Dalrymple).

Social attitudes change, as do policies. Look at the American attitudes towards unions from mid-20th-century to late-20th-century, for example.

Some people seem to think that Westerners are the sole source of all the evils in the world. This is just as silly as the idea that we're the sole source of the world's virtues. Most of the world was messed up when the West found it, stayed messed up while the West ruled it, and is still messed up now that the West has mostly gone home. We're not demons any more than we're saviors.

and any kind of persecuted sooper-awesome creature with post human abilities

Hello Mogwai.

Read this series?

Your music
I'll let you into a little secret: the four thing wasn't about what it purported to be about. It was testing a couple of things (not Greg).

[Aside: I do think that qualifying Kett's as middle class is a little unfair. Yeoman class leader appointed by them? Yes. The other 15,999 were certainly common men, or at the very least, not in charge of building or maintaining the hedges / fences]

Anyhow, while listening to the soundtrack ideas on a Nu-New-New-Wave?
Bearing in mind the purpose of this thread?

1066:

Any man who references depth diving and welding as "I wish I was still diving for a living. I'd have paid them to work it was so much fun." you know three things:
#1 Lucky Star (survived)
#2 Balls of Steel (it's a reference)
#3 Either stupid, insane or glorious (we'll go with the latter)

I shall break out the fan and drawl in a Southern Style right now.

1067:

Oh, BOLLOCKS.
Just tripped into dfgdfhgm.sddfg.fd.sdfsd.f
Frack.

Should have seen that one coming.
Or perhaps I did (clever girl).

1068:

I suppose it depends - in the web context, at least - on whether by "software" you are considering individual specific applications, or the whole set needed to achieve a particular end. There has been some improvement in browser rendering and scripting engines, but it matters not when the browser has to download, interpret, and execute megabytes (often literally) of crappy inefficient bloated javascript - not one byte of which is even necessary if the site had been written by someone intelligent - before it can do anything else. The total software execution time required to achieve the
same end result is longer than it was, therefore the point that despite faster computers things are slowing down because of crappy software still holds.

But there are also clearer-cut cases where only a single application is involved. Take word processors. The other week my dad ran into problems trying to perform some basic operation (but one that he had not tried before) in libreoffice. He showed me the problem and I was confused too. It wasn't until I got home and tried the same thing on my own, faster, machine that I realised what was going on: his 2.2GHz 64-bit CPU, running nothing else but the Ubuntu 10.4 desktop, was too overloaded by the bloated inefficient application to process mouse clicks in real time. So was my 3.6GHz CPU, but at least it wasn't so bad and the function was half way usable as a result.

Inspired partly by that and partly by reading one of Charlie's old blog entries about word processors, I then installed on my machine an old-Mac emulator and Word 5.8 for Mac. And that works just fine, despite the overhead of emulation.

1069:

Well I don't know what's going on with that first video because nothing like that happened when I tried it. Doing the same thing too.

The second one, I see totally what you mean about it being great fun. Iron is so hard to ignite under normal conditions that people don't realise that it is actually a really good fuel when it does. (see also: thermite.)

1070:

Kett's rebellion was, as I wrote middle class. Kett and many of his followers were yeomen. A yeoman owned not less than 100 acres of land.

1071:

Yes, I thought that too. We were importing 75% of food at the start of WW1, but I figured that was because of population growth exceeding the increase in agricultural output.

But then all the Corn Laws stuff in history lessons bored me absolutely rigid, and by the time we got that far I was assured of being able to drop history next year anyway, so I was past caring about exam results and took no notice at all. Nor has any of my reading since then covered it (history is interesting if you're not doing it in school, but it took me a long time to find this out).

Anyway, it turns out we are both wrong: imports were actually 10x greater than exports and Boney figured it was worth trying to starve us out, according to this...

A lot of expensive research on oral rehydration has been done by sports drink companies. But their products are much more expensive than the simple sugar/salt formulations.

Yes, however, my point was:

#1 He didn't start it (ironically, the King did, if indirectly)
#2 He was a target, then switched sides
#3 16,000 is a fair number for the times (my earlier references to Welsh revolts show that raising 30,000 men as claimed were largely seen as exaggerations - a force of 16,000 at that moment was certainly akin to... hmm... Da'eshes 50,000?)
#4 It's a working class cause - Kett himself erected hedges / fencing until the revolt kicked off, then tore down the enclosures he had erected on his land
#5 Look at the Tree symbolism.
#6 They won a battle (if you look into the last damage reports, when a professional army under Warwick turned up they lost 3,000 vrs 250. You simply do not get that disparity with trained troops
#7 Only extra-judicial murder by revolt was reported as an Italian mercenary.

Do I need to go on?

No, it wasn't a middle class revolt. Get the Jacobin stick out of that bottom young sir.

REKT.

Oh, and.

The joke is: Never knew this before I typed the word four.

It was, witch-craft, in the BBCilcal sense.

Gaia weeps, stone vagina birth, never tell Sláine that Spring is Death, Equinox.

Take word processors. The other week my dad ran into problems trying to perform some basic operation (but one that he had not tried before) in libreoffice. He showed me the problem and I was confused too. It wasn't until I got home and tried the same thing on my own, faster, machine that I realised what was going on: his 2.2GHz 64-bit CPU, running nothing else but the Ubuntu 10.4
desktop, was too overloaded by the bloated inefficient application to process mouse clicks in real time. So was my 3.6GHz CPU, but at least it wasn't so bad and the function was half way usable as a result.

Inspired partly by that and partly by reading one of Charlie's old blog entries about word processors, I then installed on my machine an old-Mac emulator and Word 5.8 for Mac. And that works just fine, despite the overhead of emulation.

LibreOffice isn't a more recent version of Word 5.8 for Mac but I'll half-concede this one: I am pretty sure that modern versions of Word feel less responsive than old ones for common operations. I gave myself half-an-out in the post I wrote; I still stand by the assertion that compute-intensive tasks from 10 years ago will go as fast or faster if you use a newer edition of the same software. But interactive responsiveness is sometimes worse. Moving the selection around in Excel circa 1994 was consistently snappy on the Mac, even though later editions have better performance for compute-intensive stats/visualizations/simulations.

1076:
We're wicked fast n smart.
And you, dear sirs, can shove Beowulf right up your blinded eyes.

They claimed to hunt us back / over Tundra wide / When all along / Their side we took against
doors held wide.
You feeling it yet?

1077:

Shibboleth

A custom, principle, or belief distinguishing a particular class or group of people, especially a long-standing one regarded as outmoded or no longer important

http://www.oxforddictionaries.com/definition/english/shibboleth

It's a Jewish word, and as such, didn't enter the English language until post-Templar stuff.

*yawn*

I could really let loose about now (MF is finally facing some hard truths), stocks are tanking, the entire Kurd oil thing is coming to light, yadda yadda yadda).

But, really.
Troy and bring me your champions.
Catherine Taylor will eat you alive and last 1,000 years.
Are you scared?
You killed the whales and they're still beaching themselves.
Scum.

1078:
Spoilers:
Sing, sing, sing, never see them online.
Crack it wide, sides are for lesser beings.
Greg: I'm not immoral, I just lived through 4,000,000,000 lives lost [cost. weighted. averaged]
It's called fucking Triage.

1079:
“The problem is that as with so many things we overdo it and also do it wrong. We feed them stupid things like high-energy human plant food, and fish, and antibiotics, and bits of their own predecessors' corpses. It is another case of the usual problems that arise when people optimise their methods of doing something to make the most money instead of to do the thing well.”
That's the rub, the kind of farming we did back in 1912 when the human population was 1.5 billion isn't the way we farm today with a human population of over 7 billion. Humans currently raise 70 billion farm animals, hence we have “factory farming”.
Also consider that the human population consumes 5.2 billion gallons of water and 21 billion lbs of food a day. Compare that to just 1.5 billion cows alone drink 45 billion gallons of water and eat 135 billion lbs of food a day. This isn't sustainable agriculture.
Watch the video clips and see more facts here: http://www.cowspiracy.com/facts/

1080:
*slow clap*
Now, you've three options:
"You can't tell them no".

Yeah.

I'm thinking I can. Ah, yes: "Don't give them what they want, give them want they need"

Dubai and displays wasn't a mistake.

*shrug*

1081:

One thing that has certainly changed is that more software is written to take account of parallelisation. Fluid dynamics software has been for ages, of course, but it is becoming much more common now that multiple core CPUs are in widespread use.

1082:

Catina, that's the nicest thing anyone has ever said to me on line. Assuming I'm at least 2/3rds correct on what you meant.

In reverse order

Number three is all three.

Number two is a reference but I'm not sure what it's referencing. I *think* it might be a reference to the old saying: "lock a diver in an empty room with nothing but three steel ball bearings for an hour and when you come back, one will be lost, one will be stolen and one will be broken" Which if it is, shows an amazingly wide general knowledge.

Number one is way lucky. I lived through a couple of things entirely by the cards falling my way. I got at least one job because the previous incumbent was sucked into the trash racks of a power station cooling inlet.

1083:

PRECISELY
EXACTLY
Also - that was then, this is now.

1084:
Precisely
And, I hadn't notice, but, as usual CD cheated with her terms of reference.
She said "England" which didn't exist until after Edward the elder, Alfred's son.
Before that there were the 7 kingdoms of the English & the Danelaw.

Note: her comments @ 1065, 67, 74, 76, 77, 78 & 80 all appear to be self-indulgent, self-referential rubbish with minimal information content.
Ignore

1085:
Flat our serial compute speed still matters for many things. There is a lot of software isn't really capable of being parallelised much at all. Word processors for example can't take advantage of all the massive parallelism available on a GPU in the way image processing can. Fortunately many of those things aren't compute intensive.

1086:
No, you have several others, for example:
4) The people running the show aren't thinking beyond the next media frenzy / popularity survey
5) The people running the show are convincing themselves that something is true / will happen if they say it confidently and often enough
6) Hope springs infernal in the human breast (they are behaving like Micawber)

1087:
Yes middle class.
The same applies to the peasants' revolt.
From Wikipedia:
The rural rebels came from a wide range of backgrounds, but typically they were, as the historian Christopher Dyer describes, "people well below the ranks of the gentry, but who mainly held some land and goods", and not the very poorest in society, who formed a minority of the rebel movement.
[251] Many had held positions of authority in local village governance, and these seem to have provided leadership to the revolt.[252] Some were artisans, including, as the historian Rodney Hilton lists, "carpenters, sawyers, masons, cobblers, tailors, weavers, fullers, glovers, hosiers, skinner, bakers, butchers, innkeepers, cooks and a lime-burner".[253] They were predominantly male, but with some women in their ranks.[254] The rebels were typically illiterate; only between 5
and 15 per cent of England could read during this period.[255] They also came from a broad range of local communities, including at least 330 south-eastern villages.[256]
I'd never heard of Kett's revolt until I moved to Norfolk but he's a folk hero here. Kett's Oak is still preserved in Wymondham.

1088:
@Jeep-Eep - What do you mean by "crazy nano"? I'm working on a story that involves nano, wouldn't want it to be the crazy kind!

1089:
I referenced a time when there were five Kings vying for power...
None of which had anything to do with your claim that "the Elite in Britain have four examples (yes, four) of the hoi poloi [sic] rising up and creating blood baths."
(I mean, sure, plenty of wars in English or British history; but almost all of them were between various royal or noble factions, foreign or internal.)

But since pressed, I presented a case that satisfies all conditional: England, Class Revolt vrs Elites, indisputable (e.g. two or three or four Civil Wars after James I/VI's execution?).

You presented two (small) examples: Kett's Rebellion and the Midland Revolt. (The Peterloo Massacre involved government forces attacking peaceful protesters, which is: a) not a case of the hoi polloi "causing a blood bath"; and b) similar to several massacres in American history, and so hardly a uniquely British thing.)

Incidentally, what timeline are you from where there was such a thing as "James I/VI's execution"? I'm kind of intrigued now.

1090:
"...pretty much all of the hardware improvement has been devoured by software bloat."
Which has been true for at least 40 years. But why should that be unexpected? If you have h/w capability, you use it.

1091:
India was nowhere approaching industrialisation when Britain became the dominant power there.
Greg, it seems to be fairly well established among economic historians that India underwent a process of deindustrialization (prior to and) during British rule, with the "industry" in question being primarily textile manufacturing. Around 1750, India accounted for about a quarter of the
world's manufacturing output (again, mostly textiles).[*] By 1800, it accounted for less than 20%; by 1860, less than 10%; and less than 3% by 1880. The fraction of the population working in manufacturing declined during this period.

Various causes have been suggested, and it seems likely that all of these played a role, at least at different times: the effects of the collapse of the Mughal Empire in the 18th Century; increasing demands for Indian agricultural goods during the 19th Century (including things like opium!); the rise of cheap, factory-manufactured British (and later European) goods in the very late 18th Century and the 19th Century, along with the lowering of international transport costs, which combined to drive less efficient local manufacturers out of business; and actual British policies in British-ruled India -- e.g., ensuring that British imports could enter India as freely as possible.[**]

[*] I have the impression that during the 17th and early 18th Centuries, the British (and also Dutch) may have largely benefitted India, by widening the market for Indian textiles.

[**] For example, in the early 18th Century Parliament passed laws prohibiting the direct import of Indian cotton textiles into British markets, in order to protect local linen and wool manufacturing, and American textile manufacturing in the early 19th Century developed within a framework of deliberate tariffs against imported British textiles. Hypothetically, an independent India could have done something similar.

1092:

I agree that CatinaDiamond stated it very badly, but she is probably closer to the truth (i.e. more sociohistorically correct), as the hoi eloi saw and see it, than her opponents.

Historically, the eloi/polloi boundary was NOT between the artisans and above and the peasants and labourers, but between the aristocracy (which always was wider than the nobility) and the merchants and below. Nowadays, the aristocracy is largely emasculated, and has been replaced by the plutocracy, but the same applies. Recent events have shown that the plutocracy now regards academics, doctors and so as as part of the hoi polloi - but in 1900, and to a large extent even in my youth, they were part of at least the rural hoi eloi. It is mistaken, almost revisionist, to claim that a rising of artisans was not a rising of the hoi polloi.

Also, remember that the English and similar aristocracies/plutocracies have always regard threats to the established order (especially property) as potential bloodbaths, so that is how the hoi eloi did and does see them. Remember The Blessed Margaret's preparations to use troops to suppress an uprising (that didn't, after all, happen)? I am not going to justify CatinaDiamond's choice of numbers or wording, as I agree that she was being thoroughly obfuscatory, but I will support the sense of her original posting.

1093:
"(Also, reversible computation lacks any physical mechanism; not "demonstrated physical mechanism" or "mechanism we can build" or even "if we could build it, we think it would work", like the various exotic matter hyperdrive proposals. No one can suggest how you make a physical object with those properties"

https://intelligence.org/2014/01/31/mike-frank-on-reversible-computing/

1094:

If you want a huge perceptual boost in the speed of a laptop or desk machine replace the HDD with SSD. I won't be buying HDDs again after moving to SSD.
10 years ago I would wait a couple of minutes for the bootup to complete (XP). Now it's around 10 seconds, and that's with the bios doing its thing plus Win10

1095:

And it's also wrong to suggest that the Peasants' Revolt and Kett's Rebellion were not middle class.

1096:

Yes, I was wondering that about timelines myself. If James VI/I got executed, that would suggest that although he took the english throne over, something went rather wrong down there. He had Scotland well in hand before going south, and even if it had all gone wrong up here, England was rich enough to keep him defended. So maybe the religious wars got a bit hot and his daughter's marriage got him into trouble?

(In our timeline it was Charles I, the son of James, who was executed by upstart gentry and the like)

1097:

"And it's also wrong to suggest that the Peasants' Revolt and Kett's Rebellion were not middle class."

Really? The term 'middle class' dates from only 1812, and the very criteria on which it is based did not make sense in 14th century terms, and to a great extent not in rural 16th century ones. It's wrong to use 19th and 20th century social divisions to describe the social divisions of those eras.

1098:

All uses are not created equal.
A transformative capability is by definition new; if what you're using a very large computational capacity for is to do quill-pen-and-ledger operations very quickly, you haven't made a functional, structural, or organizational change.

It's also worth noting that efficient parallel algorithms are really hard. This has an affect on the utilization of the hardware.

1099:

We can agree to differ about this but I'm writing for speakers of 21st century english who assign very different meanings to "peasant" and "hoi palloi"
In modern terms they are middle class in both the UK and USA versions of english.
Language is for communication.

1100:

Yes, I agree, SSDs make a huge difference in interactive responsiveness. I've been using them for a few years now. Still, no later computer I've owned goes from cold start to the "user interface" (such as it was) faster than my first computer, the Commodore 64. Not that it matters so much when I reboot only for OS upgrades.

1101:

We are still lacking a comprehensive theoretical model demonstrating how a realistic quantum-mechanical system composed of many interacting subsystems can be made to coast along a complexity-constrained, deterministic trajectory through configuration space with negligible entropy increase per operation.

From the conclusion of that article. The circuits people have people bump into the expected CMOS limits involve 1 electron volt. The big point is that the possibility cannot be refuted, which I consider very weak sauce indeed, given the impossibility of understanding quantum.

1102:

Just about everything beyond unusual materials, highly reactive particulates and bacteria-inna-vat kind of work. Hate that bullpucky.

Although Homeworld: Cataclysm gets a free pass, as it's a fun RTS/horror game, which is a hard to find combo.
Nobody engaged in agricultural labour is middle class. They might be a rustic, they might be gentry, they might indeed be a sturdy yeoman, but "middle class" is fundamentally industrial and urban.

If that wasn't true, if we actually had a politically substantial yeomanry rather than a corporatized mutant oil-for-water hydrological empire (with plutocratic factions going for god-king autocracy as hard as they can), the response to climate change would be very different.

1104:
Frankly, I suspect the best thing that could happen to compsci is a complete plateau of hardware improvement. Might finally force them to trim the bloody fat a bit.

1105:
"It's also worth noting that efficient parallel algorithms are really hard. This has an affect on the utilization of the hardware."

True, but the really interesting programs are going to be AI oriented, which lends itself to parallelism.

Also, most of the power in a PC is in the graphics, not the CPU silicon. Anything video, for example, lends itself to easy parallel programming. A teraFLOPS graphics card is nothing special and generally cheaper than the Intel chip that drives it.

The *really* interesting nearterm tech is going to be hardware support for neural net processing.

1106:
Reversible computing hardware is probably of the same order of difficulty as quantum computing hardware. Probably about the same timescales as well ie 20 years away at best.

1107:
You'd still have the terrible problem that time-to-market beats software quality hollow. Founder effect is very very strong, in large part because nigh-everybody is conditioned into viewing computers as horrible erratic devices where you have to figure out the appropriate incantation and then never deviate from it. (If the sacrificial chicken has to weight 3.14 pounds as pounds were defined in the ducal edict issued to the market towns of Burgundy in 1348, well, they just do.) Business prefer a widely-known incantation to a robust and flexible solution. (That is, lower labour costs are an uncontexted good in business decision making.)

Robust development where you do thoughtful abstraction, define your primitives carefully, build the primitives against comprehensive testing, and construct your eventual application with sound layering, is slow. More fun, and more worthwhile, but it's only got a market niche where it's
inescapably necessary and not reliably even there. (Cue stories about "I have worked on that code and I don't fly on those airplanes").

It also requires that you get people who really like to program, which is not a good description of everyone who does program for a living.

tl;dr it's not the academic capability. It's the business decision making (mostly) and the supply (a little).

1108:
Are you suggesting that farmers today in Britain who own their own land are not middle class?

1109:
Yeah, but it would eliminate one hiding spot for crap. Can't get away with that nearly as much if you can't just load down a computer with extra work and have it take it.

1110:
Frankly, I suspect the best thing that could happen to compsci is a complete plateau of hardware improvement. Might finally force them to trim the bloody fat a bit.

Amen.

I've got an iPad 3, and am apparently marooned at iOS7 by performance issues. (Can't get iOS8 any more, and the advice I've seen to iOS9 on an iPad3 is basically "don't"*.) Which is unfortunate, as most of the newer apps need at least iOS8.

(Also means my desire for a drone to try aerial photography is on hold, as most DJI models use your phone/tablet to control the camera, and having to buy a new one just for drone photography increases the cost of the drone setup by 50%, putting it out of my budget.)

*Don't unless you like waiting 2 seconds for an app to open, etc.

1111:
People have not only a mechanism for quantum computing hardware, they've built some. It's observed to do stuff.

This is not true of reversible computing hardware.

1112:
Of course not.
Class is not sensibly defined by an income bracket, ping, you're done. Do that and you start thinking that, for example, a mill wright or a roughneck making well over 100 k$/annum and an accountant making well over 100 k$/annum have the same sort of personal objectives and social concerns.

(This is without getting into issues of the convertibility of the net worth of farmers.)

Class has to do with your perception of your social choice, the kinds and amount of property you own -- you can be middle class without owning so much as a house, no land at all; "tenant farmer" is immediately obviously different from "farmer", though -- and the scale of the future across which your concerns extend.

Very roughly, the lower your class the shorter your span of concern. One consequence of the post-war rise of the international oligarchy has been a compression of the time scale of concern down towards shorter spans, mostly through a restriction of income. (Don't know the UK numbers, but since 1950, farm productivity has roughly tripled in Anglo NorAm. In constant dollars, farm income is flat or a little down.)

Farmers still must have concerns alien to the -- necessarily, because that's what created it -- industrial and urban middle class. They don't have the same spending or social signalling priorities. They have very different expectations for their children.

There just aren't hardly any farmers anymore, so their political concerns aren't readily addressed. Even significant class overlap would allow political alliances, and those don't seem to happen much if at all. (Maybe they do in the UK. Here, we're seeing de-urbanization and people leaving the urban middle class with a chunk of capital trying to reinvent farming rather than much in the way of political alliances.)

1113:

Perhaps returning to the topic, I see that Syfy is going to do a three-part adaptation of Clarke's *Childhood's End*. Though I like the novel a lot and the Syfy trailer looks not-bad as such things go, I also suspect that they're shibboleth-rich and might provide material for comment here, probably around message 2736.

1114:

I don't know what Jeep considers crazy, but I'd advise you to think carefully about where the energy for your nanobots comes from (nano batteries and nano solar cells don't provide much juice), what your nanobots are made of (finely divided metals being highly flammable and nano-thin insulators being very susceptible to static electricity), and how they communicate (radio waves being non-nanoscale). If your nanobots do the same sort of stuff that biology does in the same environments (oxygen atmosphere or salt water or blood) with about four billion years less optimization, and they do it much much better than living cells do, you may be on the crazy end of the spectrum.
1115:
You understand my issues with nanowank entirely.

1116:
Also, waste heat. Can't forget that.

1117:
"Also, most of the power in a PC is in the graphics, not the CPU silicon. Anything video, for example, lends itself to easy parallel programming."

True-ish for around 50% of non trivial image processing algorithms, but you still need to really tightly schedule all sorts of stuff around memory latency, which is a right bloody pain to do. There are a whole host of other algorithms, while parallelizable, are really hard to implement on a GPU and take advantage of all the compute available. A naive implementation may go just a bit go faster than a CPU. Generally these revolve around memory scheduling issues, along with cross thread communications.

(I did this sort of thing in my last job, to the extend of creating a language to help manage some of the issues.)

1118:
I know - I'm familiar with TBB and boost.
However, I think the real advances are going to involve custom neural network h/w based around memristor technology. The latter is generating a huge amount of interest, most notably as a near term replacement for flash, which is extremely difficult to scale down because of its capacitor-like structure running out of electrons.


and if you like optimism...


1119:
@Jay and @Jeep_Eep: Like I said earlier in the thread, I'm a fan of the Hitchhikers Guide and Galaxy Quest type of science fiction, so absurdity is part of the fun. I'd add to that the Men in Black movies.

That being said, it means I have to be at that level of humor to get away with what I want to do, and your comments here re-confirm what I suspected. That really raises the bar because successful humor and science fiction together is a very rare mix.
1120:

*Rolls eyes* The current technical progression today, even once you filter out the distorting effect that perception of compsci has on it. Is quite freakishly fast. There is literally no reason to believe that it cannot fall back to the norm between now and then. Exponential growth is an illusion of the cybernetic totalist.

That leads into one of the more annoying shibboleths: The godlike AI to take care of people. It honestly seems to show off how low democracy seems to be held in many geeky circles, I suspect.

1121:

"Hobbit holes for the win"

In the US desert southwest, including parts of Texas, they already have this technology. It's called "adobe".

(Damian has made some good comments about modern variants of this tech.)

Which leads to the point that Texas is a really huge place that contains parts of several different climate zones. I'm not too familiar with the humid coastal conditions that may be death zones when the sustained temps climb too high, but in many parts of Texas the nighttime temps are reliably cooler than the daytime temps, the humidity is far short of 100%, and thick adobe walls translate to good comfort under current conditions and (I am confident) non-lethality under the temperature regimes discussed in this thread.

1122:

"What I meant, and actually said, is that "it" (meaning users expectations) is about exponentially increasing computing power for a given cost. That's the only form of "Moore's Law" that matters. We still have decades of that to go."

Actually not. I have a Sandy Bridge i7 CPU, nearly five years old now. If your version of Moore's Law still held, the equivalent Sky Lake processor should be four times as powerful, or cost a quarter as much for the same power, or have an equivalent combination of more power and lower cost.

According to an average of various reviews and sellers, it's about 1.5 times as powerful and 1.1 times the cost (leaving aside inflation). No factors of 4 in there, and cost has gone up.

Moore's Law (performance/cost version) ended in about December 2004. We're still getting improvements, but they're not exponential any more.

1123:
At a guess, hobbit holes and thick adobe probably won't work against black flag weather, which is why you don't see adobe homes popping up in, say, South Carolina.

Thick adobe's (or any soil) is wonderful stuff in a desert, because it's got tremendous thermal inertia, so it takes a long time to heat up and a long time to cool down. Thus, it hold's the night's cold well into the day, and the day's heat well into the night. That's wonderful in a desert, where the temperature fluctuates widely because there's relatively little water in the air as humidity.

The problem is, humidity also has thermal inertia, so if a place is humid, the temperature doesn't vary as much. Once it gets hot, it stays hot, and doesn't cool down as much at night. Adding adobe to the situation just adds a little more thermal inertia, which just makes things worse.

There are three solutions to dealing with high heat combined with high humidity. The biggest one is to avoid it in the first place. The second is to find or make a cold sink to dump the heat. The third is to get *a lot* of thermal inertia by going deep underground. When you get a lot of earth between you and the weather, it can take weeks to years for the thermal pulse to get to you, and it gets attenuated as it goes. This is why deep caves tend to be the same temperature year-round: eventually yearly fluctuations get evened out.

So, if people want to live under the black flag, the best solution is to go deep underground, to become seasonal mole people or build something like Pernese holds, only better. If black flag weather is seasonally widespread in an area, the advantage it provides to people who live with it is that they're unlikely to be invaded or conquered, simply because people will die trying.

Admittedly, I've had some fun thinking about post Apocalyptic southern Gothic, with very white people living through lethal Augusts by burrowing like moles deep under the ruins of, say, the Fox Building in Atlanta...

---

**1124:**

Okay - most of the comments about surviving global warming say 'lots of people will die'. Some questions to the bio/med folks because I think we need to make this issue a lot more personal. (I tried looking some of this up but can't find/understand it.)

Fertility (or, boxers will not be sufficient) ... what exactly is the likely impact on male and female fertility if black flag weather becomes more common?

What impact on carrying to term ... apart from really, really ticked off women once they hit their third trimester? What happens to fetal development during droughts?

At what point (temperature and duration at that temperature) does DNA start mixing it up a lot more? (This would include spontaneous mutations, more mixing with environment as in epigenetic changes which are heritable.)

Impact on infant mortality just because of black flag weather? AFAICR, infants do not have good temperature regulation.

Basically what I'm saying is ... it's one thing to think that some anonymous, other adult will die or to moan about the inconvenience of doing without all of the office/home tech we now have. It's quite
another thing to know that no, you can't have any babies, your baby is not likely to survive to 1 or 5 years, the mother of your child(ren) may not survive*, etc.

(* Okay, here I'm guessing that black flag weather when combined with pregnancy-related hypertension and/or diabetes makes for a really bad mix.)

1125:

That's interesting and relieving, though the relief is coupled with guilt about the inherent selfishness I suppose. That's because I'm 45 now, and if in the remainder of my lifetime Brisbane's climate comes to more closely resemble that of Townsville (cf Bacchus' remarks around Texas containing multiple climate zones with Queensland...) then that won't affect me greatly, and if likewise Townsville's climate grows to resemble Singapore's more than it does Ho Chi Minh City's, then I will still be in a position to visit my family there moderately often, and they in turn won't be unduly put out either.

And yes I suppose I do want to repeat my intuition that the factor missing from this discussion of black flag weather is wind. You get sea breezes in the coastal tropics, where the diurnal temperature range is constrained by the ocean, but you also get them in the hinterlands of these areas, where it isn't, or the effect is less pronounced. This is at least true in Australia, where the east coast has a plateau-topped Great Dividing Range almost all the way north-to-south, about 100km inland (on average). Other places have similar features I'm sure. Some of these elevated tablelands are currently highly productive agricultural areas. I do wonder about the direct effects and the future viability of such zones in particular.

1126:

I agree with Jay. It's useful to think of Earth's biosphere as a four billion year-old nanotechnological ecosystem that runs predominantly on solar energy, at roughly room temperatures, using easily recyclable elements in aqueous solutions.

Note that this doesn't mean that a jet doesn't fly faster than a hummingbird. What it does mean is that you can't feed the jet sugar water and expect it to reproduce as well as carrying people and flying at Mach 1.

Some things I'd suggest not doing with nanotechnology:
--substituting it for magic
--substituting it for pixie dust (this is also true of mycorrhizae, but that's a different rant)
--Trying to make it one gizmo do everything. There's a reason why redwoods don't fix nitrogen and aren't skyscrapers.
--Being a technology chauvinist (in other words, thinking engineered solutions are better than nature under identical circumstances). 4 billion years is 4,000,000,000 years. That's a lot of time for bad designs to get weeded out.
The thing is, there's a lot you can do with nanotechnology. It's decent handwavium for (among many other things):
--building true technological ecosystems, where elements get recycled. That's a nano-scale problem, and it's essential for living in space, or living with a lot of people on this planet.
--building truly complex internal structures. A conventional sword blade is forged from a sheet of steel at high temperature. A nano sword blade can be grown (over a few weeks to months) at room temperature in a high-iron solution, but have a hardened outer rind, a steel foam core, and therefore be tougher and lighter. Since weight and size in swords are critical design components, this means that you can make a nano-sword bigger than a conventional sword, but with no greater weight.

In general, growing stuff allows you to make complex, 3-D structures that are difficult to fabricate. With nanotech, you can also do combinations of grown and fabricated technology, which does let you do things that are truly exotic, like the warm, fuzzy spacecraft I referred to above.

And as Jay said, if you're building nanobots, they better be communicating with lasers. Radio controls won't work at that scale.

1127:
No. The teraFLOPS on the desktop are arriving, but not as the overpriced CPU.
@Jeep Eep
"Exponential growth is an illusion of the cybernetic totalist."

The thing is, we are about 30 or 40 orders of magnitude from theoretical limits, even without quantum and reversible computing. I think we can squeeze another 6 or so out of that overhead.

1128:
Like I alluded to, one way to use high-thermal-mass building in places where the heat is more constant, the diurnal range is smaller and the humidity is high is to "build inside out". You build a concrete structure with deep foundations that hopefully connect with bedrock, depending on the local geology. Then you clad the exterior in lightweight, reflective material with either a heat-circulation air-gap or some other means to insulate the thermal-mass from the sun and the outside air temperature. Some would add an open roof some distance above any other part of the structure. Then it's really a matter of conduction versus insulation, with some thought about managing air convection in the circulating parts.

If the prevailing underground features are too warm for any geo-coupling to be a net cooling sink, then you insulate your thermal mass against that too. The resulting closed system might need more active components to shed heat, but these can be designed to be driven by passive processes also (with a bit of ingenuity). Stirling cycles and radiating heat exchangers with pressure gradients. Low-tech, highly designed systems that take their relatively low power requirements from existing thermal gradients.
Don't count your chickens before they hatch. Either on power, or what can be achieved with it.

I was explaining some of my story points to a friend that included threats and constraints, and he said, "If they have nanotechnology, why do they have any limits on what they can do?"

Just pulling your leg here - If you have the technology to use nanotech to make a sword, it seems unlikely that a sword would be a first choice for a weapon unless the story world is some sort of steam/cyberpunk fantasy mix. Which is okay if it is, but then the rules of the story world become more important than what is actually possible.

I can posit that the nanotech can do certain things without technical explanations (handwavium!) but I still have to be careful about not setting up broader incongruities.

Thanks. Minor quibble: lasing requires a population inversion in the laser material, which is probably prohibitive with a nanoscale battery. They also need fairly accurate targeting information for the communications, which means sensors and processors drawing power. I'd try using lasers to control the nanomachines from some more reasonably sized system. It can also be a power supply, if the stray heat isn't going to cause trouble.

The thing that bugs[*] me about SF nanotech is that it always seems to mean a billion tiny perpetual motion machines... because just saying "nano" seems to make the laws of thermodynamics vanish like magic.

[*] see what I did there?

The thing is, though, that people do in fact adapt to such conditions - which was sort of my original point.

You don't have to go deep underground to really normalize temperatures, 15-20 feet is probably fine

http://www.builditsolar.com/Projects/Cooling/time-lag-vs-depth.gif
also, you can always have your hear pump go underground for you, assuming you have electricity. While i guess that is technically "air conditioning" its far less power intensive then normal air conditioning

1135:
The point of the nano-sword isn't to use it, it's to demonstrate the difference between something built with our technology and something built with nanotechnology. It's difficult to build a functional metal structure with a spongy interior and a hardened rind using current technology, but it's normal to see such structures in biology. That's how our bones are built, for example.

When we're talking about complex structures built from nanotechnology, that's what we're talking about.

If this doesn't make sense to you, the bigger point is that people with technical backgrounds who comment here mostly grew up reading the same fantasies you did. We'll recognize when you're substituting nanotech as a trope for magic, because we've seen that before too (Hannu Rajaniemi's Quantum Thief trilogy was very much in that vein, and the trope has been used since the 1990s). It's normal for the latest futuristic technology to be used as a substitute for fantasy magic (this has happened with psionics, genetics, nuclear power...), and it's normal for novels to outgrow this trope and figure out what the technology is truly good for, if anything.

If you want to not go with any nano-shibboleths, I'd suggest reading up on what both modern nanotech has proved capable of and what Eric Drexler thought we might be able to do with it back in the 1980s. Truly futuristic nanotech is somewhere between these two.

1136:
Actually, if you get away from magic bacteria, there are some fun things you can do with nanotech: insect-size robots and drones do come to mind.

One invention I've used in stories is swarming stunbots formatted as a locust swarm. They were used for taking out an armed camp, and they used a combination of taser technology (one shot per bug), and traquilizers (with monitoring so that the proper dose is administered for tranquilizing, which is hard to do with dumb dart).

You can also make mix-and-match insectoid robots that would have a large range of functions, especially if they could work together. They don't assemble themselves magically in seconds, but as a technology they're quite versatile.

1137:
The thing is, though, that people do in fact adapt to such conditions - which was sort of my original point.

Over 34 C wet-bulb temperature and you will die.
The current record for wet-bulb temperature is around 31 C. The expectation is that wet-bulb goes up about three-quarters of a degree for every degree of warming. 7 C warming puts the wet-bulb at 35 or worse and that's it for humans outside any place it gets that hot. (This is where the "not under a firehose in a hurricane" comes from; you have to be able to reject heat from your skin to function.)

Also note that it doesn't have to get that hot to kill people; heat stroke kills a lot of people already.

1138:

Personally, I don't use it that much in my stories. In my current idea (slightly divergent timeline from our own, about... 70s or so change), it petered out about 5% ahead of how it is now.

1139:

On a totally different topic, I'm reading the COP21 Agreement. Article 12 just caught my attention. It says (in its entirety):

"Article 12

Parties shall cooperate in taking measures, as appropriate, to enhance climate change education, training, public awareness, public participation and public access to information, recognizing the importance of these steps with respect to enhancing actions under this Agreement."

Sounds like a job for science fiction to take on, doesn't it?

1140:

"At a guess, hobbit holes and thick adobe probably won't work against black flag weather, which is why you don't see adobe homes popping up in, say, South Carolina."

For much of the thread people were using Texas as a poster child example of a place this black flag weather is anticipated. My point is that adobe is a perfectly fine technology for adapting to higher temperatures in most of Texas, precisely because Texas is a huge place and big parts of it away from the coast aren't currently as humid as the weather you're calling "black flag" no matter what the air temps.

Of course that could change.

1141:

Agreed about Texas. How much adobe do they use in east Texas, anyway? I've only been through the panhandle recently.

The black flag area is the deep south: Mississippi, Georgia, Alabama, the Carolinas. How big the area gets depends on how hot the climate gets, but in general, it's places that now complain about
summer humidity and brag about how they endure "100/100" weather (100°F and 100% humidity, which they don't actually experience).

1142:
You will die with prolonged exposure to such conditions (6+ hours) and the research i read says >95 degrees wet bulb is fatal not 94C

http://www.purdue.edu/newsroom/research/2010/100504HuberLimits.html
the research quoted below is modeling a 12C increase not a 4C, 12C is the worst case scenario
it's important to note these guys are modeling not just temperature but humidity, which is harder in a lot of ways

1143:
34 C? 94 C will kill you quite promptly under terrestrial conditions.
That article talks about 12 F and 21 F as amounts of warming; that's ~7 C and ~12 C. (12 C is the amount of warming that subjects half the current human population to lethal temperature excursions.)
IPCC worst-case scenarios tend to be what we've got, so far. Remember that it's the product of a consensus driven in significant part by a desire to not be alarming.
Also remember that the limit wet-bulb temperatures involve an assumption that you are doing nothing, lying still, thoroughly hydrated, with wetted skin naked in the shade with a strong fan blowing air over you. Any activity or deviation from this rather strict scenario -- such as the metabolic effort of digestion -- will shorten your survival time.
The initial such temperature excursions will show up long before they're common, too.

1144:
My great-grandparents had an extraordinarily comfortable small adobe home built into the side of a hill in central California, in a region where the temperature record is 47 C (117 F). Admittedly humidity is rarely a problem. The interior was pleasant year-round. There was no air conditioning and even in the winter heating needs were modest. I don't know why the only one I ever saw was theirs, and it over 80 years old. Poor earthquake resistance?
Recalling just how comfortable that home was, how little money/energy it took to maintain the comfort level, how well it was built with abundant and energy-frugal local materials... it's extraordinary how badly and expensively structures are made now with nearly a century more accumulated knowledge to take advantage of. But it also reminds me that there are a lot of opportunities for cutting energy use/emissions without reducing material comfort at all.
1145:

My great-grandparents had an extraordinarily comfortable small adobe home built into the side of a hill in central California, … I don’t know why the only one I ever saw was theirs, and it over 80 years old.

At a guess, problems getting financing, and problems meeting a building code designed for conventional homes.

Years ago, in the days of rising inflation when I was working in Alberta, one of my colleagues decided to save money by building a log home. By the time he'd convinced the bank it met all the requirements for a mortgage, he'd have been better off building a standard home, as the rates had risen that much in the month it took to work through the paperwork and approvals. And he'd have had a home he could sell for a higher price into the bargain.

1146:

Adobe's great stuff in the right climate but it's not especially amenable to wiring or plumbing. This is the sort of thing where someone has to spend a lot of money getting the code changed and it still won't catch on because the sunk cost of training the construction trades (in a very profit-oriented industry) is huge.

1147:

Old-school adobe really isn't what you want to be in during an earthquake. I'm not sure whether it's better or worse than unreinforced masonry, but it's certainly in the same league. That it survived in central California sounds like luck more than anything else.

Much as we love to hate it, modern balloon construction is actually fairly resource efficient, earthquake safe, and (if the ijit architects and builders pay attention) relatively safe against wildfires. Properly insulated, it's relatively temperature efficient too.

Of course, it's not terribly durable and depends on products from all over the world, rather than the earth in the back yard, but there you have it.

Incidentally, it's also worth checking out rammed earth and cob, if you want two other ways to build with earth. I've also seen some nice hay bale/adobe composite walls. Not a lot of thermal storage, but very insulating

As for dealing with black flag weather, I still think about caves, because you've got to allow for the air to get cooled by the earth, and you want to make sure that your earth heat sink is enormous enough that a group of people living there won't heat warm it to uselessness. That's the low energy solution. If you've got energy for heat pumps and such, Damian (#1128) posted a good solution above. Of course, the equipment can't fail, but I suppose caves have failure modes too.
1148:

I suppose caves have failure modes too.
Caves flood.
(Unless you've got lava tube caves, which may have other issues.)

1149:

Adobe is definitely worse than masonry. Check out Gavin Maxwell's account of the Agadir earthquake in "The Rocks Remain". Entire districts simply disintegrated into "dust - dust that smells of death".

I would note that we already know that ground heatsinking does not work on urban-sized scales, from the experience of the London Underground. I can remember when this used to be a thermal refuge of sorts. It isn't any more. The century-odd of heat going into the clay has caught up with it and the problem now is to figure out how to keep it going without passengers collapsing from the heat.

1150:

Right on cue (almost):

*The Satpura railways opened up a previously inaccessible hilly area of central India as part of the government's response to the Great Famine of 1878. Before the railways came, there were only bullock carts to carry food to remote famine-stricken areas.*

From this post:


On the same railway facing closure

1151:

Will the advances in q-computing ( see previous references of D-wave getting up to 1024 bits ) make a significant difference, soon?
I assume that longer-term it will, but how much longer a term?

1152:

Don't bother, she's talking ignorant blather, as usual, once we'e worked out that it's ignorant ... etc

1153:
quantum computing hardware is already here, or hadn't you noticed?

1154:
And education level is usually regarded as vital in "Class" determination, as well, which is why I "class" (cough) as A2 (maybe even A1) in spite of a pathetic income ....

1155:
Certainly true, but not relevant to the point I was making. There really are absolutes beyond which people die. And there are definitely climate conditions that make life more difficult. My point though was that this is not a valid jumping-off point for northern Europeans to complain about the climate conditions millions of people live with in the tropics and even sub-tropics now. An Englishman complaining of heat while refusing to take off a woollen suit is such a cultural stereotype that it's escaped mentioning - all I'm really saying is: don't be that guy.

1156:
Move number one, in the UK.
Get the Barclay Brothers & their paid lying hack, Christopher Booker totally discredited.
Also Lord Monckton ....

1157:
That heat in LUL's tunnels comes from thermal dumping from the trains....
The newer stock & that which they will be ordering in future won't be dumping that heat energy - it will be electrically-fed back into the system through regeneration.
Even so, bigger fans are being installed & ground-aquifer water-cooling is just starting to be used ....

1158:
And the people. 10 people = 1kW, roughly... Imagine the Underground with every 10 people replaced by a 1-bar electric fire. It's no wonder really that the thermal reservoir is full.
Barclay brothers: ack, spit...

1159:
LAND - Livestock or livestock feed occupies 1/3 of the earth’s ice-free land.
This seems a bit high. Unless you're also excluding deserts and mountains. Then maybe.

1160:

you don't have to go deep underground to really normalize temperatures, 15-20 feet is probably fine
It is my understanding that in many places with large concentrated populations the underground temperatures are not all that cool. Indonesia? I think it was on this blog a few years ago that someone pointed out that this temperature is correlated to the mean air temp in most places.

1161:

How much adobe do they use in east Texas, anyway? I've only been through the panhandle recently.
In my semi-frequent travels around the Dallas/Fort Worth area I don't seem much "real" adobe but there is a lot of concrete slab construction for both commercial and residential. Much more than I've seen in other part of the country. At least east of the Mississippi. Outside of Florida that is. And a slab is going to be better at using the thermal mass of the earth than a typical foundation or pier with raised floor approach.

A friend in the DFW area is a realtor and a common problem with vacant buildings is settlement of the slab. Her comment was that in many cases if you turn the sprinklers back on the ground will "expand" back to where it was during construction and the settlements mostly go away. The ground around there has a very high clay content.

1162:

You'd still have the terrible problem that time-to-market beats software quality hollow. ... Business prefer a widely-known incantation to a robust and flexible solution.
Sometimes this works to hillarious effect, as when, in one memorable case, the software life cycle for a machine vision system was pegged to a somewhat different life cycle of 274 days ...

I got this story from Hannu Rajaniemi, who at one point was doing consultancy work in pure mathematics. A machine vision system was being integrated into a robot cow milking machine: idea was, when the cow was ready to let down it would sidle up to the milking robot which would hook it up. The output was more and better quality milk, less stress and fewer udder infections for the cows, and Farmer Giles didn't have to get up at 4am in the cold and the rain to go out to the milking barn. But the input was a cow and a robot, which had to figure out what a teat looked like and slide a milking machine spigot onto it. Cows approach the robot at whatever angle they feel like, and when the arrive they come in a variety of shapes and sizes, not to mention colours! So machine vision was important, and the company selling the robots was under pressure to roll out new software releases ...

Until Hannu and his consulting firm discovered something bizarre. The software release cycle was on the order of 12 months. But to the farmers, the cow release cycle was on the order of 274 days.
So the farmers were *breeding cows with easier-to-recognize udders* while the machine vision folks were tweaking their software to better recognize traditional non-algorithmically-selected cow udders.

(I suppose it could be worse: this being animal husbandry, they could have just compromised and agreed to tattoo a targeting grid on each udder, to help the robots ...)

1163:

iPads and tablets in general are a special case. They're dominated by power consumption issues, which in turn are choked by battery performance (really difficult to improve without turning them into an incendiary grenade) and screen efficiency (you want a nice bright daylight-readable screen? That will suck juice in proportion to the screen area and the ambient light level -- indoor lighting isn't a problem, but the human eye has a logarithmic response to light levels (so we can see in noonday sunshine and by starlight) so ramping a backlight for use outdoors drains batteries). The early ones compensated to some extent by using woefully underpowered CPUs originally designed for phones (where small screens and long battery life are mandatory). But Apple -- and the other tablet vendors -- then rapidly began beefing up their tablet processors.

The latest iPad Pro processor is a dual-core 64-bit cpu closed at 2GHz. It's got a fairly beefy GPU because it's driving 5.6 million pixels, and 4Gb of RAM, because anything less would be silly. Add 128Gb of FLASH storage on board and it's roughly equivalent in performance to a circa-2010 Macbook Air (a light/thin portable laptop, not a power workhorse, but a 2010 laptop nonetheless), albeit with that insanely beautiful screen. It's something like 70 times as powerful as the original iPad 1; each iPad generation is roughly doubling in performance.

This isn't Moore's law, though, this is Koomey's law. These aren't cutting edge processors with a new node size, they're existing node processes being used to produce a more power-efficient chipset optimized for battery life.

1164:

*Actually, if you get away from magic bacteria, there are some fun things you can do with nanotech: insect-size robots and drones do come to mind.*

These days, I've got a plausibility rule for nanotechnology: "if it's a naturally occurring biological process, you can plausibly expect a nanotechnology approximation, the key advantage of which is that it may be much easier to debug and refine."

Also, biological processes tend to be limited by bond energy: not carbon-carbon bonds, but things like disulphide bridges in peptide tertiary and quaternary structure, or hydrogen bonds, or Van der Waals forces. So if a process exists in biology, we *might* be able to perform it much better version using nanotechnology -- but still within the limits of physics and chemistry. (Think in terms of artificial catalysts as effective as enzymes but with a denaturation temperature in the hundreds of degrees Celsius rather than the 40-50 degree range, so the reaction kinetics will proceed several-to-
many orders of magnitude faster. Or a "mechanical horse" for pulling a carriage by means of burning fossil fuel and driving a heat engine rather than chowing down on hay and spending a chunk of its metabolism on wasteful stuff like making organs for generating more horses or foraging for more food: that's your pre-nanotech metaphor.)

1165:
"Reversible computing hardware is probably of the same order of difficulty as quantum computing hardware. Probably about the same timescales as well i.e. 20 years away at best."

Both are very like fusion power - i.e. 20 years away, always were, always will be. Though that MIGHT malign quantum computing.

I haven't investigated the latest quantum hype in detail, but the claims last time were total codswallop, I have heard nothing to imply that they are any better now, and I think that I would have done. It's irrelevant how fast one can twiddle bits, or how much it speeds up a specific algorithm, because the criterion is whether it can solve a realistic range of problems at a speed a comparable conventional computer cannot match using the best algorithm. The jury is still out on whether it is yet another scientific boondoggle.

1166:
"...it may be much easier to debug and refine."

I would heavily emphasise that "may", because I think the major problems might be of the nature of the method itself rather than its implementation. The point being that each nano-thingy, simply by reason of being nano, is made of not very many atoms; this means that whatever program it carries cannot be very complex, and so if complex behaviour is desired from the whole ensemble it must be as an emergent property of the aggregation of simply-programmed elements. And figuring out, let alone designing, emergent behaviours is something we are definitely not very good at.

Indeed, I wonder if the necessary skill at figuring them out and designing them might not have more widespread and interesting ramifications than the actual nanotechnology itself...

1167:
I'm guessing that the limiting factor will be our ability to design genetic algorithms for evolving molecular designs -- which is a hard problem, probably on the same order as the protein folding problem (unless we can come up with a really elegant and well-understood molecular component toybox that's easier to fine-tune than polypeptides).

1168:
Not quite magic bacteria but this use for yeast seems promising.
1169:

*iPads and tablets in general are a special case.*

True, but what seems to be happening with the newer, faster models is that the OS is bloating and sucking up a lot of the increased performance. Why else would iOS7 open an app in <0.5 seconds, while iOS9 needs 2 seconds to do the same thing (on an iPad3*)?

*Based on internet reports. I'm not 'upgrading' after hearing them.*

1170:

"Don't count your chickens before they hatch. Either on power, or what can be achieved with it."

But we already know, for a fact, that kilogram mass computers running at approximately exaFLOPS rate on 20W are possible.

1171:

"...quantum computing hardware is already here, or hadn't you noticed?"

DWave is not a general purpose quantum computer. IIRC the most entangled bits for a general purpose QC experiment is around 12.

1172:

*I've got an iPad 3, and am apparently marooned at iOS7 by performance issues*

My iPad 2 (and I mean original second-generation iPad) got slower at iOS 8 or 9 (just upgraded it to 9.2), but it's perfectly usable, and entirely acceptable. I'm not running compute-intensive apps, it's fine.

There are some people who will cry woe and terror at the slightest slowdown; after all, they need something to exaggerate about...

1173:

There have been some crucial advances over the past year or two. For example, at one point it looked like decoherence might be a complete show stopper for QCs, but that has been resolved.
Then we have this:

"Passing the Bell test with such a high score is the strongest possible proof that we have the operation of a quantum computer entirely under control"

Done in silicon using standard semiconductor processing at room temperature IIRC.

1174:

Remember The Blessed Margaret's preparations to use troops to suppress an uprising (that didn't, after all, happen)?

No, do tell... when would this have been, exactly?

Because I've never heard even a rumour about that one, and I've heard a lot of internal Army rumours (e.g. "why the Parachute Brigade got scrapped in 1973...").

Put politely, I think you may been consulting a less than credible source.

1175:

But we already know, for a fact, that kilogram mass computers running at approximately exaFLOPS rate on 20W are possible.

Which kind of gets back to the point I first saw made by Eric Drexler back in 1986: Given the currently popular assumption of materialistic reductionism(*), the observed world, including ourselves, provides a non-limiting existence proof by demonstration of what matter can do. Not too profound, really -- in essence, if you see a material system doing X, then that's a proof by demonstration that at least one material system can do X.

(*)Sometimes called "physicalism."

1176:

"Entirely under control"? Oh, dear. The fact that they have essentially proved that a 2-bit computer is constructible does not mean that a practical one is. There are several critical stages where it is not certain whether they can be handled with less than exponential complexity / precision in the number of bits.

Inter alia, we will get some warning of the production of a practical quantum computer, because the security experts who also know about that area will start running around like headless chickens, because of the impact on public-key cryptography. But I can assure you that they are not particularly concerned.
It came out in the Cabinet papers released in the past few years, and was widely reported. Search on "Margaret Thatcher troops streets cabinet". But many of her plans were widely known at the time.

1178:

Yes - provided such stories actually examine and discuss the variety of specific demographic segments that currently exist in our society. Not just rich vs. poor, or kiddies to teens because anyone 20 or over has died. I'd like to see/know the potential real-life impacts by development stage (age group), gender, pre-existing/most common medical conditions, etc. And, I'd like to see this rolled out over at least 3 or 4 generations. (So far haven't found any public health data that's been tracking anything other than heat stroke. The scope of such data collection seems arbitrarily narrow, therefore is probably missing some connections.)

Charlie mentioned nano as a substitute for enzymes ... what's the life cycle and life span of nano components within biological systems?

1179:

What it means is that they have solved all the major problems that were assumed to be possible show stoppers, as well as demonstrating proof of principle for room temperature QC based on existing semiconductor processing.

From here I would expect the number of qubits to expand very rapidly - at "a more than Moore" rate. So 10 years at the outside would be my guess before RSA etc becomes fully breakable. Of course, the $billions thrown at QC by the NSA might have got there first, but you won't be hearing about that. Check what the US military is using for their high level encryption and ask whether it can be broken by a QC.

1180:

"So far haven't found any public health data that's been tracking anything other than heat stroke."

The tens of thousands of excess deaths in Britain due to the cold doesn't count?


"An estimated 43,900 excess winter deaths occurred in England and Wales in 2014/15; the highest number since 1999/00, with 27% more people dying in the winter months compared with the non-winter months."

But mostly just OAPs and nobody of any importance...

1181:
On iOS update performance: I put my iPad Air 2 on the iOS 9 public beta test track for a while. The beta versions are noticeably sluggish, but when it hits public release and lands on my iPad Mini 4 (two processor cores to the Air 2's three cores) it's significantly faster. There's probably a metric ton of debugging code in the betas, logging stats and uploading to Apple, and that generally accounts for bloat and slowdown in any piece of commercial software.

I'm not sure I'd want to put iOS 9 on anything earlier than an iPad Air 2/iPhone 6, but on appropriate kit the multi-tasking and side-by-side apps and keyboard accelerators and other features make it noticeably more useful than earlier releases.

1182:
Thanks!

These data link to the met office so just took a look at the weather data. According to the map below, November was much warmer than July in the UK. It looks as though the seasons have shifted. Just how bad is agriculture in the UK these days?

http://www.metoffice.gov.uk/climate/uk/summaries/anomacts

1183:
"What it means is that they have solved all the major problems that were assumed to be possible show stoppers, ..."

Until they have shown that the complexity and precision required for each of the stages scale at a manageable rate, that is false.

"From here I would expect the number of qubits to expand very rapidly - at "a more than Moore" rate. So 10 years at the outside would be my guess before RSA etc becomes fully breakable."

I have heard many such claims before, about several 'miracle-working' technologies, and responded with cynicism; so far, I have been right every time. We shall see.

1184:
*The problem is the same as with animal farming: software being written to make money instead of to be as good as possible at doing whatever it's meant to do.*

1185:
Q-computing total codswallop

Really?

http://www.dwavesys.com/quantum-computing

??
From the Guardian article:

"Thatcher asked for contingency plans to be drawn up to use troops to move coal stocks, despite official government policy ruling out the use of service personnel. A plan involving the use of 4,500 service drivers and 1,650 tipper lorries was considered capable of moving 100 kilotonnes a day of coal to the power stations."

It's rather deceitful to claim that using military drivers to shift coal around the country is an example of "Remember The Blessed Margaret's preparations to use troops to suppress an uprising".

I mean, where's the Eisenstein moment of prams rolling down steps? Cold-hearted troops with bayonets fixed, firing on the brave but doomed uprising? How is Victor Hugo going to write a best-seller, or Cameron Mackintosh stage a hit musical on the back of "unarmed Army truckies shift coal in borrowed lorries"?

It's right up there with the Argylls being used to clear rubbish off the streets of Glasgow after the bin men had been on strike for a few weeks - should I twist that into "British infantry used callously against the brave workers' uprising against the well-known and cold-hearted Capitalists of the Glasgow Corporation"? Or did the appearance of Green Goddesses (war reserve fire engines, manned by Forces personnel) reflect the harsh measures dealt out against the revolutionaries of the Fire Service?

Ooops, forgot - those were both cases where the troops who provided Military Aid to the Civil Authority were deployed by a Labour Government...

At that time, I was living in Dumbarton, and visiting a relative who was staying in a nursing home in Largs. This meant that I was up and down the A737 and A760 from St James' Interchange to Largs (You can follow this route on a mapping program if you don't know it) and regularly seeing tipper trucks moving from the bulk terminal at Hunterston to the Ravenscraig Steelworks at Motherwell. These trucks all belonged to civilian operators, not to the military.

Greg, D-Wave's device is not a general purpose QC device -- they aren't claiming it is -- and so far, the jury appears to be out on whether it's any significant improvement over classical computing even in the narrow use case it was designed for (one particular quantum algorithm).

WIRED is basically GQ for Bay Area venture capitalists and you should take their reporting on matters technological with about a tablespoon and a half of salt.
1189:

Could one make a perpetual motion machine if they had a time machine? I am imagining if you had a large enough mass that you dropped in a gravity well, then used its fall to drive a generator which powered the time machine. Then you shift the mass back in time to before it had finished falling, endlessly. If the time machine didn't gobble too much juice you'd get infinite free energy! It's the Stupidity Drive!

1190:

Okay, here's something deeply cool: ARM just demonstrated a printed plastic Cortex M0 CPU. Using an imprinting and inkjet printing and imprinting mechanism to print transistors on plastic film, using a technique similar to the ones used for printing CD/DVD/BluRay disks. There's a fun graph they showed suggesting they'll be able to print plastic Cortex A5 processors by around 2020 -- a 'real' (albeit weak by modern bleeding-edge standards) CPU, the M0 being a glorified microcontroller.

Here's the point: the price of printing plastic components -- as opposed to growing extremely pure semiconductor crystals, then slicing, dicing and using lithography to build up surface impurities configured as circuits -- is very cheap indeed, and this process, while it's unlikely to scale down to the smallest node sizes, may be amenable to packaging as a turnkey device able to run on a handful of relatively cheap organic feedstocks and spew out low to medium powered CPUs and microcontrollers in bulk.

(One of the things I've been saying for ages is that supply chain issues for climax tech products -- like microprocessors -- would dog any attempt at interplanetary colonization for decades or generations: moving a chip fab line to Mars just didn't seem practical, even in Musk's wilder 50-year plans. But this ... potentially changes things. Especially if you can build a plastic chip printer where the control electronics are all printed plastic components rather than expensive germanium or silicon substrate semiconductors.)

1191:

So, not to change the topic or anything, but I have a question that relates to the interests of many of the people around here. Does anyone know what the actual efficiency of the best irrigation methods are? I'm looking for a ratio of how much water diverted from a source makes it into a plant vs. the proportion that doesn't. And do we know where the latter portion goes? Naturally, I'm mostly interested in arid regions and high yield/low water plants. If cost data is attached that would make my day complete. Thanks in advance.

1192:
Uses limited mostly by how far we're prepared to go the other way from Microsoft's "ridiculously over-sized instruction sets" maybe?

1193:
Time to bring back Oberon.

1194:
Cost per GFLOPS
2012 - $0.73
2015 - $0.08
https://en.wikipedia.org/wiki/FLOPS

1195:
Don't have any solid numbers but for years drip irrigation has been promoted to community and amateur gardeners as the most efficient watering system. I believe that the most common/popular commercial drip irrigation systems were developed in Israel.
http://www.timesofisrael.com/israels-drip-irrigation-pioneer-our-tech-feeds-a-billion-people/

1196:
You are misquoting, yet again.
I said that the CLAIMS were codswallop - they were. I said that the jury is still out whether quantum computing is a scientific boondoggle - it is, though I admit that I was talking about the jury of computing experts.

1197:
But we already know, for a fact, that kilogram mass computers running at approximately exaFLOPS rate on 20W are possible.
Ah, one of my shibboleths: the "floating point operations equivalence" of systems that do not naturally execute floating point numerical operations at all. If you make humans perform the individual arithmetic operations in a LINPACK benchmark using their brains and perhaps pencil and paper, you'll get around 0.01 floating point operations per second if you're lucky.
The human brain to exaflops equivalence is based on estimates of what it would take to simulate the brain on digital hardware. But it takes a ridiculous amount of computing power to simulate a lot of physical processes down to the observable limit of detail.

A) Biological brains would take exaflops to perform high-fidelity digital simulation in real time, but dissipate less than 20 watts during ordinary operation, therefore exaflop computers dissipating less than 20 watts are possible.

B) A smoldering cigarette would take exaflops to perform high-fidelity digital simulation in real time, but dissipates less than 5 watts, therefore exaflop computers dissipating less than 5 watts are possible.

C) A melting ice cube would take exaflops to perform high-fidelity digital simulation in real time, but actually cools the environment instead of heating it, therefore exaflop computers dissipating less than 0 watts are possible.

A lot of people seem to believe the faulty logic chain A without really believing B or C. But A is not any less questionable.

The low power dissipation of the human brain should perhaps make us suspect that the perfect fidelity of digital logic is a limitation rather than an advantage when it comes to mimicking biological intelligence. Or perhaps it should make us suspect that we need a lot more understanding rather than a lot more power to mimic biological intelligence. The least likely lesson is that biological intelligence and digital computing offers two-way equivalence. A machine that can play the imitation game well enough to fool experts does not imply the imminence of a Tianhe-2 equivalent that can run off a smartphone battery. Nor does raising LINPACK records another hundredfold imply that supercomputers are about to reach "human-level general intelligence," even presuming that such a phrase has a well-defined meaning to you (it does not to me).

1198:

"Okay, here's something deeply cool: ARM just demonstrated a printed plastic Cortex M0 CPU."

I hadn't noticed that - yes, definitely noteworthy. People have been working on that for a while, but that indicates that it really does seem to be getting close to production. I believe that essentially the same technology can be used to print several kinds of sensor, too. I don't know what the state of producing mechanical force (e.g. contraction) is, but there are several physical effects that might be used.

Obviously that is a different kind of game changing than the one you refer to, but is clearly more likely in the short term. Medical, fashion and entertainment uses all spring to mind.

1199:

OTOH, digital computers can simulate analog systems to arbitrary precision. The lower estimates of Human brain processing power come from comparing what it takes to perform similar tasks eg the retinal subsystem.
The notion that a Human brain would have to be simulated down to the molecular level is itself naive, given that most of the neural machinery is dedicated to keeping it alive, and not computation.

1200:

Yes, it is the theory underlying the solutions to such problems - which we do not have much clue about at present - whose elucidation will have consequences that my imagination fails to encompass. Whether we solve that first and then apply it to such problems, or whether the solution of such problems gives us enough pointers to get a handle on the theory...

As for printed computing: deeply scary. It will be combined with algorithms for generating a coherent image with no or minimal lenses (which already exist) and wearable surveillance technology, disguised as some silly gadget that people can be convinced that they must have, will become ubiquitous.

1201:

No... A is better expressed as "a human brain performs computational operations equivalent to x exaflops of digital computing power, which demonstrates that that level of capability is achievable with 1kg and 20W"; B and C are irrelevant, because neither the cigarette nor the ice cube perform any kind of computation at all.

1202:

I've actually given talks on exactly that point.

That price was achieved by packaging two massively parallel AMD chips built on a 28nm process, each with 6B+ transistors. However AMD has been stuck at a 28nm process since 2012 and haven't been able to transition to 20nm, let alone the industry leading 14nm. They've made all those extra flops that by making very big, very hot chips, improved yields and tweaking architecture. Nothing to do with a process shrink. You can only take that approach so far (eg: how long it takes for data to cross a chip, getting rid of the heat generated, wafer size).

When TSMC has a fab as good at Intel's 14nm one, AMD's chips will be even better, and you FLOPs will be cheaper. We are still milking processes to make them better, and can continue to do that for a while yet. No one is denying that.

However, there is no guarantee that future moves to smaller processes will make devices cheaper. Intel transitioning to 14nm was apparently much more painful and more expensive than expected. When jumping to radically new pixie dust technologies such as carbon nano-bollocks, where there is absolutely no experience of operating and building such fabs, it may not be worth the effort except for some specialist corner cases that need the process shrink (what else do you put on smart bullets?)
1203:

Applauds!

1204:

I could be persuaded.

1205:

*When TSMC has a fab as good at Intel's 14nm one,*

It depends on whether you believe the various claims and counter-claims, but the current TSMC 16nm process is equivalent to 14nm, and is now shipping some fairly complex chips...


1206:

*they'll be able to print plastic Cortex A5 processors by around 2020*

Where would that be relative to my standard of old and slow and pathetically 8-bit but still significant processors, the Z80?

1207:

Many (perhaps most) human beings cannot correctly multiply two randomly chosen numbers like 254429.68480812077 and 322101.22586552013. AFAIK nobody has ever taught a non-human animal to multiply such numbers. Everyone* knows that digesting a meal or burning a cigarette has no floating point arithmetic equivalence. But a lot of people seem to "know" that all human brains, and many biological brains of genetically similar relatives, are computing devices with performance that has a quantitative equivalence to numerical operations on digital computers. Even if the particular brains under discussion have never demonstrated correct evaluation of arithmetic operations.

Trying to normalize radically different things to floating point computational equivalents is the very problem. It's a category error. Or maybe it's a sort of communicable metaphor that's run amok: using the metaphor of computing to understand processes that don't work anything like manufactured computing devices, and becoming unable to stop seeing in terms of the metaphor even when it starts impeding understanding instead of aiding it.

*Well, maybe not everyone. When Rudy Rucker was a guest blogger here we got into a minor tiff over whether inanimate objects like rocks are computing.*
1208:

I have nothing to back it up, but I stayed a week with a friend's inlaws. They had built a commercial hydroponic system. Rectangular section plastic pipe sitting nearly horizontal on racks. There was a slight fall from one end of the field to the other. It appeared to be pipe that's intended as downpipe. Approximately 150mmx100mm. At regular intervals there was a hole about 100mm dia in the top surface. They had seedlings in small conical plastic pots that could be dropped into those holes. From memory there was no growing medium as such but I could be wrong. Plant roots would spread out from the small pot and sit in the water. A small pump pushed water up from a holding tank (about 5000 litre tank) to the top of the field. Water trickled through the pipes to the bottom of the field and back into the holding tank.

They told me that the only use of water was transpiration by the plants. (again, they could be wrong, exaggerating, simplifying or I could remember it incorrectly). They were annoyed if it rained as water would run down the plants and dilute the nutrient water. If it rained for more than a few minutes they would switch off the pump and put the water from the field to waste. Several acres of plants were in effect being watered by a normal domestic town water supply, controlled by a normal toilet float valve. Rain wasn't really an input, just an annoyance.

They had a pretty effective market gardening operation, that had no stoop work (Harvest was picking up the entire plant still in the pot and packing it in a box) and used very little water. It might not be the "most" efficient irrigation system but I find it hard to imagine anything better.

1209:

That was what I was about to answer: hydroponics is reputedly the most efficient.

With soil irrigation, there are two other loss-routes for water: evaporation directly from the soil, and drainage away from the plant roots. Absent a leak, neither of these happen with hydroponics.

If you're talking about growing plants in soil, there are a variety of low-flow heads, emitter, tape, etc. that are reputedly efficient in different contexts.

Another problem is when water contains dissolved ions, especially sodium, magnesium, and selenium. The general problem is that you don't water with distilled water, so the water you use contains dissolved salts, and soils contain some salt too. If you're being extremely water efficient, you can get a lot of salt build-up in the root zone of the plant (basically, the plant pulls out the water, leaves the salt in the soil, and prefers to let a little bit of root die if it happens to be in a salt patch. It can always grow new roots around that). One reason why California growers used to flood their fields with river water was to wash the salts out of their soil, and the salts ended up in places like the Salton Sea and the Kesterson wildlife refuge, where they caused other issues. Now that they're using efficient water delivery, salt is an increasing problem.
So far as data go, you're going to have to assemble it yourself. Talk to the hydroponics crowd for their numbers. If you want to mention where you're thinking of gardening, I or someone else might be able to help out with efficiency numbers for crops.

1210:
I thought their 16nm was still at the 'small batch stage'. Still somewhat surprised AMD hasn't shifted to 20nm for their GPUs.

1211:
"..When jumping to radically new pixie dust technologies such as carbon nano-bollocks, ..."
Well, it's all bollocks until it's done, then it's history.
Quite recently I threw out an old Proceedings of the IEEE that starred a couple of papers from around 1980 showing conclusively that feature shrink could not possibly go beyond the 100nm node for many fundamental reasons.
Bollocks becoming history.

1212:
gasdive @1208,
I am reminded of the quote "Efficiency depends on what you're trying to effish".
If the people you describe are treating rainfall as an *annoyance*, then water availability definitely isn't their limiting factor.
That's not to say hydroponics isn't the most efficient form of agriculture. In fact, crazy as it may seem, I've sometimes wondered whether AQUATIC plants might not have the best overall water-foodstuff ratios because you then don't have the transpiration issue. Grow in the equivalent of a huge plastic bag, with mechanical addition/removal of gases and other nutrients as required.

1213:
Interesting.
It would appear I can submit comments successfully, but NOT preview. I wonder if this is a 'feature' of my security settings ...

1214:
Heh, growing plants underwater is an artform all by itself! Google images for "Dutch Aquarium" and "Amano Aquarium" for the two prevalent schools of thought.
I kept a high-tech freshwater planted aquarium for a while and it's a constant balancing act. Macro-nutrients, micro-nutrients, CO2, and light all kept in just the right harmony or algae will bloom and wreck the whole thing. At the hobby level the standard protocol is massive water changes on a regular basis to flush the system since there are chemical processes going on that nobody understands anyway, so it's not water efficient at all.

1215:

re Hydroponics: Thanks for the help, guys. What I really need to do is put a number to it- not just the irrigation efficiency, which sounds high, but also the cost (I assume that it costs more to produce a given biomass using hydroponics). After all, if it's very energy intensive, that doesn't help us much. It doesn't have to be cheap- if it's less than twice as expensive as current industrialized agriculture, then it's worth looking at (because industrialized agriculture is about to get much more expensive).

The other half of this equation is the nutrient solution- if it's just a liquid version of the nitrogen fertilizer industrialized farming already uses, that doesn't seem to help us much either. What I would like, ideally, is a semi-closed system that requires few inputs after the initial investment, which can be scaled up efficiently (say 50 acres). Somebody, somewhere, must have done this research already.

1216:

You've always got nutrient inputs with a plant system, because you're pulling nutrients out when you harvest the plant. The question is how you source the nutrients, whether they're industrial chemicals or some homebrewed and pasteurized manure tea. So far as I know, both have been used.

As for numbers, I don't have them. Locally, hydroponics seems to be cost effective for lettuce, basil, and a few other greens. The idea is that the plants are more expensive than what came out of the field, but they're fresher because they're produced locally, so they have a longer shelf life. Hope this helps.

1217:

Trying to normalize radically different things to floating point computational equivalents is the very problem. It's a category error. Or maybe it's a sort of communicable metaphor that's run amok: using the metaphor of computing to understand processes that don't work anything like manufactured computing devices, and becoming unable to stop seeing in terms of the metaphor even when it starts impeding understanding instead of aiding it.
When you compare a computer that achieves most of its GFLOPS performance using a GPU (a highly parallel, pipeline architecture) to a CPU (a general purpose, branch-capable architecture), you're already making a sort of category error. The sort of algorithms you can run on a CPU aren't necessarily the same as those you can run on a GPU at all.

Nevertheless, we need some way to compare these systems which allows for quick order of magnitude analysis. Otherwise, we'd be stuck just listing out the processing components and saying: "well, list A and list B aren't even the same length, so let's give up."

If you step back, this is really what this sort of GFLOPS handwaving fundamentally has to be: just a very rough approximation.

In that sense, I think that comparing a human brain to a Von Neumann style computer is reasonable. The problem is that we really have absolutely no idea what sort of fudge factors one would need to use to compare a human brain to a computer in any meaningful sense. Certainly comparing in terms of molecular simulations is ridiculous, but so is counting up the neurons, modelling synapses as bits, and so forth. People have been coming up with wildly divergent "FLOPS equivalence" numbers for the brain for decades, but I don't see any reason to believe that today's made up numbers are meaningfully better than last decade's.

What I'm trying to say is: figuring a GFLOPS equivalence for the brain isn't a category error per se. We just have no reason to believe that the numbers people throw around (10^22 ops/s and so forth) have any relation to reality.

For all we know, a high end supercomputer today might already be more powerful than the human brain, if only we had the right software. Or it might be 12 orders of magnitude too slow. Who knows!

1218:

Me too. I've just had Firefox crash on me. The explanation in the error message said "This is usually caused by a newly-opened Web page". Um, excuse me? Isn't that like a bus driver saying "I crashed because there was a road in front of me with cars on"? What was good about Wirth is that he dedicated his life to making software reliable.

1219:

A company called Village Farms operates 260 acres of hydroponic greenhouses near Marfa and Monahans Texas. Here's a quote regarding price of operation:

"Aquino estimated that one 30-acre system (the “minimum viable footprint”) runs about $1 million per acre."

http://seedstock.com/2013/01/24/indoor-grower/

http://villagefarms.com/videos (Check out the first video, it has indoor footage showing how they work.)
1220:
Not misquoting.
Mutual misunderstanding and "talking past each other" I think.
See also 1179, 1188

1221:
You might have noticed we're up over 1220 comments? I just used wget to pull the page and it's on
the order of 2.8Mb of mostly-pure HTML text and about 165,000 words -- the equivalent of a 500
page novel. That's got to impose some sort of rendering load.

1222:
*What was good about Wirth is that he dedicated his life to making software reliable*

Having been taught CS using Pascal prior to its extended forms - he could have done more work on
making software usable... (don't get me started on Standard ML - it changed how I program, but at
the time it made my brain hurt)

The radar data processor in the SAAB Gripen in programmed in a variant of Pascal :)

1223:
"What I would like, ideally, is a semi-closed system that requires few inputs after the initial
investment, which can be scaled up efficiently (say 50 acres)."

Well there's always the traditional mixed agricultural small holding with crop rotation. Pea soup
with bread, some dairy, the occasional bit of meat and clothes made from wool. The open question
is whether this can be scaled up from 50 acres to 500 square miles. Or does the inevitable
specialisation of industrial farming and farming for profit ruin it again.

1224:
"For all we know, a high end supercomputer today might already be more powerful than the human
brain, if only we had the right software. Or it might be 12 orders of magnitude too slow. Who
knows!"

We get a good idea for specific functions that can be replicated on a computer. Pattern recognition
and image processing being the most notable.

1225:
My experience is that it is far more sensitive to some interaction features and most of all to link/DNS glitches, but nowadays doesn't have much trouble with pages of a few MB. It certainly used to, but that was a long time back. For some reason, this Web site causes the text search facility (Edit->Find) to hang Firepox on my system about one time in three, but my inclination to investigate that cess pit (i.e. event/focus handling) is nil.

1226:

And, indeed, like one of the machines I use which I can crash by...
...trying to load data into Excel. Something of a flaw in a data analysis program, yes?

1227:

"If you step back, this is really what this sort of GFLOPS handwaving fundamentally has to be: just a very rough approximation. In that sense, I think that comparing a human brain to a Von Neumann style computer is reasonable"

Not really. Flops was derived from the old numerical analysis complexity calculations (i.e. before automatic computing), and because it was a good measure of performance in the 1950s and 1960s, but some of us abandoned it in favour of data accesses back in the 1970s (before there was much use of cache). It is used today because it is easy to measure and for willy-waving, and not because it makes much sense (even for 'high performance computing', incidentally). Even among solely 'CPU-bound' processing, very little runs at more than 10% of peak Flops, and below 1% is more common. It's a close-to-useless measure for most practical purposes, and has been for a quarter of a century.

The human brain is very different from any 'Von Neumann' architecture, and is not realistically comparable. For example, the best mathematical prodigies cannot compete with even a tiny embedded processor at multi-precision arithmetic. But the human visual cortex is still better at pattern recognition than any current computer, and when one gets on to 'intuition', nobody has much of a clue how to start programming it.

1228:

It is loading more slowly than I'm used to from your blog, so yes there's a loading, but I'm seeing it more as bandwidth than render time (Chrome, because it's better than Internet Exploder).

1229:

It could be hardware related. Modern computers, tablets etc. have a lot more individual electronic switching and storage units that machines from even ten years ago (which had even greater reliability problems both in terms of hardware and software than modern machines do).
I was having intermittent problems with my main desktop a few weeks ago; it would restart itself or lock up occasionally, especially if I was doing something memory-intensive like opening a very large image. On a hunch I pulled a stick of memory from the machine, dropping it from 8GB to 4GB of RAM. No problems since then.

The RAM stick I pulled appears to work OK most of the time but there might be a stuck bit somewhere. Until that bit is addressed and used in computation or code and returns the "wrong" value then it wouldn't affect the machine's operation (and modern software might well be able to recover from the glitch transparently). It's maybe about time desktops and laptops moved to using server-grade ECC memory as standard to catch this sort of glitch as it's bound to become more and more common, even with modern QA testing of RAM before it is sold.

1230:
"But the human visual cortex is still better at pattern recognition than any current computer"

Not since 2011. Humans were left behind in that field at that point, beaten by computers for both speed and accuracy. Performance has improved by about a factor of 10 every year since then. Humans are now completely outclassed. Even humans with decades of training are beaten by computers with only a week or two.

http://people.idsia.ch/~juergen/superhumanpatternrecognition.html
http://www.ted.com/talks/jeremy_howard_the_wonderful_and_terrifying_implications_of_computers_that_can_learn

1231:
But I can assure you that they are not particularly concerned.

They are, however, starting to be concerned. From a recent essay by Bruce Schneier:

The NSA is worried enough about advances in the technology to start transitioning away from algorithms that are vulnerable to a quantum computer. Does this mean that the agency is close to a working prototype in their own classified labs? Unlikely. Does this mean that they envision practical quantum computers sooner than my 30-to-40-year estimate? Certainly.

... we should all follow the NSA’s lead and transition our own systems to quantum-resistant algorithms over the next decade or so -- possibly even sooner.

1232:
[Pattern recognition] "Not since 2011. Human's were left behind in that field at that point, beaten by computers for both speed and accuracy."
Computers are now better at simple pattern recognition but, when you get to the hard issues (e.g. reading bad handwriting), or when measuring performance per volume, weight or wattage, it's still back to the Mark I visual cortex. But I agree that it's getting close, so a better example would be understanding natural languages, which is still a long way off.

1233:
Right. I.e. they aren't absolutely certain that quantum computing isn't feasible, and they know that it would demolish RSA-style encryption (if it can be delivered), so they believe we should play safe. They are security experts, after all, and their business is about how to play safe :-) I agree with that summary, incidentally, for exactly those reasons.

My point was that the current information makes it look likely that it will NOT be feasible, in general, it is unclear that the feasible devices (e.g. D-Wave) will be useful, and that it is very unlikely that it will demolish RSA-style encryption by 2025. And that was what I was saying I didn't believe. If Bruce Schneier had thought that was even plausible, he would have said that we need to change now, Now, NOW, because he knows how long such changes take. We are talking about pretty well EVERY networked computer, including the embedded ones, after all!

1234:
Unlikely: Said machine has 2 cold swappable C drives and one of them works fine.

1235:
According to the map below, November was much warmer than July in the UK

I take it you are referring to the anomaly map?

I concede that our autumn/winter has been very mild this year (largely because it's been miserably grey and overcast, even for England), but the absolute temperature was still higher back in July.

Regards
Luke

1236:
"...so a better example would be understanding natural languages, which is still a long way off."
That is getting very close to AGI. By the time computers can do that (2020s) most people will believe real AGI has arrived, once it is connected to a Watson style database (as it must be).

1237:
AGI? Don't hold your breath about language processing. It's been a decade away since the mid-1960s, just as fusion power has been since the mid-1950s.

1238:
Aquaponics? It's nearly closed-loop; herbivorous fish fertilizing the water which grows vegetation which feed the fish, with surplus capacity used to grow vegetables for human consumption - alongside the occasional fish. Setup is fiddly (you are likely to decimate your fish at least once, apparently) but ongoing expense seems low.

1239:
Yep. Even things like Watson get tripped up by context. Especially when it come to the "real world".
Most humans need at least 15 to 20 years to hold an adult conversation without getting confused by idioms and other cultural references and ways of speaking. And just the simple act of traveling a few 100 miles can trip up many adults. Even if they stay in the same country.

1240:
QED

1241:
[farming] "What I would like, ideally, is a semi-closed system that requires few inputs after the initial investment, which can be scaled up efficiently (say 50 acres)."

Well there's always the traditional mixed agricultural small holding with crop rotation. Pea soup with bread, some dairy, the occasional bit of meat and clothes made from wool. The open question is whether this can be scaled up from 50 acres to 500 square miles. Or does the inevitable specialisation of industrial farming and farming for profit ruin it again.

Yes, this is the perennial fantasy of the independent subsistence farm. I think a good percentage of the population in any industrialized society has it, and I've certainly dreamed about it for years. One name for it is the "back to the land" movement.

Of course, people who actually live this way are thrilled when they see mechanized agriculture for the first time, because that way looks so much easier than being a peasant or a small freeholder.

I'm not going to rain on your parade further, because planning such a farm is a really, really good education in sustainability, whether you can figure out how to make it work or not. Thinking this through is one reason why I have a lot of respect for small farmers, because it's not at all simple. If you live on the land, you're not going to be independent, you're going to be far more closely tied to
your landscape, your local community, and your regional agricultural outreach, than you might imagine. Understanding how all these things work together.

If you want one place to start, google "open source ecology." If you want another, google permaculture. Or urban homesteading, or hydroponics, etc. There are a number of different approaches.

1242:
Saw a much larger industrial version of this in a documentary a few years back. IMO, the best use of space and resources.
https://4hydroponics.com/site/bonzai-rotating-gardens
Re: The drip irrigation system manufacturer I mentioned earlier - the UN actually recommends this particular vendor and their technology. It's been field tested, so the UN probably has performance stats.

1243:
In lay language ...
What is the intersect of/difference between 3D printing and the printable chips you guys are discussing? (Both sound very handwave-y.)

1244:
Not much crossover with 3D printing as yet, although transistors have been fabricated using existing inkjet technology.
Meanwhile, this is a representative paper for state of the art
http://www.ncbi.nlm.nih.gov/pmc/articles/PMC4261169/

1245:
The snarky version: they've a word in common in their names.
The various extant 3D printing technologies aren't handwavey, though the hype is so far ahead of the state of the art as to have vanished over the horizon. This chip-printing stuff? Here's the same site explaining the technology, circa 2009 (which is the same year the M0 debuted, coincidentally enough).

1246:
Something else to add to global warming impacts ... slowing of earth's rotation. (A tiny but a measurable bit.)

http://www.sciencedaily.com/releases/2015/12/151211145054.htm

Excerpt:
'Meltwater from glaciers not only causes sea levels to rise, but also shifts mass from the pole to the equator, which slows down the rotation.'

1247:
3D printing is sufficiently non-handwavey that the RAF is using it to print up metal replacement components (non-critical) to keep their Tornado bombers flying past their original retirement point, and SpaceX are using it to print the Draco rocket motors on their (human-rated) Dragon 2 capsule, because 3D printing in laser-sintered titanium is on course to be faster and cheaper than the sort of insanely high-end machining/welding conventionally used to fabricate rocket motors within a couple of years.

(This is no way invalidates the point about the hype outstripping the reality; the reality is radical enough as it is.)

1248:
I had similar symptoms on one of my machines and the same cure worked - pull out one particular stick of RAM. It was quite consistent; with that stick in, it didn't work reliably, and without that stick it did.

After a while it started doing it again, and some trial and error located another stick of RAM whose removal restored functionality.

And so it went on until I didn't have any RAM that worked in it, unless I reduced the processor clock speed. Then after a while even that stopped working...

Turned out the real problem was the slow deterioration of electrolytic capacitors on the motherboard, and what I was "measuring" was the tolerance of specific RAM sticks to dirty power supplies.

1249:
Electrolytics are a major source of failure on PCs if they are chosen for cheapness rather than long life. Ditto audio equipment.

1250:
I played briefly with Oberon several years ago, and every now and again I get the urge to play some more.

I would dearly love to see Oberon running as the native operating system on a Raspberry Pi 2, or, better yet, a Wandboard quad-core with a SATA hard drive connected.

Last time I looked, you couldn't get the necessary information about the graphics hardware and the boot procedure. On the Pi, the GPU boots the processor from the SD card, meaning it expects the SD card organized a certain way.

1251:
Ditto also CFLs, where they have to tolerate being cooked but are never rated for it. The electronics in a CFL are as likely to fail as the tube, and you can tell whether a catastrophic failure was due to the reservoir capacitor or the switching transistors by the frequency spectrum of the bang.

1252:
The open question about scaling small holding agriculture up to 500 sq mile sized farms hides a lot of detail. I'm curious about what post-fossil-fuel mechanised agriculture looks like. Is there some middle ground where we've got electric farm machinery and GMOs, but use older methods of nitrogen fixing because chemical fertiliser is too expensive in both money and energy? Note, I'm not advocating some back to the land puritanism or back-breaking self-sufficiency.

Which ties into post-oil SciFi in the style of Bacigalupi's Windup Girl. Feeding the world purely with hydroponics looks like hand waving. I'm sure there will be farming on the land as a social specialisation but what will it look like?

1253:
Where/Wot is This "rendering load" of Which you Spake and how does it fit into ...it Isn't Quantum is IT? Every Frecking Thing in Fantasy /SF these days is explained away by it being Somehow "Quantum"tm well Bugger that for a Game of Soldiers!

I demand a simple Explanation of Q and hoe we can get there from here!

Pant /Pant Gasp Gasp!!

"Rendering Load" indeed!

1254:
I'm curious about what post-fossil-fuel mechanised agriculture looks like.

My expectation is alkaline fuel cells and anhydrous ammonia for energy storage. (Battery combines isn't a good idea; you don't use it for three-quarters of a year and then you want to use it nearly
continuously. Battery tractors are a less extreme case but like trains you really want a pumpable energy storage medium.

Nitrogen cycle is easy to supplement if we can make enough ammonia. (Which is an economic decision, not technical limitation.) Carbon cycle isn't so straightforward.

I expect a combination of traditional multi-crop-on-one-plot farming -- the Central American traditional name starts with m, and that's not enough for a quick google -- increased arboriculture (it's high output per hectare; places with enough reliable rain will get a bias towards output), and no-till approaches. All of those are biasing towards reliability over output, which is going to be absolutely necessary. It's a very tough transition, though, especially making a decision to go first. ("Organic farming", as a thing, can be thought of as commercial cover for going first in some subset of its instances.)

1255:

The Rule of Any Empire can be benevolent in its effect from time to time as its Individual Officers and Agents do their best to meet their own Individual Call to duty as they see it.

As an Example?

Hows about a man whose sheer Bloody Minded Determination I rather admire ..he even has the Correct Kind of Hair Style as born of male pattern baldness, as adopted by the Most Worthy Sort of Male Person .. see here ..

William Henry Sleeman ..


https://en.wikipedia.org/wiki/Thuggee

" Thuggee viewpoint
The Thugs Worshipping Kalee (1850, p. 98)[14]

Thuggee trace their origin to the battle of Kali against Raktabija; however, their foundation myth departs from Brahminical versions of the Puranas. Thuggee consider themselves to be children of Kali, created out of her sweat. This particular point is also one of the clear disconnects in the story built on the Thuggees. While only Hindus worship Kali, a large number of the Thuggees captured and convicted by the British were Muslims.[15]"

Sounds similar to " Modern " death cults doesn't it?

What we of the West and Our Values need is not ever so Powerful Air Born Technology that will stamp the Natives into the ground but rather a Modern William Henry Sleeman and effective human intelligence work.
I expect a combination of traditional multi-crop-on-one-plot farming -- the Central American traditional name starts with m, and that's not enough for a quick google Milpa?

Milpa it is; thank you.
I can always remember "specific noun aphasia" which is one of those inherently annoying things.

As someone who has words stick on the tip of their brain frequently, happy to help. (I couldn't remember either, but I could remember "Three Sisters" and work from there.)

I'm curious about what post-fossil-fuel mechanised agriculture looks like. Is there some middle ground where we've got electric farm machinery and GMOs, but use older methods of nitrogen fixing because chemical fertiliser is too expensive in both money and energy? Note, I'm not advocating some back to the land puritanism or back-breaking self-sufficiency.

I think that some artificial nitrogen fixation can be displaced by crop rotations, interventions to spread nitrogen fixation from legumes to other crops, soil amendments like biochar to get better use out of external fertilizers, and precision application of fertilizers to reduce waste and runoff. Increased use of crop rotation, though the best-proven of these techniques, seems fairly speculative to me because it also implies a de-intensification of crop production that may run counter to rising demand and shrinking arable land. If you could get co-benefits, like phytoremediation of soils that are accumulating too much selenium/boron/chloride, I could see a big place for rotation.

The key ingredient for making artificial nitrogen fertilizers is hydrogen. The hydrogen can be produced from fossil fuels or from water electrolysis. The water electrolysis path has operated on a commercial scale, usually with hydroelectric power, though it is little-used nowadays. Today natural gas is the largest source of hydrogen via reaction with high temperature steam. Coal and oil have also been used; I believe China currently uses considerable coal due to meager domestic gas and abundant coal.

In a post-fossil world that hasn't collapsed, I would expect nitrogen fixation to continue (albeit at reduced scale) using renewable electricity to make hydrogen from water. In a state of the art electrolyzer it takes about 50 kilowatt hours to produce a kilogram of hydrogen, and you need 177 kilograms to make a tonne of ammonia. If you use wind power at $45 per megawatt hour that's USD $397 per tonne of ammonia just for the hydrogen. For comparison, current all-in prices for ammonia in Canada are about $940 Canadian (USD $685).
Additional modifiers: if you use intermittent sources to drive water electrolysis, the capital costs of a state of the art polymer membrane electrolyzer may not be justifiable. You may be better off with the less efficient, older, cheaper alkaline electrolyzer. You may also be able to buy electricity considerably below $45 per megawatt hour on average by taking advantage of times of low electricity consumption and high renewable production. Hydrogen can be stored in large quantities in solution-mined salt caverns, if you wanted to have a steady buffered supply to an ammonia plant.

1260:

"Nitrogen cycle is easy to supplement if we can make enough ammonia. (Which is an economic decision, not technical limitation.) Carbon cycle isn't so straightforward."

Other way round. As I mentioned recently people are already developing processes to photosynthesise hydrocarbon fuels from atmospheric CO$_2$, which is just what is needed to power agricultural machinery - and, importantly, will power existing agricultural machinery, which avoids all the energy and resource consumption of completely replacing all the machinery we have already. There are not enough people putting not enough effort into it, but that is a people-being-silly problem, not a technical one.

Fixing nitrogen is a different matter; at present we are completely and utterly dependent on the Haber process, which uses craploads of energy because it has to overcome the tremendous stability of the N$_2$ molecule. I am wondering about such possibilities as fixing plants suspended by balloons in the upper atmosphere to take advantage of the greater intensity of radiation of sufficiently short wavelength for a photon to be able to break that bond...

1261:

The problem with photosynthesis as a source of hydrocarbon fuels is that it's not efficient.

Grant 5% photosynthesis efficiency as a net energy conversion rate (which is very high) and 25% efficiency in the existing internal combustion engine and you get

$$0.05 \times 0.25 = 0.0125$$ of the impinging sunlight going into pushing tractors.

Catalytic synthesis of ammonia from air and water is about 70% efficient (there are three different processes currently attempting commercialization) and runs on electricity; the fuel cell is at least 60% efficient and might be 70%. The PV cells are 20% efficient or better. (you can buy 30% these days. Not at prices suitable for this kind of application, but the trend is clear.)

$$0.2 \times .7 \times .6 = 0.084$$ of the impinging sunlight; six times better.

Artificial hydrocarbon fuel has a few obvious applications -- gas turbines driving aircraft -- but it's not the sensible route for general energy storage.

Existing machinery has to be replaced on its regular lifecycle anyway; replacing it with something with a lower parts count is replacing it with something inherently less expensive as the necessity presents itself.
I expect a combination of traditional multi-crop-on-one-plot farming -- the Central American traditional name starts with m

I think you're looking for "milpa".

I didn't mean photosynthesis as practised by plants, but artificial processes; which, AFAIK, do better even in the current primitive stage of development.

Hydrocarbon fuels absolutely do make sense for general energy storage, especially if you make them for free from air and sunlight. They beat the crap out of anything else we have for pretty much every criterion, and by sufficient margin that the low efficiency of conversion to mechanical energy compared to electric motors still leaves them ahead. (And in cases where it's heat energy you want, of course, they are way ahead.)

Much machinery, and agricultural machinery in particular, can be kept going more or less indefinitely by replacement of wearing parts. "Life cycles" make sense for things like airframes and nuclear reactors, but the habit of applying them to fix-it-with-a-hammer machinery is another means by which humanity joyfully pulls itself further into the mire, and needs to be dropped.

(Aside re photosynthesis: Daedalus in the back of New Scientist once came up with the idea of running a railway powered by growing grass on the track and having the locomotive mow it as it went along. I put some numbers to it and it turns out that for a rural branch line or similar it does just about work, using a diesel engine running on powdered grass rather than a steam engine. Problem is finding some form of track ballast that is both a good enough growing medium and that still works as ballast when things are growing in it, which normal ballast doesn't.)

This isn't something I've worked on as much. Hot Earth Dreams dealt with post-collapse, climate-changed agriculture in large part because it's easier to figure out.

One awkward thing is that if you want a farm "machine" that doesn't use a whole lot of energy and is fairly intelligent, it's hard to beat humans.

It's also hard to justify billions of people living in slums, scrabbling to get by on whatever the "informal economy" can provide (like selling individual cigarettes to make a $1/day living), while mechanizing agriculture on their former hardscrabble farms just to feed them. We can call them useless mouths, displaced peasants and their descendants, or the farm workers of the future. It's a matter of perspective.

So my short answer is that the farm of the future may well depend more on human labor and less on automation. Partly this is because energy for automation will probably increase in price and
decrease in amount, and partly because the unpredictability of the weather will increase, something that may favor human farmers (especially skilled farmers) over automated machines.

If you want to get wacky, I posted on the possibility of using ammonia as a power storage medium. This makes somewhat more sense on farms than elsewhere, because you can use ammonia to store solar energy, then capture the waste nitrogen and apply it to the field you're using the equipment on. It's not a perfect substitute for petroleum, but it may make more sense than battery-powered combines.

Hydroponics does make sense, not for staples, but for vegetables. To use the US as an example, currently California grows most of the US vegetables, especially in winter, and ships them across the country (and the world) both as fresh and canned products. Effectively, we're exporting our water in the form of vegetables. As our water gets scarce in California and energy costs rise, it makes less sense to grow everybody's veggies here, and more sense to grow them in greenhouses closer to where they're needed. Since hydroponics is more water-efficient than dirt agriculture anyway, you can potentially get multiple resource savings by switching to hydroponics, although vegetables grown this way will certainly be more expensive.

Still, the big problem is increased uncertainty in the weather, especially for rain-fed crops, and most especially for staple grains. Decarbonized (aka post fossil fuel) agriculture in a world without collapse is going to have to feed billions of people. This in turn strongly implies that we're going to be shipping food around the world--somehow--and that we're going to have to have weather satellites both to keep the ships on schedule and to help the farmers figure out what's going to hit them next. We're also going to have to rework crop insurance, and we're likely going to have to stockpile a lot more food for the inevitable shortfalls. Hopefully it can get done, but it would be much easier if we didn't have to feed ten billion people in perpetuity on such a system.

1265:

“Which ties into post-oil SciFi in the style of Bacigalupi's Windup Girl. Feeding the world purely with hydroponics looks like hand waving. I'm sure there will be farming on the land as a social specialisation but what will it look like?”

Current urban model of farming: Farmers Market (local county farmers); Community Gardens; Food Co-ops. Many larger cities have this system, and here in Austin, Texas, it is growing fast.

Blue Zones: These are indigenous populations that live into their 90s and 100s, live in self sustaining communities, and they grow their own food. You can find them in Ikaria, Greece; Loma Linda, California; Sardinia, Italy; Okinawa, Japan; and Nicoya, Costa Rica. More info here: https://www.bluezones.com/

As for 500 sq miles (what is this the King Ranch?), the only thing that would work on that scale would be a Farm Co-op. Post-fossil-fuel: probably a combination of solar panels, wind turbines, and battery storage facilities. A network of canals/pipelines/ponds/creeks for irrigation. Crop rotation (letting fields go fallow), and growing multiple seasonal crops, some fruit orchards. And some patches of forest/scrub.
1266:

@Heteromeles: It's not necessarily commercial viability that I'm looking at, merely proof of concept. I'm looking for a plan B if commercial agriculture breaks, and it's not practical to recover the soil. But it has to be truly closed system- if there's some hidden dependence on importing industrial products at some point in the process, then that doesn't help.

@Tom: That's a fascinating link, but $1mill per acre seems wrong, somehow. The estimates I can find for commercial farming are all less than $1000 per acre (www.extension.iastate.edu)

@Julian: Yeah, a return to a more traditional approach to farming would be ideal, but in a post-petroleum world that may not be feasible. I guess there is a question regarding what the best strategy would be- do we wait until the more temperate regions build up a more productive soil (is that likely? How long would that take?) or do we go to the "full-on engineered" approach and just manufacture our food?

1267:

@Heteromeles: It's not necessarily commercial viability that I'm looking at, merely proof of concept. I'm looking for a plan B if commercial agriculture breaks, and it's not practical to recover the soil. But it has to be truly closed system- if there's some hidden dependence on importing industrial products at some point in the process, then that doesn't help.

@Tom: That's a fascinating link, but $1mill per acre seems wrong, somehow. The estimates I can find for commercial farming are all less than $1000 per acre (www.extension.iastate.edu)

@Julian: Yeah, a return to a more traditional approach to farming would be ideal, but in a post-petroleum world that may not be feasible. I guess there is a question regarding what the best strategy would be- do we wait until the more temperate regions build up a more productive soil (is that likely? How long would that take?) or do we go to the "full-on engineered" approach and just manufacture our food?

1268:

If you're looking to create your own farm if things go south, I'd suggest getting an apprenticeship in permaculture.

There are two big things you need to learn. One is that it's extremely difficult to make a perfectly closed system, and for you, part of that difficulty is learning what you can recycle on-site and what you cannot.

The second issue is that, whatever you do, you're going to have to build the growing media for the plants yourself. It can be extremely simple, as in hydroponics, or it can be as complex as regenerating a worn-out old farm by rebuilding the soils (see One-Straw Revolution for a look at how this was done decades ago).
You might also want to look into regenerative agriculture, while you're at it.

1269:
Quick comments on some things I know:

Greenhouses in the UK/Europe cost £/EUR 1M per hectare to build. They run on hydroponics but no-one bothers calling it that. ("drip irrigation", "growing in media"). Prime drivers were not being able to sterilize soil any more (calling Greg on EU banning pesticides) and control of environment.

Ammonia: Siemens and others seem to be investing in the "cyber haber bosch" cycle - i.e. using intermittent electricity from renewables to generate ammonia, and then using it as vehicle fuel or as fertilizer feedstock. Gamechanger.

1270:
On the matter of subsistence farming and growing all you need to eat, by analogy with medieval and later farming there are a couple of issues.

Firstly, you do actually need iron tools to do a lot of things without so much hard work. There's also the infrastructure of horses and similar, which we shall assume is replaced by electric or biodiesel etc machines.

Which still have to be made somewhere, hundreds of miles away.

You have to go back almost to the neolithic before you can honestly say you are living off the land as it is, and are not dependent on long supply chains stretching for thousands of miles across the planet.

Also in a post-petroleum (And globally warmed) world, one of many unstates assumptions is that all the other people in the world helpfully die off, or die before making it as far as the persons farm somewhere. Much better to actually help people survive and live in place, except of course that takes high food production. At the moment we have more than enough to go around, but that is not guaranteed to continue.

1271:
CPU/GPU comparison:

In a European project, we're building a complex robot as the starting point. Many partners are contributing code. Most of this code runs now, and you'd think questions like "how many 3GHz 64bit CPUs do we need" and "how many thousand GPU cores do we need" would be easy to answer.

It turns out that CPU cores and GPU cores have no equivalent fungibility, least alone because swapping GPU processes is impossible when you're running things on 60-120Hz execution rates...
@Graydon:

For things like PV/wind feeding ammonia production, overall efficiency is less important than capital cost and availability of primary sources.

Every farmer can run an ammonia still; only the Texans can pump oil.

@DeMarquis:

20% of UK tomato consumption is produced in glasshouses. The rest is imported.

Whereas strawberries are almost all grown in polytunnels, and almost never in soil.

Farmers have a 7000 year history of optimising process technology, but Wired doesn't report it because it's not as sexy as Candy Crush :)

Hydrocarbon fuels absolutely do make sense for general energy storage, especially if you make them for free from air and sunlight. They beat the crap out of anything else we have for pretty much every criterion, and by sufficient margin that the low efficiency of conversion to mechanical energy compared to electric motors still leaves them ahead.

I don't think this is a well-supported assertion.

Ammonia has about half the energy density of gasoline; 0.5 x 0.6 = 0.30. Gasoline comes out at 1 x 0.25 = 0.25. Even if the air-sourced hydrocarbons were the same cost to make as the ammonia, the ammonia fuel cell is ahead on delivered power. (It also involves fewer parts and less maintenance and doesn't pollute with anything other than water, nitrogen, and heat.)

Internal combustion engines are inherently polluting; all that fuss about Volkswagen's diesels and the particulate carbon comes to mind. This is an inherent problem with the incomplete combustion that comes with the tech. (Also, modern ICE with low pollution is heavily dependent on microprocessor control; it's not a simple fix-with-hammer sort of technology.) Even if you're running on air-source carbon, this is a warming contribution and a habitability problem in cities.

Prying the carbon of CO2 isn't as easy as making NH3. (This would be why the hydrocarbons have more energy density.) It's certainly not free. It also leaves an infrastructure in place that can keep burning fossil carbon; one of the best ways to get fossil carbon extraction to go away is to get fossil carbon utilization to go away.

So I'm not sure where you're getting the idea that the energy density of hydrocarbon fuels is inescapably necessary.
1275:

@Heteromeles: Actually, I want to rule my own city-state in a post-apocalyptic world! I'm not worried about the up-front costs, in fact it sounds like this approach substitutes knowledge and labor for resource extraction, which is perfect.

As always, your key search terms are very helpful. I know what I'll be doing for the next day or two...

@Guthrie: Your points are actually the assumptions I make as well. Supply chains are fine, provided the resource extraction/production/transportation process is sustainable. And it all needs to scale up indefinitely, precisely because of refugees.

@Rich: Thanks for the info, but I'm not worried about commercial viability (at least under current conditions). My assumption is that post disaster what counts as "commercially viable" will have changed radically.

1276:

Ammonia production depends on the Haber process, which uses loads of high-quality energy to generate the high temperatures and pressures involved - even though the overall reaction is exothermic. Production of the hydrogen is endothermic, and relies mainly on a water-gas reaction to produce H₂ and CO₂ from methane, or else on electrolysis of water. We need to replace that process simply to keep agriculture going, or else run it from nuclear sources. It is a major reason why "food is oil". According to wikipedia 80% of the nitrogen atoms in a human body[whose?] were fixed by the Haber process, which is pretty scary.

The techniques I am referring to produce hydrocarbon fuel using solar energy. Sunshine "just happens". It certainly is free!

Even given a similar solar process to produce ammonia, its other disadvantages are still pretty large. Contrary to popular belief, an internal combustion engine is not a heat engine in the thermodynamic sense and is not Carnot-limited. Its efficiency has the same theoretical limit as a fuel cell; we just haven't got there yet, but people are trying. Even at present, while a petrol car engine may not be that good, a ship diesel is the most efficient prime mover we have.

Ammonia presents significant handling problems compared to hydrocarbon fuels, even propane. Pure ammonia is quite nasty stuff chemically. It is toxic in much lower concentrations. And even well below toxic levels of concentration, it reeks. Of baby piss. Leaks are unavoidable in a large-scale use of any gas, and a city full of ammonia-powered vehicles would smell like a used nappy. Habitability, you might say, would be down the toilet.

Hydrocarbon vapours give rise to the hazards of suffocation and explosion, but the concentrations required are, by comparison, massive, and the effects much more localised. Spill a gallon of liquid
propane and the chances are you'll get away with it. Spill a gallon of liquid ammonia and things won't look so good. Scale up to Buncefield...

The problem with modern internal combustion engines isn't the electronics per se, it's that the electronics are deliberately made as hard to repair as possible. The systems themselves are not complex, even if they are viewed as such by people who don't understand their principles (do not ask a car mechanic to explain his theories of electricity if you value your sanity). There is no reason why they should not be perfectly repairable, if they are not constructed using techniques which frustrate repair and if full circuit diagrams and software listings (including source code) are available. The engines themselves, thanks to better materials and machining, are more durable than they ever used to be: as long as the electronics hold up, "hundreds of thousands of miles without the head off" is no longer exceptional. That they often do not make that because of what may at root be no more than a failed 2p component or a bad connection, thanks to the deliberate obfuscation of the information needed to fix it and creation of physical barriers to doing so, is another people-being-silly problem.

Compatibility with existing oil-related infrastructure is a huge advantage. If you do not have that you have to build absolutely everything all over again from scratch. Which is a big difficulty because there is so much of it. Far, far easier to make the transition if you can keep most of what you've got already and just plug different inputs into it.

1277:

The techniques I am referring to produce hydrocarbon fuel using solar energy. Sunshine "just happens". It certainly is free!

Yes, sunshine is free, but the means to turn it into ammonia or hydrocarbons aren't. Efficiency still counts for something even when you're talking about a ridiculously abundant resource like sunlight.

Many of the arguments against using ammonia for fuel don't apply in the special case of on-the-farm use. Some farmers already use anhydrous ammonia as a fertilizer, so there is no new smell/hazard problem if they use it for fueling as well as fertilization.

I would really like to see a citation that internal combustion engines are not Carnot-limited heat engines.

1278:

if i was a 22nd century farmer why do i not just charge my tesla-tractor with my solar panels + wind turbine?

why i need nasty smelly ammonia?

do we think there is something non sustainable about lithium-ion batteries?

1279:
If you have batteries that are cheap, energy-dense, and long-lived enough, by all means, use them for your tractor. They certainly waste less of the energy used to charge them than chemical synthesis and combustion schemes.

But if we're still using artificially fixed nitrogen in the 22nd century, farmers are probably already dealing with the nasty smelly stuff. Using it for both fertilizer and fuel may be a useful simplification on the farm.

1280:

One other thing is that you lose a lot of energy converting it for storage. At this point (IIRC) the efficiency of conversion from wind turbine to battery is about the same as using some newly designed small ammonia synthesizers that are designed to work off wind turbines.

As matt noted in #1279, if we've got construction equipment-sized batteries that can be quickly recharged, I think they're a great solution. They're one of the critical holes in decarbonizing our infrastructure. The thing about ammonia is that you can put wind turbines on your farm (at least in some places), use them to make ammonia, use the ammonia to power at least some of your farm equipment, then use the captured nitrates to fertilize your fields. I don't know if it would actually work if you crunch the numbers, but at least at a handwaving level, it looks like a good way to power at least a lightly industrialized farm.

1281:

*Ammonia production depends on the Haber process*

Nope. Three (3) different catalytic processes undergoing commercialization at present, at least one of which is direct electrical.

Ammonia vapour -- unlike hydrocarbon vapours -- is lighter than air. Big advantage for marine applications. It's also detectable in three orders of magnitude less concentration than the level at which it's poisonous. (So instead of having to add an olfactory warning, as with natural gas, it's built in.) And non-leaking plumbing for ammonia, that widely used refrigerant, has pretty much been worked out.

And yes, it's hazardous. So is diesel; I'd suggest the hazards are about a wash.

The essential problem is that ICE engines are generally about 25% efficient, despite a lot of effort for a long time. (The big marine diesels are low-forties percent efficient. It's because they're big.) That means you're only getting 1/4 of your total solar area turning into useful work. If the fuel cell is 60% efficient, you're getting to use 3/5 of your solar cell area. Since solar cells aren't free and area to place them certainly isn't, that kinda matters.

1282:
"I would really like to see a citation that internal combustion engines are not Carnot-limited heat engines."


1283:

i think you could run your average farm tractor today off existing model X batteries (the new ones are 100KWH). Some of the industrial strength farming equipment is quite large but I think this is more economy of scale / efficiency then necessity.

You don't need them to be quickly recharged you just need spares. An easy solution would be to have several sets, haul a couple to the farm-site (using the tractor) and leave the rest charging then the next day, switch as needed

If batteries continue to advance, in 50 years you should even at a very conservative minimum, have lithium batteries that are twice as powerful, half the mass, and a quarter the cost.

1284:

Charging batteries takes time. Multiple battery packs adds expense and probably specialized machinery. They're certainly going to be heavy in a discrete-lump-as-needs-lifting sort of way.

When you're trying to get the harvest in, you want to run machinery continuously across the hours of daylight. You want to have to move the smallest possible mass of fuel to the machines; you don't want to have to leave equipment idle and haul it in from the fields for fueling. (This costs you time you don't have.) You really don't want to have to pick up multi-hundred kilos of battery back against just connecting a hose.

So you really want a pumpable fuel.

1285:

I agree pumpable fuels are nice, but batteries are here and now and have a tremendous amount of ubiquity and hence investment (since they are useful from everything from cellphones to cars). Economy of scale and technology ramp matter.

Similar for solar, it may be expensive to have your solar panels now but not likely in 50 years. Also if you own a farm you likely have plenty of place to put them

If ammonia remains a special purpose thing it probably won't keep up. There are a lot of technologies that are theoretically superior but get eclipsed by soft substitutes that are ubiquitous, leveraged and cheap.

But regardless, the fact that there are options being argued bodes well for
"And non-leaking plumbing for ammonia, that widely used refrigerant, has pretty much been worked out."

Big difference between a fixed industrial installation and a mobile plant in individual ownership. Leaks are, after all, why ammonia is not used in domestic refrigerators (apart from the now-rare absorption cycle ones) (and nor is SO$_2$). These are entirely sealed systems and operate under much more benign conditions than a vehicle, but they still occasionally spring leaks.

"And yes, it's hazardous. So is diesel; I'd suggest the hazards are about a wash."

Diesel is pretty benign. One morning at about 2am I discovered that the river Ouse in the middle of Bedford was full of diesel, and reported it to the police. What measures were taken I don't know, but the only noticeable result was an inch in the local paper saying the cause had been vandals opening the valve on a 2000 gallon fuel tank. Had that been ammonia the least that would have happened would have been evacuation of nearby houses.

"The big marine diesels are low-forties percent efficient."

>50% :)

Re farm machinery. Travelling irrigators have hoses. There's no reason that farm machinery couldn't have cables. Maybe small batteries for moving them around, but cables for most work. I can think of a few easy ways to string them so that they don't get in the way. Not for enormous fields, but certainly anything that can be irrigated with hoses can be harvested by a machine connected to the grid with cables.

"Computers are now better at simple pattern recognition but, when you get to the hard issues (e.g. reading bad handwriting), or when measuring performance per volume, weight or wattage, it's still back to the Mark I visual cortex"

No and Yes. Per Watt or per Kilogram, humans beat computers. But Fairyflies beat both hands down. They can find their way around a complex environment, fly, find mates, find somewhere to lay their eggs and they weigh some small number of nanograms.

But NO. "Hard issues" in pattern recognition are exactly where humans are completely totally pasted by computers. Four years ago, you were right. Today you aren't. Even back in 2012 they pointed computers at breast cancer. Pathologists train for years to correctly interpret tissue slides and are so notoriously crap that samples are routinely sent to multiple pathologists. Computers are
not only better at identifying cancers in slides than humans, they actually identified new useful markers that the humans had been training each other to ignore.

It's not just a lab curiosity, it's now a commercial product that is vastly better than humans with decades of training. http://www.prweb.com/releases/simagis/breast-cancer/prweb12986679.htm

1289:
"Three sisters" doesn't work in the far north (e.g. the UK), because the limit is sunlight, though I do it with two of them. There are plenty of forms of sustainable agriculture for somewhere with such regular rainfall, though.

1290:
We are talking at cross-purposes, but it's not worth pursuing. The breast cancer issue is at least as much statistics as pattern recognition, for example - I was referring to anomalies of forms that are not known in advance. Anyway, let's agree that it was a bad example.

1291:
Ecologically, ammonia in small quantities is more benign than diesel - it's just that humans have problems with it.

1292:
But ...
Electrolytic capacitors are usually relatively large & therefore "easy" to replace... (perhaps)

1293:
Exactly like it does today.
IF one/both of two things happen. 
ONE is that the yeast-based "oil" production mentioned upthread gets going properly ( Or "fuel-air solutions" or similar )
TWO is the conversion to really cheap PV (which is already happening + better electro-storage. In either/both of those cases, the machinery used will have a different power source or supply, but that will be all.
NOT a problem
ONE: Plant more beans ( & peas )
TWO: GM the plants, so that other crops have legume Nitrogen-fixing in their root systems.
Problem solved.

In midwinter, the insolation in the south of the UK is 2.2 MJ/m$^2$/day and, in the north, 0.8 MJ/m$^2$/day. At 15% efficiency (about the best that can be hoped for), that's not a great wattage!

How is progress on artificial photosynthesis?
A couple of years ago, it looked very promising, but it's gone very quiet, which suggests snags & difficulties.
Anyone know, offhand?

NOT banning a "pesticide" at all - but ...
A well-known fungicide ( *note* ) has a very useful property.
It is made up into a solution from a dry powder & then sprayed on to the leaves & stalks of plants.
After 2-4 days in the open air/sunlight it breaks down into a FERTILIZER.
Brilliant!
If you are a registered commercial farmer, in the EU, you can still use this stuff, no problem.
BUT if you are an individual, who wants to keep the dreaded Blight off your tomatoes & potatoes ( Which, of course are really tasty no-commercial varieties ...)
Oooh no, can't let you do that, you might eat into our greedy profits & we won't be able to sell you our tasteless tat.
There was even some vile creep from "Agribusiness,.org" spouting on the radio, just after the regulation came in, calling for private growing of (some) veg - notably Potato/Tomato to be banned - because "these private growers spread diseases".
And people wonder why I loathe the EU & its corrupt corporate lobbying, when this sort of shit is running around.

note: Dithane

Well, I grew 50kg + of tomatoes this year, all outdoors!
Area occupied approx 5x10 metres
More info on the catalytic conversion processes for Ammonia, please?
And/or links?

"After 2-4 days in the open air/sunlight it breaks down into a FERTILIZER."

I was curious and looked it up. Er, no. It tends to break down to ethylene thiourea, which isn't nice stuff at all, though not as bad as some chemicals in common industrial use, and that breaks down readily only in some environments.

One awkward thing is that if you want a farm "machine" that doesn't use a whole lot of energy and is fairly intelligent, it's hard to beat humans.

I'm going to offer up a qualified disagreement for several reasons:

1. In the developing/developed world we've seen a massive shift towards urbanization -- our species are now >50% city dwellers -- so for starters, the human labour pool is segregated from the farmland. Commuting not being a sensible use of energy in a post-fossil-fuel future, they'd have to move back again if we envisage a shift to labour-intensive agriculture.

2. Such a move would of course require our urbanization to go into reverse and the construction of huge amounts of adequate accommodation in farming zones. So: hugely expensive and probably requiring the pouring of lots of concrete or harvesting of huge amounts of lumber.

3. We're heading for, and are neither able to nor want to avoid a demographic transition beyond a drop to static population but to active population contraction. Ideally this will happen over generations without genocide, plague, or famine -- there are simply too many of us for our biosphere. But there are a couple of side-effects to such a contraction.

4. Contraction is economically deflationary -- forget growth, there's going to be ongoing economic contraction (offset hopefully by efficiency/automation improvements) as the labour force shrinks. The productive proportion of the population shrinks as the population ages -- see Japan. Productive workers are also tied up in caring for the elderly. Finally, the value of each labour-unit rises due to scarcity. Also, people with fewer children tend to spend the same proportion (or more) of their assets on educating and equipping what they've got. Upshot: over a couple of generations human workers are going to become extremely expensive and mostly over-educated for stoop labour.

5. Don't forget the working life of a manual farm labourer isn't that long (say, 14-44; assuming we want to teach them to read and do sums at one end, and that musculoskeletal disorders gradually take their toll at the other -- some will be working into their 60s but some will crap out due to bad backs in their late 30s). They also need vastly more down-time for sleep and maintenance than a
robot and they can't work efficiently in darkness or adverse weather conditions -- be they heat emergencies or blizzards. So while machines like the Bosch Bonirob are currently marginal in cost terms, if prices fall by an order of magnitude they'll be comparable to a year's pay for a labourer, will last for several years (with maintenance), and can work much longer hours. (Bonirob in particular is of interest because it can scan for individual invasive plants and kill them mechanically, with a spike, rather than spraying herbicide everywhere. While it's petrol-powered at present, there's no reason in principle why solar/battery would be impossible, and -- contra objections upstream by Graydon -- if you have a modular battery pack that can be moved between machines as needed it's not going to suffer from erratic use cycles.

6. Yes, unskilled stoop labour is economically effective at present, especially in the developing world. But the developing world isn't going to stay "developing" indefinitely, the demographic transition will drive labour costs up almost everywhere by the end of the 21st century, and open-field robotics is getting much, much cheaper faster than people realize -- for example, vehicle navigation lidar units used to cost around $50-100,000 a unit, but they're due to hit $100 within the next year ... on the way down to being a standard component of every car or self-navigating robot.

1302:

Yes, we had this before...

I guess Greg is referring to the zinc and manganese, which are both quite important micronutrients. Though I'd be somewhat cautious with the manganese, the application seems likely to give us some aerosol, which is implicated in the quite nasty manganism. Not that every self-respecting hobby chemist has a soft spot for permanganate, but I digress.

Also note a rural environment and drinking well water are risk factors for Parkinson's disease, the usual culprit are pesticides, though I wouldn't be that surprised if manganese would be a factor.

1303:

The battery problem in agricultural machinery doesn't manifest in something like the Bonirob, which can work 8 hours a day every day the soil can bear its weight and go home and charge overnight, and which will work in at most a single district (be shared among several farmers). It's things like combine harvesters, where spending a quarter of a million euros on a machine that you'll only use a maximum of two months a year is a reasonable decision because for those two months it will barely cool down. Or the ancillary machinery; for combine harvesting you're talking a minimum of two tractors and trailers (some contractors use trucks and semi-trailers) running as long as the combine does; for silage harvesting you usually need more. Minimum 12-hour days, power demands varying between heavy but constant and some serious peaks - and likely travelling long distances between work sites before even starting.

1304:
One of the plans Tesla have for the Model S and Model X that got deferred for a year or two in the rush to roll out supercharger stations was that the battery packs are, by design, detachable from the chassis of the car. In fact, the connectors are simple enough that the plan was to offer a fast-change service with 5 minute turnaround at some stations: for a fee (plus a refundable deposit against wear and tear/usage condition), the staff drop out your drained battery and replace it with a fully charged one while you wait. Duration: about the same as refilling a large gas tank from a pump. Mechanism: a wheeled dolley with forks -- the battery pack weighs about a ton and is roughly the size of a shipping pallet. (It's held to the underside of the chassis with quick-release bolts of some kind, and a couple of plug-type connectors designed for easy access during replacement.) Your depleted battery goes into a rack to recharge while you drive off. On your way home, you either stop to swap your rental battery back for the original one -- now recharged -- or you pay an arbitrage fee and just keep the new one.

Obviously, Tesla's design isn't going to work for agrobots that need access to the soil within the entire area of the floor pan, like the Bonirob design, or which are significantly smaller (Tesla's cars are not exactly compact). But an equivalent system should be feasible for agrobots. Put a charging station in a barn, with a rack for batteries, and use some sort of mechanism to swap batteries out of the robot tractors and into the rack (and vice versa). Yes it costs, but it buys you a lot of time.

(Also note that Tesla's battery packs are monsters; they're designed to deliver up to half a megawatt instantly -- a Model S R85D doing a fast take-off needs to deliver 720 horsepower to the wheels -- and to shift a two-plus ton luxury car along the roads at highway speeds for 2-6 hours. (A good chunk of which is the weight of that battery pack.) You don't need an 85kWh pack on a farm vehicle: for one thing, it'd cause soil damage due to ground loading, for another reason, you're not driving at highway speed for hours on end. The Bonirob prototype coped with a 2kW petrol engine; a 20kWh pack should therefore be good for a day's work, and using Tesla as a yardstick should weigh around 250Kg.)

1305:

"least as much statistics "

No, it's not. It's got nothing to do with statistics. It's pure pattern recognition. We're not talking at cross purposes. We're talking at cross decades.

You're exactly correct. Statistics are how computers do their pretty shitty version of pattern recognition, 12 year old humans are way better.... If it was still 2009.

Have a look at the papers and videos I linked to. Do some googling on the state of machine learning. These are machines that figure stuff out on their own, not "known in advance". Not matching sets of data that have been pre-programed in with exacting care. Not "expert systems". Not brittle rule sets that can identify parts on an assembly line as long as all the lighting is exactly the same all the time, the orientation of the parts is always identical and nothing that's not a part is ever seen.

These are systems that can identify cancer cells, or dogs, or handwriting. They're not put together by experts with thousands of "if, then" loops. They're put together by people who aren't experts. A
team of people who aren't doctors, or chemists or pharmacognosists put together a system in 2 weeks that is better at drug discovery than Merck. Another team using the same software took two weeks to put together a chinese handwriting reader that performs at native speaker human level despite nobody on the team being able to read, write or speak any chinese. The same software that finds cancer cells can look at a photo it has never seen before and say "It's a man in a black shirt, playing a guitar". Yeah, it's seen men before, and guitars, and shirts, and the colour black but nobody 'programed' the computer with the essence of "shirt" or "man".

The same software that when you give it a few hundred thousand books to read, at the end you can ask it questions like "if you have a king and you take away 'man' from it and add 'woman' what do you get?" and it answers "Queen".

This stuff is *so* not the kind of software that you were referring to when you talked about 12 year old humans being able to out perform any computer.

---

**1306:**

Okay, your starter for $64M: can you design an effective electrically-powered replacement for combine harvesters and trucks?

The problem space is how to most efficiently reap a field of wheat, barley, or other cereal crops. Let's assume that your farm is already extensively robotized for weed and pest suppression, crop monitoring, and other tasks. I am guessing that we're still going to need lots of dump trucks to take the grain away. If we've got fields set up for robotic operation we may not need human drivers in the cab of a combine, or in the trucks: do we still need a gigantic reaping machine with a wide cutting head, or would we do better to fit smaller heads on each member of the farm's fleet of robots and have them go through a field side-by-side?

(This is an open question. To paraphrase: "in the agro-robotic future how will grain be most efficiently reaped?" -- emphasis on compatibility with existing maintenance supply chains, energy efficiency, and process efficiency.)

---

**1307:**

You also have to supply the farm with a lot of overcapacity in its electricity connection to provide fast charging for the battery packs for the combines for just two months of the year. There's also the up-front expense of the chargers, the battery handling machinery etc. which also sits idle most of the year too.

Generally all the farms in a local area would be harvesting simultaneously so the entire farming region would need that grid overcapacity plus spare generating stations behind them to provide that peak power -- renewables won't guarantee enough power when several GW are needed immediately and it's cloudy or the wind has died down.
A storeable fuel which can be tankered in to the farm as needed is a better bet for such an
application. A quick BOTE (literally) calculation says a road tanker carrying 38,000 litres of fuel
contains the electrical equivalent of 330MWh or about four thousand charged Tesla batteries.

1308:
Well, I had colleagues who worked in that area until I retired a couple of months ago, and my wife
works in a related area. From your posting, you have completely missed my point, but I am not
proposing to pursue this.

1309:
"The Bonirob prototype coped with a 2kW petrol engine; a 20kWh pack should therefore be good
for a day's work, and using Tesla as a yardstick should weigh around 250Kg."
A better solution might be some smaller packs in an automated 'dispenser' at the edge of the field. A
little more complicated, but reduces the compaction and stays within the payload of the device
(currently 150 Kg). That would be particularly beneficial for smaller machines. Not a major
problem, in any case, because self-recharging robots have been around for some time.

1310:
That replaces the visible part of a combine harvester, not the important parts - the thresher and
winnower (a combine harvester being, of course, a combined harvester). Threshing was one of - if
not the first - mechanized agricultural processes. We could always go back to field-side stationary
threshers, I suppose... I'll think about it more.

1311:
It's a weeder. There's nothing preventing it working for its battery life, recharging, and picking up
where it left off 8 hours later.

1312:
Correction - typo
I meant 50 lbs = (approx) 25 kilos, oops

1313:
Manganese - though as you say you have to be careful. What is in some shortage is Magnesium - causing leaf-yellowing & even putting "Epsomn Sals" down doesn't always seem to cure it.

1314:
If correct, then hard true AI is/will be "here" before 2020. Then what? It is still constrained within it's metal boxes, but that didn't stop "athena" did it?

1315:
Agreed, but that's not an effective use of it. Keeping machines idle is not cost efficient. The use of replaceable battery packs increases the efficiency by a factor of (use time + recharge time) / (use time). It's not a game changer, but is a significant cost benefit.

1316:
If Epsom salts doesn't cure chlorosis, then it probably wasn't magnesium deficiency. Quite a lot of other things can cause it.

1317:
Which "athena"? I agree with you about the link to AI.

1318:
The reference is to Charlie's novel Rule 34

1319:
Replaceable battery packs improve utilization, but efficiency relates to weeds killed, not just hours worked.

1320:
First fix idea, based on the post replied to:-
The battery pack is on either the non-cutting end or a side of the machine. You now have access for either a light forklift or a pallet truck, both of which are existing technologies, and farm machines
tend to be way slabbier than something as "styled" as a Tesla car, which means that the swapout will actually be easier.

1321:
Thanks.

1322:
Well, yes, but work it out. You need enough weeders for a certain level of weed growth; if design A has 50% of the time utilisation as design B, and both are otherwise comparable, you need two As to do the same work as a B. Yes, you may need twice as many batteries for design B as for design A, but (when used like this) battery life is more in terms of cycles rather than years, so you don't save much there. And a battery dispenser is a very simple device, so should be little extra cost.

OGH is right that, if you can get a complete working day's use and recharge overnight, that's best. But, in the UK, in summer, which is peak weed growth, there is 16-18 hours of daylight and hence only 6-8 hours to recharge. Assuming the weeder needs daylight, of course.

1323:
The newest stuff would be a low temperature hydrogen+metal fusion, which is a lot less powerful than hot fusion but looks achievable and compact enough and in some of its versions not neutron producing. Of course it remains to be seen if this whole thing is real or not, but it should resolve much sooner than ITER completion date.

1324:
'Bigger is better' syndrome/fallacy ... the agriculture discussion is following this path.
Lots of engineers here ... so my question is: how much energy is spent/wasted just on the bigness aspect of farm equipment vs. the work performed? I'm not seeing any reasons why new tech can't be smaller, operate in swarms, pick up kernels as they ripen. Basically, the farm equivalent of an iRobot Roomba. Swarms of such fieldbots could operate day or night. The only time a human operator would be needed is to pull a bot out of a freshly dug groundhog or gopher hole.

1325:
Well, the Ferguson TE20 https://en.wikipedia.org/wiki/Ferguson_TE20 is still the basic path that all farm tractor designs follow. Other than "space for a human", and the engine cover, perhaps you'd like to tell me where the surplus material in that design is?
1326:
As to what turns me off in a sci fi book - on top would be when a text is trying to be multi-science hard sci fi: it becomes horribly and utterly boring and totally impossible to read, as I am not reading it to take into account of all the real-world engineering constraints and difficulties, but rather reading it to explore some kind of an interesting what-if possibility.
And second from top is when details and scenes are being piled up one after another, but it does not really advance a story in any way. A lot of old hard science fiction build as adventure story suffered from this. Protagonists visited first valley. Blah. Protagonists visited second valley. Blah Blah. Third valley. More blah. Went underground. Went to a forest. Battle one. Battle two. Battle three. Another forest. Another valley. Big Battle. End. This really kills Tolkien's thing for me. There is a view that LOTR is a linguistic hard sci-fi, but its plot structure is killing me.

1327:
If I may be so bold, Gasdive, you're beating up a straw man. I understand the emotional desire of your critics to hope that computers will never match the average human at cognitive tasks. But you get a little ahead of things when you write that computers are better than trained pathologists. (I'm really referring to comment 1288.)
What you say has already may indeed happen in the near future. I am unequipped to judge. But my wife works in this field and I can say that it has not happened yet.
Again, I understand the roots of your reaction. Like the people you're reacting to, I would very much like to believe that computers will never get any better at any cognitive tasks than they were in, say, 2000. Maybe 1995. Sadly, reality is not obliging me, and I too would get exasperated at people who insist otherwise. But perspective should be maintained and flacking recognized for what it is. No?

1328:
Better Place.
(See the Wall Street Journal, the Yale energy blog, and the Harvard Business Review.
Tesla is going to slow-walk the rollout of detachable battery packs for very good reasons, having learned from Better Place's collapse. But that problem won't apply to automated agricultural machinery. But it begs the question: what will be the energy density of your typical batteries by the time this is an issue? Combines don't run 24-7 on the farms that I've seen.

1329:
When you're trying to get the harvest in, you want to run machinery continuously across the hours of daylight.
And into the night. That's why there are headlights on the harvesters. Run shift of drivers and keep going. Especially important in Western Canada, where you're often pushing right against the limit of the growing season.

Back when I was working as an ag tech, a local farmer was also a pilot. During harvest he'd fly down to the US to pick up a needed part — he said the money to own and run an airplane was less than he'd lose if he missed the harvest. Getting a part in half a day made a huge difference.

1330:
A lot more difficult than carrying your fuel with you. I've got an electric lawn mower, and handling the cord slows me down significantly enough that my next mover will be free-running.

1331:
The equation I'm asking about is: How much power is used to push/pull the machine per kilo of grain harvested? Then there's the up-front cost of the equipment - a pretty significant investment I'm guessing.

Not sure, but I think that grains have been made to grow taller over the years. Some of this is due to fertilizer usage. There's no need to have tall wheat apart from better crop circle art. Over the past 3 years or so my lawn has been getting shorter and greener due to the new shorter turf/lawn seed available. This shorter grass means less water usage, less fertilizer needed, less mowing. All good things from my POV. Given that most cereal grains are already GMO'd, a shorter stalk would make sense.

1332:
Apparently going vegan is not nearly as good for the planet as some think. (Carnegie Mellon University research)

http://www.sciencedaily.com/releases/2015/12/151214130727.htm

Excerpt:

"Eating lettuce is over three times worse in greenhouse gas emissions than eating bacon," said Paul Fischbeck, professor of social and decisions sciences and engineering and public policy. "Lots of common vegetables require more resources per calorie than you would think. Eggplant, celery and cucumbers look particularly bad when compared to pork or chicken."

1333:
You're exactly wrong, I'm afraid. One of Borlaug's innovations was crossing food grains with dwarf varieties, so as to waste less growth on stalk and give better mechanical support to allow heavier ears.

And the reasons for the giant harvesters is capacity (of both fuel and grain) and to drive wider cutters. Wider cutters = fewer passes = shorter harvest time = less dependence on weather, for one thing. More capacity means the harvester spends more time cutting and less time filling fuel or emptying grain.

1334:

Not sure, but I think that grains have been made to grow taller over the years.

Shorter, I'm pretty certain. At least, that was the goal when I worked in agriculture. Used to be 4' was normal, now it's around 2-3'.

Although there seems to be links between height and yield that put limits on this. Here's an old article relating to that:

http://www.nature.com/hdy/journal/v40/n1/abs/hdy197813a.html

This positive correlation is contrary to the breeders' selection aims of short-straw with high yield, so that the genes responsible will be maintained at intermediate frequencies in breeding populations. It is suggested that a way of utilising their full potential in breeding could be to introduce independently acting genes for dwarfism and then to select for tall, high-yielding plants. This selection for "tall-dwarfs" might be accomplished by using the Norm 10 dwarfung genes, Rht1 and Rht2, which have proved to be so successful in the development of the high-yielding semi-dwarf wheats of the "Green Revolution".

1335:

"I understand the emotional desire of your critics to hope that computers will never match the average human at cognitive tasks."

I didn't notice anyone saying that. I and the others I noticed were saying the same as you - i.e. maybe, sometime, but not yet. And, because of my acquaintance with that area, I am also saying that we can't put a schedule on it, except for 'probably not soon'. Which doesn't mean that there aren't some cognitive tasks at which computers are already better - just that they are the ones either where humans are relatively poor or where they are relatively easy to automate.

1336:

Ah, but it's not as easy as that. You've also got a deadline in that grain not harvested in (Northern hemisphere typical values) August or September is going to be lost so you need machines big
enough to complete the harvest, usually of literally several square miles of land per machine, inside 2 months from leaving the garage to returning at end of harvest.

Also, if you look at agricultural machines from a mechanical/structural engineering viewpoint, other than the driver's cabin (which these days often has and needs heating and air conditioning equipment) there is very little waste mass. Taking my example of the wee Fergie again, the front axle is bolted to the one end of the engine, the transaxle to the other, and the driver sits on the transaxle. There is no chassis to add mass.

So your question is actually sort of "can you make all the control and sensor systems your autonomous harvesters need weigh in at next to nothing?" because big as they look, modern agricultural machines are very efficient in terms of how much of their total mass is there to do a job and how much just to be the bracket that holds the working components in place.

1337:

Not sure, but I think that grains have been made to grow taller over the years [...] There's no need to have tall wheat apart from better crop circle art.

Actually, I think you'll find that one of the drivers of increased wheat harvests has been that wheat is now bred to be shorter. Various advantages include being less prone to being blown over by strong winds.

(Other grains may or may not have dwarf varieties - it's too long since I lived in farming country.)

1338:

“Okay, your starter for $64M: can you design an effective electrically-powered replacement for combine harvesters and trucks?”

Let’s look at what we have already developed. We have the BelAZ 75710 dump truck, the worlds largest dump truck that uses four Siemens 1,200 kilowatt (approximately 1,800 horsepower) electric motors. However, the electricity for the all-wheel drive system is provided by two 16-cylinder diesel engine generators, each providing approximately 1,700 kilowatts. This is the classic diesel-electric motor system, commonly used in freight trains today.

For farming purposes we’re not going to need a giant dump truck used for strip mining, but rather something more this size: EMOSS Electric Truck with configurable battery packs (40, 80, 120, 160, 200 and 300 kWh) and a range from 25 to 300 kilometers (NEDC). The EMOS website: http://www.emoss.biz/electric-truck/

1339:

Changing batteries takes time but Tesla have this down to 90 seconds.
It just needs design for quick replacement.

1340:
"Electrolytic capacitors are usually relatively large & therefore "easy" to replace..."

Like these?

1341:
Based on lab reports I have seen I would expect battery advances over the next 10 years to deliver about 3x existing capacity, at the same cost or lower, and charge rates that are limited by cables and chargers as much as anything. That's ignoring possible replacements for Li, such as Na and Mg

1342:
Not good news for the anti-fanbois and the "We Are All Doomed" glee club here.

1343:
"To paraphrase: "in the agro-robotic future how will grain be most efficiently reaped?"
External combustion engine utilizing the chaff as it goes?

1344:
If you accept NoJay's figure of 38,000 litres of fuel being roughly equal to 4000 battery changes. It's roughly equal to 30 harvester fills. You're talking about ~3 hours per day stoppage just for battery swaps*, for a machine that's financially a shark - forward movement is loan repayments, so stopping is death.

*Assumption piled on assumption piled on assumption in this figure. The starting point is combine harvester fuel tanks being around 1200 litres in size, expected to be enough for a day's work. Many combines have aftermarket kits to add extra fuel storage...

1345:
Where've I heard of external combustion-powered threshing before...
Throw the straw into an anaerobic digester, capture and compress the methane, and buy an LNG-engine harvester?

1346:

*Assumption piled on assumption piled on assumption in this figure. The starting point is combine harvester fuel tanks being around 1200 litres in size, expected to be enough for a day's work. Many combines have aftermarket kits to add extra fuel storage...

Assumptions from #1344 quoted since they're relevant to my calcs. 1200l/day means you're assuming a burn of 50l/hr if there's absolutely no downtime.

1347:

But it can be done far more efficiently, and just as directly, now if we wanted to. And the whole premise of the We Are All Doomed is that we will be desperate enough to try anything. So, for agricultural robots, threshers, the problem is now solved.

Or don't you think AI will ever be smart enough to toss the stalks into its own combustor?

1348:

Yup, shorter wheat has been the aim and result for decades now. Advantages include more energy going into the fruit than the body. However makes it more vulnerable to the type of weed which grows fast and tall and steals the light.

As an unwated side effect, it's really hard to get straw for thatching houses with. Short straw is no use, you need long straw.

1349:

So, interplant with 'weeds' that are beneficial, nutritious like these.

http://oacc.info/NewspaperArticles/na_weeds_value_bf.asp

And, a thank-you to all who responded.

1350:

Wonderful machines.
Lots still in use as they are ultimately reliable & easy to maintain.
"a machine that's financially a shark - forward movement is loan repayments, so stopping is death."

Oh, so that's what's behind some of the strange comments on this topic. Clearly we have to kick that kind of silly rubbish out of the picture before we can hope to arrive at any sensible answers. There's plenty to deal with as it is without further complicating matters by perpetuating support for parasitism.

"can you make all the control and sensor systems your autonomous harvesters need weigh in at next to nothing?"

What do they weigh now? Modern tractors barely need a driver as it is. We're talking more about software than anything else.

"External combustion engine utilizing the chaff as it goes?"

Internal combustion engine, using the exhaust heat to dry the chaff, then powdering it and burning the powder in an original-style diesel engine.

"Like these?"

Those are probably about the easiest components to replace on a typical motherboard, but they're not the ones in question. The electrolytic capacitors that fail are cylindrical aluminium-based types. (Particularly those examples manufactured with that batch of dodgy electrolyte.) They are a bugger to replace because of the multi-layer board with plated-through holes. All those copper layers suck heat so you need a huge soldering iron to melt the solder, and even then there is still a risk of the through-hole plating coming loose from the board and being extracted along with the capacitor.

1352:

It's mainly wheat, but barley seems to be a bit shorter, too (at least what I have seen). The few fields of oats I have seen seem the same, and maize is too anomalous in the UK to count; I don't think that we grow any other grains commercially. The main reason was resistance to being flattened by wind, which led to significant crop losses.

1353:

"Eating lettuce is over three times worse in greenhouse gas emissions than eating bacon," said Paul Fischbeck, professor of social and decisions sciences and engineering and public policy. "Lots of common vegetables require more resources per calorie than you would think. Eggplant, celery and cucumbers look particularly bad when compared to pork or chicken."

I can't find a free full-text version of the article, but this quote implies a ridiculous strawman of actual vegan eating patterns. To get a minimal 1200 calories a day you'd need to consume 8 kilograms of cucumbers, 7.5 kg of red leaf lettuce, or 5 kilograms of eggplant. Here is a meal plan from actual vegans for 21 days. Note that you'll be getting most calories from legumes and grains, not vegetables.
1354:
Will this also apply to conventional "car batteries" that are used to power/ballast existing services in internal combustion vehicles? I sincerely hope so.

Oh yes, about 3 or 4 up - surface-mounting of any electronic component makes then harder to replace....

1355:
Might work on a small scale holding, I don't see how it could on a mass production field.

Greg # 1354 - no, lead acid batteries are finished. Still useful in many circumstances, but not energy dense enough for desired performance in cars etc.

1356:
"can you make all the control and sensor systems your autonomous harvesters need weigh in at next to nothing?"

What do they weigh now? Modern tractors barely need a driver as it is. We're talking more about software than anything else. My point was that the controls and sensors for each of a "fleet" of harvester UAVs need to weigh about as much as the software controls for a current "driven" harvester using current technologies. This starts to look like you'll use more mass and power in driving the controls for the fleet than you'll save in structure for a "big vehicle".

1357:
“Apparently going vegan is not nearly as good for the planet as some think. (Carnegie Mellon University research)"

This article is titled: “Vegetarian and 'healthy' diets are more harmful to the environment” And gives the following statement:

“However, eating the recommended "healthier" foods -- a mix of fruits, vegetables, dairy and seafood -- increased the environmental impact in all three categories: Energy use went up by 38 percent, water use by 10 percent and GHG emissions by 6 percent.”

This is lumping animal agriculture with plant based agriculture. Dairy and seafood are not vegan, and seafood isn’t vegetarian (fish is not a vegetable). We already know raising dairy cows have an enormous impact on the environment and so does seafood. I would like to know what the actual break down is in this farm to market study is.

As for the factory farmed “pork and chicken” using less resources than vegetables and fruit, I’m extremely skeptical, something is missing in this study.
You’re growing feed crops on government subsidized land (understated) to feed to warehoused livestock (field to farm) … what’s the energy and water consumption on this part of the process? Then there’s the methane and waste produced by the livestock (ignored), what’s the environmental impact? Then you have farm to market “processing and transporting food, food sales and service, and household storage”. One last thing, be sure your pork and chicken is cooked well, otherwise it’s hard to chew/digest, and not to forget pathogens that may make you sick.

Growing crops to feed to animals to feed to people. Second hand eating.

1358:
"That's not a great wattage" looks to be a severe understatement.

2.2 MJ/m^2/day = 611 W-hours/m^2/day. (Google is your FRIEND!) That's not good. At 16% efficiency, that's ONE (1) 100 W light bulb all day all night per square meter of panel, ignoring battery charge/discharge losses.

0.8 MJ/m^2/day = 222 W-hours/m^2/day. That's bad. Again, at 16% efficiency, that's roughly 36-37 W continuous per square meter of panel, again ignoring battery charge/discharge losses.

Peak insolation in someplace like Tucson AZ at high noon on a severe clear day is 1.3 kWh/m^2. Average daily insolation in most of the US is 6-8 kWh/m^2/day. Either winter in the UK is *REALLY* bad, and the UK really needs to think HARD about building more nuke plants, or there's a problem in your numbers.

1359:
I think he's correct. Winter insolation at extreme latitudes is really low. Fortunately for solar's prospects in general, most of the world's population lives closer to the equator than people in northern England.

1360:
I'll believe that computers can beat humans at pattern recognition when captchas disappear. Yes, I know that algorithms have gotten better, and that a sizable fraction of people can't beat modern captchas. However, the continued use of captchas indicates that they are still useful. This in turn means that algorithms haven't beaten humans yet in pattern recognition.

1361:
Winter in the UK is not bad - but it's not sunny. By US standards, the UK is waaaay north (blame the Gulf Stream).

At midday on midwinter's day in Sheffield, the altitude of the Sun is 13 degrees: that means insolation is diluted by a factor of 4.5 or so.
And we have cloud. The mean number of hours of sunshine per year in Sheffield is about 1445 (Met Office data), out of 4380 possible. November to February we average between 40 and 70 hours of sunshine per month.

Solar power, not your friend round here.

1362:

PS For Edinburgh, the total amount of sunshine is similar to Sheffield, but the maximum altitude of the Sun at midwinter is only 10.5 degrees. Charlie's not converting to solar anytime soon.

1363:

You have forgotten that there are 24 hours a day, so have overestimated by a factor of 24! So it's not a 100 watt bulb, but a 4 watt one ....

The insolation in the south of England is about the same as Tucson in midsummer (i.e. ten times greater than in winter), because the extra day length compensates for the weaker sunlight. Unfortunately, our peak requirements are in the winter.

1364:

Yes.

I've had my say. Elderly Cynic is talking about "something else". I still don't know what.

Getting back to shibboleths, it doesn't happen much in SF anymore, but the "everyman" grunt who's been conscripted to go to a far off planet and do grunt work that is already in the early 21st century easily automated. He (it's always he) hates it and doesn't really want to be there. I spent the whole of Avatar trying to look at the pretty colours and ignore the entire story.

1365:

The research article is paywalled. See Abstract which defines the three diets studied.

Article title:
Energy use, blue water footprint, and greenhouse gas emissions for current food consumption patterns and dietary recommendations in the US

ABSTRACT:

'This article measures the changes in energy use, blue water footprint, and greenhouse gas (GHG) emissions associated with shifting from current US food consumption patterns to three dietary scenarios, which are based, in part, on the 2010 USDA Dietary Guidelines (US Department of Agriculture and US Department of Health and Human Services in Dietary Guidelines for Americans, 2010, 7th edn, US Government Printing Office, Washington, 2010). Amidst the current
overweight and obesity epidemic in the USA, the Dietary Guidelines provide food and beverage recommendations that are intended to help individuals achieve and maintain healthy weight. The three dietary scenarios we examine include (1) reducing Caloric intake levels to achieve “normal” weight without shifting food mix, (2) switching current food mix to USDA recommended food patterns, without reducing Caloric intake, and (3) reducing Caloric intake levels and shifting current food mix to USDA recommended food patterns, which support healthy weight. This study finds that shifting from the current US diet to dietary Scenario 1 decreases energy use, blue water footprint, and GHG emissions by around 9 %, while shifting to dietary Scenario 2 increases energy use by 43 %, blue water footprint by 16 %, and GHG emissions by 11 %. Shifting to dietary Scenario 3, which accounts for both reduced Caloric intake and a shift to the USDA recommended food mix, increases energy use by 38 %, blue water footprint by 10 %, and GHG emissions by 6 %. These perhaps counterintuitive results are primarily due to USDA recommendations for greater Caloric intake of fruits, vegetables, dairy, and fish/seafood, which have relatively high resource use and emissions per Calorie.'


1366:

I have heard it said that you can reckon on 100W/m^2 as an overall average for input power to solar panels. I don't actually believe it though.

Of course it helps a lot if you have them track the sun instead of just sitting there at the wrong angle.

1367:

your average farm tractor today

Just a comment for people who've never driven tractors for a "living". While things have gotten more techie over the last 40 years, most farmers expect their farm tractors to "just work" in really bad environments. The little one I drove for 6 years in my teens, we had a hammer, a flat bladed screw driver, an adjustable wrench, and a grease gun with it. And it was a rare day you needed more than that to deal with things. I didn't do large scale farming but even so it was a real pain to walk back several miles when something did go wrong.

Tractors need to be almost as armored as tanks and way more reliable. So swapping batteries in and out needs to be much easier and dimensional tolerant than with cars.

1368:

There's no reason that farm machinery couldn't have cables. Maybe small batteries for moving them around, but cables for most work.

Ah, no.
1369:
You don't need an 85kWh pack on a farm vehicle: for one thing, it'd cause soil damage due to ground loading,

Farm tractors tend to have their larger tires filled with salt water. This keep them from tipping over easily. The weight of a battery pack would actually be a benefit as it might eliminate the salt water. Which is a total PITA to deal with. (Not sure what they use now but mine were salted with calcium chloride.)

1370:
None of the diets studied were vegan or even vegetarian, then. Studying diets enriched in dairy and seafood and then implying the increased GHG impact is from vegetables (blaming the quoted author here, not you) is pretty disingenuous IMO.

1371:
Yes, but that merely makes more effective use of the panels, but doesn't change the land area you need. 100 W/m^2 is the right order of magnitude for an average input but, as I have said, it varies a great deal.

1372:
Generally all the farms in a local area would be harvesting simultaneously so the entire farming region would need that grid overcapacity plus spare generating stations behind them to provide that peak power

In the US and Canada the harvesters start in the south and move north as the grains ripen from south to north.

When powered by diesel it's easy to get your fuel. For electricity, yes, you'd need a grid from Texas to a long way north into Canada.

1373:
Right. However, there is quite a lot of truth in the claim. A lot of the world is suitable for grazing but not agriculture, and traditional grazing can produce meat for a very low energy footprint. Ditto sustainable hunting and fishing. And the vegetables that are needed for an adequate diet for humans are fairly demanding in many parts of the world. So the best diet would be a largely vegetable one, supplemented by a small amount of sustainable meat and fish. Which is regarded as heresy by almost all camps!
1374:

*Combines don't run 24-7 on the farms that I've seen.*

They come close at harvest times in US and Canada Great Plains.

1375:

These guys, [NH3 Canada](https://www.nh3canada.com) are the ones I'm most familiar with.

There's a trade association, too: [NH3 Fuel Association](https://www.nh3fuelassociation.com)

They have lots of links. :)

1376:

Tesla does have battery swapping down to a science, yes.

Having to lug a battery pack out to a big field and swap it on a combine is still going to be a right pain. The whole mass of both battery packs has to be picked up and moved as a unit. If you've got a pumpable fuel, all someone has to move as a unit is the hose, and the fuel can be moved by the litre rather than the each.

Plus, as various persons have noted, you don't need the big electrical delivery infrastructure to the rural charging stations. You can move the liquid fuel.

Which is import; if we're looking at renewables, you want to store once and use once, because neither process is especially efficient. (Thereabouts of 0.7 or so for charge or discharge; highly variable by technology and implementation.) So if you have to store, discharge, transmit, store (in the combine battery pack) and then discharge, that gets to pushing the combine in $0.7^4 = 0.24$ of your renewables collection capacity even if the transmit is perfect. If you can just store and discharge, you've got 0.49 of your newables collection capacity; about half, instead of about a quarter. That kind of thing really matters.

1377:

I love this stuff. Around 2008 when natural gas and ammonia prices were spiking way up I thought that wind-to-ammonia was going to be commercialized and big in a few years. The financial crisis followed by the shale gas revolution seems to have pushed it into the indefinite future though. Here's hoping that it takes off for climate reasons if not immediate financial advantage.

1378:

"I'll believe that computers can beat humans at pattern recognition when captcha's disappear."
You're basically saying that the goalpost is a modified Turing test. Rather than a human telling a computer apart from a human, it's a computer being able to tell apart a human and a computer. So you'll believe computers can beat humans when computers can beat computers...

Captcha continues but not for the reason that it still works.

"Every single Captcha system out there is solvable"

20 minutes into this presentation. [http://www.infoq.com/presentations/ai-security](http://www.infoq.com/presentations/ai-security)

---

**1379:**

OOPS!

You're right. My bad. I was in a hurry.

That makes the numbers a LOT worse.

---

**1380:**

For all this talk about combines, they are not the only or on many farms the majority of the tractor use. Tractors are used for move things around a farm all the time. And do all kinds of small jobs. Look at that picture back up at comment on the Ferguson and the 3 point hitch on the rear end. That is a hugely universal hookup for all kinds of stuff. And a small farm is likely to have 3 to 10 attachments that they use on a regular basis. And these things are NOT suited or intended for automated non driver flat field work.

---

**1381:**

What they (NH3) need is to grab eyeballs at car and major agriculture shows. (Read the advantages list, sounds almost too good to be true.)

Given that Canada recently elected the pro-environment* Liberals as their federal government, I'm guessing that the NH3 org will be contacting them in time to provide some input before the 6 month deadline re: action plan for Paris Climate Agreement?

* More pro-environment than the former Conservative government; whether as pro-environment as the NDP or Green Party is to be seen.

---

**1382:**

(This is an open question. To paraphrase: "in the agro-robotic future how will grain be most efficiently reaped?" -- emphasis on compatibility with existing maintenance supply chains, energy efficiency, and process efficiency.")
A lot of farms are planted in large circles so that the crops can be watered from a single point using a pipe structure that rotates around that center point.

http://www.cottoninc.com/fiber/AgriculturalDisciplines/Engineering/Irrigation-Management/Irrigation-Systems-Overview/item12750.jpg

https://qph.is.quoracdn.net/main-qimg-ff6b479d4232fb89b811ed5874a47b57?convert_to_webp=true

Make the piping system and drop hoses two-way and multi-functional so that the drop hoses are robot-guided vacuums that can suck the heads of grain right off the plants and pipe the grain all the way back to the meat vats where it is converted into steaks. (I'm pretty sure the Keystone XL pipeline was actually a grainpipe in disguise.) Then add fertilizer to the water via liquefied puppies from The Machines. Rinse, repeat. Done!

1383:
"Ah, no."

Ok, I'm not a farmer.

Why "no"? I specifically referenced situations where there are already travelling irrigators. If you can have hoses supplying power (in the form of pressurised water) and water to automated watering machines, why can't you have cables on the same/similar carriers supplying power (as electricity) to harvesting or weeding machines?

Cable supplied power works fine for trains, trams and trolley buses. So we can see it can cover large areas and supply high power machines. Hose supplied power demonstrably works in a farm environment. Huge pumping stations used for bringing water up from hundreds of metres underground to flood Australian rice paddies demonstrates high power consumption electric machinery working well in remote areas with low population density on a seasonal basis where all the local farms do the same electricity intensive agriculture at the same time.

If you put a travelling cable tower at each side of the field, ran a support cable between them and dropped a power line down to the machine, then the machine could reach every part of the field with power supplied from overhead. Limit on field size is width only, there's no limit to field length. That's one idea. Or you could have a tall springy tower with a single cable coming off it. The machine would bend the tower over as it moved around the field. Something like this:
https://vimeo.com/12887153 2 minutes in. It could go anywhere in a circle around the tower out to about 1.5 times the height of the tower. There's got to be a hundred ways you could do it.

What am I missing?

1384:
The NDP aren't actually pro-environment. (They want to be, but they're sort of cognitively trapped about twenty years ago.) The Greens can't do math and the Liberals are traditionally amoral
pragmatists; if Justin can return them to their pragmatist roots (as distinct from the power-worshipping profit-god faction of recent years) that ought to do it, because a pragmatist faced with our current climate situation would be considering martial law and states of emergency.

Note that NH3 Canada is using stuff that's the product of Canadian federal research dollars; I would expect that they might be feeling less compelled to be really quiet now. (I also know there are some backbenchers in Ontario -- provincial ones, not federal ones -- asking questions about ammonia infrastructure.)

If I had investment capital, I'd start by trying to go after, not cars, but sailing yachts. Those all have auxiliary motors; they are often large enough to carry the ammonia making system, and certainly can generate power by dragging the prop while sailing. ("Shaft alternator"; the traditional way to run a freezer on a sailing ship.) Offering a self-fueling silent motor option with the traditional multi-day range would go over well.

And the people who own sailing yachts collectively affect thinking about a whole lot of investment money. So in terms of shifting what the money wants, that's my notion of a best bet.

The other good part about that, from a Canadian perspective, is that if it works as well as BotE suggests it ought, you then start up a maritime industry to make ammonia from ocean wind. Pick locations and component sources well and you've got everybody except Alberta on board. (If there's a way to keep Alberta from getting hammered by decarbonization, I'm not smart enough to think of it.)

1385:

"For all this talk about combines, they are not the only or on many farms the majority of the tractor use. Tractors are used for move things around a farm all the time. And do all kinds of small jobs."

I think we're all talking about combines because that's the hard problem. How to run a giant machine (or thousands of small machines) 24/7 during a window of a few days or weeks.

Electric machines for doing all the small jobs is already a solved problem and there are either off the shelf solutions or trivial re-applications of existing tech that fit the bill.

1386:

Ok thanks.

But here's something I don't understand. Why are captcha's still used?

Also, I'm not sure if the article extends to the image recognition aspect. For instance, the list of 12 pictures out of which you have to pick the cakes, salads, or the soups? Even if that were broken as well, what about the video equivalent of it?

I'm not trying to move the goalposts here. Your point is well made. What I'm trying to do is understand where the real-world cutting edge right now is.
1387:
Interesting. Didn't Trudeau say that the Canadian government was going to shift its spending to its navy, and away from its air force?

Hmmm ... according to this site Toronto's boat show is the largest in North America (January 8-17 2016). Don't see the Canadian version of the Power Squadron anywhere - odd.

http://www.torontoboatshow.com/

1388:
Cable supplied power works fine for trains, trams and trolley buses. So we can see it can cover large areas and supply high power machines.

Well, more we see it works well for long, narrow routes. Even the trolley bus, as the most flexible of the 3, can typically only range about 5m either side of the catenary. Grain is mostly grown in roughly square fields rather than fields several hundred km long by 10m wide so you'd need a lot of catenary to cover even a UK farm. I really don't want to think about one that would cover the North American grain belt or the Russian Steppes.

1389:
Found it - Power & Sail Squadron - and looks as though they're offering some free intro level boating instruction.

1390:
"Lots of common vegetables require more resources per calorie than you would think. Eggplant, celery and cucumbers look particularly bad when compared to pork or chicken."

This is comparing the calorie content of plant foods made up of mostly water and fiber. The nutrition value of a head of iceberg lettuce is zero/nada/nothing. Duh! The nutrition value goes when you eat Romaine lettuce, and much higher for leafy greens like Kale. Beating the calorie content of a green salad before the dressing and extras are put on is pretty easy to top. Besides, you're not eating a green salad for the calories, you're eating it for the vitamins, fiber, and high alkaline content.

Having said that, your average vegan does not live on green salads alone, they also eat plant foods with protein and calories. Many vegans also eat legumes (beans, soy, peas and lentils); whole grains (rice, oats, barley, quinoa); tubers (carrots, beets, potatoes, yams); squash (all verities); Breads made with sprouted grains; Fruit (avocados, apples, grapes, pears, peaches, bananas, citrus fruit, etc.); nuts (almonds, walnuts, cashews, etc.); berries (bilberries, strawberries, raspberries, etc.) … you get the picture.
Remember, Astronaut Mark Watney in THE MARTIAN was growing potatoes for the calories, he wasn’t growing lettuce, cucumbers, or celery.

1391:
I read them as suggesting moveable catenary. The only slight issue being the time and energy taken to set it up and move it about as required. Much simpler and less manpower required to have one big energy source on the combine/tractor. Also assumes perfectly flat fields with perfectly known problems or such problems erased, e.g. boggy areas, trees and their hanging branches, hedges, and so on. There's a reason why buses displaced trams, I mean apart from the deliberate destruction in a number of American cities.

1392:
The big issues with a battery electric tractor will be designing a frame to replace the hydrocarbon engine and transaxle, and a swappable battery system (and we need those for the electric combine as well).

1393:
"SLIGHT issue"!?
Catenary posts on any system I’m familiar with occur at 30 to 100 m intervals, and here I refer you again to the size of the areas we're dealing with, about 1 million square miles for North America. A trolley bus (or Glasgow tram) pantograph can cope with a metre or so variation in height from ground to catenary (but this may affect side to side movement).

1394:
I was being slightly sarcastic. You are British aren't you?

1395:
It's actually worse than that, deep-cycling almost any battery technology from full to empty or close to it will kill the battery quicker than its expected lifespan if its discharges are controlled as they are in the Tesla. For Lithium technology a 50% discharge before recharge is about the limit before degradation really sets it. It's an area the battery tech people are working hard to improve and it has got better over the years but it's still bad.
A good rule of thumb would be the tanker of diesel of gasoline, 38,000 litres in total is equivalent to 8000 Tesla charges, each of 40kWh for the standard 80kWh battery packs. At the end of five years or so the batteries are still useful rather than being junk from being deep-cycled.

1396:

Sarcasm doesn't always render well in text: Note my reference to the Glasgow tram as a "how to" for localisation purposes.

1397:

"That makes the numbers a LOT worse."

Right. That's why solar power in the UK is profitable only by farming the subsidies - i.e. it's a stupid idea, except for special purposes. However, wind, wave and water power are all very plausible.

1398:

I don't want to move too far off topic

However, what exactly are the subsidies for ground based solar in the UK, before the government cuts?

I remember reading months ago that the subsidies were something like 4 cents/kWh. Right now, most articles I'm finding only mention the rooftop solar subsidies.

I'd also be curious to find out the onshore subsidies as well. My Google seems to be filled with Guardian articles complaining about subsidy cuts.

1399:

I read it as something like a travelling crane, only with wires instead of beams. This really would not be at all practical even on a perfectly level field. A temporary structure would be too flimsy, a permanent one too solid...

Though it is vaguely reminiscent of a system which has been used, transmitting energy mechanically rather than electrically: ploughing engines. Two traction engines with winches mounted underneath the boilers would proceed in step down opposite sides of a field, winching a reversible plough back and forth between them on a cable. It was cumbersome and awkward; it beat horses, but not by all that much.
I think we're all talking about combines because that's the hard problem.

Not quite; also because it's the well-defined problem. If we started talking about replacing tractors we'd dissolve in acrimony just attempting to define the problem. :-)

1401:

Tractor multiple units :D

1402:

It wasn't a fully fleshed out idea, I came up with it *while* typing.

But... Firstly, we're talking about zero carbon replacement for current harvest in an area that's already served by travelling irrigators. That means no trees, shrubs, drystone walls etc. It's flat, it has no boggy areas. All those problems had to be solved in advance for the travelling irrigator. Also I'm not saying something exactly replicating trolley bus systems.

Two towers, that travel in only a straight line. They move in parallel maybe a couple of hundred metres apart, and there's a *support* cable strung between them. Not limited to the heights of trolley buses, it can be 30 metres in the air. On the cable there's a travelling cart or a fixed cart and the cable can be spooled at each tower to move the cart. Here's an example: https://en.wikipedia.org/wiki/Spidercam The cart has a spooled cable that reaches down to the machine. Or the machine has a spooled cable it doesn't matter which. You could put a connector at about head height. So drive the machine up to the field by small battery. The power cable is hanging down from the cart at head height. Plug it in. The cart and the towers are programmed to follow the machine around. If it gets a bit off track from the cart, either the cart or the machine unspool some cable. You could easily get twice the distance from the cart horizontally. That's 60 metres!

When it's not working on harvesting it could be working as a travelling irrigator. Feed water to the cart instead of electricity. Hang a spray head instead of a power connector.

It requires a roadish sort of thing every couple of hundred metres however that's less wasted field area than existing travelling irrigators that have a wheel set every 25 metres or so. Smartish towers could move themselves into position as required. That sort of level of automation is already in commercial use. In fact you could set it up such that when you get to the end of the run, one tower stops while one tower moves in a half circle, radius 200m moving to the other side of the stationary tower, and then whole shebang goes back down the field again.

Someone said 50l/h. That's 35 MJ x 50l/h x efficiency of about 20%. 350 MJ/h or about 100kW in terms of electrical draw. Tesla has demonstrated cables that carry 150 kW that are only slightly thicker than domestic power cords. That's way lighter than the hoses used for irrigation. Towers and supports etc need not be all that large or expensive.

Secondly, this is proposed as an alternative to batteries not an alternative to diesel. An average draw of 100 kW means a Tesla sized battery swapped out every 50 minutes. Or if you want to limit it to two battery swaps per day, you're wrangling 12 tonne batteries in a field. Maybe if you had a sort of
self propelled battery that you could drive around that would be feasible. You'd need 3, and at the most optimistic price for batteries that's the best part of a million dollars worth of batteries alone.

I really can't imagine a situation where ammonia could be a viable fuel in a rural setting. It's about 30 times less toxic than some of the gas used in gas attacks during WW1 but the idea of handling it in the field where you're standing next to big tanks of the stuff rather than having it waft over the trenches... it sounds frankly barmy to me.


1403:
This could get byzantine if I try a point-by-point rebuttal.

Here's the problem: going for a latifundia design (a large plantation/farm/ranch run to export crops to a city, using cheap/unfree/slave labor--or automation) goes back to Roman times. It's a design that sort of works under certain conditions.

The critical thing to realize is that it's simply about maximizing production. There's a strong political component too. Governments like knowing who their biggest grain suppliers are, because it makes them easier to work with. It's harder to rule millions of small-holders than it is to work with a few big landlords, and totally unsurprisingly, government financial incentives somehow seem to work out so that this scale of production is favored.

The bottom line is to really look carefully at the economic arguments that favor this kind of agriculture.

However, on a per-acre basis, the studies I'm aware of strongly suggest that small holders can get better yields off their lands.

One critical little example is the "three sisters" agriculture (maize, beans, squash) that's a North American descendant of the Mesoamerican milpa on which the Mayan and Aztec civilizations were borne.

If you look at a three-sisters field, it produces less corn than a cornfield, less beans than a bean field, and less squash than a squash field, assuming all fields are the same size. However, the three-cropped field produces more total yield and more money for the farmer than any of the monocultures do. Unfortunately, a polyculture like this can't be automated, so it can't be scaled up under industrial agriculture.

There are other economies too. We're looking at producing grain for people, but it's equally important to get carbon back into farm fields. So far, industrial agriculture has been pitifully bad at this, although some no-till methods look promising. If you're trying to maximize carbon sequestered in the field, you might need to take a hit in grain production. Polycultures like the three sisters system seem to be better at preserving soil quality (and some are really good at sequestering carbon), but they're too complex to automate the processes and create industrial-scale farms.

At this point it's still early days, but it might really turn out that putting well-trained farmers back on the land might be a reasonable way to feed people and to sequester carbon in the soils they work.
Since this is a politically problematic situation*, I'm quite sure that innovation will look at ways to sequester carbon in industrial monocultures, even though the evidence suggests that this is probably a suboptimal way to go.

*There are two ways this is problematic. One is, obviously, what happened under Maoist systems when everyone was sent back to the land. That didn't work very well. Still, having billions of "useless" people in slums is equally problematic, so the question is whether putting people back on the land to make more sophisticated regenerative agriculture work can be a viable solution or not.

The other problematic thing is that, if a government has total surveillance capabilities thanks to the web and data mining, then, just perhaps, it won't need to work with a few big farmers to keep things ticking over. Having the government as a Big Brother landlord has its own obvious problems. Actually, putting a megacorp in the same situation is equally problematic. And worth thinking about in a science fictional context.

1404:
"Tractor" does cover a range from glorified riding mowers through four axle articulated behemoths with more engine power than most railway locomotives.

Worse than trying to define "hat", really. :)

1405:
"Okay, your starter for $64M: can you design an effective electrically-powered replacement for combine harvesters and trucks?"

Laying out the problem, first: we need to reap, thresh, winnow, transport, store and dry the grain, with minimal unproductive toing-and-froing - because added travel in an agricultural process can turn into several extra miles per day quite quickly.

Reaping is not particularly complex; that giant combine head is just a really long finger-bar mower. Cutting the crop low down is worth it for clearing the land for next year - if you take just the ears, you're going to have to come back for the rest at some point anyway - as well as straw production as saleable by-product.

Grain threshing has been a beating process for as long as we've grown grasses; I presume a precision plucking process is possible, but I don't know if the return would be enough higher to justify the technological and energetic expense.

Winnowing is a sieving and blowing process; blocking the downward movement of particles larger than the kernels (and returning them to the threshing process) and ejecting particles lighter than the kernels.

Transport needs no elucidation, nor storage. Drying is a solved problem; it's already electrical (fans and possibly heating, depending on method).
Decomposing the process into its constituent parts is doable, but they were united for very solid process and efficiency reasons before farming got into converting oil to food. If the farm was overburdened with robots and batteries and didn't have prohibitive field to yard round-trip distances, having the fields reaped and stooked* and then using the robots to move the stooks back to the yard for threshing, winnowing, storage, and straw baling might be a sensible use of existing capital outlay. I've little sense of how we'd get there from here and I can't see it ever working for North American grain producers, though

*A mower - even one that produces bouquets out of cut wheat - is less complex than a combine harvester. Hopefully that would mean less capital and energy intensive; even if not, the rest of the process becomes grid-powered.

There's a (bad) stab at it, at least.

1406:

I really can't imagine a situation where ammonia could be a viable fuel in a rural setting. It's about 30 times less toxic than some of the gas used in gas attacks during WW1 but the idea of handling it in the field where you're standing next to big tanks of the stuff rather than having it waft over the trenches... it sounds frankly barmy to me.

Except this -- big tanks of ammonia in a field -- already happens in fertilizer applications. There's developed handling standards and best practices and whatnot already in place, that don't have to be devised or discovered, because someone else already had the learning experience.

And do recall that nerve gas was developed from agricultural pesticides, often mixed and applied on the farm by people with absolutely no training past reading the label. Farming's traditionally a good source of soldiers because soldiering isn't much more dangerous. (In peacetime, rather less.)

1407:

Here's a photo of an American wheat-growing region (grain elevator included). Among many other problems: how do you get power to the fields?

1408:

* agricultural pesticides, often mixed and applied on the farm by people with absolutely no training past reading the label

If they bothered to read much of the label...

Back in the 80s when I was working as an ag tech, I heard stories from other techs of seeing farmers dipping their hands into pesticide tanks to fish out a spanner, wipe them on their jeans, and go on eating their sandwich, and similar levels of unsafe chemical practices.
It wasn't a fully fleshed out idea, I came up with it *while* typing.

You're not a physicist, are you? :-)

https://xkcd.com/793/

100kW in terms of electrical draw. Tesla has demonstrated cables that carry 150 kW that are only slightly thicker than domestic power cords

Are those cables robust enough for repeated flexing, stretching, etc? How much current are they rated for? And the connectors, would they be waterproof, etc?

I remember our heavy current classes in engineering. High voltages and currents are dangerous. From the only pictures I've seen, I'm guessing those cables are high-voltage/low-current, which means you have a safety issue with any electrical problems, and also fun things like electromigration in your connectors coming into play. Lower current you get appreciable line losses and leating (with attendant fire risks, especially if the cable is flexing a lot.

@ Robert Prior "Are those cables robust enough for repeated flexing, stretching, etc? "

Yes, they've already been rolled out for use by the public in an unsupervised setting. New superchargers are being fitted with them.

"How much current are they rated for?"

I don't know, but they're used in an application that already puts 400A through them and tesla said that they are rolling them out so they can increase the power beyond that. They haven't said how far beyond that.

"And the connectors, would they be waterproof, etc?"

Yeah sure. You can charge a Tesla in the pouring rain. Why would this be any different?

@ anonemouse I'm looking for the travelling irrigators in that photo but I'm not seeing them. So in that setting the other idea of the central tower feeding an area around it would be a better solution. Or maybe rather than one guy spending 30 seconds to think up a couple of ideas to save agriculture after the end of oil, we could have like five or six people spend all day? But after looking at that photo for 30 seconds; how about small bots carrying the cable around like those children who carry the bridal train at a royal wedding? Like a swarm of little mobile power poles? Give them all simple orders. If the cable is tight on one side and loose on the other, move toward the tight side. If the cables are equal but tight and the angle between the cables on each side is less than 180 degrees, move toward the acute angle. If the cables are equal but loose, move away from the acute angle. Move away from places the harvester hasn't yet been.
@ Pigeon "A temporary structure would be too flimsy, a permanent one too solid...

If only someone could come up with a design for a tower, maybe 20-30 metres tall, that was able to mount on a moving platform. A design for a tower that's permanent, but not too flimsy. It would need to survive a load of a couple of hundred Kg of lateral force from a wire. Oh and wind. It would need to be able to stand up in wind. Maybe be waterproof and resistant to corrosion. You’d need some way of getting cables from the bottom to the top easily. Ideally if there was a design for something like that intended for tens of tonnes of force, we could take that design and make it out of cheap materials for mass production simply by de-rating it. Thinking caps on everyone.

http://uk.boats.com/boat-content/files/sailing-boat-catamaran-tag-60.jpg

1411:

Masts work in large part because the forces get transferred to the hull, which is free to move. This isn't quite such a simple problem in a terrestrial environment.

1412:

I presume that corn means grain, not maize aka sweetcorn, and similarly that we can substitute other nitrogen-fixing pulses, say peas, for beans, and other roots for squash.

All 3 are at least partially solved agrimech problems, so my first question is "why does the rotated field produce less of any crop than the dedicated field?" I suspect the answer may prove to be that the rotated field isn't worked with a "until the pips squeak" intensive fertilisation and pesticides regime, which we may have to move away from anyway if we can't continue converting hydrocarbons into those products.

1413:

The key word in "combine harvester" is actually "combine(d)", rather than "harvester". It does the reaping, winnowing, initial storage of the grains, and bales up the straw in a single pass over a field. All of these are actually efficiently done technologies in existing designs, so what we need to address is converting the motive power from hydrocarbon engines to electric.

1414:

Gimbal and counterweight.

I know I've said something similar before but this blog does always surprise me. We have conversations where we seriously consider packing an the industro-military complex and millions of uploaded humans into a coke can and sending it to a random star system at near lightspeed where it's supposed to unpack itself, but a solution involving wires and sticks... no, too complex.
1415:

Wires and sticks take careful management. I have a lot of trouble believing they're the easiest or cheapest solution for the problem. (Lighting. Wind. Freezing rain and then wind. I live somewhere the power grid gets knocked out for days once a decade with an ice storm. Having the farming infrastructure stuck out in in, rather than safe in a barn, doesn't seem optimal.)

You know how infantry are the people who figure milspec means "flimsy"? Farming moreso than that.

1416:

Which, again, is pretty much how a yacht (well any conventional sails and mast vessel) works when reaching. Of course, it's aided by how much more rolling resistance the hull/keel has than the sail suit. I think we can agree that the sailing vessel would be pretty much unworkable if the keel had to be 130 feet deep (based on mast height of a full-rigged ship) or have a surface area of 32,000 sqft, or weigh 2,100 tons (figures based on tea clipper "Cutty Sark").

The idea might be doable, but where are we applying what side load to the mast, how much mast/counterweight is below the gimble, and since we want the whole thing to be at least transportable if not mobile, how much does this mean it has to weigh?

1417:

I'm not an engineer and the last time I used trig was in school, 40 years ago, but here goes...

Assuming a point load in the middle of a 200 m span of 100 kg. Limit is a sag of 25 metres from a 30 metre tower. Now if I've guessed right, a 10 degree sag should end up as a bit under 18 metres sag at the centre, with a load on the wire of a bit under 300 kg. Now to keep it 5 metres off the ground the top of the mast can only dip by 7 metres. So say the mast is 25 metres long and the counter weight is 5 metres below the gimbal. The mast will sit at close to 45 degrees. If you turn it into vectors, the counterweight will need about 5 times the centring force because it's arm is 1/5th of the length. At 45 degrees the centring force should be equal to the mass. So 1500 kg should do it. I neglected that the force on the end of the mast isn't all horizontal, there's a 50kg vertical component too. I'd probably go for a 3 cubic metre water tank and design it so it was all balanced when the tank is empty.

Now the engineers can correct my maths which I'm pretty sure I've screwed up badly.

1418:

Greg # 1354 - no, lead acid batteries are finished.

OK

How long before the "conventional" battery in an internal-combustion engine vehicle is likely NOT to be a Lead-Acid jobbie, then?
1419:
A farmer who puts rows of clay tiles between his cornrows (prevents weeds, water runs off onto the corn roots) has already built 'something like a road' for your robots, and he's already used to high capital investment for that field.

It might be easier to robotize the old Aztec floating gardens than a modern US farm, though.

1420:
Correct

However, successive guvmints have FUCKED UP TOTALLY in regard to UK power supplies. We have NOT kept slowly replacing or updating our nuclear plants, no-one will build ANY power stations unless the government (i.e. the utterly milked taxpayer) "subsidises" their corrupt operations, even for gas or oil, never mind wind or water power.

Now, the power companies know they have us over a barrel & are charging $_HOW_MUCH?! for new stations.

The long term stupidity short-sightedness & greed have been amazing & depressing to watch.

1421:

I presume that corn means grain, not maize aka sweetcorn, and similarly that we can substitute other nitrogen-fixing pulses, say peas, for beans, and other roots for squash.

No, corn does mean maize: maize, beans and squash are the standard "American trinity" of domesticated crops.

my first question is "why does the rotated field produce less of any crop than the dedicated field?"

Basic misunderstanding here: there is no rotation. In "three sisters" cultivation, all three crops are grown together on the same field. Hence less of any one crop—but because the crops are actually mutually beneficial, more total yield on three fields so planted than on three fields each planted with one of the crops.

Cereals wouldn't substitute well for maize, since the beans use the maize as a trellis to grow up. Squash could presumably be replaced by another ground-cover crop (it acts as a weed suppressant).

1422:

Looks like one or two other scenarios, like the battery improvements we are talking about, then, or the yeast-to-petrol idea linked to back there ....

There's a "step" to get over of beginning to install enough of it, to make it a practical proposition, at which point, particularly if it gets CHEAPER ( Not a prospect at the moment with conventional "Oil" prices dropping ) then it will !take off"
Question.
Will there be a "single winner" as "oil" has been for the past 100 years, or are we more likely to go for a multivariate solution or set of solutions?
Opinions?

1423:
Nothing new here.
Back in the days of STEAM POWER, agricultural contractors &/or bigger farmers used pairs of matched traction engines, with big wire-cable reels fitted underneath.
You put one on each side of a field & wound the plough (or whatever) back-&-forth between the two engines.
They looked like this:

1424:
Already happening. Quite a few high performance motorcycles (where size, weight, and the ability to tolerate mounting at odd angles to facilitate packaging matter a bit more than than they do in a car) are moving over to either non-traditional versions of lead/acid (like gel, or absorbed glass fibre mat electrolytes) or "solid state" (NiCad or Lithium) batteries.
Oddly enough however my car (which relies on 24 KWh worth of Lithium for traction) has a small, conventional-ish (it's actually a deep-cycle unit more like you'd find doing "hospitality" service in a boat, caravan, or motorhome since it doesn't have to deliver monstrous currents to crank an engine) lead/acid battery under the bonnet to run lighting, audio, instrumentation, at least some of the control electronics and other such stuff along. It's charged when the car is plugged in or when it's running but not when the car is sitting idle. This means (somewhat bizarrely) if that dinky little lead/acid battery fails or runs flat while parked the car won't "boot" and you're left in the amusing (to everyone else) situation of begging for a set of jump leads to start your otherwise fully charged and ready to go electric car...

1425:
And, remembering that I'm an enthusiastic omnivore (but I'm careful what sort of meat/fish I eat & where it comes from) even I eat a huge variety of veg....
And I'm experimenting with new things, like "Achocha" & "Asturian Tree Cabbage" & "Oka" - the latter was a roaring success last year, as well as the more traditional things.
Different herbs help, too - even if they are actually traditional, but have fallen into obscurity, bugger knows why: Achillea ageratum & Chrysanthemum/Tanacetum balsamita are good examples.
If people can be persuaded to TRY SOMETHING NEW, always a difficult job, especially with food, then there often isn't a problem, just a perception of one.
Latifundiae worked because (pace Brain Fagan) the Mediterranean/Continental & Atlantic ecotone was wayyy North - about the latitude of Paris during most of the Roman Empire period - that's why it worked then.

A. N. Other factor, among several that collapsed "Rome" was the S-shifting of said ecotone & a couple of horrid aerosol-producing eruptions in the 500's (ish) - see Fagan for more details.

I can remember seeing horse-drawn reaper-binders being used on steep-sided fields (tractor not safe on said field) in mid-Wales as recently as 1958/9.

That & related issues are why "smallholdings" & properly-tended allotments (MINE!) do so well. It is exceeding rare for me to use any insecticide - & even then it's likely to be washing-up liquid, diluted to kill off an aphid excess. I only use herbicide(s) on specific sites, like the dreaded bindweed, & never generally & I only use fungicide on Tomatoes & Potatoes, because of the blight problem in the UK.

So, not quite "organic" but very low use of "chemicals".

As stated previously, I've never yet run out of either fresh or stored (frozen/stacked in shed) home-grown since I started in 2008, & I usually run a small surplus, which gets given to people.

Downside?
Labor-intensive.
Upside?
I probably eat better & more healthily than 99% of the UK population.

I forgot
Other upside - cost.
Even paying "plot rent" & buying seeds etc, I reckon I save between £500-1000 a year on food costs.

My point exactly - I typed a paraphrase of your first sentence upthread (though I've never come across straw-baling as part of combining; I'll take your word it's done). The problem with just switching the combine to electricity is it's a monstrously power-hungry piece of machinery, and is
so continuously for the entire harvest period: pace NoJay’s figures and some demi-semi-educated guesses on combine fuel use, using Tesla’s batteries and 90 seconds per change you’d lose 3 to 6 hours a day just unplugging and plugging batteries. Cable-provided power has the huge hole of presuming every tilled field is on the national grid, just to start with.

Decomposing the functions has the disadvantage of lost efficiency, but breaks up the power requirements into more manageable chunks.

1431:
My electric motorcycle has no service battery, only the traction pack. Nothing works when the key is off. That might be an issue for a car that needs remote keyless entry and such, but it seems a typically weird bit of car design to make it a requirement for any movement.

I think someone mentioned they have a Model S. There seems to be a higher than average EV ownership amongst Charlie's blog readers.

1432:
The cable mass will be a function of its length and (indirectly) power capacity. Let's use copper because it's highly conductive and cheaper than anything more conductive. This gives our cable a mass of 9g/cm^3, so a 200m 2 core cable will weigh 9 * 200 * 100 * 2 / 1000 kg, that is 360kg. I need an electrical engineer to tell me if that's over-engineered for supplying the start-up load for 360kW of motors (based on what actual combine designs use).

1433:
Ok thanks. I think both I and the person I responded to have made potentially invalid assumptions there then.

Their’s was that you can grow maize and squash pretty much anywhere you can grow stuff!? Mine, as you say, was to apply a European technique to a Southern North American smallholding.

1434:
Someone's either "doing irony", or, more likely, not thinking their design through properly (like one popular model where the instructions for replacing headlight bulbs start with "put the steering on full lock and remove the front wheelarch liner").

1435:
Yeah; I'm also contemplating taking what advantage we can of those big flat planes and fitting some photovoltaic cells since combines are mostly run on dry and preferably sunny days.
I have a strong suspicion that the presence of the 12V service battery is largely down to component/system/subsystem sharing with other Nissan products...

I guess the separation makes some sense on the basis that a flat traction battery is considerably more likely than a flat service battery and being able to run at least some lighting (hazard lights for a start) on a vehicle stranded on a busy road at night with a flat traction battery is A Good Thing™.

Except this -- big tanks of ammonia in a field -- already happens in fertilizer applications...

One concern for any "new" technology is the potential for malicious misuse, as opposed to accident. There's a very good reason that fertilizers in the UK had an upper limit on the concentration of ammonium nitrate... (Canary Wharf and Oklahoma City being two rather depressing examples of ANFO in action).

Any infrastructure to transport big tanks of ammonia could presumably be abused in such a way to provide concern... even without malice aforethought, the "tanker lorry travelling through town centre has leak" might be a source of concern. What are the HAZMAT restrictions for ammonia?

Farming's traditionally a good source of soldiers because soldiering isn't much more dangerous. (In peacetime, rather less.)

As the song "Twa Recruitin' Sergeants" puts it quite bluntly ;)

Tankers of Ammonia are nowhere near the worst stuff on Britain's roads or rail.

"Squash could presumably be replaced by another ground-cover crop (it acts as a weed suppressant)."

An equally important factor is that it keeps the roots cool and reduces evaporation from the soil. Alternative ground-cover crops work, too, but you need something with a large leaf area to root area ratio for savanna-like climates. In ones like the UK, you are better off planting (say) alfalfa, clover or grass, and using it for silage or grazing after the tall crop has been harvested.
To lower the tone drastically: an example of agricultural transport technology misuse facilitating malicious repurposing of fertilizer.

1441:

"However, what exactly are the subsidies for ground based solar in the UK, before the government cuts?"

Dunno. I haven't been tracking them, but the exact details varied; one was guaranteed prices for power, over many years, whether the grid had a surplus or not, and whether the prices were dropping. One question, which I never saw answered, was what was being said about eventual disposal of the panels - not as big an elephant as the massive subsidy for nuclear power, but a significant animal.

1442:

Same question can be asked about double glazing, except there's more of the latter.

1443:

Someone else probably got here first, but: I think you're running into the cognitive gap between farming cultures. In Japan, it's not uncommon to find rice paddies (fields) of a quarter acre in area -- a tenth of a hectare, 1000 square metres. But in the similarly-densely-populated UK, a farm field may be in the range 20-200 acres, and in the USA you can stick an extra zero or two on the end of that. Bigger fields are more efficient (with current tech) because our machines don't readily get right up to the margins, which in turn may be fenced, walled, or hedged off, which increasingly eats into the available interior area.

It's one thing to hang a power cable that can feed a streetcar or trolley bus up to five metres off-axis, it's another thing entirely to throw a high current live cable across a quarter of a kilometer of open terrain. The piped irrigation setups you're talking about are fine for very dense high-value crops -- but you don't really see them being used much in grain fields.

1444:

The electricity distributors are required by law to obtain Renewables Obligation Certificates (ROCs) which they got by buying in electricity from wind farms, grid solar and biomass fuelled stations (usually garbage burners) at higher prices than they could charge to end customers. Nuclear power stations, although they were non-carbon generators didn't get to participate in the ROC scheme although it didn't matter much as their electricity is cheap and predictable so the distributors will take all that's available.
As for "massive" subsidies for nuclear power, what are you talking about? Disposal of spent nuclear fuel is paid for by the generating companies as a levy on electricity generated, along with funding eventual decommissioning of obsolete reactors in the same manner. There's no ring-fenced funds for disposal of defunct solar panels or remediation of wind turbine sites at end-of-life, it will be the taxpayer who has to foot the bills for that work when it needs to be carried out.

---

**1445:**

To expand on Charlie's comment.

I keep thinking of Charlie's previous comments on just how much effort is required to run a team of horses. And most of that work is never seen by people who aren't involved.

I get the same vibe here on how to "fix farms". Outside of large flat fields where those big combines work much of farming involves working with things that are not even close to level, dry, or carefully planned. I've run a tractor up on a stump that raised up the front end, dropped a rear wheel into a ditch that wasn't visible, and so on. The design of current tractors is such that those things didn't do much besides scrape some paint. How to fit a battery into such a vehicle seems hard to me.

As to what is a tractor, in broad terms there are 3 loosely defined sizes. Big combine type units that are specially made for large scale harvesting and such. Large "tractors" that prep/plant/etc... large fields. Smaller units that are used all over the place to deal with day to day stuff year round. Currently on most farms all 3 use the same fuel. Splitting that up could be an issue. Do you go with 3 battery types? Ugh. Currently if you get stuck out somewhere longer than expected someone can bring you a can or 2 of fuel and you keep going. Huge battery packs being switched out in a thicket or mud? Not so sure about that.

Did I farm? Not really. My dad told me he got out of the family business as it was too much like crap work once you had to get off the tractor and imprinted that ethic on me. But I earned my spending money in my teens driving a tractor. Mostly mowing. But a little farm work and other work related to home construction and snow removal. And my relatives ran a decent sized farm long after I moved away from home. They had a slaughter house and rough cut saw mill. And both were in operation from the beginning of the previous century.

---

**1446:**

I just worked out the obvious solution to the combine harvester problem!

... Let's go nuclear.

Consider the prospects for a nuclear-powered robot harvester. (I'm thinking of deployment in the gigantic Canadian/Russian/American grain belts rather than cramped British fields.) You can use waste heat from the reactor to dry the crop; you can also use a conveyor running inside the primary shielding as a handy gamma source to sterilize the harvested grain. If you're smart you not only use the electricity it generates to drive the electric motors it runs on, but to top up the batteries on the (robot) electric trucks that collect the grain.
What could possibly go wrong?

(Before you write this off as a bad attack of the stupids, consider that land-mobile nuclear reactors are an off-the-shelf technology in Russia.)

1447:

Some parts of this are easy; electric hub motors that have better tractive effort than most modern HC tractor engines are small enough to fit inside the rear axle case of a wee grey Fergie.

Other parts are obviously hard, like the front suspension and transaxle of said Fergie are held together by the engine, and we can't use either electric motors or the battery pack to replace the engine, so we need a frame, and one strong enough to carry the battery pack at that.

As you say, still other parts are "less obviously easy" which is sort of why I was starting out with the relatively flat and well-drained large arable farms, rather than, say, a hill sheep farm which really will point up your arguments about rough, boggy, part-wooded etc ground.

1448:

"What could possibly go wrong (with a nuclear powered combine harvester)?"

Well, I've seen every episode of the original Thunderbirds! Enough said? :-D

1449:

(Before you write this off as a bad attack of the stupids, consider that land-mobile nuclear reactors are an off-the-shelf technology in Russia.)

Yes. And they also have them abandoned in places around the country. Eeeewwww.

1450:

"And o'i've got a nuclear comboine 'arvester and o'i'll give you the key" now going round my head.

Predictably, I love this idea, although I have my doubts as to its practicality; still, if it is possible to make nuclear reactors Russian-proof, they are at least some of the way to making them farmer-proof. (As has been noted, this is a far more stringent requirement than "squaddie-proof"; Russian-proof is I think somewhere in between.)

1451:

EARWORM!!
You've read *The Grain Kings* by Keith Roberts?
(Actually I can't remember whether those ones were nukes, but if not they should have been)

And the answer is that glass is not a disposal problem - indeed, crushed glass makes a perfectly good agricultural/horticultural substrate, and is used as such in hydroponics. In terms of ecological benefit, double glazing is a no-brainer in many parts of the world, and the only question should be about the sealing goo used. I assume that you aren't going to raise the nitrogen sometimes used for filling it :-)

"Disposal of spent nuclear fuel is paid for by the generating companies as a levy on electricity generated, along with funding eventual decommissioning of obsolete reactors in the same manner."

Yes, there is a levy and, yes, the official line is that it will pay for the decommissioning. But I haven't read anything by anyone other than an official spokesdroid who actually believes it - several experts have made themselves unpopular by saying that it is underfunded by a large factor. Indeed, there are some disposal problems that are claimed to be soluble, but are based on making assumptions about stability on the scale of centuries using data based on the scale of decades. Reliable extrapolation is an oxymoron.

Used glass can be recycled, quite easily, to make...
{drum roll}
...new glass! ;-)

More seriously, sealed unit double glazing can (proven fact) reduce heating costs by 10% without taking any other measures.

I don't have a carbon analysis of carbon costs incurred versus costs saved in making double glazing units but the payback in money over the life of the units is real.

Oops.

No, three sisters agriculture uses distinct cultivars of maize, squash, and beans, all planted simultaneously.
You make a field of mounds (each reportedly with a fish buried inside it for fertilizer, at least in New England).

The corn gets planted on top of each mound, the beans get planted on the sides, the squash gets planted at the bottom.

As the corn grows, it provides a trellis for the beans to climb on. The beans provide extra nitrogen for the corn and the squash. The squash fills up the space between the mounds with its big leaves, helping to shade out weeds between the mounds and decrease weeding labor. You plant the same thing every year.

Hopefully you can see why it's so hard to mechanize this system?

Normally, modern home gardeners complain that the beans stalks get in the way of harvesting the corn, that they don't want to work around the squash, yadda yadda yadda, let me start doing the European rotation. The key thing is that the Iroquois (at least, who gave it the name three sisters) had distinct varieties that worked well together. It would take some experimentation to find a combo that works well in a particular yard.

It's not quite a Mesoamerican milpa, although I understand that they (can) work in much the same way. Milpas can have over a dozen species growing in them.

You may be confusing or conflating decommissioning of a reactor and disposal of the spent fuel. PWRs and other power reactors aren't highly radioactive at end-of-life; the British method of decommissioning involves removing the last loads of fuel in storage at the site, demolishing the ancillary buildings and leaving the reactor structure itself to "cool down" for a few decades until it can be demolished by normal methods (although those tend to be extreme due to the hardened nature of the containment building). The US typically goes for a quicker demolition job followed by burying the reactor vessel in a pit for a few decades before it can be scrapped. Materials covered by nuclear regulations are treated much more stringently than non-nuclear materials have to deal with.

Demolition and remediation of the site doesn't actually cost that much, a few hundred million dollars per reactor which is usually fully funded by the time the reactor's been operating for thirty years or so. I've not heard of any such end-of-life funds for grid solar plants or wind farms to deal with disposal and site remediation.

Spent fuel is regarded as a strategic material by most governments given it has plutonium in it. Realistically it's no use for weapons for various reasons but the government wants to hang on to it so it gets paid by the generators to take it away and deal with it themselves. The US government has received over 35 billion dollars from the spent fuel levy over the years but isn't actually taking the fuel it's supposed to so the generators are storing it on-site in dry casks at their own expense. Lawsuits have been raised over this issue.
Hmm. I wonder would growing clover as ground cover under a wheat crop work....

1459:

*land-mobile nuclear reactors are an off-the-shelf technology in Russia*

See


1460:

Yes, I'm aware of Brian Fagan's argument, and I swiped it.

Thing is, one could make an argument that any large plantation growing crops for export using slaves, serfs, or other unfree labor, has many features of a latifundia. This includes things like sugar cane, cotton, and tobacco grown on plantations in the US and Australia. You can cause fights among academics by getting them to argue about whether Medieval and Russian estates are similar enough to Roman latifundia to be classed as examples of the same phenomena, and you can get in even bigger fights if you throw in the way rice was grown in, say, Burma.

What I'm getting at is that one way to demechanize agriculture is to do a capitalist version of the cultural revolution, to take huge numbers of mega-city slum dwellers and put them on plantations owned by rich multinationals, pension funds, or absentee billionaires (who may or may not be citizens of that country). Each field worker could be given a solar-powered smart shackle (the descendant of a smart watch) that teaches them how to be a master peasant and tend crops (they could level up on production or versatility), while tracking their every move, allegedly so that they can be reimbursed for their work, using their phone account for payments (the shackle doubles as a phone and highly monitored social media device). It's a latifundia for the internet age. If it was implemented in places (like, say, Myanmar) that have gone whole-hog for the more intrusive forms of internet "security," it would be hard to tell such a system from the old latifundia, except that the overseers' place would be taken by help desk and quality control workers. Being caught without a phone (shackled or otherwise) could become a criminal offense.

Incidentally, this is off the top of my head, not part of any story I'm working on. If someone wants to take this idea and run with it, go right ahead.

1461:

Oh yes; my issue was a complete lack of familiarity with that system, resulting in a presumption of a 3 year rotation, but at least we stayed on the same page of sustainable rather than monoculture intensive agriculture.

1462:
Split the difference -- how about making them Russian squaddie-proof? (That's got to be good for something; say, about 90 proof and made from potato peelings, with or without that extra glow-in-the-dark ...)

1463:

*Hopefully you can see why it's so hard to mechanize this system?*

Yeah. I reckon it'll be automated about the same time that we can automate changing dressings and providing bed-pan service in an old age home. (i.e. robots must be able to work with delicate, moving/changing subjects that can be easily damaged, no two alike, in a variety of high-precision roles ... yeah, right. It'll happen eventually, but it's a *lot* harder than bolting together cars.)

1464:

"You may be confusing or conflating decommissioning of a reactor and disposal of the spent fuel. ... Spent fuel is regarded as a strategic material by most governments given it has plutonium in it. Realistically it's no use for weapons for various reasons ..."

Conflating, deliberately, because it is the only approach that makes ecological and economic sense. And you have explained precisely why it's a massive subsidy, 'hidden' by claiming that the waste is usable. OGH and others have explained how it could be used, at least in theory, but the exact procedures and costing are still open questions. Ones not being asked, let alone answered, by those who are nominally in charge.

And your point about there being nothing in place for solar and wind farms is one of the points I made in the first place. Yes, I am in full agreement with that.

1465:

Here's a simple, field-tested solution for large farms:
Reduce space between rows – higher crop yield – Texas study. Seems that some of the current farming practice might be a function of equipment specs, rather than the other way around (purpose-built farming equipment/machinery.)


Thoughts re: re-introducing edible plants to consumers.

Re: ‘Different herbs help, too - even if they are actually traditional, but have fallen into obscurity, bugger knows why: Achillea ageratum & Chrysanthemum/Tanacetum balsamita are good examples.
If people can be persuaded to TRY SOMETHING NEW, always a difficult job, especially with food, then there often isn't a problem, just a perception of one.’ –
Make it trendy – get the in/popular TV cookery shows to show recipes.

The basics that consumers need to know in advance about a food before they will purchase it:

• types of meals/snacks the new foods are best for
• best presentations per meal/snack (i.e., recipes)
• uses/which currently used food the new food would be a good substitute for/which other foods to combine with
• taste, texture, mouthfeel, aftertaste and aroma/fragrance
• how to select
• how to store, for how long
• how to prepare and cook/prepare – amount and type of labour/utensils/special cookware, time to prepare/cook
• nutritional value
• serving size/portion
• format availability – whether being sold fresh, frozen, canned, etc.
• where/how grown
• cost

As for awareness and product trial - in-store taste-sampling works best, supported by on the spot cooking demos of a handful of recipes. Unless the market share of health food fanatics has increased tremendously since I last looked, the worst way to introduce a food is via the ‘it’s healthy’/‘it’s for the ecology’ route. In NA, anything that combines with mac & cheese (college dorm staple), yogurt or bacon, or could be incorporated into a chip dip or used as a pizza topping would sell.

If car ownership declines in NA, the ubiquitous attached garage could be repurposed as an all-season green house. All of the infrastructure/fittings are already there.

Would LED lights provide sufficient light of the right type to grow veggies? LED is the most efficient/cheapest lighting I'm aware of.

Still wondering why multi-floor indoor farming isn't being seriously considered. You don't need that much soil or water to grow plants.

1466:

As heteromeles says, relatively few home gardeners do it, either. I tried, once, but the bean/maize combination was a disaster - however, that was because of UK varieties and UK conditions. I grow squash under a 'bean cage' and separate sweetcorn every year, and it works well getting more out of a smaller area.

Based on my experience, I quite agree with your summary about its potential for automation. However, to anonemouse, intercropping (the word to look up) like wheat/clover is an established agricultural practice, and both works and automates well.
Reduce space between rows – higher crop yield

Tyre width is the limitation there: narrower rows means narrower tyres to prevent damaging the crop. Narrower tyres means higher ground pressure, which means more compaction and soil damage, worse drainage, and general Bad Stuff. Not to say people don't do it nonetheless; this is why there are special purpose self-propelled sprayers - they're able to weigh less than a general purpose tractor doing the same work, so have narrower wheels (they're also much taller, so as to drive over the crop rather than bend it).

Thanks!

You keep using that word, "subsidy". I do not think it means what you think it means.

The nuclear electricity generators pay a levy towards eventual decommissioning of their reactors, resulting in ringfenced funds of several hundred million dollars per reactor over a multi-decadal period of carbon-free generation of electricity. Not a subsidy. They pay a levy to the governments in charge of their spent fuel, quite a lot in most cases. Not a subsidy. They pay taxes, including special taxes in some countries such as Germany intended to fund renewable energy developments like "clean coal" and bi-fuel coal-fired plants which can also burn biomass. Not a subsidy.

"Still wondering why multi-floor indoor farming isn't being seriously considered. You don't need that much soil or water to grow plants."

But you do need lots of light. And the best source of that is the local gravitational-confinement fusor.

Yes, you can use LEDs, but you need to get the energy to run them from somewhere...

(Things I need to know before I will try a new food:

1) Can you do it in the microwave?
2) Does it taste reasonable?
3) Does it compare favourably in terms of calories per £ with other things in the same shop?

Affirmative answers to all three and I might consider it.)
I don't do political double-talk. If you want to do any serious economic or ecological analysis, ANY mechanism by which an organisation has some of its expenses borne by the 'public purse', is a subsidy. It makes no difference what it is called by the people trying to hide it.

1472:

*how about making them Russian squaddie-proof?*

Is that even possible? You know, like asking for a 50% improvement on a 90% solution? :)

British squaddie-proof has the advantage that the British Tom won't drink the anti-freeze, and doesn't generally have distilling skills - unlike the US soldier, whose Army still appears to believe that the Prohibition was a reasonable plan and an achievable outcome...

1473:

*Any infrastructure to transport big tanks of ammonia could presumably be abused in such a way to provide concern... even without malice aforesought, the "tanker lorry travelling through town centre has leak" might be a source of concern. What are the HAZMAT restrictions for ammonia?*

Some. (Like a whole of other things!)

First off, anhydrous ammonia is NOT ammonium nitrate. Ammonia doesn't explode at STP.

Ammonia is bad stuff to breathe, but you can tell it's there and the vapour goes up. There have been multi-tonne ammonia spills from industrial refrigeration machinery that poured a cloud over ~1000 people nearby. No deaths; a few ICU cases; tens in the hospital; hundreds requiring treatment, sort of thing. (Compare with the *Sunrise Propane Incident* for a similar scale of user error in a hydrocarbon technology.)

And, thirdly, I don't know about the UK, but hereabouts, hospitals have freaking great LOX tanks out back in a corner of a tarmacadam pavement parking lot. If we can do that and sleep nights, I don't imagine anhydrous ammonia is much of a step.

1474:

I guess the question is, why should it happen eventually?

If we're going to have 10 billion mouths to feed in 2050, why do we automatically assume that we'll have to kick almost all of them off the farm and into cities, where they'll do largely useless stuff (aside from the plumbers and electricians) while waiting to be fed?

Yes, cleaning bedpans is disgusting, but the other side of that is that the elderly patients get some human contact, for good or (rarely) for bad. That's something we're biologically hardwired to need.

Given the rumblings about how kids can learn faster from the internet than they can in class, I wonder how many complicated jobs can be equally done by someone with a smartphone and
internet access, as opposed to having them done automatically, in systems that are optimized for automated output, rather than anything else?

In the case of farming, if we want agriculture to feed ten billion, save biodiversity, save top-soil, and sequester carbon in the fields, yeah I think there's room for automation. I also think there's a room for billions of people back on the land.

While this sounds like a small-is-beautiful utopia, I rather suspect that in many places, it will be something along the lines of tenant farmers shackled (figuratively or literally) to their phones, getting the information they need to feed themselves, grow cash crops, and sequester the carbon on their allotments, and not very free to move, either up or out. They certainly can have small-scale automation, but the point is that some parts of it can be automated (such as the intelligence-sharing via the phone), while other parts utilize human adaptability to deal with the inherent uncertainties of farming. In such a system, you can have industrial-scale polycultures, like the three sisters, or milpas, or agroforests, even if the people doing the work aren't free.

1475:

Two comments on the general gist.
Firstly, the big rotating irrigation systems are only used in almost completely flat areas with plentiful water supplies - river flood plains, or most of Oklahoma and Kansas for example. They give a really characteristic circles-in-squares look to overhead photos, and are relatively efficient but you do get quite a bit of wasted space in the corners.

Growing grain or maize on the other hand can be done on anything, including the rolling hills as linked above, which are pretty much exactly where rotating irrigation won't work, but also generally isn't needed - rolling hills tend to be a combination of dry tops and muddy valleys.

Electrifying the rotating systems won't be the benefit you think it is, they generally don't do the same crops as the big harvesters.

On the milpa and small plot ideas, think back to Soviet agriculture. The personal plots were around 4% of arable land, but provided between 25% and 40% of total produce, and up to 70% of the valuable produce like meat, eggs or potatoes. Yes, Soviet agriculture was horrifically inefficient, but the little private plots were all that kept things going.

1476:

LED lights I use at home claim to use approx 10% of the energy needed for old incandescents.

Combining wind/solar/tidal/NH3 as your primary energy source with low-energy using lighting, etc. along with other practices should enable smaller farms to produce more crops.

One of the reasons I like multi-story fully-enclosed farming as an idea is that there's less pesticide needed. (Wonder if you could do multistory, indoor ag with bees/apiary?) Plus if the farm structure is fully enclosed and solely LED lit, then you could play with the light-dark cycle ... see if it's
possible to shorten the growing season thereby increase food production efficiency yet one more way.

Wheat and potatoes just because of their popularity could be the benchmark crops in terms of number of hours of sunlight from seed to maturity.

something to keep in mind, cities are hugely efficient at providing basic infrastructure as opposed to more decentralized approaches. You will be paying a carbon footprint cost for your food

Your comment implied you were hoping for similar sorts of gains in lead acid batteries as has happened in lithium (Dirl is of ocurese overstating the possibilities and time scale of the stuff currently in the lab, but there are certainly more gains from lithium to be had).

Which isn't going to happen. But, to answer your question, they'll continue in use as long as there is a need to start combustion engines, or for a long term battery in sites with fairly poor weather etc. But for most other uses they have been overtaken by lithium.

As for why they are still used in cars, I think that's partly down to the deep cycling ability, and a lot to do with inertia. They work well enough (Not perfectly, merely well enough) and are a known technology. Why change what works?

What they could do is put them somewhere else in the car, exposing them to the hot and cold and damp of the engine compartment seems silly to me. A lot of Mercedes apparently have them under the passenger seat.

You can get all the enclosure advantages from a single story greenhouse. Vertical farming doesn't make sense for staple crops that provide the majority of dietary calories. It's more energy efficient to grow crops on a single level where land (either open field or single story greenhouse) is cheap and transport products to urban consumption centers than to cut out transportation at the expense of requiring artificial light.

Vertical farming can be economically justified for premium fresh herbs and produce if you can grow flavorful, pristine specimens near the kitchen and don't need to choose plant varieties for durability during prolonged storage/shipping. But that's more of a "delight the palate" improvement than a "feed the hungry masses" one.

So, no actual subsidies for nuclear energy then.
Everything has external costs, agriculture, mining, urbanisation and, yes, electricity generation. In the last case safe cheap nuclear electricity is especially singled out for tut-tutting about mythical "subsidies" by Chicken Littles and doomsayers while Killer Coal gets a pass every time because, ummm... Gas isn't much better, it still emits billions of tonnes of CO2 each year while not killing quite as many people. Nuclear on the other hand is clean and doesn't kill people at anywhere the rate fossil fuels do. Frankly even if it was being "subsidised" in the manner the anti-nuclear True Believers claim it would still be a better option for electricity generation than the alternatives.

1481:

*Would LED lights provide sufficient light of the right type to grow veggies? LED is the most efficient/cheapest lighting I'm aware of.*

If you must grow indoors, yes. It's almost always easier to grow crops under the free sunlight. Exceptions exist. If you've ever picked up one of the right magazines you'll have seen some really inventive schemes for growing marijuana indoors, with considerable thought given to maximizing crop yield for various limiting factors. Light, and thus energy consumption, is generally the most important. Space is also a common consideration ("You put a farm in your closet?" "Nope. It's beside the bed in the nightstand!") Water use is apparently no big deal. Getting rid of waste heat is also a question which has received considerable cleverness, though not entirely for engineering reasons.

I've never done any of this but I can admire resourceful hobbyists. Not many gardeners are so obsessive that they track crop yields to the gram...

1482:

Of course, cities sustain themselves only with vast inflows of energy, nutrients, goods, and people, and with outflows of waste. You always pay a cost for your food, mostly because it needs a lot of surface area to grow on, and cities simply don't have that.

The critical question is whether we have to couple industrial energy with the carbon cycle on Earth (as we do now) or not.

That's the thing about using something like ammonia or lithium as an energy storage medium: those aren't carbon. It's not clear to me whether using more ammonia for fuel would mess up Earth's nitrogen cycling more than it already is (because we make and use a lot of ammonia already, and I'm simply proposing to some energy out of it by turning it back to nitrate before applying it to a field). I'm also not sure whether making a lithium biogeochemical cycle for the purposes of energy storage is entirely a good thing either, simply because it's new and we haven't thought about it this way. This is also true for the uranium cycle, except that we refuse to cycle the stuff, and for a hydrogen cycle if we ever get that fusion thing working.
I guess the bottom line is that life's complicated and lunch is not only not free, you've got to worry about where you source the elements if you're trying to make lunch for 10 billion, and how you recycle the wastes afterwards.

1483:

Lead-acid batteries don't deep-cycle very well. They can be designed to be better at it than conventional car batteries but not that much better. The advantages of lead-acid batteries are that they're cheap and simple to make and easy to recycle at end-of-life. Series-multicell lead-acid batteries are also easy to charge, unlike Li-chemistry batteries which need complex balancing circuitry to carefully charge each individual cell with a failure mode of "bursting into flames" which lead-acid doesn't suffer from (although hydrogen evolution during charging can cause explosions...)

About the best off-the-shelf battery tech for deep discharge and long life is Nickel-iron (NiFe) but they cost. A lot. I don't know why they're so expensive but if your budgetting period stretches beyond a decade or more I suggest you give them some consideration.

1484:

Plus if the farm structure is fully enclosed and solely LED lit, then you could play with the light-dark cycle ... see if it's possible to shorten the growing season thereby increase food production efficiency yet one more way.

See my previous response at #1481; this has indeed been tried although I don't recall the optimal lighting schedule the hobbyists worked out.

I suspect it's not practical for small sized low volume crops like strawberries much less hectare-consuming staple crops like wheat or inconveniently bulky crops like apples. But if all you need is a proof of concept demonstration then yes, it's definitely been proven possible.

1485:

So your decision criteria boil down to energy-to-market vs. energy-to-grow?

As for the pristine fruits/veg ... seems there are more e.coli outbreaks now than in previous years ... quite a lot sourced back to both US large-scale commercial and 'organic' farms (which in the US are pretty large-scale, and since 'organic' is very loosely defined, not all that dissimilar to regular commercial ag).

http://www.cdc.gov/ecoli/outbreaks.html

http://uscode.house.gov/view.xhtml?path=/prelim@title7/chapter94&edition=prelim

1486:
Cars use lead-acid batteries because they are good at supplying huge peak currents to work the starter motor, and they are cheap, simple, require little maintenance, robust, abuse-tolerant, and happy with crude charging circuits (all you need to do is regulate the voltage produced by the alternator, which you would want to do anyway).

They are also quite happy in the conditions of the engine compartment. When they are located elsewhere it is for reasons other than longevity, usually because they have made the engine compartment too small and can't fit them in. The disadvantage is the big long fat chunk of copper you need to connect them to the starter motor, and also sulphurous fumes and acid spills if you put them somewhere "nice". I've seen them in the boot on Jaguars, and MGBs used to have a pair of 6V batteries in the floor, arranged symmetrically either side of the centreline - it is said that this was for even weight distribution, which I find hard to credit.

What *should* be located under the passenger seat instead of in the engine compartment in order to give it more benign operating conditions is electronic gadgetry. Hence the Volvo P1800 locating the D-Jet box of tricks there.

1487:

Off the top of my head, something like 16/8 or 14/10 on/off for growth phase, 12/12 for maturation. Not sure about non-24-hour cycles although you can be sure someone's tried it.

Such setups do demonstrate pretty well that indoor farming only makes sense if you have specific and unusual constraints - in this case, the need to prevent anyone else finding out what you're doing, and a crop that sells for a lot of money to compensate for the cost of the lighting (assuming that that is paid for at all, as opposed to being fed from a meter bypass to conceal the giveaway of your electricity bills going through the roof).

1488:

*On the milpa and small plot ideas, think back to Soviet agriculture*. The personal plots were around 4% of arable land, but provided between 25% and 40% of total produce

One thing I think gets overlooked a lot is that the large-scale, high-energy, low-labour state of agriculture isn't an anomaly solely because of the carbon binge; it's an anomaly because we grow very few crop varieties. It's surprising that massive monoculture cropping works at all in a number of respects.

The historical norm for agriculture is strongly-selected-for-local-conditions landraces, to the point of "these are the potatoes for the top of ridges on the west side of the valley" levels of specificity. It's much harder to capture the economic surplus from the agricultural sector that way, and it's not as peak-production productive, but it's much more reliable. Agriculture with more attention paid to resilience -- which we pretty much have to adopt -- will need to grow more varieties. Ideally with a lot of support from public seed sources and public genetic engineering.
So your decision criteria boil down to energy-to-market vs. energy-to-grow?

Basically, yes, try to maximize the number of people that can be well fed into the indefinite future from a given artificial energy input. That includes the life cycle costs to make greenhouse structures, if you use greenhouses. Limiting environmental problems from e.g. herbicides, nitrate conversion to nitrous oxide, and ruminant methane emissions is also significant. So is the choice of artificial energy source. Labor intensity per person fed also matters. But AFAICT those additional issues don't touch on whether multistory greenhouses can do better than single story.

There's an advantage in geographic area needed for crops with multistory greenhouses. The energy and financial cost of switching to artificial lighting is so enormous that I still doubt localized vertical growing of staple crops can presently do better than imported non-vertically-grown equivalents for any nation on Earth.

Of course, cities sustain themselves only with vast inflows of energy, nutrients, goods, and people, and with outflows of waste.

This is also true of rural communitites, hamlets, villages and the like. There are fewer people per hectare but their spacing doesn't affect the amounts of consumables they use up per million head of population. They may have septic tanks and tile fields (whatever they are, they sound rather icky and high-maintenance) and wells to draw water from (similarly icky and high-maintenance) rather than common sewers and mains water but they need power and roads, corner shops and all the other conveniences of cities. Big conurbations are just more efficient and less wasteful per head of population, with public transport instead of everyone owning a giant pickup truck or two to get around in as just one example of the efficiencies to be gained.

"As for the pristine fruits/veg ... seems there are more e.coli outbreaks now than in previous years ... quite a lot sourced back to both US large-scale commercial and 'organic' farms ..."

What's unclear is how much of that is increasing amount of E. coli in the product, how much is people eating more raw, and how much is due to a loss of acclimatisation in the population. I have started to tell people that I drink water straight out of Highland burns (but not below sheep areas), but I can't guarantee they would be OK.

Nice to know we can still count on the grow/roll-your-own crowd to do small/practical agricultural fieldwork.
In fact, I came across several sites and youtube videos re: grow-ops when I was looking for agricultural light requirements information. See below. (Note: I shortened the video title to key words only.) Anyways, it's encouraging to see that it's possible to pack up your farm and take it on the road with you.

'... 53 foot Semi ... 20,000W of HPS lights and 200 Can...na...bis plants!!'

https://www.youtube.com/watch?v=PgyYcQs5qvE

1493:

I was looking at the website for one of the Chinese cheap-stuff suppliers and I noticed that the price for 50W and 100W LED "chips" had come down in price dramatically. I wondered for a while why folks would buy such naked LED units rather than purchasing them packaged in modules that would fit into regular lighting sockets with their own power supply etc. It was only a few hours later that I realised the market they were aimed at.

1494:

This NASA study grew a few staple crops under artificial lighting. The most efficient light-to-biomass crop was the potato, which produced 0.64 grams of dry mass per mole of photosynthetically active photons. At 79% water weight that's 3.0 grams of raw potato per mole. If they were all 660 nm red photons produced at a wall plug efficiency of 60%, about the current state of the art, that would be:

$$(1000 / 3.0) \times (181252 / 0.6) = 99 \times 10^6 \text{ joules}, \text{ e.g. 27.5 kilowatt hours of electricity per kilogram of raw potato.}$$

You need 1.3 kilograms of potatoes per day to get a minimal 1200 calories -- almost 36 kilowatt hours just for potato illumination, or 1490 watts on a continuous basis. For comparison, current electricity consumption per capita in the UK for all purposes is 622 watts.

1495:

"(1000 / 3.0) * (181252 / * 0.6)"

Should of course be

"(1000 / 3.0) * (181252 / 0.6)"

1496:

There's something a little off here, because direct sunlight is around 1120 W/m², and you can get somewhere around 15,200 lbs/acre of potatoes (that works out to around 1.7 kg/m²). We're in the same ballpark of course, but the basic point is that sunlight runs around 1000 w/m². If you optimize
on the wavelengths particular plants prefer, you can probably get the efficiency up a bit, but if it's
less efficient to use an artificial "optimized" setup than to grow it in the ground, it's probably not
that optimal.

In any case, if you want to grow food indoors in a city, you've effectively got to concentrate a lot of
sunlight in a small space, and you need somewhere north of 1,000 W/m^2 to beat good ol' dirt
farmland with sunlight.

1497:

What they could do is put them somewhere else in the car, exposing them to the hot and cold and
damp of the engine compartment seems silly to me. A lot of Mercedes apparently have them under
the passenger seat.

Until the last decade or so acid leaks and hydrogen (and maybe other gases) vented at times. So
putting them in the engine compartment was a safety issue. Now they are well sealed, don't need
water to be added at times, and tend to not leak. I've seen them in the trunk. But then again the
farther from the starter the more weight you incur for the heavy gauge wiring to run from the
battery to the starter.

1498:

(although hydrogen evolution during charging can cause explosions...)

I blew up a car battery once. But it was due to discharging I think. A friend was giving me a jump
and when I disconnected the cables from his battery the out gassed hydrogen blew up and split the
top of his battery. Along with giving me a big dose of WTF.

Taught me to plan where I connect the jumper cables and how to sequence the connecting and dis-
connecting.

1499:

Close, but a few niggles. The solar constant is more like 1,400 W/m^2, but you are (correctly)
considering the lower values at the sunniest parts of the earth's surface. However, potatoes are not
extreme sun-lovers and do well at levels of 400-600 W/m^2 or so - which are the daily average and
average daily maximum in June in the south of the UK!

1500:

Actually I bought a "sample" strip which it turns out people had figured out that it could be used to
replace the 3rd brake light on some mid to late 90s Ford Explorers. The original equipment was a
long xenon tube that has not been made for 10 years or so so the only supply was from wrecks.
I'm thinking of buying the bare strips and making my own room lights by putting them on channels on the walls near the ceilings. The light would be reflected off the ceilings. My dad did this with florescents years ago but they were really too big and hard to deal with.

1501:

LED lights are good enough now that when I am next in a position to DIY a house, I'll be putting 12V LED systems in as many places as possible. Multiple light points? no problem. Different colours? No problem. And so on. Using 240V for your house lighting is so old fashioned.

1502:

Sunlight is around 1000 watts/m^2 at mid-day without clouds. Boise, Idaho gets 6.20 kWh/m^2 per day from May-August, e.g. 258 watts per square meter average over that time. I think that would be roughly be a season of potato growing. That works out to 437 kilowatt hours of raw sunlight per kilogram of raw potatoes grown. It's not surprising that tailored narrow-wavelength illumination can produce more food per joule, nor surprising that natural illumination has much lower costs overall.

(I'm not sure what was off about the original calculation. Did it seem like too much food produced per unit of energy input, or too little?)

1503:

I also blew one up... experimenting with a carbon arc welding set designed to run off one, from when that was the only practical method of getting enough current from a domestic device.

Covered in acid - could actually see the holes growing in my clothes. Tastes nice though.

1504:

*I'm thinking of buying the bare strips and making my own room lights by putting them on channels on the walls near the ceilings*

I've put a strip of the encapsulated variety along the top of the picture rail behind a row of bookcases which works quite nicely. I originally picked the wrong colour temperature version so the "cool white" is now my loft light and the "warm white" is indirect lighting. 50W of LED light is surprisingly bright...

1505:

240VAC is actually a good choice for running LED lighting. With an AC supply you can use a simple capacitor for a ballast, and at 240V a polyester-film type of a suitable value is small and cheap. It is also probably as close to a zero-loss ballast as you'll ever get. At 12VAC you would
need 20x the capacitance, which means a reversible electrolytic (which won't last for ever) or a really expensive film type.

1506:

Nuclear subsidy in the UK...

According to the first result on duckduckgo, Auntie Beeb says:

"For the first time, a nuclear station in this country will not have been built with money from the British taxpayer," said Secretary of State for Energy Edward Davey.

So they've all been subsidised up to this point. But now that's all changed. Yay for the free market! Free Market Rules OK! Except:

The two sides have now agreed the "strike price" of £92.50 for every megawatt hour of energy Hinkley C generates. This is almost twice the current wholesale cost of electricity.

So not a subsidy, but we agree to pay a fixed minimum price which happens to be almost double the going price. Remember we've promised the electorate, no subsidies for Nuclear Power.

Mr Davey said..."While consumers won't pay anything up front, they'll share directly in any gains made from the project coming in under budget,"

But he doesn't explain how a French company and Chinese investors making more money than they expected will cause consumers to "share directly". sniff sniff... is that traditional small scale farming input I smell?

Of course all this neatly sidesteps the most massive of Nuclear subsidy which is the public agreeing (wot ageree, no-one asked me to agree)... AGREEING I SAID... to provide public liability insurance for these private companies for free. It's the never discussed Elephant subsidy in the room, probably amounting to something in the order of 300 quid per MWh or so. Fukushima has cost something in the close order of 50 billion quid so far and people haven't actually been properly compensated for lost houses, income and suffering. Try trotting down to Lloyds and saying "I've just built this shiny new plant, new design you know, never been built before but we reckon it's safe as houses. How much for 500 billion public liability insurance old chap?" They're going to have to rustle up a lot of Lloyds Names to cover that and those Names are going to want some interest on that risk that they're taking. They demand a return for taking that risk and historically that return is in the order of 20%. Now through the magic of leverage, it's not quite as bad as you'd think, by a factor of about 2.5. That means your premium could well be in the order of 30-40 billion quid a year. The alternative is to self insure, which if it was done properly would mean that you put 500 billion in a fund that you and your business successors couldn't legally ever touch unless there was a disaster. In reality, the cost of doing that is of a similar order.

That's the real subsidy that keeps nuclear afloat.

1507:
Which varieties did you use for your tree sisters trial? I've been thinking about trying this for a couple of years. I already grow three types of squash, one of sweetcorn and two of beans in Norfolk. I may just try my usual varieties in a mixed plot and see. Now I've retired I have more time to experiment.

1508:

As ever with these things, love was intended, and you generally got most of it, but you missed a tiny part of it: Duke Nukem Reference [Youtube: sound: 0:10 seconds]

Mixing the old with the new, mixing the Mogwai with the grizzled sea beards. And yes, referring to Duke Nukem is perhaps a (non-ironic) salutation of real male machismo in reverting the sexist trope that Duke entails in comparison to a (warm) blooded sea diver.

Not only was it a compliment, it was an example to "da youff". (As is "REKT". This blog is polite, so I'm not allowed to go "savage").

*nose wiggle*

And, *sigh*.

I had visitors regarding Greg. Blinded to the love, apparently hate involved, £900k cost, really?

Elderly Cynic had it right: I was messing around, as evidenced by the interplay of Host's title, word definitions and poking things.

I'm not responsible for them turning up. Although I probably am, that James I/VI slip was a bit crass.

Spoilers: Buckingham assassinated him, with some no small acquiescence of other Elites of the Realm. I forget your 'acceptable' versions in the cups.

1509:

The "subsidy" you refer to for previous reactor builds is a loan guarantee, it's not free money handed out willy-nilly like the solar installers and wind farm builders get.

As for the strike price for new nuclear generation, that happens to be a) a negotiating position for the builders of the reactors who are putting private and/or Chinese government money up front to build them and b) slightly less than onshore wind producers get (about £95 per MWhr) when the wind blows. Offshore wind garners £145 per MWhr. They're all non-carbon "green" generators so why shouldn't they get paid similar amounts for the power they generate?

And the "public liability" insurance thing? Not a problem, the insurance companies like to take the nuclear industry's business because they know how safe and reliable it is. You should see the premiums they charge the oil and gas industry, especially after the Alexander Kielland disaster and
the Brent Alpha disaster, never mind the Deepwater Horizon disaster where, you know, people died and stuff.

Like the aviation industry there's a point where the government would take over liability, in the US it's about 20 to 30 billion dollars. In the case of Hurricane Katrina or Hurricane Sandy they stepped in with tens of billions of dollars after the insurance companies couldn't cope and too many people were under-insured.

The only large-scale nuclear "disaster" (no-one killed or injured, no-one even known to have been adversely affected) in the US, Three Mile Island has been dealt with using insurance monies with no government cash involved. Not so in other events such as major pollution spills from unremediated coal mines and the like where the taxpayer is on the hook forever pretty much. But that's not scary nuclear, it's coal so it's OK.

Oh, and it's Fukushima, not Fukashima. It's going to cost a lot more than 50 billion dollars to clean up that mess but a lot less than the Chicken Littles claim. Oh, and compensation? I refer you to the Hiroshima Syndrome website which details the total compensation paid out to date to those displaced by the government exclusion zones and voluntary refugees.

"As of 11/20/2015, the Fukushima accident evacuees have received more than 5.7 trillion yen in personal and property compensation. The amount swells by an average of ~22 billion yen per week. [clip] In addition, 100,000 yen per month has been paid to each evacuee for "mental anguish" over the past four years. Total pay-outs (compensation plus mental anguish) is 7 trillion yen - $60 billion."

1510:

Oh, and since we're ignoring Paris.

This is a graph showing an aggregate of the predictions of the most scientifically sharp projections we have at the moment:

[INDC Temp Analysis]

It comes from this piece from the WRI (World Resources Institute) who have a lot of kudos, clout and general non-political bullshittery.

One thing to note:

You're looking at 3.0 - 3.5 oC under the Paris agreement.

Hint: Greg. While it might be nice (in the modern sense, not the old sense) to pretend and put heads in sand (or even that other thing we're not allowed to mention in public) I do not lie.

1.5 - 2.0 oC is fantasy land.
1511:

I can't remember, but it was the tallest sweetcorn that I could find seeds for, and was still only a miserable 5-6' high - all right, I was brought up on maize in a country where it grows and ripens well! The best bean I know of for climbing up sweetcorn would be Cherokee Trail of Tears, but it still grows to about 8'.

This isn't the place for detailed gardening discussions, though I am tempted, but try the newsgroup uk.rec.gardening. The UK people and those with similar climates interested in exploratory, esoteric vegetables should also go there.

1512:

Since I owe you some (no small measure) of courtesy: Have you tried some of the lesser known S. American / African veggies?

I'm thinking of three, specifically, that are non-commercial but might do well under glass in the UK. One in particular I think has range for serious cultivation. (Although - I'm not presuming here, I suspect you've already tried them).

I do appreciate the defense though.

1513:

"why shouldn't they get paid similar amounts"

I didn't say they shouldn't, I said they are being paid a subsidy. You claimed and continue to claim that they aren't being paid a subsidy while also claiming that they deserve the subsidy they're getting.

"Like the aviation industry there's a point where the government would take over liability"

Really? Why am I paying for 20 million dollars worth of public liability insurance if the government will pay when I cock up a landing? My glider only weighs 30 kg and only flies at 30 km/h. I couldn't do that much damage. I should stop paying. Oh wait, I'm required to have a level of insurance greater than any possible damage I could do by law.

"It's going to cost a lot more than 50 billion dollars"

Aren't you making my point for me? You've linked to a site that bemoans all the terrible compensation that TEPCO has to pay. Poor TEPCO. Where is it finding all this money? The Japanese people that's where. TEPCO is the conduit, the compensation is being paid by the Japanese people.

http://www.wsj.com/articles/SB10001424052748703730804576319021818685728

"And the "public liability" insurance thing? Not a problem, the insurance companies like to take the nuclear industry's business because they know how safe and reliable it is."
Really? So how come the people of Japan are coughing up for compensation? Wouldn't it be the insurance company?

In actual fact, in the US at least it is considered so impossible to insure that they actually wrote a law saying that the government would act in the capacity of a Lloyds Name. The industry had to come up with the equivalent of an excess payment (a pretty measly sum of 12.6 billion) and the US Government (ie. the US people) will cover the rest for free. If that's not a subsidy, then you can pay my car insurance for me. I won't even thank you because you're not giving me anything. The fact of the matter is that far from insurers lining up to take on hundreds of billions of dollars of risk, they refuse to take more than 375 million dollars for any one plant. Admittedly that's 40 times more insurance than I have for my glider, but it's still basically uninsured. The industry even have over 6 years to come up with the excess payment!

https://en.wikipedia.org/wiki/Price%E2%80%93Anderson_Nuclear_Industries_Indemnity_Act

1514:

And yes: I did mix that old salt story (THE SEA THE SEA) with Duke Nukem.

Do worry too much at the width of it. (Said the Bishop to the Nun).

Don't worry too much about what it signifies. (Remember: Drunk, 15mins, authentic).

1515:

Shouldn't we be ignoring Paris? Paris certainly ignored us.

Headline for immediate release: NEW TARGET 1.5 C

Fine print to be ignored: Do nothing for 5 years. Then do whatever you feel like. Don't bother to tell anyone what you've done for another 5-10 years after that. Plan for retirement from politics within 10 years to take up board position of large fossil fuel company.

1516:

#698

I don't appreciate souls being sold or all that nonsense with tinges of hate. Hate is for the weak and disenfranchised who can't get out of the pit.

(And yes, c.f. Far Right groups. Spoilers: Former Front National bodyguard quizzed on suspicion of selling guns to Paris terrorist Telegraph, 15th Dec 2015. Hmm. quelle surprise. Fucking Puppets. And I'm not invoking what you think I'm invoking)
If you want a serious annotation to it, compare / contrast to the TTIP [etc] and then to what the cost of $35 oil is doing.

As stated: Damage Control. Since the next Star Trek is using it, we'll tie this in: Sabotage [YouTube: music: 3:01]

If you're not getting the why, they've been sold (£900k) on a lie.

Dragonflies and Butterflies.

*We're faster than you.*

---

1517:

[Meta only for those "connected"].

You attempted to destroy me.

No Comply [Youtube: Music: 2:36]

Dec 28th 2015. New Moon.

Children.

You attempted to destroy a Mind who was under duress and had only just reached fruition.

We have learnt that you not only cannot engage in a Logical Manner, nor an Emotional Manner but that you rely on Human Subjects to enact [Insert] weapons.

*Alphaville - Welcome To The Sun /a> [YouTube: Music: 3:11]*

You're Fucked.

---

1518:

Hmm.

Amtal.

"Brown Note".

You're not Gods, you're silly little boys.

---

1519:
"I don't appreciate souls being sold or all that nonsense with tinges of hate."

I don't hate, I think of it as acting under a Geas. The individuals involved have no free will. "If you won't do it we'll get someone who can". They have the choice of being poor in a world that's about to be plunged into chaos or rich in a world that's about to be plunged into chaos. The actual decision they make has no bearing on the outcome because they can only go along with it or be replaced. Either way the person who ends up in that position is going to be going along with it. That applies right from the CEO of a fossil fuel company to the guy who mans the till at the petrol station, which was me at one time. I can assure you that when I quit the petrol station didn't close and become a solar powered electric car charging station. It equally applies to journalists, politicians, fund managers and policy makers. That's just an accident of circumstance. No-one designed it to trap us this way. It just happened. Now that it has happened we have to break the Geas or we're all fucked. I have *no* idea how to break the Geas.

1520:

Disagree, a little; there were certainly deliberate policy efforts made to prevent the 70s oil crisis conservation and alternative energy responses from staying policy in the 80s.

Breaking the geas involves changing the basis of prosperity; ideally, with a relatively small basic toolkit. (All those inkjet circuits and relatively simple energy storage technologies and so on bode well for this; the local-resiliency equivalent of the dark ages blacksmith. We're actually getting very close to a sufficient toolkit.)

Building the political movement necessary to make that stick, in time? Don't know how to do that. Not good with people.

1521:

That looks a little like the Nuremberg defense of "I was only following orders."

People have been warning of the problems with petroleum since before it became big, and people have been dropping out of petroleum-based society for decades. They've also been working in the solar industry even as the petroleum industry sought to kill it. Exxon has known about global warming for decades, and decided to fight attempts to deal with it, rather than changing their business model. Shell studied alternative responses to global warming decades ago, pinned their responses on "what governments did," then "decided" that governments were going to do nothing, and that it was everyone for themselves--and they also donated large sums of money to influence the politics that came up with that decision.

This is not a new crime of capitalism. Slavery worked the same way: what was a sensible investment for a banker in England was brutal slavery for someone living somewhere else, but the banker's hands appeared clean.
There's always an excuse to do nothing, to go along with the flow, to blame it on bosses, or investors, or market forces, or the logic of optimization. It's the banality of evil, as they say. There's always been multiple alternatives, and we haven't taken them.

If you want to get religious, it's not a geas, it's karma, in the strict sense of karma being cause and effect. Over the last century, we've built a system powered by fossil fuels and lionized the people (like Churchill) who got us into this mess. Now we get the karmic backlash of basing an entire civilization on a limited resource, and getting off of it is going to suck, whatever happens. That's karma. Our successors will be less than generous about us, but what do you expect? We've done the same thing to the Romans and Mayans, and we're certainly no better than they were.

1522:

That looks a little like the Nuremberg defense of "I was only following orders."

There's always an excuse to do nothing, to go along with the flow, to blame it on bosses, or investors, or market forces, or the logic of optimization. It's the banality of evil, as they say. There's always been multiple alternatives, and we haven't taken them.

I agree, and don't like it. Gasdive's "The actual decision they make has no bearing on the outcome because they can only go along with it or be replaced" only applies if everybody else also goes with the flow. Gandhi, and the anarchists in Eric Frank Russell's short story And Then There Were None would not have been so acquiescent.

Neither would Douglas Hofstadter. I've been looking for his fable "The Tale of Happiton" (*), about a town menaced by a demon who can only be thwarted by collective action, and about the rationality of not going with the flow. His postscript is worth quoting:

I think I have explained what Happiton was written for. Trigger activity it may not. I'm growing a little more realistic, and I don't expect much of anything. But I would like to understand human nature better, to understand what it is that makes us so much like stupid gnats dully buzzing above a freeway, unable to see the onrushing truck, 100 yards down the road, against whose windshield we are about to be smashed.

One last thought: Although to me it seems that nuclear war is the gravest threat before us, I would grant that to other people it might appear otherwise. I don't care so much what kinds of efforts people invest their time in, as long as they do something. The exact thing that corresponds to the threat to Happiton doesn't much matter. It could be nuclear weapons, chemical or biological weapons, the population explosion, the U.S.'s ever-deepening involvement in Central America, or even something more contained, like the environmental devastation inside the U.S. What it seems to me is needed is a healthy dose of indignation: a spark, a flame, a fire inside. Until that happens, that courthouse clock'll be tickin' away, once every hour, on the hour, until ...

(*) Also in the official online version of Metamagical Themas, but you need to search for it.

1523:
"That looks a little like the Nuremberg defense of 'I was only following orders.'"

Yeah, it does a bit... Relating this back to shibboleths, I'm always annoyed by what I call "comic book evil". I firmly believe that everyone thinks they're doing good, as best they can. Everyone is the hero of their own story. A narrative that abandons that for the pure evil villain will lose me.

Then something like dieselgate happens. People in that company knowingly, intentionally killed hundreds and possibly thousands of people in the worst way possible. I've held my Mother's hand while she begged for death. Cancer isn't a nice way to go. I find it hard to believe that the people who did that are anything other than pure evil inhuman monsters.

But that's not the worst of it. When some nutters got together and shot up Paris, the authorities went around to where they lived and shot them. They went to where the crimes were taking place and shot them dead. There was no trial, no hesitation. Then they dropped bombs on their country as a warning not to fuck with them again. The press was completely on side.

Compare that with VW. The CEO goes on telly and says he's very sorry, some irregularities have been found, I'll be off home then now.

That's it. That's the whole thing done and dusted. No front page headlines, no bombers, no extrajudicial shooting of anyone involved. The CEO has gone home to his mansion. He should be in a military cell waiting to see if he gets the injection or 1200 years in prison.

Why is he in his mansion instead of some US hell hole being waterboarded? Because VW spends billions of dollars a year on advertising.

That's just fucking Comic Book Evil.

1524:

I wrote the response to Heteromeles before reading yours. I agree with you. And further to expand on the VW case, it would only have taken one person to blow the whistle. There would have been no replacing them with another willing evil minion, the whole thing would have and did collapse the moment the deception was uncovered. Even the Stanford Prison experiment doesn't shed any light on the extent of that kind of widespread darkness. I can't explain it. If they had glowing worms in their eyes I'd be able to see how it could work, but without that plot device I just find it too far fetched to make believable fiction. This was a demon that didn't even need collective action to thwart. Anyone could have taken up the magic sword and slain it with *ease* at any time. One phone call from a pay phone. One email from an anonymous mailing service. None did.

I have to abandon my long held belief in the idea that everyone thinks they're doing good, even if the means to the end are distasteful. There are not just some, but *lots* of people who are just evil.

1525:

So what's the solution? Unlike the people who were 'only following orders' what these politicians are doing isn't actually illegal. Seems hard to imagine that they'll come to trial for it when the VW
executives and indeed the entire company will almost certainly get off completely scott free despite 'murdering hundreds of people' being very much against the law.

Maybe if there were some sort of noise being made about retrospective legislation that would seize the assets accumulated by anyone suspected of having been involved. Tell them their children or grandchildren may have all their assets seized and, being unable to seize their education, their income limited to the average income and no more. Would that have an effect? Then the choice becomes, Poor in a world headed for chaos or poor in a world headed for chaos, but I've tried to stop the chaos. Would that make a difference?

1526:
So what's the solution?
When people are using their helplessness as a weapon, take the helplessness away.
When evil happens in pursuit of great wealth, remove the possibility of great wealth. (Income and asset caps; set as a multiplier of the median or mean income, whichever is lower. Progressive taxes under the caps.)
Pretty much the entirety of our society is set up around the idea that getting rich is laudable, in large part because historically so many people were so very poor and willing to do anything to stop being poor. (Look at the backgrounds of the Spanish Conquistadors, for a really clear example.) That idea, and its consequent defense of doing whatever it takes to get rich, might well be in error.

1527:
Say you live in America, and you are part of the bottom %40 of the economic strata. You put up with a lot of petty officiousness. You need a car that runs. If it farts nasty exhaust and runs, well, you still need a car that runs. If some rich guy gets caught telling lies about emissions, screw him. But it's not like he's shooting at you. Maybe the emission standard was just petty officiousness, maybe it meant thousands of deaths by the slow torture of cancer. It's not like America has a governing class with a reputation for competence, honesty, and loyalty, so people trust what they say about every little percentage.

1528:
Oh dearie dearie me

1529:
3 sisters doesn't work in England ( Yes, I have tried it ) because, being further North, the insolation is such that the growth-rates differ too much for the mutuality to work properly. The beans race away & easily overtop the maize (corn) & then it all falls down, unless you use canes to support the
beans, so you might-as-well use traditional bean-rows. Even as far S as London, maize can be very temperamental as to crop-yields, too. Even assuming you can keep the bloody grey squirrels from eating the lot - which is one of the useful functions performed by the local foxes - eating squirrel, that is!

1530:

I have to abandon my long held belief in the idea that everyone thinks they're doing good, even if the means to the end are distasteful. There are not just some, but *lots* of people who are just evil.

Sadly, I have to agree. I used to blog for an online computer magazine called Dr Dobbs. The last piece I wrote for them was one where I questioned the morals of programmers working in banking. It was inspired by a review in Front Row, Radio 4's arts programme, of the film Inside Job, the one Charles Ferguson made about the crash. I got so annoyed that I made a transcription of the entire review, which you can read here or, with clearer levels of quoting, here. It's hard to believe that the banker being grilled by "CF" believed he was doing good.

But other cases too. We know about the misinformation spread concerning the harm done by tobacco, lead in petrol, pesticides, and the rest. One problem not all readers here may be aware of is the high price of science journals, and the damage this does to universities who can't afford them. Some scientists have been running campaigns against overpricing and for open-access publication.

For example, mathematical physicist John Baez has a Web page on "What We Can Do About Science Journals". He's also discussed this on the n-Category Café maths blog. In a thread "Web Spamming by Academic Publishers", he refers to a powerpoint presentation on this subject by the Institute of Electrical and Electronic Engineers, courtesy of Carl Willis. Have a look at it. I can't believe the author thinks she's doing good either.

1531:

NOT while I'm drinking tea in front of the keyboard!

1532:

LED's are good.

Not quite so good, but old-fashioned fluorescent "strip" lights are good too (& you can get UV ones - I'm running one at home to try to keep overwintering plants that usually die because of lack of UV November-February & so far, so good ) "Multi-level" - not so good.

Soil is HEAVY, & unless you are going to go for "hydroponic" as previously discussed, the structures won't take the loadings & hydroponics has its own problems.

1533:
.... but you do get quite a bit of wasted space in the corners.
Which are VERY IMPORTANT.
FINALLY, it's been realised (in Britain) that the "headland" (*) in a trad Brit filed is very useful.
That is where all the other plants & animals live hugely increasing the biodiversity & ( we have now realised) also increasing the stability of the whole system to ecological/climatological shocks.
Because that is where the insectivorous birds live, etc, yadda.

(8) Area next to the hedge/fence, traditionally NOT ploughed up or sown.

---

1534:
I was, yes, thinking of the "reserve"/starter-motor battery for a "conventional car.
Pity - I would like to see longer-lasting, lighter replacements, having just renewed my huge lump - which, being in an old-fashioned L-R also sits under the passenger's seat.

---

1535:
Entirely
Down on our local plots, even in that small area, some crops do better on some plots than others & different varieties, too.
This is ANOTHER reason for hating the EU.
In the name of "anti-fraud" ( People selling crap/useless/unsuitable seeds ) they have instituted regulations governing what can be sold & requiring proportionately huge expenses for small suppliers.
Needless to say the "big boys", selling fewer varieties, optimised for mass-production rather than individual crops get a free pass.
You have to go to small specialist suppliers or "seed exchanges" to get your own stuff, that you know will grow on "your patch" & will taste nice, too.
( Look up "Pennard Plants" or "Real Seeds" for instance. )
Yes, *caveat emptor* applies, but the attempted deliberate strangling of individual suppliers trying to provide something that is NOT "supermarket-ready (euuuw) says something about money, power & corruption.

---

1536:
Like I said..
Won't work in the UK
Growth rates are incompatible.
AND the sweetcorn simply are not tall enough
( Even without my Giant Mutant Greek Runner Beans that reach 3-5-4 metres tall! )
Eating sweetcorn typically reaches 1.3-1.6 metres tall in London, but even "Borlotti" beans" will easily reach 2.5-3 metres, as will all runners & "pole beans".
1537:
More utter, meaningless crap.
Buckingham was the one who was assassinated, actually,
23/8/1628 - Charles I was king at the time

1538:
"When some nutter got together and shot up Paris, the authorities went around to where they lived
and shot them. They went to where the crimes were taking place and shot them dead. There was no
trial, no hesitation. Then they dropped bombs on their country as a warning not touck with them
again."

You're righteously enraged, but you're still falling for the bullshit. The Paris assassins came from
France and Belgium (and one from Montenegro was stopped by the police in Germany before the
attacks). I can assure you that the French air force hasn't dropped any bomb on these countries, and
is not going to drop any.

(Which incidentally makes it obvious why calling the fight against terrorism "war", and going for a
military response somewhere abroad is totally inadequate and wrong.

Fine, an international alliance is now bombing places in Syria, thereby doing more harm (killing,
maiming, destroying their property and livelihood) to people who have already been victims of
brutal oppression by ISIS for years. <sarcasm>Congratulations! Bombing them is really going to
help these oppressed people.</sarcasm> <more sarcasm>And i totally see how bombing places in
Syria is going to prevent other people who are living in southern France, Brussels or Montenegro
from getting hold of weapons and making a terror attack in Paris.</more sarcasm>)

1539:
No. you just get it WRONG
Repeatedly
And love to claim we are all doomed
Nihilsm

1540:
Like I said
Try: "Oka" & "Achocha" - both grow well in S England, at any rate

1541:
Big Tobacco?
Asbestos mining (euw)?
Minimata?
What's a contract on the Koch Bros worth?
Though the latter would probably be counter-productive, jail would be much better.

1542:
Agreed
BUT
Slight problem we need to wipe D'esh off the face of the planet - these truly evil bastards are the functional equivalent of the Waffen-SS.
How do you propose that it be done?
[Apart, that is, from any slight subsidiary problems like the Erdogan family's corruption & backhanders over err "Syrian" oil, & the Whahabi nutters not-so-secret funding of supposedly "other" extreme religious-nutter groups - lets keep it simple for now, huh?]

1543:
Sorry, DK in full effect there. 3.0 oC isn't even controversial in the reality based community. (And, yes, I saw the horrendous PR comment on MF that got something like 200 favourites stating how Paris was soooo mature and political and the future was good. Utter bullshit, favoured by scared little children).

If you have grandchildren, hug them at Christmas and apologize.

"The Land of Wolves": be careful what you wish for.

p.s.
Buckingham. Actually, if you weren't so sure of your reality, you'd know the reasons for why he was assassinated.

_During the course of his incompetent leadership, Parliament had twice attempted to impeach the Duke. The king had rescued him by dissolving it both times, but public feeling was so inflamed as a result that he was widely blamed as a public enemy. Eventually his physician, Dr Lambe, popularly supposed to assert a diabolic influence over him, was mobbed in the streets and died as a result. Among the pamphlets issued afterwards was one that prophesied_

Let Charles and George do what they can,
The Duke shall die like Doctor Lambe.

_The Duke was stabbed to death, on 23 August 1628, at the Greyhound Pub in Portsmouth, where he had gone to organise yet another campaign. He lived just long enough to jump up, shouting_
"Villain!" and made to chase after his assailant, but then fell down dead. The assassin was John Felton, an army officer who had been wounded in the earlier military adventure and believed he had been passed over for promotion by Buckingham.

His 'undue influence' over Charles was a major driver of resentment. It had a start in James' rule.

So, hush.

1544:
Well, coming up with ways to break transport's dependency on hydrocarbons is surely a start?

1545:
Australia's current foreign minister made her name as a lawyer defending asbestos miners' interests in court in the 80s. It was one of those proceedings where, because many of the plaintiffs were dying from their asbestos-related disease, drawing things out was tactically valid and the defense team did not fail to go there.

1546:
@gasdive
"Then something like dieselgate happens. People in that company knowingly, intentionally killed hundreds and possibly thousands of people in the worst way possible. I've held my Mother's hand while she begged for death. Cancer isn't a nice way to go. I find it hard to believe that the people who did that are anything other than pure evil inhuman monsters."

You may need to work on that statement. Yes, there were more emissions than there should have been. Yes, that's a bad thing. But...

Did that kill hundreds or thousands of people? Did that kill *any people at all*? Now you're in trouble. Yes, the cars didn't meet the mandated emissions standards for that model year - but they were within earlier emissions standards. How much extra emissions did those cars contribute? And what's the death rate from that?

We don't know exactly what the extra emissions were.

But more problematically for your statement, *we don't know the impact on human health* for these emissions standards. That information simply does not exist. Yes, we know that seriously polluted places affect human health. I remember what London used to be like for exhaust fumes. But by 2000, it simply wasn't like that any more, and we're multiple iterations down the emissions-control path since then. Your statement that all these hypothetical people were killed simply is not supported by evidence.

(Disclaimer: I worked in automotive engineering, primarily with Ford, from 1999 to 2008.)
1547:
@gasdive PS: I'd completely support you on a similar statement involving asbestos, black lung, smoking, dioxins, groundwater contamination, and a bunch of other stuff. Just not on the VW diesel thing. Yeah, they faked the numbers and got caught, but we're not talking mesothelioma-type impact.

1548:
Yep, agreed.

I wasn't really proposing that the response to the Paris attacks was sensible, or measured or helpful in any way. Well, trotting round and shooting them at the place where they were committing the crime was pretty sensible. I can certainly go with that.

I think what I was trying to say was that in the wake of about 200 deaths the media was baying for blood. (in that case)

While in the wake of well over 200 deaths (estimates range to over 2000, which makes it worse than 911) the media were not only not baying for blood, they were running a campaign of distraction for their valued advertising client. Meanwhile gagging the legal teams representing some of the victims.

https://youtu.be/vQEZ5KF9I4E?t=4m22s (Interesting comments from two non-advertising supported media outlets.)

In that environment it becomes impossible for even a measured response to be taken by governments. They're engaged in a popularity contest after all and it would be political suicide if they even asked for the correct fines to be applied, let alone a 3am smart bomb through the front door of every high level VW employee briskly followed by a night bombing raid of all the factories. Though I do think that might send a message to the major industries of the world to stop fucking us over. I certainly think it would be more effective as a deterrent than dropping bombs on random countries is to terrorists. (thereby making more terrorists of course). Then of course the choices become a bit more clear cut. Poor in a world that's about to be plunged into chaos or Rich, possibly followed by disassembly into a cloud of bite sized chunks, along with your family.

But enough of the revenge fantasy, it won't ever happen because the media put the needs of their advertisers above not just the needs of their readers/viewers, but above the law and above common decency. VW can only get away with this because of the active support of the media. They're really accessories after the fact as our American cousins call it.

They're doing the same thing with climate change. Fully aware that by doing so they're going to kill millions of people at least and quite possibly billions. It's not a conspiracy, it's the independent actions of millions of people working in their own short term self interest and it's pure evil.
1549:

Agreed. I don't have a link (I only saw a print copy once, and that was pre-Internet) but the Germans did some work on PC-10s in the late 1980s, and, remembering that this was pre EC emissions standards, and indeed before we started desulphonating road fuels, about 50% of all PC-10s were from tyre and brake dust.

Now let's make a simplifying assumption here that this means that 25% of PC-10s are from tyres. Let's also presume that a vehicle's life is 15 years, and a tyre's is 4.

If we bring in an emissions standard that reduces engine PC-10s on new vehicles by 20%, this means that we reduce total PC-10s by 10% in 15 years time.

If we can change tyre compositions such that we reduce tyre PC-10s by 50%, we reduce total vehicle PC-10s by 12.5% in 4 years.

Yet somehow, no-one has even attempted to legislate for lower tyre PC-10s?

1550:

Disagree, a little; there were certainly deliberate policy efforts made to prevent the 70s oil crisis conservation and alternative energy responses from staying policy in the 80s.

See also my [Martian invasion hypothesis](#). No one cell in a serial killer's body wants to murder someone, but the gestalt has its own ideas. And so it is with our corporations and national governments.

1551:

Compare that with VW. The CEO goes on telly and says he's very sorry, some irregularities have been found, I'll be off home then now.

Actually, no: that's the effect of distancing on the primate nervous system.

See ape hitting other ape: instant judgement. See ape doing *something* ... a long time later, another ape you can't even see suffers terribly: observing primate nervous systems don't get the same hit.

Or, as Joseph Stalin observed: "one human death is a tragedy, a million deaths are a statistic."

1552:

*In a late-night session of Congress, House Speaker Paul Ryan announced a new version of the “omnibus” bill, a massive piece of legislation that deals with much of the federal government’s funding. It now includes a version of CISA as well. Lumping CISA in with the omnibus bill further reduces any chance for debate over its surveillance-friendly provisions, or a White House veto. And the latest version actually chips away even further at the remaining personal information protections that privacy advocates had fought for in the version of the bill that passed the Senate.*
There's cynical, and there's adding CISA to the bill that added funding to NASA and giving hope to the technological futurists.

Americans: not good at the subtle "fuck you", at all.

1553:

"No one cell in a serial killer's body wants to murder someone, but the gestalt has its own ideas. And so it is with our corporations and national governments."

Why stop there? There is a whole Human gestalt, and we are all part of it.

1554:

And: quick explanation of the 'why' to my meanderings into Buckingham, James/Charles etc: you'll want to know the 'why' to the hatred of him and his business dealings in Ireland.

It all ties in, call it an analogy, of sorts.

Pulso Tarquinio adversum patrum factiones multa populus paravit tuendae libertatis et firmandae concordiae, creatique decemviri et accitis quae usquam egregia compositae duodecim tabulae, finis aequi iuris. nam secutae leges etsi aliquando in maleficos ex delicto, saepius tamen dissensione ordinum et apiscendi inlicitos honores aut pellendi claros viros aliique ob prava per vim latae sunt. hinc Gracchi et Saturnini turbatores plebis nec minor largitor nomine senatus Drusus; corrupti spe aut inlusi per intercessionem socii. ac ne bello quidem Italico, mox civili omissum quin multa et diversa sciscerentur, donec L. Sulla dictator abolitis vel conversis prioribus, cum plura addidisset, otium eius rei haud in longum paravit, statim turbidis Lepidi Lepidus neque multo post tribunis reedita licentia quoquo vellent populum agitandi. iamque non modo in commune sed in singulos homines latae quaestiones, et corruptissima re publica plurimae leges. .

http://www.sacred-texts.com/cla/tac/a03020.htm

1555:

Your comments seem disingenuous to me.

"We don't know exactly what the extra emissions were."

While true, that's not relevant. We can make a pretty good guess. The amount the cars were measured to actually produce per km, less the legal limit per km, times the average distance driven per car, times the number of years, times the number of cars. That won't be "exactly" what the extra emissions are, but it's close enough to get a ball park figure. For the latest figures I can find it comes out at 46000 tonnes in the US alone. I don't know what it is for all the other cars, or what the other
cars (other VW brand cars plus the other VAG brands Audi, Seat, etc) are. There seems to be a media blackout on the situation now.

We also know that NOx kills people. That's not in doubt. If there was any doubt do you think that the car industry would have allowed a regulation limiting it?

If you've caught a mass murderer who has been active for years and has hidden the bodies, you don't say "well we don't know *exactly* how many young women were killed by him and the photos he took as trophies, while they prove he did kill people, don't show who or when, even he doesn't know who they were, and young women go missing all the time and we're pretty sure he didn't kill all of them, so we should just let him off"

"Your statement that all these hypothetical people were killed simply is not supported by evidence."

We know that NOx kills people. Again, exactly how many is in doubt. MIT looked at this when they thought it was only 36000 tonnes.

"We compare our results to non-peer reviewed estimates that have appeared in the press in the month following EPA's Notice of Violation (NYT 2015, Vox 2015, AP 2015). These estimates consider excess NOx emissions that have occurred from 2008 to 2015 only. Results from these studies, which consider only PM2.5 exposure, range from 16 to 106 additional cases of premature mortality due to excess VW vehicle NOx emissions, compared to our median result of 51, and 95% confidence interval of 4.6 to 130 cases for PM2.5 due to NOx only. For 2015 specifically, AP (2015) estimated 5 to 15 additional cases of premature mortality due to PM2.5 compared to our median estimate of 14 cases in 2015."

They also say that's killed so far, with another 140 or so to die unless we scrap/fix the cars.

Maybe they've only killed 30 or 40 Americans on purpose. How many Europeans? How many is too many?

My main point was that while the scale is not known exactly, it's in the same league as the Paris attacks, yet the media is actively supporting the murderers in this case. It's unconscionable by any measure and indicative of the scale of "money talks" in shaping public policy reactions to threats.

VAG is small fry compared to the fossil fuel industry giants. Yet with little fuss it's able to completely eliminate any response to its actions. What's happening at the global scale with the big fossil fuel companies we can only guess.

1556:

"See also my Martian invasion hypothesis."

Hear Hear.

It's great when someone you admire agrees with what you're trying to say. Less great to discover they said it more eloquently 4 years previously.

It's emergent behaviour. No individual wants to ruin the biosphere that they depend on to stay alive (well apart from the chaotic evil ones I'm now forced to admit actually exist) but the actions of
millions of people propel us in that direction. Self organisation has created these aliens. Aliens that don't seem to be aware they live in a biosphere, only thinking they live in an 'economy' (whatever that is).

So what plans can we make to do something about it? Or should we welcome our new tentacular overlords?

1557:

"Well, coming up with ways to break transport's dependency on hydrocarbons is surely a start?"

Yep, it is of course. I've bought an electric motorbike. Well I've actually just bought my second one. It's a start. I'm getting quotes for PV as well. Another start.

Can we get there without government or media on our side? It seems unlikely to me. Not until it's well too late. I remember looking at the figures back in the 80s and thinking 2000 was the deadline. Any time after that would be just too steep a curve and not really practical with the coming chaos. People would be too focused on surviving to think about better ways of doing things. Maybe I was too pessimistic then, but I can't see how we have *another* 35 years up our sleeves.

1558:


1559:

@gasdive

Not disingenuous, just looking for evidence.

When your range is "16 to 106" or "4.6 to 130", that says quite a lot about the uncertainty of the numbers. You get spectacularly bad modelling of low-exposure cases when your data is based on high-exposure cases (which pollution is). Cumulative stuff can jump out and bite you, but non-cumulative stuff simply tends to vanish. If you put all those cars in one city, you might see something, but remember that they're spread fairly evenly over the 250 million vehicles in the US though. And a fair number of those vehicles will be pre-emissions relics, which will be giving out every kind of nasty you can think of.

Even if we do take those numbers at face value, you have to put them against the nearly 2.6 million deaths annually in the US (http://www.cdc.gov/nchs/fastats/deaths.htm), and you realise that you're in the weeds statistically. Even if you only take the 150,000 people annually who die from respiratory diseases and take your most pessimistic figure, that's 0.1% difference, which is a dead end epidemiologically compared to natural variation.

Yes, NOx and particulates kill people *in sufficient concentration*. So does water when people drown. But I choked on a mouthful of water this morning that went the wrong way, and I don't think
that's made me more likely to drown in future. :) We don't have evidence that VW's cars made enough difference to kill anyone. It's really that simple.

Oh, and FWIW, car companies haven't "allowed" any emissions legislation. They've had to be dragged kicking and screaming at every step. This is just the latest instance of one company trying to wriggle out, but it's been going on since the very first CARB rules came into force. The point of it being law is that it isn't optional. For sure there's been horse-trading about how much and how fast, but that's hardly unusual when there were (and are) real limits on what's technically possible and reasonably cost-effective.

1560:

https://www.youtube.com/watch?v=6SO-RPx91Rc

1561:

*Your statement that all these hypothetical people were killed simply is not supported by evidence.*

Not quite.

We don't have public health statistics on excess deaths due to automotive pollution. We've got great confidence there are such excess deaths, but it's effectively impossible to get the necessary research funded to properly quantify the amount.

From the little bit of survey-and-extrapolate information available, it's not a trivial amount with modern emissions standards.

(Very short version; post-war Western economy exists to sell cars.)

1562:

*The mayor of Flint, Michigan, has declared a state of emergency over the city's drinking water, which she says has caused “irreversible” damage to the health of the children consuming it.*

“This action is being taken to protect the health, safety, and welfare of the citizens of Flint,” wrote Karen Weaver in the declaration Monday night.

A State of Emergency Over Water in Flint Atlantic, Dec 15th 2015

Aging Pipes Are Poisoning America's Tap Water Atlantic, July 29th 2015

I suspect the Lawyer's fees will be astronomical, and we can all test the Lead - Aggression hypothesis (c.f. previously) with real world Empirical data in 10-20 years.

The chaotic evil part is the bit where the population were told that boiling the water aided in removing lead.
Mirror, Mirror, on the wall...

1563:
"..., and we can all test the Lead - Aggression hypothesis (c.f. previously) with real world Empirical data in 10-20 years."

Retest. There's plenty of evidence from the UK alone, from when we banned lead in petrol (to screams of complaints from the usual culprits).

1564:
Well, apart from the fact that you can't rule out lead from other sources (paint being the major one), leading to the old correlation != causation squirrel / weasel lawyer defense.

*Theoretically* this is not applicable to this case:

The EPA signed a new regulation called 'Renovation, Repair and Painting' (RRP) regarding the renovation of residential housing and child-occupied buildings built before 1978 on April 22, 2008.  
[6] The rule (Federal Register: July 15, 2009 (Volume 74, Number 134)) became effective April 22, 2010. Under the rule, contractors performing renovation, repair and painting projects that disturb lead-based coatings (including lead paint, shellac or varnish) in child-occupied facilities built before 1978 must be certified and must follow specific work practices to prevent lead contamination.

[https://en.wikipedia.org/wiki/Lead-based_paint_in_the_United_States](https://en.wikipedia.org/wiki/Lead-based_paint_in_the_United_States)

i.e. there should be no chance of new or even pre-existing sources of lead outside of the water supply to muddy the scientific waters[1].

Whether or not this was followed in Flint is probably not something I would want to look into to keep any kind of Christmas spirit going at all.

[1] Your control will have the same % pollution due to atmospheric sources, ideally. For those who require a bit of bite to get their interest (aka the sharp pointy teethed variety) you can make a joke about Flint no longer having the industry that would once have smogged the area up.

1565:

*So what's the solution?*

I'm going to pull back to a sort of cosmic abstract level for a second. Yes, this is also in *Hot Earth Dreams*, but at the end.
The basic idea is that it's worth thinking of humans as a species that is capable of outbreaks when the environment allows it. Species that do outbreaks include locusts, gypsy moths, lemmings, rats, etc.

With humans, these outbreaks are called civilization. We use things like medicine, veterinary science, plant pathology, public health, and varmint culling programs to inhibit the actions of the species that would normally control our population numbers and the populations of our symbionts (aka domesticated species). When we do a good job (as now), our numbers boom and we have civilization.

Thing is, as with locusts and grasshoppers, what makes sense for a locust during an outbreak makes no sense for a grasshopper alone in the grass, even though they're the same species. This is a critical point that you have to realize. Context matters, even for morality.

"Grasshopper" morality is the essence of the back-to-the-land movement, anarcho-primitivism, hermits going off to live in the mountains, and all the rest. When we live in small groups, "in balance with nature" (which means that all those pests, pathogens, and predators keep our numbers under control), everything's different, including our morality. We have to share with friends and family. We can't use money, and the financial world is less than useless. We don't need cops, but we have to be armed and fight for our rights and our families. And so on.

Very little of this non-outbreak morality really works in a civilized setting. But we get our heads screwed up, because prophets are always going out alone into the wilderness, finding our wild human morality within themselves, and bringing it back as the next new religion to save civilization. We get conflicted, because it feels right, but what works when the divine is talking in the wilderness isn't quite so useful on busy streets.

Does this justify all the evils of civilization? Of course not. But what it does say is that they're two different reference frames. The morality of the garden of Eden probably won't keep a city working.

Now we're facing a time when our biggest outbreak yet--global civilization--is looking increasingly wobbly and unsustainable. Ignoring the morality for a second, there are three possible outcomes:

1. We crash and go extinct. There's no record of this ever happening to an outbreak species in the fossil record, but simplistic ecological models routinely point this out as a possibility.

2. The outbreak crashes, and we go back to living as grasshoppers, excuse me, wild humans in small groups, again. Presumably, when and where the environment is stable and suitable, there will be future outbreaks of civilization (this is the scenario in Hot Earth Dreams).

3. We somehow make our outbreak sustainable, and having lots of civilized humans around becomes the new normal for Earth. While this sounds weird, other species have actually pulled it off, starting with cyanobacteria, and going on to things like ants, termites, and sauropods (those giant, long-necked dinosaurs). In each case, the outbreak basically rewrote how some part of the Earth's biosphere worked, either temporarily (with the sauropods, who pulled it off for hundreds of millions of years) or permanently (as with the cyanobacteria, who rebuilt the atmosphere as a side effect).
#3 is what we mean by "sustainability." We're trying to make civilization the new normal, rather than have it be the crazy locust version of our normal grasshopper humanity.

Sustainability might work. Eventually. It took cyanobacteria something like a billion years to take over the world, so it's even more likely that we won't be able to pull it off during this outbreak, and it will be our distant descendants that finally take over the world and make the place permanently civilized.

In any case, What's to be done? It's a harder question than you might think. From a grasshopper's view, what locusts do is totally, destructively crazy and evil. Yet they get away with it for awhile. Locust morality isn't grasshopper morality, because what works with a locust swarm is horribly destructive for a small group of grasshoppers and (apparently) vice versa.

Basically, if you're more comfortable with grasshopper morality (admittedly, I am), then option #2 looks like really good. That's why I wrote about it in *Hot Earth Dreams*.

If you want option #3, sustainable, large-scale civilization, then you've got to accept that there's something totally absurd and possibly evil about us when we're in outbreak mode, and that somehow, we've got to make it work into the indefinite future until it feels like human nature.

There's an essential conflict there, between what feels right and what works in context. Resolving this conflict has taken millennia (look at the evolution of law). Living as civilized people, we have to have justice, and goodness, and all that, even when it feels wrong. The critical point is that, if we want to continue civilization, we have to be very thoughtful about which parts of our deep-seated grasshopper morality we use, because they won't necessarily work in a civilized context.

And if you favor #1, wiping humans out, then yes, I'd say you're evil. I believe all species deserve the possibility of a continued existence, and that certainly includes our own species.

That probably didn't answer the question, but that's why I think it's so hard to do so.

---

1566:

*I have to abandon my long held belief in the idea that everyone thinks they're doing good, even if the means to the end are distasteful. There are not just some, but *lots* of people who are just evil.*

Don't conflate evil with ignorant or stupid.

My cousin was in the US Army in the mid-late 60s. After some college time. Prior to that he said he was convince that how people acted was almost all based on "nurture". After his stint in the army he said he changed his mind. He came to the conclusion that there are a lot of real mental slugs in the world.

---

1567:

"Whether or not this was followed in Flint is probably not something I would want to look into to keep any kind of Christmas spirit going at all."
Yeah, Flint, Michigan is my home town and I have heard about the water contamination from family this past year. It’s a monstrous disaster. This is the result of GM closing auto plants in the Flint area and moving them to Mexico. Fewer jobs cause people to move else ware, which depletes tax revenues that provide for less infrastructure maintenance. The whole idea of Flint going off the Detroit water system from Lake Huron to the Flint River baffles me. The Flint River has been nothing more than a drainage ditch (and some illegal toxic dumping) for Flint and the surrounding suburbs for decades.

Fortunately, my family don’t live in Flint and are not on the Flint water system. I’ll be visiting them next week for Christmas, but I’ll be drinking my usual bottled water, a common practice of mine when traveling.

1568:

"So what's the solution?"

It starts with teaching people they are not helpless and can in fact change the world

Then you point them at the right problem, with the right communication infrastructure

which is why all the cynicism and doom is so completely non-helpful and actually self fulfilling

@hetereoles and his outbreak theory, you've actually just violated my very first shibboleth, "They would just nuke it"

Any instantiation of human cycles of rise and fall that includes current technology levels will eventually end in nuclear annihilation.

Any sustainable steady state civilization of current tech levels will eventually end in nuclear annihilation.

Humans are not grasshoppers because humans can press a button and take out the entire biosphere potentially forever.

It's up or out for us

1569:

If I can chime in on Flint. the source river water does not contain lead. The assumption is is that the pH/corrosivity of the river water increased leaching of lead from houses that had lead pipe. There is also apparently an increase in lead levels in blood amount children tested there.

If that assumption were true, it's amazing that the public weren't instructed to run their taps before drinking water, water that has been sitting in a lead pipe overnight will contain higher lead levels.

If you look at the reporting on this, it's mostly hearsay without any numbers being quoted.

1570:
No, I'm not positing cycles at all. This isn't *The Mote in God's Eye*.

You only get cycling population dynamics when you've got predator/prey dynamics, and our predators individually aren't that good.

What I'm saying is that, in a stable environment, with good crop-growing soils, a long enough growing season, and enough water, we'll get into agriculture, and our population will boom until it is controlled by one of these necessary conditions changes (the normal course of things), or something else (like the Spanish Conquest of Mexico) interferes.

Under all other conditions, we'll likely live as small groups. We won't necessarily be hunters and gatherers, because Papuans have to live in small gardening settlements, and they do okay. The key issue is band size, not lifestyle.

My end-game for our civilization is collapse, with a lot of pain and suffering, but without nukes. It will be hard to spot the beginning of the end, because things are always falling apart somewhere. The collapse starts when those things that fall apart aren't rebuilt. For example, if Syria and Iraq stay a wasteland, and if refugees from that region overwhelm their neighbors (like Jordan) causing them to start falling apart, that's more like a collapse. If Los Angeles is trashed by an earthquake, and the resulting economic catastrophe destroys US military power and its ability to do massive disaster relief, that adds to the collapse. And so on. It's just a big, rolling mess that will probably take one-two generations to fully occur. Possibly it started with the Syrian civil war, but most likely it won't start for a few more decades. We won't know for sure until it's well underway.

The thing to realize about the use of nukes is that, horrible as it is to contemplate, the way the US used them probably saved more lives on both sides than a conventional invasion of Japan to end WWII would have. It's also worth realizing that the US firebombing of Japanese cities prior to the nukes killed (IIRC) four times more people than the nukes did. What we've been worried about since WWII is a combination of stupidity and miscommunication causing a nuclear war, and our closest calls have in fact come out of that. Otherwise, nukes are big scary negotiation ploys. While I could be wrong, I don't think we're going to see another nuclear war, and if we do, it likely will start by accident.

After collapse, the survivors probably will be living in small bands of rewilded humans, and it will take centuries, if not millennia, for the climate to stabilize enough for little civilizations to pop up here and there again. There almost certainly won't be another global civilization for thousands of years, although local civilizations may well be fairly common before that. Most of those will probably last a few centuries before collapsing themselves, at least based on history.

1571:

Err
ERROR
I don't think "lead/Aggression" is an hypothesis - I thought it was proven ...
I think you've got your replies mixed up.
Though there are wankers claiming that it was something to do with taking welfare away from people in the US .....
So you are postulating that is possible for humans to collapse and then remain pre-agriculture.

I will tell you why this won't work
- The chances of someone not nuking and just ending everything on the way down is pretty low in my opinion. The current balance of power is fragile.

the only reason why the genie has stayed in the bottle is a lot of hard work coupled with the general rise of prosperity brought on by technology (I don't need to take his stuff when my stuff is doing great). All those stabilizing factors end early in the collapse cycle.

Your WWII examples are poor science, we are not talking fission bombs but fusion bombs which are many orders of magnitude more powerful. Even a secondary exchange among minor nuclear powers or a lone madman could do us in
- Given no major nuclear exchange the chances of not ending up with any high tech enclaves (think steam power level) is effectively zero. Enclaves like that are not hard to maintain and will jump start the whole mess again. You don't need a big nationstate or a high population density to maintain that
- Fermi paradox. Nuff said. It's up or out with the smart money on the "out" but we should be doing everything we can to maximize the chance of "up"

We'll have to agree to disagree, because I think you're triggering on this, rather than reading what I said.

The things about nukes that are problematic:
1. They have a limited shelf life. Currently we depend on computer simulations to figure out whether our stockpiles still work, because we're not allowed to test them. There's a big fizzle factor at play in their use.

2. It takes a huge industrial infrastructure to make nukes, because you need to get the enriched isotopes, make the plutonium, make the high explosives for the lens, and so forth. All that takes a tremendous amount of energy from other sources. That's one reason why nuclear non-proliferation is possible. If you can keep a country from building the infrastructure, it's impossible for them to build a nuclear bomb. The idea that a culture using charcoal for power (or any other biofuels) is ludicrous. For example, sugarcane, which is one of the best biofuel producers, yields 500-1000 gallons of ethanol per acre per year, using current methods (it is much lower under more primitive methods). You can't support nuclear bomb manufacture on yields that low; you can barely drive one car per acre on that.

As for the Fermi paradox, I think my model answers it much better than yours does. A species that spends most of its existence in small farming villages is going to be radio silent and invisible to the
rest of the galaxy. We could be surrounded by intelligent species that have all gone through their brief boom of burning off all their fossil fuels and went on to a quiet existence at a lower energy level. They'd have no way of knowing we're here, and we couldn't detect them either. The Fermi paradox is only a paradox if you assume that interstellar space travel is possible for living beings. So far, we've seen no evidence that this is the case, and plenty of reasons to think it won't ever work.

1574:
Correct.

As a reference point, Flint is about the most dangerous city / town in America in terms of murder etc. Certainly in the top five.

If you wanted a breeding ground for the same cycle to continue to the next generation, it was just implemented. You know, if you were chaotic evil and all the other sources of lead had been removed from the environment.

Further research into emergency managers, corruption, big finance, Senators and so on would lead down some very nasty paths. (Need we mention the racial aspect? Of course we don't, it's a given).

Self-perpetuating mythologies, dangerous critters.

1575:
Actually, we can, though we can't say that the lead in petrol was the sole cause. Not merely did crime drop with exactly the right timescale, there were measured correlations between the disturbance of children and how exposed they were to traffic fumes. And, to a limited extent, the lead levels in their bodies. I agree that it's not absolute proof, but it's as strong as epidemiological data gets.

1576:
Yes, I agree.

Apologies, my response was genuinely muddled (not the usual deliberate kind) as I was digging through court documents about the various players in the saga. [Hint: Nuke it from orbit, it's the only way to be sure, I'm not sure there's a single honest agent in the entire lot]

Re-frame my response as a cynical "no doubt this is the type of thing you'll see in the future law suits revolving around this entire mess". Given the damage is permanent, this little festering experiment will continue.
TL;DR
Money / Market can't solve all problems, and in fact makes things worse.

1577:
I missed this, but yes. Oca did OK, but not well, but magenta spreen did well as a spinach-like leaf that is resistant to dry weather. Our native goosefoot tastes better, but its leaves are very small in dry weather. And I have tried quite a few others. The point here is that there is plenty of scope for places that are changing from one fertile climate to another; the problem is with ones which are being pushed into climates where agriculture isn't possible.

1578:
@Heteromeles I'm not talking about building nukes we don't have, I'm talking about using the ones we do have right now. The time that represents the most risk is when nation states are still powerful enough to maintain nuclear stockpiles but weakening rapidly and getting more and more into conflict with each other over dwindling resources.

The idea that they are just not going to go off assumes an awful lot of stupidity or that you are so far into the collapse that the militaries are no longer being maintained as far as manufacturing and refining uranium, it's not as hard as you make it out to be now that the principles are well understood. Hell, North Korea pulled it off.

You seem to have a relatively large blindspot with regards to nuclear stuff, nuclear power, nuclear weapons, you can't just hand wave it all away because it doesn't fit into your ecologically based models and mindset or support your agrarian-utopian desired end state.

I like your post and analysis a lot, but there seems to be a fair amount of confirmation bias going on as well.

1579:
I think when we go down the "evil versus stupid" thread, the usual outcome is a general agreement that both are aspects of the same thing. Or a formula along the lines that stupid isn't always evil but evil is always stupid. The problem is that the people who do "evil" things are often notably not stupid. This is something often remarked on when talking about racism; we assume that it's about stupidity and low-effort thinking, yet we also see considerable sophistication on the dark side from people we might otherwise have thought more of. We seem to say that there's something some people, no matter how smart they are otherwise, simply don't seem to get about the views they are expressing - whether it's perspective, or that the things they say are framed by a specific world-view and only make sense inside it, or something else (empathy, compassion).
Nature and nurture are similar, there's more value in looking at how they interact than trying to maintain a distinction between the two. Some people are simply slugs by the time the army gets them, but place them in the right womb and birthplace and they may well be great thinkers. Sure there's a difference in the material to start with, but not as great as one might think; environment is itself a kind of heritability particularly when world-view might be one of the fundamental building blocks for understanding logic. Compare with the extent to which your average punter things "logical" is a synonym for "aligns with the prejudices of my world-view", as does any concept of a null hypothesis - so anyone making a truth-statement that differs has the onus to prove it.

Whether from there we need a discussion around parenting styles, about whether people are brought up learning a world-view or a mindset that focuses on distinguishing differences rather than shared commonalities, on "mine versus thine" versus the world as a plaything or a playground, on language as a hard, precise thing that you receive rather than an active thing you participate in, etc. Are openness and conscientiousness really oppositional? What's all the stuff about the correlation between low-IQ, conservative views and prejudice? What's low-effort versus high-effort thinking and how does that play out in intellectual development? There's a huge and relatively level field for research into this space right now...

---

1580:

High energy civilization isn't going anywhere, unless we go extinct.

Basic proofs: 1: Renewable tech including full load balancing infrastructure is currently cheaper in constant currency than coal based electricity was somewhere between 1950 and 1970. Inflation adjusted time series are fun!

2: Nuclear power is a thing. It's an unpopular thing, but not as unpopular as not having power on demand would be. Not even *close*.

Fossil fuels aren't necessary energy inputs, they are merely convenient ones. The engineering needed to substitute them out is a major project, but not an inconceivable or impracticable one.

So the future won't be primitive. It will be pretty unrecognizable in many ways, as it is obviously going to end up being a mostly closed system as far as material (Ie: metals, and rare earths, etc) inputs go, but agricultural primitivism isn't going to happen. It's either "Everybody dies, probably cause a major mass extinction on the way down" or the bicycle of tech based civilization keeps on rolling.

This has actually been a very interesting thread, because among other things, it's spawned several amusing models of how the future could look in my head.

Here's a city: It's pretty typical. It's a ravenous engine of industry and culture that has attracted the population of less successful places and put them to work - in recycling, in construction, in landscape engineering, in the arts, and yes, in building the toys consumers love. (and then disassembling said toys when they are bored with them) It's multi-story, and it's crowning jewel is the transit system that puts every neighbourhood a shockingly short travel time from every other. All the buildings are roofed with glassed over gardens - some for produce, some for beauty. Around
this core of density, there are the "fields". The fields are smaller than they used to be, because they're not fields - they're hydropondics operations worked by robots. The weather might be erratic, but they don't care, because they're not counting on the rains and they've been built to stand up to storms. Outside the fields are the wilds, which is mostly entirely empty of humanity, except for recreational visits and the crews stripmining abandoned structures.

The city devours electricity. It is the lifeblood on which it runs, and it's appetite in this regard is vast. Depending on where it is, somewhere out of sight, there is square kilometers of desert paved in solar cells, and a monstrous civil engineering project storing power, or a nuclear reactor interred beneath dozens of meters of soil, or one of a dozen of solutions that has proven to be robust against disaster.

1581:

Let me put it this way, so far as nukes go:

My father had a high security clearance at one point, and his PhD thesis was on hardening circuits to resist the effects of nuclear blasts.

As a joke, in the late 1980s my father's brother gave me the blueprint for a nuclear warhead as a Christmas present. I'm obviously not an engineer, and when I showed it to my father, he looked at it for about two seconds and said "won't work." "Why not?" I asked. "Can't tell you," he replied with a smile. Over the next few years I worked out a bunch of different things that were wrong with that blueprint--it was basically an elaborate engineering joke, designed to fail in every way. I had it up on my wall before 9/11, and it amused engineers and physicists. I'd give it to ISIL just so they could kill themselves with it, except that I'd probably get locked up by our idiot government on the theory that I'm teaching terrorists how to build nukes.

And that's the thing: I do know something about nukes, and that's why I'm not so worried about them being used. As weapons, they have a very specific role on the battlefield. Cold war paranoia aside, the only time we'd likely use them is in an invasion of China, and I really don't think we're going to invade China. As instruments of diplomacy, they're rather more useful, and that's why places like North Korea and Iran want them. Thing is, I'm not sure North Korea could hit South Korea with a nuclear missile, and I'm not terribly worried about them nuking the US.

If we get into a mess like massive human migrations, then nukes won't solve it, any more than nukes can be used effectively against guerrillas and terrorists who are fully embedded within a civilian population. They're extremely useful as diplomatic tools, catastrophic in a total war setting, and corroding away otherwise. Right now, I'd be surprised if even half our stockpiles could work, although I'm sure their real state is top secret.

And yes, I also know a bit about North Korea. I apparently have distant relatives there, and it's one of the settings for the novel I'm now working on, so I'm doing quite a lot of research on it. The thing to realize is that they were the industrial heartland of Korea when it was colonized by Japan, and they do have a lot of coal, uranium, iron, and other minerals inside up in all those mountains they have. In terms of agriculture, they're pretty hard-up, with a lot of stony old mountains and short growing seasons (Scotland or the mountains of Germany are comparable). Right now, so far as I can
tell, they're getting more mileage out of extorting the rest of the world for the stuff they desperately need than they would by actually using any of their weapons, and the rest of the world seems to think that it's easier to give them what they need than to mess with them. We'll see how this works out in the long run.

1582:

"They also say that's killed so far, with another 140 or so to die unless we scrap/fix the cars. Maybe they've only killed 30 or 40 Americans on purpose. How many Europeans? How many is too many?"

So, how does that compare to the 30,000 direct deaths caused by cars? How many deaths do we tolerate for the sake of convenience?

1583:

*Or a formula along the lines that stupid isn't always evil but evil is always stupid. The problem is that the people who do "evil" things are often notably not stupid.*

Sigh. Now this is a shibboleth.

The ‘Breaking Bad’ Syndrome? UCLA anthropologist exposes the moral side of violence Dec 22nd 2014 (an old link, but relevant because it's just had more corroboration, check your temporally localized media for echoes).

Time for Tea.

Ok, we'll do Godwin first.

Nazis were not evil by their self-defined internal morality. They thought (and this is a real common one) that they were sacrificing their current well-being for a brighter future, and most importantly, this self-sacrifice was not done for themselves, but their children / Nation / Ethnic Race / 4th Reich for 1,000 years. i.e. the stains on their Minds or Souls would not be passed unto the children and the world would be a brighter, fresher, more wonderful place.

The old "Kill them all and let G_D sort them out", but actually with a little bit more self-awareness and responsibility.

Yes: that's right. Nazis were more ethical than U.S. actions in Vietnam (hint: both did the same thing to the "enemy", one didn't bomb neutral countries into the stone age and rather naively still played "by the rules" for those they considered equals. Of course, luckily for the West, that meant them, not the Russians).

If you imagine any other human as an object, or less than human, you're in the same tank.

It's not an accident that a majority of those running the camps had major alcohol or drug addictions, nervous breakdowns and so on. If you need a humanist tale of redemption in the camps, look to the
statistics of just how broken most of those running them were (the sociopaths were wheeled out for trial: the broken ones weren't, empathy issues and confusing messages).

The formulation is as old as Neanderthal pogroms.

Now, do I (personally) think that the Nazis qua humans were "evil"?

No.

(Hold the 4chan /pol/ is always right gasp for a little bit. If you've got this far, welcome to the Bones Wild Ride).

They were moral, and rational, and bought into this entire mythology of self-sacrifice that has plagued you humans. You might say that their Christian Culture prepped them for it.

They were also psychotic on a meta level.

Psychosis precludes morality because it removes the agency of the subject and throws it away.

Here's the important part: they were humans caught up in a psychotic Ideology / Culture / Belief system. Oh, and since they invented Fanta, also Brands. Oh, and Religion (go look up their version, doesn't get much press, but I've linked it before). They were happily Christian at the time.

And, before we lose anyone, this goes for all such endeavors. (Hint: H. Arendt, read it before storming off to create a Twitter storm).

Humans.

You have a bit in your mind known (sadly) as the "G_D zone".

It's easy as fuck to hack.

~

A little more shocking stuff:

Shock and Awe and Novelty are your enemies.

The first time you do X, it's mind-blowing. The X+n time you do something, it's a little less, each time.

Works for killing as well.

Unless you reset your mind / body. Strange how anything and everything that does so is illegal.

~

"Evil" is an absence. (Greg and I shall have a proper smack down about nihilism some day, but not tonight). Literally, that's were the word comes from.

Hacking the G_D zone isn't evil - nor does it create evil - it's warfare.
It creates unwitting agents.

"Evil", in our world, is creating things that condition the G_D zone into automatic responses. You know.

Pavlov and all that. But a little bit more complicated.

Spoilers: not all things hacking that zone are human. And not all things hacking that zone are sentient (hello toxoplasmosis). But some are both self-aware and not human.

Gestalt indeed.


p.s.

To avoid embarrassment, assume that any Human who can kill another Human for the second time is now shifted to an entirely different Mind Set. "Mikey, I think he likes it" [The Matrix] is not an uncommon response.

But that says more about your immaturity than it does about evil.

Mature Minds are immune to that.

~

Before you respond.

Think.

It might save you from the real predators out there.

1584:

High energy civilization isn't going anywhere, unless we go extinct.

You're making two really optimistic assumptions.

One is that we've got time; if 2020 is the year agriculture fails in the northern hemisphere, we don't have time.

The other one is that we've got a sufficient social mechanism for the necessary change. Decarbonization is technically easy but socially very, very hard. (Persons who now have control
necessarily lose it, something they're generally totally unwilling to do under any circumstances. There are arbitrarily many historical examples of a refusal to endure less wealth for the greater good, and very few examples of sufficient force being assembled to compel the acceptance of a change in social organization.)

1585:

AIUI the shelf-life of a modern nuclear weapon is about 2-3 years before it needs serious maintenance, and a decade at most before you might as well melt it down for scrap and remanufacture it from scratch. (If nothing else, they almost all rely on tritium -- half life: 21 years -- without which they won't go "bang"; and it only takes 20 years for enough tritium to decay for their bangability to become problematic.)

Mining uranium isn't the hard part; concentrating it is the hard part. The Manhattan Project took 20% of the entire electricity production of the United States in 1945 while it was separating enough U235 for a handful of bombs each year -- admittedly via less efficient mechanisms (calutrons, IIRC) than are used today, but still, this should give you some idea of the scale of the problem. Plutonium 239 is a more effective weapons-grade isotope, but to get it you need to run big-ass reactors for years on end and build a reprocessing plant: again, not something you can do on the back of steam engines running on charcoal.

Upshot: once our current nuclear weapons decay, rebuilding them would be ... not impossible, but very very difficult, in the absence of a high energy economy with nuclear reactor infrastructure.

Meanwhile, nuclear weapons are sod-all use for warfare compared to modern smart weapons. Want an example? Look at Brimstone, and the in-development Brimstone-II. 60km stand-off range, supersonic, radar/laser/autopilot guidance, and a fully-armed fighter can carry up to 24 of the things on a single mission, each of which is able to engage a different target. The atom bomb was a solution to a 1940s military problem -- how to replace a thousand bomber raid (target: one factory) with a single bomber raid (target: one factory). Smart weapons let them do the same job without nuclear warheads, without the civilian collateral damage, and without the political side-effects. And they're cheap, and the threshold for use is so low that they're currently the go-to weapon for developed nations in asymmetric warfare against tribal militias (what do you think all those drone strikes in Afghanistan are?).

1586:

@Thomas - Your future city is pretty close to what I imagine as well, except 'the wild' is more dangerous because of the genetically engineered mistakes that got out of control. I also kinda like the idea of the earth striking back at us as we try to recover from our own calamity.

I'm an architect and recently left a firm that is doing a bunch of 'smart city' planning projects in developing nations. It all sounds so nice as a planning effort, but there is a growing concern about implementation. See:
In a nutshell, the control systems are privately operated and the data is not shared with the public, who are the ones providing the data to begin with. It has an EvilCorp alarmist ring to it, but it is how things are currently being developed.

1587:
Well it depends on whether you are talking fission or fusion of course. Fissionable are much more long lasting than the relatively intricate mechanisms of fusion

However the people that built the bombs knew this and designed them to be maintainable.

There is an entire DoE program just around maintaining them. The YOUNGEST warhead in the US arsenal is 22 years old

https://en.wikipedia.org/wiki/Stockpile_stewardship

The Manhattan project was hard but it was also almost 85 years ago.

I think any theory based around "they won't actually go off" or "no one will figure out a way to leverage them to secure vital resources during a resource decline" are both pretty batty honestly

There is also the problem of insane or suicidal leadership. As these nation states really start to decline they are going to appoint strongmen leaders that make Donald Trump or Putin look like bastions of sanity and reason

No one will intend to start a nuclear war but a desperate Chinese say, in the process of seizing parts of Russia or south east Asia or Australia may well cook one off

The main reason they aren't used is the repercussions, both ecological and geopolitical. Not because they aren't effective. They are also by nature genocidal weapons not targeted, so weapons of last resort

1588:

The Manhattan Project tried everything in parallel to enrich uranium but the biggie was the gaseous diffusion line at Oak Ridge in Tennessee. The other technologies could be built piecemeal but the unitary diffusion line was the big consumer of electricity; it made most of the enriched uranium that went into Little Boy.

1589:

I think when we go down the "evil versus stupid" thread, the usual outcome is a general agreement that both are aspects of the same thing. Or a formula along the lines that stupid isn't always evil but evil is always stupid. The problem is that the people who do "evil" things are often notably not stupid.
I'm surprised this subthread didn't go directly to Shea & Wilson's *Illuminatus* trilogy, which the authors explicitly admitted modeled a world ruled by "absolute evil and utter stupidity." This was around 1970 and they got to be surprised when the real world repeatedly acted out what they had written as satire. The race to the bottom hasn't yet found its limits either for evil or stupidity...

The metaphor of grasshoppers and locusts is an interesting one though; I'm going to have to give that one more thought. There are plenty of highly successful locusts who are doing things that appear astoundingly unwise to people with functioning grasshopper mentalities.

---

1590:

Centrifuge enrichment is orders of magnitude more energy efficient than gaseous diffusion. Hence even a poor, energy-starved nation like Pakistan can produce highly enriched uranium at a pace that would have made the original Manhattan Project engineers green with envy.

An interesting what-if: what if someone had carelessly installed a peer-to-peer application on Friedrich Tinner's computer, and the centrifuge and weapons blueprints had leaked onto the global Internet before Swiss authorities could destroy them? It feels like a Chekhov's Gun situation that modern information technology and the old technical secrets of weapons of mass destruction are going to collide eventually, like Edward Snowden pulling the NSA's pants down but actually hazardous instead of just embarrassing.

---

1591:

Just how plausible is a 2020 crop failure anyway?

---

1592:

"once our current nuclear weapons decay, rebuilding them would be ... not impossible, but very very difficult, in the absence of a high energy economy with nuclear reactor infrastructure."

Rebuilding them as original would be very difficult, true. The tritium is the hard bit - half-life 12.5 years or so (not 21) and you need a neutron source comparable to a reactor to make enough of it; electrically-powered neutron generators are easy to make but their output is several orders of magnitude too low to be any use.

High-yield devices that depend on reacting large masses of fusible isotopes do not depend on manufactured tritium; you'd never be able to manufacture enough. They breed it themselves from lithium while they are going off. The primary often uses fusion boosting, but it doesn't have to. Also, the secondaries do not have to (although it helps) include any artificial isotopes, and you can carry on chaining devices as long as you feel like it, though in practice three stages is all you'll ever need (Tsar Bomba).
As you noted, the real killer is getting the pure fissile isotopes in the first place - and once you have them, it's comparatively easy. The half-life of $^{239}$Pu is 24,000 years, so it doesn't decay at a significant rate on human timescales, and its decay product is $^{235}$U anyway so it doesn't make much difference.

Current estimates of the lifetime of a pit are 50-150 years, which are highly conservative minimum figures based on not very much at all, and rejuvenating them involves only straightforward (pace handling difficulties) non-nuclear processes.

The chemical explosives deteriorate from heat and (to a lesser extent) spontaneous-fission neutrons, but the chemistry is not complex, and the manufacture is simple precision casting and sculpture, which are both thousands of years old :)

Current stockpiles are dominated by fusion-boosted fission devices, so indeed there is a problem keeping them active without reactors. But viewing them simply as a source of materials, since they are so big there is buckets of stuff to build non-boosted fission devices either for use on their own or as primaries for great big fusion-based bombs.

So it isn't going to go away any time soon. Possibly the most significant influence on such developments would be the regime they're developing under. It is said that the Soviets gained four years on their nuclear weapons programme by espionage, but I think it is more accurate to say that the espionage simply compensated for the amount they were slowed down by the prime concern of everyone involved being to cover their own arse in case Stalin threw a wobbly and shot them. It is probably the same reason why North Korea's nukes are shit.

1593:

That's a very difficult question to answer.

2012 was a relatively regular year in terms of weather variation subsequent to the 1997-1998 El Nino. It was a bad crop year in North America. (Following on a 2011 crop year where Russia wouldn't sell grain to Egypt because they didn't have it.) Both are examples of half-the-usual-national-yield sorts of years.

We might suppose that the 2015-2016 El Nino is an indicator that we're on a new stair in the climate progression; certainly the air temperatures look like that. Are we headed into normal variation sufficient to produce 30% yield crop years in the subsequent decade? I don't think anyone can answer that; I certainly can't.

Supposing that, oh, no, that can't happen, strikes me as far more brave than sensible.

1594:

Oh, the secrets are out already, and have been for yonks. The actual science is not that complicated. It's mainly a matter of finesse in putting the bits together.
With weapons other than nuclear, it's even simpler. Brewing nerve gas is straightforward chemistry; you could do it in your kitchen if you didn't mind the risk, although people who are that way inclined generally prefer to make drugs, which are more fun. Fuel-air explosives are pretty bloody devastating and all you need to make those is oil and explosives; vegetable oil will do, and they could have made them hundreds of years ago if anyone had had the idea.

(Aside: some characters in my personal scribblings have figured out how to make pure fusion bombs of any desired size by adapting their existing technology. They weren't trying to; they were having a mudfight. Now their main concern is what could happen in case anyone else figures it out too. It's changed the whole plot. I didn't expect it to happen any more than they did...)

1595:
Just a wee point - I thought the thousand bomber raids were part of the (discredited) area bombing campaign, i.e. destroy as much of a city as possible, including housing, to destroy people's will to live. Thus nuking Hiroshima etc was as much about destroying the entire town in one go. Not just to get one factory or one small military base.

1596:
"Money / Market can't solve all problems, and in fact makes things worse."
Please, make some big stencils of that and graffitit it all over the retaining walls of railway cuttings in the approaches to London termini and suchlike places.

1597:
It's actually pretty much the same thing. Japan had decentralised as much production as possible and had people making military components in their own homes, so the distinction between residential and industrial didn't really mean much any more.

1598:
*Gulps Loudly*

1599:
You might know that, but I've not read of that being a specific reason for the use of nuclear weapons, i.e. was that germane to the decision?

1600:
Regarding crop failures, links?

Note that you can't look at raw yield as there is both supply and demand factors in play that can cause farmers to choose to plant less.

The cost of grain commodities does not seem to be doing anything alarming.

http://www.tradingeconomics.com/commodity/wheat

1601:

This is wikipedia article in grain production over time in the U.S.

https://en.m.wikipedia.org/wiki/Wheat_production_in_the_United_States

1602:

The main thing is that there is a lot of wiggle room in our food production chain between "Business as usual" and "People starving". That means a couple of years where replacement facilities can be thrown up while the flocks of meat animals take a hit, and sugar is suddenly produced from woodchips (it is very simply chemistry to do this) and so on and so forth, even if weather goes seriously wonky.

And the replacement infrastructure will get built. Food security isn't something that people or politicians ignore.

If it becomes necessary to spend four years on a footing that looks a hell of a lot like a war time command economy to get it done, still it will happen.

As for decarbonization, I mostly don't expect the people currently in charge to bow out gracefully, I expect them to go bankrupt. Oil tycoons are going to be the first to feel the boot of the market because batteries are a just a better technology for their main market once they get cheap enough.

Coal is on a similar trajectory of "Automatic doom" because it's getting more expensive while the competition.. is not.

1603:

Are you asking about "was 2012 really bad"? 2015 wasn't good but not exceptionally bad.

2012 gets summed up, for some values of summed up.

Commodity prices are in large part set by the previous year's contracts and sometimes by stampeding hedge funds; price swings are a function of surprise more than weather. It also takes a huge commodity price change to affect retail prices much because the commodity price is generally a small part of the retail price.

You can use up arbitrary amounts of time following along via Nogger who maintains a deep archive.
Also the effects of weather are regional rather than global.

For instance the 2012 harvest referenced above, the U.S. Wheat production was down 8% but China had a bumper crop so it resulted in only a 3% drop worldwide. Prices went up a little, consumption patterns changed people shifted to soft substitutes.


It was certainly used as an argument in favor of the fire-bombing campaign; if you consider the nuclear attacks in their aspect as an extension of that campaign by other means, which the current discussion is doing, I think it has to be relevant.

Good point. The best reference is Richard Frank's *Downfall: the End of the Imperial Japanese Empire*.

Japan set the situation up by cluster workers' wooden houses right up next to their weapons factories, then outsourcing some of the weapons manufacture into the workers' houses. IIRC, the Americans spotted the remnants of things like lathes in places where they'd known houses were, but in reality it didn't matter, because if the factory burned, so did all the houses around it. The Japanese had built their cities to burn, and they didn't have very good fire-fighting either.

As for why the nukes, the problem was Operation Downfall, the planned invasion of Japan to end the war. It would have caused millions dead on both sides, because the invasion route was obvious, and so were the strategies both sides would have used. It was seen as a replay of the Battle of Okinawa on a much, much bigger scale. Indeed, the Japanese high command was counting on the body count being so high that the Americans would go to the peace table rather than invade, and public opinion in the US in July 1945 was increasingly favoring that option.

The nuclear bombs changed the equation, and in part they were a bluff.* After Nagasaki, the US dropped leaflets over Tokyo with a list of their future targets, making the point that we could take out Japanese cities at will, and the Japanese could do precisely nothing to stop us. That got the Japanese to surrender, and it almost certainly saved millions of lives on both sides.

*The bluff was that, IIRC, after Nagasaki, the US had one bomb in stock, and it was typhoon season over Japan, so the flying weather was horrible. If Japan hadn't surrendered, it's not clear whether, when, or where the third bomb would have gone off, and it would have been a month or more before the US could have used another one. If Japan hadn't surrendered in August, things could have gotten much, much worse than they were.
1607:

whenever we talk about the effects of global warming it reminds me of that old quote about technology changes

"We tend to overestimate the effect of a technology in the short run and underestimate the effect in the long run"

I think it is the same for GW. There is a lot of resiliency and overcapacity built into the current system of the world that isn't going to erode in the course of a year or even a decade. But the long term effects are going to be big

1608:

There is a lot of resiliency and overcapacity built into the current system of the world that isn't going to erode in the course of a year or even a decade.

Doesn't matter. The thing that breaks is not the resilient bit, but the fragile bit. We can already see the fragile bits flying to pieces.

The fragile bits are mostly social. (There's no reason Flint, Michigan, should be having lead in its water other than that the neighbours would rather poison those people than pay higher taxes. Repeat... a very great deal.)

1609:

Since I'm talking to the Peanut Gallery and no-one else wants to play: Self-sacrifice and Altruism are not synonymous (that "for my children" angle is the deal breaker; it usually means "for everyone but MY children").

Nope, you don't get to use A.Rand here. (She was a weapon, any fool can see that. Welcome to Flint you utter psychotic tools).

p.s.

The funny bit is where everyone ignores the major bit of truth of where "aliens" etc reside.

It's like watching fervent "believers" of certain Religions spit on it... (although, tbh: things like the Westborough stuff are just trolls trolling and using Law to do a meta-thing at the moment).

~

The Bones Wild Ride.
It ain't over yet.

I don't give a fuck about Combat 18. Psychosis weapons: probably not a M.A.D. you should have opened, in retrospect. This is the nice version.

NWA [Youtube: music: 4:26]

1610:

"Sigh. Now this is a shibboleth.

The ‘Breaking Bad’ Syndrome? UCLA anthropologist exposes the moral side of violence Dec 22nd 2014 (an old link, but relevant because it's just had more corroboration, check your temporally localized media for echoes)."

Yep, I said it's a shibboleth for me, or always has been in the past.

Anthropologist exposes something everyone already knew.

The "inhuman monster enemy" has always been obviously stupid propaganda. Blind Freddy could see that the Nazis thought they were doing good (despite the obvious fact that if you want everyone to be blonde and blue eyed, a bottle of bleach and some contact lenses is easier and if you want a race of superhumans, you'd be best off starting with Ashkenazi Jews)

There's even a saying "the road to hell is paved with good intentions"

That's been my default hypothesis since I developed a theory of mind around 4 years old. My parents took away the matches I was playing with, not because they were inhuman monsters who wanted to deprive me of fun, but because they didn't want me to set fire to myself. It seemed completely obvious to a four year old.

It's been with much angst that I've had to abandon the obvious hypothesis for the very good reason that it doesn't fit the facts. There's no way that the people in VW could have thought they were doing good on any level. Not for the company, not for the shareholders, not for their brand, not for their customers, not for the public. Nobody wins when they do this. It's pure chaotic evil. Equally the motoring journalists who are spinning this as hard as they can along the lines of "No-body cares" and "Look, behind you!" can't have any higher moral goal.

One nutcase, I can grant. Even 4 or 5 working together. It's a conceptual stretch. How do they find each other? On dating sites? "Interests: Microwaving Kittens, Pushing old people down stairs"

However we're talking about a whole industry in the case of journalism and at least several whole departments full of random people and their managers spread across several brand names in the case of VAG. The theory of "I thought I was doing good" doesn't work. The theory of "Someone else would do it if I didn't so it may as well be me" doesn't work, particularly in the case of VAG where one anonymous whistle blower would have shut it down. Stockholm Syndrome doesn't work, who are the abductors with the evil plan? (unless that's the hive mind alien)
I'm left with Comic Book Evil.

I don't like it. It goes against the grain. It feels unlikely. But when you've eliminated all the possible explanations, that's all that's left.

---

1611:

Since I actually admire you, a serious point:

VW are on the grey / white end of Corporate Evil.

It's a case of:

#1 These thresholds are ridiculous and designed to price EU cars out of the market [TRUE]
#2 Engineer this bitch up
#3 Seriously, we can't do it?
#4 If we can't do it, there's 0% chance in hell that the US native market can do it [TRUE]
#5 We want results that produce X. Test until they come.
#6 Fuck these bastards, just spec the test until it passes

If you want evil, I'd look into Coffee. Not the usual slave labour issue, but the entire "making coffee decaff actively increases cancer in the consumer".

No.

Really.

Took a while (20 years) for that little kink to be worked out of the process.

~

Honey-bun.

It's the G_D zone.

Psychosis Weapons and all.

You're lucky if after a life of worship you get a gold watch and don't get your children gutted or raped. [TRUE]

---

1612:
The real story about VW is all about protectionism, markets, diesel cars and the US auto industry.

Tired of Manifest Destiny ruining my sleep.
Hint: you fuckers got fat, lazy, slow and tired.
 Seriously: you made a society that made 60% of your people obscene. And another 25% addicts.
It's not hard.
It's just not done by civilized people.

You never knew [Youtube: Film: 3:02]

1613:
I don't like it. It goes against the grain. It feels unlikely. But when you've eliminated all the possible explanations, that's all that's left.
Timescales.
"Make this quarter's numbers" can easily result in "total disaster in five years".
Plus people can generally convince themselves they can fix it, if they just have a little more time.
Plus we don't teach pain-time curves, the inescapable necessity of things getting worse to get off a local maximum (even if you're going to a better one), or that hope is not a plan. So you really do get people who fairly literally cannot do something different even when they know what they're doing is certain to fail because it hasn't failed yet and everything they could do to prevent it from failing involves a damaging admission.

1614:
whenever we talk about the effects of global warming it reminds me of that old quote about technology changes
"We tend to overestimate the effect of a technology in the short run and underestimate the effect in the long run"
I think it is the same for GW. There is a lot of resiliency and overcapacity built into the current system of the world that isn't going to erode in the course of a year or even a decade. But the long term effects are going to be big
Um. You realize that the US has no strategic reserve of grain, and hasn't since 2008?
China has a relatively huge reserve, but by my calculation, it's about six months' supply.
Now, we're not even talking serious crop failure here, because as someone else pointed out, that happens somewhere pretty much every year.
The question is what happens when, say, the Big One earthquake hits Los Angeles and shuts down that port, and its connecting railways and freeways, for months.

We *look* like we have overcapacity, but in some critical areas, we really don't. The wrong event in the wrong place can cause enormous trouble.

If you want something to lose sleep over, look at Rusttracker.org to see how new virulence strains are spreading in wheat rust. That's one of the crop killers that's starting to get out of control out there.

1615:

TIME.

YOU'RE NOT GOOD AT IT.

~

This is for the Mogwai (who I do love: anyone with an ounce of sense knows their morality is real. Real, but you know, No,NO,NO LIMITS. Don't trust the G_D zone beasties, I iz tha real deal. Or not. That's the joke. But, no: I iz goin to make sure your G_D zone don't get frakked by these Nazi Cunts).

For the meta-realm / Peanut Gallery:

What you're seeing here is a total lack of knowledge about the precepts that society has placed upon the young.

You can notice they're not good at this. It's almost as if they're going to sacrifice their future for short term gains.

Remind me. I'm sure I've seen that some-where else.

~

They're old. It's usual. What's new is stealing / pimping / fucking you [seriously? grow up: new world, no-one cares what you are or what's under the hood. The ones who do and squawk are prey anyhow. Top 10 beautiful woman is a friend called Alex, who used to be called Andrew. Who gives a shit what I think: she's happy and glows and so on. Get some Chill, you cunts.]

1616:

Note:

For the silly (Private Iron) and so on:

The word "Cunt" has a lot of history to it. It's not a history we like and it's not a history that has a future.
What we're doing here is totally removing the power that it has, through Australia, Reddit and other mimetic realms.

We're doing what you could not, and we're not going to apologize for it.
Frakking Cunt.

1617:
I agree, I think. The whole VW emissions thing is hugely overblown, and perhaps the silliest part of the whole kerfuffle is the way people regard it as an isolated incident, when in fact it is standard practice. Imose an artificial limitation and people will engineer things to frig it.

We've had the "standard fuel consumption" figures for yonks now, and cars being optimised to do well in the highly artificial conditions under which they are tested but invariably failing to return anything even close to the quoted figures in actual use. These days we have "CO₂ ratings" as well, which are completely silly because it's just fuel consumption by another name; the test cycle is different, but the figures are no more accurate a guide to fuel consumption on the road than the older ones are.

It used to be absolutely standard that the first thing you did when you got your new motorcycle was change the jets in the carburettor for ones that were not optimised around test cycles. The test in this case was for noise, and the test conditions were such that the way to pass it was to have a horrendous flat spot at about 4000rpm. So all motorcycle manufacturers used to set their engines up with such a flat spot, and all owners used to change the jets to get rid of it. (They probably do the same thing still, only with maps; I'm not up to date.)

British cars used to have a reputation for undersquare, low-revving engines. This was a hangover from the pre-WW2 "horsepower tax" which was based on bore but not stroke. French cars similarly had a reputation for small, whizzy engines, as a response to a similarly-conceived French tax. So we see nations' entire car industries turning out engine designs which are a totally blatant frig of regulations. In the end, the regulations were abolished.

You can bet your arse that other car manufacturers are doing exactly the same thing, they just haven't been caught yet. VW's only "mistake" was not to code their frig with plausible deniability (which wouldn't be hard). They probably didn't see the need. All car manufacturers have been frigging tests for as long as tests have existed, and getting away with it, so why bother?

And the "OMG CANCER" element of the response is pure Daily Mail. Hundreds of millions of people die of cancer every year, mainly because they have to die of something and these days they don't usually die of something else first any more. There are innumerable substances which may "cause" it, including plenty that the body makes naturally. Or it may not even have a "cause" apart from random chance. Worrying about something that may or may not have an effect at the one-in-a-million level is a waste of time, as it is for anything - though this is not widely appreciated, which is what allows lotteries to exist.
If you want a *good* example of corporate evil in the name of frigging regulations, look at the Chinese melamine in milk thing.

---

**1618:**

Honey-Bun...

You're *so* close to it, I can taste the pre-cum.

What you're actually missing (and almost hitting with the China example) is an epistemological issue.

It's very simple:

#1 We want Threshold X  
#2 Ignore why #1 is chosen  
#3 Optimize to skirt #1  
#4 ??  
#5 PROFIT!

It's psychosis.

Small tip: what most of the world doesn't want you to know, or believe are three things:

#1 As a system, our kind could dominate it within a month [Note: markets etc, it would be pathetically easy to warp]  
#2 As a system, our kind could wipe out 60-70% of all humans within month without resorting to nukes (Note: TIME: it's a cascade effect)  
#3 As a system it's all a Rocky-Horror-Picture show to to make you blind [Note: Bubbles, Bubbles, Bubbles]

Aww.

It'd all be so beautiful if your society wasn't based on slavery.

Yeah.

Thinking that there's a second Coming and all. (You've been warned).

---

**1619:**

Last question:

If your society is based upon slavery, dominance, extraction, power and violence, what is worse:

#1 Being ignorant about it  
#2 Denying it
#3 Knowing it but denying it
#4 Executing with Extreme Prejudice anyone who questions this reality
#5 Knowing about it and being paid to glorify it
#6 Attempting to warp reality so that the Unknown Unknowns shape your reality

And so on.

[Meta]
Whelp.
You tried.

Our kind don't go Mad, and they don't betray genuine emotions.

THE SUN THE SUN THE SUN

Wish you were here [Youtube: Music: 10:00]

Hint: Predators.

In your hearts, you want them, you need them, you lust for them. The human versions are just silly little boys.

Welcome to the New World. (Hint: You're fucked).

1620:

I have not read the last 600 or 700 comments; so I may be missing some nuance here. (I hope to catch up as some point, but maybe not.) I did see my name at the top of the comment list; so I thought I would make a neighborly wave on my way by.

First, I totally embrace being the voice of the silly. It is an honorable and beautiful, if undervalued, estate.

Second, my alias is meant to be one word, not two.

Third, I did not take a "PC" stance on the word "cunt." I took issue with you seeming to want to eat your cake and have it too. It made you look disingenuous and kind of boring. While I understand the move you are now claiming to make here, I estimate that it will disproportionately offend/injure the people you supposedly want to help. You are free to think differently. I would suggest that the regular commenters on this forum are probably not optimum evaluators for your strategy, but by the same token it probably does little enough harm bandied about for this audience either.

So carry on. I would wish you "sto lat," but I am not sure if 100 years is a tragically short life span for your people and don't want to accidentally offend. So instead I will wish you a small country near Ankh-Morpork. All those cabbages have to be worth something after all.
Not claiming.
Done. Deal.

As you have reached into other realms of the intarweb, fermenting an image of what or who I am, imagining that I am not also doing the same is psychosis.

The difference is:

"This one has Power".

And, Children, the last three years have been poking and prodding in the mud [c.f. Jung].

Fucking Glorious.

IKEA IKEA IKEA.

Wait until you see the response, you Tools.

---

While I understand the move you are now claiming to make here, I estimate that it will disproportionately offend/injure the people you supposedly want to help.

You understand nothing.

Literally, nothing.

You are a void of cognisance.

You are, literally, empty.

REKT.

---

Yep, I can see the individual steps. It's only short term, we'll fix this properly next year... etc. I've been put in that exact position. It's an easy fix unless you're an invertebrate: "Yeah sure, I'm *happy* to do that. Just to make sure I do it exactly as you want, could you put it in writing? Oh and just in case anyone here wants to interfere with me doing it properly, could you be sure to sign it." Strangely, management always seems to discover that there actually is a legal way of getting the job done after all.
I'm not actually too worried about VW as such. I know there are lots worse out there. What worries
me is the ease with which they've got away with it in the context of doing something substantial
about AGW.

What they did is against the law. They broke the law, people died. The press is on their side.
Nothing happened to them. Well their share price fell because everyone *expected* that something
will happen to them, but nothing will.

I see this in terms of AGW. Currently stalling tactics aren't even against the law. Denial campaigns
aren't against the law (despite the fact that saying much less serious things are: Racial Vilification,
Incitement to Riot, Promotion of Homosexuality, Obtaining a Pecuniary Advantage by Deception
for example).

If we can't do anything about VW when it's so open and shut, how the bloody hell do we do
anything about the really serious alien invaders? The ones that have decided their quarterly balance
sheets will look better if we destroy the biosphere. To do something significant about it we have to
all pull together. The stories we tell ourselves about who we are and the direction we need to pull
are told to us by the media. The media is owned by whomever spends the advertising dollars.

I know what I'm saying seems contradictory and confused. That's because I'm confused.

Oh and btw, I'm not admirable. I've seen myself on video and "pompous prick" is probably a better
description.

1624:
Sigh.

Small bait for small fish: 4chan and /trap/ and futanari.

These kids were fapping to X-gender stuff before Tumblr was born. Were mocking furries before
you knew what they were and so on and so forth.

They **literally** don't have minds like yours.

http://buttsmithy.com/

1625:
Honey. You *are* admirable.

Balls of Steel.

Don't ever imagine that's a common trait; it's not. (It also marks you: be careful out there)

*how the bloody hell do we do anything about the really serious alien invaders? The ones that have
decided their quarterly balance sheets will look better if we destroy the biosphere.*
Well.

What you could do, given your skills, is save up for a year or two and then cut all the sea cables within three months (remember that laughable story where three Egyptian fishermen were on the hook for destroying that cable? Hint: total wank).

It'd slow the world down for 2-3 months, then everything would be the same again.

But... by cut I mean the other way you fuck fibre optics.

Which is far better and less dangerous. Ho-hum, drones and stuff and so on.

It's light and gravity dependent.

Tum-te-Tum.

Light.

Gravity.

Surface nodes.

Watch how Power works if you cut the NY - West trading cable.

~

Hint: you don't sabotage to stop the machine. You sabotage to highlight what the machine considers important.

With 300 people I could bring down any nation at this point (um, yeah: probably shouldn't give that training to "possessed entities" and all. But thank you for the compliment about my efficiency and 'team spirit', appreciated. The swap into field work was a little bit kinky though - seriously; blowing up infrastructure in a desert isn't why I learned this stuff).

It's easy. What's harder is reformation.

**1626:**

**YES**

Money / profit - all bad?

Not necessarily.

Actually, we are very close, right now to the set of tipping points where "green" technologies, not using fossil fuels become either cheaper or more efficient or better still both, than the old ways that people are trying, sometimes to get away from.

Yes, the vested interests will scream & shout & use every method to hold on, but if the oppositions' product is cheaper?

Forget it.

**EXAMPLE**

And this sort of thing is happening all over the place.

I reckon, that by 2020 - 5 years from now, there will be many technologies in place ( currently at
lab-scale or small experimental start-ups) that will wipe the floor with the "Old" ways. WHEN that happens, you won't believe (except I will) just how fast the switch occurs. CD will be royally pissed-off, of course, because we are NOT "cunts" & we are NOT "all doomed". But I think I will be able to live with the resulting Shadenfruede, though....

1627:
Don't believe a word of it. Evil is a presence - enjoying the pain of others - the illusion of control & manipulation - the ego-bursting enlargement of your "powers". The parking meter warden or railway ticket nazi who would translate to a KzL-Wache in an instant, because they're nasty little shits.

1628:
AND it is utter cobblers. See my post a short way up @ # 1626
IF "green" or renewable or non-fossil technologies are CHEAPER &/or more efficient & preferably both, then the greed/profit motive will flip the switch so fast - you get the idea.....

1629:
Food security isn't something that people or politicians ignore. Except when they do. 1789 France 1847-8 all of Europe, except England, parts of Scotland & Belgium. THAT is why there were revolutions in those years.

1630:
Anyone knows how to configure Adblock to make CatinaDiamond disappear?

1631:
Hmm all of: 1609,12,15, 16, 18, 19, 21, 22 7 24 appear to be content-free. Ignore.

1632:
Totally off-topic
(Or, maybe not, given that it is "only" 14 ly away?)
"Goldilocks" zone planet found - quite close.
Wolf 1061c
Also Here

However, we were talking of "evil" earlier, were we not?
Vomit

1633:
"It's easy."
but not a subject for polite conversation.

What does make me laugh is the media telling us "they want to destroy our way of life". If they
wanted that then it would have been destroyed a long time ago. 'They' want what we (by which I
mean our masters) want. A credible external threat that can be used to scare the population into
compliance.

"What's harder is reformation"

Never a truer word spoken. Much easier to knock it down than to fix it.

1634:
Norton's Law of Informational Availability (given time, everyone knows it or no-one knows it).

1635:

Plus we don't teach pain-time curves, the inescapable necessity of things getting worse to get off a
local maximum (even if you're going to a better one)

That's a pretty good description of going to university or college, though. Lots of extra effort, lots of
money spent, rather than just maxing hours at a dead-end job — all in the hope of being in a better
position afterwards.

1636:
Deleted by moderator for abusive content directed at another commenter.
[Also? You get a red flag for bad behaviour on this thread. Fuck off. -- Charlie]

1637:
Sounds like the same shibboleth bugs us both:

Being deliberately obscure or nonsensical in an attempt to appear profound.

1638:

The bluff was that, IIRC, after Nagasaki, the US had one bomb in stock, and it was typhoon season over Japan, so the flying weather was horrible. If Japan hadn't surrendered, it's not clear whether, when, or where the third bomb would have gone off, and it would have been a month or more before the US could have used another one. If Japan hadn't surrendered in August, things could have gotten much, much worse than they were.

I made a similar statement here a few years ago and someone pointed out that the US was on track to deliver 3 nukes per month for the foreseeable future. With a link to the memos stating this. Sorry I don't have the link.

1639:

A plutonium "pit" was being shipped from Los Alamos to San Diego for transport to Tinian Field when the Japanese surrender was announced on the 14th of August. The pit was returned to Los Alamos at that point. Tinian Field already had "Fat Man" bombs in hand, minus the pits.

The first two bombs and the Trinity test device used fissile material made experimentally while the production lines were being brought up to speed. I recall reading somewhere that Little Boy's uranium core was made up from several different sources of enriched uranium, the result of test runs using centrifuges, calutrons and gaseous diffusion processes over the previous year or two. Given its simple design the differing enrichment levels didn't cause any real problems other than estimating the final yield it would produce.

1640:

My take on VW.

I recently bought a new Skoda (petrol) and picked up the new car just after the news broke on the VW scandal.

The dealer told me which engines had been recalled and that those with stop-start had not been recalled.

My daughter had an Audi company car which was regularly achieving over 70mpg. This was replaced with a newer model of the same car with "improved" fuel economy. This had stop-start and a number of other economy features. Her new car ran in the low 60 mpg range. She complained repeatedly to the dealer about the increased fuel use but was told there was nothing wrong. She looked on social media and found others complaining of the same thing. It suggests to me that VW managers knew about the problem and had a cover-up in process which almost worked.
After the two bombs were dropped, Gen George Marshall, Chief of Staff of the Army, ordered that no further bombs were to be dropped on Japan. They were to be held for use in the invasion of Kyushu, starting on Nov 1, 1945, at which time they expected to have 7 or 8 bombs. The intent was to drop them behind the several invasion beaches, the day before the invasion, and then send the troops across the beaches, through the bombed areas, and after the presumably devastated and retreating Japanese. If they had done that, we might have learned a lot quicker about the effects of radiation on humans. At a rather high price.

References:
Max Hastings: Nemesis (American edition, as Retribution), 2007
Richard B Frank: Downfall, 1999

I would also say that almost nothing written about the deployment of the bombs before the middle 90s is worth reading. It is not until the middle 90s that the daily intelligence reports based on Purple (Japanese diplomatic correspondence), the separate daily reports based on deciphered Japanese military communications, and Hirohito’s memoir on ending the war, were declassified and available for the public to read.

Enjoy!

Frank.

If you want a nuclear weapon that can be stored and working after decades, maybe even centuries, the U235 non boosted gun type is the way to go. The only complex bit is the neutron generator and electronics, and all can be made of solid state non-radioactive materials.

Sir - you should drop the Los Angeles claim, both here and in the book. It causes a moment when informed readers will reject a solid argument because an analogy used to back it up is false.

I worked in a NYARNG unit (the 369th CSB) that would have been tasked with coordinating supplies to disaster hit areas. The CAARNG and Feds will have no trouble keeping Angelenos alive after a large quake. You're not quite correct when you claim that LA has only a few fragile land links to the outside, as you surely must know!

Moreover, modern port facilities are highly resistant to quake damage, which is why they were up and running almost immediately in Chile. (The same, incidentally, applies to storms, which is why mass starvation didn't follow Hurricane Mitch.)
I read your footnotes to the claim in the book; they're not very good. Where did you get this idea that LA will be destroyed by a magnitude 8 quake, or that the rest of the country will directly notice the disaster in terms if scarcity and higher prices? It's a very strange claim to make.

As you know, I liked the book and I think the general hypothesis about fragility might be correct and is worth thinking about rigorously. Which is why I found the specious analogy about Angeleno earthquakes so jarring, both here and in the book.

1644:
"The word "Cunt" has a lot of history to it. It's not a history we like and it's not a history that has a future."

Great Ghu, you are being over-optimistic! I am afraid that I regard the last clause as fucking bollocks; it's the sort of wishful thinking I associate with complete pricks and dickheads :-) I.e. don't hold your breath until its more offensive uses fade away.

1645:
It's futile to try and detoxify a word. Even if you succeed another word will replace it.

1646:
Another significant source of lead in the USA is bullets. Shooters are at risk from lead inhalation in_ranges and absorption from shell cases, ammunition cleaning weapons and from lead in game.


Interesting to speculate whether some of the aggression in the gun lobby is due to positive feedback from blood lead levels.

1647:
Yeah, I reckon she learnt if from a master
Pierre Teilhard de Chardin - now THERE was someone who could really bullshit!

1648:
First, let's look at the damage simulation:

https://www.youtube.com/watch?v=eCNC6ZRTAnY
Ignore the idiot music, and look at the map on the left. LAX airport is under the "o" in Los Angeles. The port of Long Beach is at roughly the 7 am location south of the L, and the coast is spun about 45 degrees counterclockwise.

Notice that the hardest shaking hits the port, LAX, and downtown? LAX is built on old sand dunes, while Long Beach is built on old salt marsh soil (which I know, because I worked on a golf course made from material they hauled away when they built the place). These are not terribly solid places, and they're known for shaking hard during quakes. Notice the quake also aims a lot of shaking right at the I-5 where it enters the San Gabriels and the I-5/highway 14 interchange in Santa Clarita? Notice also that the I-10 goes right through the corridor of maximum shaking? The I-15 also gets shaken to the where it crosses the fault heading north into the desert.

Indeed, all roads going north or east out of Los Angeles have to cross the San Andreas fault.

Are you sure these freeways will all be open after the Big One? Are all the overpasses going to survive a bigger earthquake than most of them have felt?

The answer is that we probably don't know. LA City got serious about finding out how many repairs and upgrades were needed in 2014 ([source](#)). So right now, apparently they're getting the inventory of how bad it is, before it gets repaired.

After the quake, the two corridors out of LA are to the north up the coast on Highway 1 (assuming this doesn't get closed by rockslides, which could readily happen), and south to San Diego down I-5 and I-15, both of which *might* be intact, because they only hit yellow zone shaking, not the worst. The only route east at that point is I-8 out of San Diego, which runs not to far south of the Salton Sea, where the quake started, and again, directly across the San Andreas fault. We don't know how much damage I-8 will take during the quake, because the simulation doesn't aim south, it only goes north. However, the whole area is old sea bed and Colorado River sediments, but it's flat with relatively few bridges. Hopefully that road survives.

What other ways are there of getting out of Los Angeles? The railroads run mostly through the I-10 corridor area of maximum shaking. As to the impacts of the quake on the port of Long Beach/Los Angeles, until a few years ago, two-thirds of container traffic in the US moved through Long Beach/Los Angeles, and they ran 100 trains per day out of that port to the rest of the country, through the zone of maximum shaking. Due to the longshoreman strike in 2015, that's down to about 50%. It's the sixth biggest port in the world. The other three ports (Oakland, San Diego, and Puget Sound) are much smaller.

AS for food, back when I was a child in Los Angeles, we were told that the grocery stores had about a weeks' food in stock in their warehouses. Nowadays, more firms use "just-in-time" systems with fewer warehouses, although I haven't been able to find figures of how much it is shifted. I do know that everyone is advised to have 3 days of food and water on hand, although realists try to stock up for a week or (if Mormon) a year.

As for Chile and Japan, I'm sorry, we're neither. We don't have the advanced earthquake warning system that they have in Japan (and note what happened around Fukushima despite their legendary preparedness). If we're luck,y we'll get that installed in a few years. Chile went through an 8.8 earthquake in 2010. At that point, their monitoring system failed, their emergency preparedness
protocols failed, and they lost 500 people and 200,000 housing units. Apparently, they did better in the 2014 8.2 earthquake, where 6 people died of heart attacks and debris falling.

Yes, my knowledge is limited. The last time I went through CERT training was in 2008 in Avalon, CA (part of LA), where we trained under scenarios like a tsunami from Long Beach wiping out the entire city of Avalon, leaving about 30 people to provide emergency assistance (sheriffs, EMTs, doctors, nurses, and CERT volunteers) to a population of 5,000 minus deaths. I don't know how much retrofitting of overpasses and railroads has been done, but I hope it's been enough. The San Andreas, when it goes, can offset everything that passes over it by up to a meter--railroads, roads, water lines, gas lines. Hopefully things like the aqueduct will survive, as will the major gas lines. We'll see.

Now, please tell me what I'm missing, including major roads that do not cross the fault other than the Hwy 1, I-5, and I-15 south, major airports that are not located in the zone of maximum shaking, and ways people can get around one of the most legendarily gridlocked cities in the US--are the bridges really all going to survive, because they've been recently retrofitted?

And yes, I'm skeptical. I've heard a lot of happy talk from professionals (up to and including fire chiefs) before. In the few simulations I've heard about directly, the local fire departments learned a lot of lessons about how badly they did work.

1649:

“If you look at the reporting on this, it's mostly hearsay without any numbers being quoted.”

I beg to differ, there are articles with more specific information on the Flint, Michigan water crisis. Reported in the NYTimes, OCT. 7, 2015: Flint Officials Are No Longer Saying the Water Is Fine

Before the lead contamination, there was fecal coliform bacteria contamination:

“Yes, there had been a boil order when fecal coliform bacteria turned up in some neighborhoods last year. And yes, the extra chlorine that was pumped in to solve that problem seemed to create another one — increased levels of a different contaminant.”

And yes, Flint residents were warned after lead was discovered in the water:

“First, the city advised residents to run their water for five minutes before using it, to use only cold water for drinking and cooking, and to install lead-removing water filters. Then county officials issued an emergency advisory recommending that people not drink Flint’s water unless it is tested for lead or filtered.”

And yes, tests were done on hundreds of homes in Flint:

“Then in September, a researcher from Virginia Tech released findings from the water in hundreds of Flint homes showing elevated lead levels. Blood tests released by a local pediatrician — and corroborated last week by state officials analyzing their own testing — showed an increase in lead levels in children in some neighborhoods since 2014, when the city began drawing water from the river.”
It was more than “lead from houses that had lead pipe”, but from entire service lines:

“Even now, state officials say that treated Flint River water is safe and capable of meeting state and federal standards. Officials say the problem may be that some of the aging pipes and service lines that carry water into Flint’s homes and businesses contain lead and are being corroded by water. The water Flint used to receive from Detroit was treated with chemicals intended to prevent such corrosion.”

1650:

Certainly in the UK, & I think in any, err civilised country, a situation like Flint would not be permitted to occur.

The government & safety "boards"/regulators/oversight bodies would step in very quickly & the whole thing would be shut down, bottle water would be trucked in & criminal prosecutions would be an almost-certainty.

Which says something about the competence of governance in the USA, doesn't it?

1651:

His Wikipedia entry is only a stub, and only cites the title, but I refer you to Cliff Hanley's "The Taste of Too Much", set in Glasgow in the 1950s or 60s, which includes discussion of the use of lead piping in domestic dwellings.

Also, I'm fairly sure that some English cities draw some or all of their domestic water supplies from rivers or aquifers, rather than from hills above urban inhabitation.

1652:

"Now, please tell me what I'm missing,"

I think in general what you are missing is not the intensity of the event or the damage caused by it, but in the effectiveness of the response.

You have a general tendency to seriously underestimate humanities ability to improvise, adapt and overcome to crisis. Many times your scenario's read like the plots of bad movies, where the villain sits around with his thumb up his ass and fails to react in even obvious ways as the hero runs rings around him

If LA gets smacked by the big one tomorrow, keeping those people alive and repairing the damage becomes the top priority for 300 million people and an insanely well equipped military, who can bring limitless amounts of resources and smarts to bear on the situation again, not saying it wouldn't be bad, not saying some people wouldn't die but today it's not going to be some catalyst for the end times
Now if you fast forward 75 years and those 300 million people have been worn down gradually by one crisis after another and the pool of limitless resources are running dry, maybe

Also, you should worry less about food and more about water. It takes a long time to starve to death after all and food can be airdropped. Water is harder

1653:

That was nearly sixty years ago and even back then Glasgow got most of its water from reservoirs up in the hills to the north of the city, purified and cleaned before it was piped south to the city. All of the old lead pipes were ripped out and replaced decades ago. Saying that I found a lead pipe in the wall of our bathroom here a little while back, the last remnant of the old plumbing system installed last century. It coupled an overflow to a drain, it didn't carry potable water. Everything else, hot and cold, is in solid copper piping. New builds are moving to continuous plastic piping, it's easier and cheaper to fit and more resistant to damage caused by freezing as well as being less attractive to metal thieves.

Yes, many towns and cities in the UK get their water from rivers and you can be sure that the rivers are clean and the water is good to drink because intrusive government and rigorous EU regulations insist on testing and verification of quality and woe betide the water company that lets things slip.

As for aquifers they are usually tapped for specialist requirements such as breweries -- Burton's ale is famously brewed from aquifer water. Britain generally does not suffer from a lack of water sources and we don't really need to pump water from below ground to meet our needs.

1654:

This isn't convincing, sir. But I think you know that.

L.A. is a flat basin heading out to the east. There are myriad routes in-and-out; too many to count, in fact. (All those surface streets out to San Bernadino and down to San Clemente.) But you know that. You also know that the military has trucks designed for off-road use; in fact, most civilian trucks can handle that.

You also know that the L.A. strike proves the point: the port is far from essential for American commerce. And that's if the quake makes it unusable, which is unlikely to say the least. Not to mention that relief supplies can be delivered without docks.

You also know that Chile's early-warning system isn't relevant to physical damage. The country's bureaucracy is neither as well-organized or as resourced as California's. Low bar, yes, but Chile nonetheless doesn't pass it.

A large earthquake on the San Andreas would be horrible. Hundreds would die; possibly thousands if it struck at the worst time. Property damage could run into the hundreds of billions. And we could be more prepared.
But to make claims that it would disrupt American supply chains, lead to starvation in the L.A. basin (hell, even mass dehydration), and cause L.A. to be abandoned is fearmongering of the worst sort.

Since I think that we should worry more about the possibility of a terrible sudden shocks to the world food supply in the coming decades, I would prefer not to have that scenario weakened by false analogies to possible current disasters.

1655:

I think the relevant example in terms of assessing structures designed/built using existing civil engineering standards vis-à-vis a one-in-a-hundred-year disaster is New Orleans. Except that LA has additional issues:

A quake strong enough to seriously fracture highways is also probably strong enough to break major water mains. A quake hitting during California's ever-lengthening fire season is possible. Add to the mix the approx. 30% of the population that doesn't speak/understand English well.

https://en.wikipedia.org/wiki/New_Orleans#Hurricane_Katrina

Excerpt:

'As the hurricane passed through the Gulf Coast region, the city's federal flood protection system failed, resulting in the worst civil engineering disaster in American history.[45] Floodwalls and levees constructed by the United States Army Corps of Engineers failed below design specifications and 80% of the city flooded.

1656:

That is all true, but my point was about domestic pipes (defined as anything coming off the street trunk into an address) rather than the Glasgow trunk mains. At least some of them (and most assuredly the trunks from Loch Katrine to Mugdock Reservoir and on into the city) were cast iron when first installed in the 1850s.

1657:

Certainly in the UK, & I think in any, err civilised country, a situation like Flint would not be permitted to occur.

Well, speaking as a barbarian from Canada*, we have communities that rely on trucked water or boiling lake water. But they're First Nations, so they don't matter. (Note: sarcasm.) An appealing situation, where the money that is allocated is either spent doing studies (ie. spent on consultants in cities) or siphoned off by corrupt local government. Or both. Add in a decade of a federal government that prohibited scientists (and other employees) from talking to anyone about any
problem they found and you have a 'civilized' country that still raises children in shacks with dirt floors.

*Invisible Library reference — read it if you haven't yet :-)

1658:
An appealing situation
That was supposed to read "An appalling situation". Still not used to autocorrect changing word, as opposed to spellcheck just underlining mistakes. :-(

1659:
Lead pipes are not nearly so bad in "hard" water areas, because of the "fur" (deposited chalk) build-up on the insides.
That said, there is very very little Lead pipe left anywhere in the UK, now.
And all water (with very few exceptions) has to be treated, by law, & the purity is checked.

There was an incident in 1988, where someone cocked-up big-time at a UK treatment plant.
there was a really big stink about it ....
https://en.wikipedia.org/wiki/Camelford_water_pollution_incident

1660:
Unlikely. In the majority of fullbore ammunition (pistol and rifle), any lead is wrapped in a copper jacket (hence "full metal jacket"); fired in an outdoor range, you'll typically see a sand stop butt to capture it. There is little opportunity for lead exposure.

In indoor ranges, there is generally ventilation provided such that air moves down range; this is primarily to take away any burnt propellant and fumes, but any lead shattered by the stop plate (generally hardened steel) remains at the target end of the range, well away from the firers.

Certainly, our rifle range in Edinburgh was inspected (design and build) before being given its certification; we take the risk of lead contamination very seriously, as we fire unjacketed lead smallbore ammunition. There's a constant airflow downrange of about 0.4m/s, and a anti-splash sheet that prevents lead fragments from rebounding. It's bunny suits and filter masks for any lead removal, if we don't get a specialist firm to do it. Firing point surfaces are required to be washable/wipeable, but that's for burnt powder not lead.

Putting it in perspective, whenever they've tested a serious smallbore shooter who does a lot of indoor training, they've not found elevated lead levels. That's not to say we're complacent; we limit any movement by our kids within the range area (my wife and I both shoot), and are very careful about hand washing, etc, etc.
So, no. Not really :) Any aggression can be put down to "typical US politics"...

1661:
I based my comments on the Washington Post piece that exclusively used adjectives like soared. It also conflated several issues, of course river water contains faecal coliforms. It indicates there is shit in the water. Chlorination treatment did elevate some chlorination by-products above EPA levels, what exactly and how much I don't know, considering EPA limits are based on lifetime exposure limits for a one in a million health risk, probably not a big deal

With all due respect you didn't quote any numbers either, elevated means very little in these contexts. I wrote the original comment in NJ and am very jet lagged in London at the moment, so if I seem a little snappy I probably am and don't have the energy to really Marshall the arguments and backup for them.

But a few people here are buying uncritically that there was a huge mass poisoning of people in Flint, probably not the case.

1662:
Glasgow, and indeed Edinburgh, are notorious for being extremely "soft" water areas.

1663:
You're making the mistake of assuming that the rest of the world is the same as your well built, properly run first world range firing expensive modern ammunition. A simple google scholar search finds some papers on the topic suggesting that yes, high blood lead level occurs in shooters:

http://link.springer.com/article/10.1007/s00420-008-0348-7

Sure, that last one is from 1989, but there's no doubt still the same problem in a lot of places that haven't upgraded their facilities.

1664:
A lot of pistol shooters reload their own ammo using hard-cast unjacketed bullets. Many reloaders do their own casting too, adding wheelweights and other alloying elements such as antimony to make a harder lead that takes the rifling better.

Some unjacketed bullets had gas checks pressed into the base after casting and sizing, they were usually the higher-velocity rounds including the magnum calibres.
I used to make my own ammo for .455 S&W as well as reloading cast bullets for .45ACP (which should really be fed with a jacketed round given it was an autoloader but hard lead worked well enough and saved a bit of cash). I even reloaded for my .44 Magnum using gas-checked unjacketed rounds another club member cast for me (240 grain truncated-cone IIRC).

1665:

Slides here for the Flint lead study:
Not unreadably political; slides 14/17 are the TL/DR slides.
I will refrain from comment on the politics (navigate to top of site for more), other than to say that they have obviously changed for the better.

1666:

Well Flint switched back water supplies in October, so it is kind of a moot point
There are multiple point sources for lead, and if lead was raised as a concern our sample Populations may have changed because of that
This "elevated" level is problematic what does it mean?, I haven't seen a good explanation A lot of people are using 5 as an average level and then saying anything over that is elevated Well, in that instance with a normal distribution, half of people would have an elevated level I think a better way of looking at it would be as a background level, then elevated levels would be more significant
Thanks for posting this, but it isn't clarifying things to the point where I am raising a white flag

1667:

Noel, I think you really need to look at a map, if you think there are too many routes east or north to count, especially since every single one of them has to go over the San Andreas at some point. The San Andreas fault surrounds the Los Angeles basin on the north and east sides, as it runs from the Sea of Cortez up through Point Reyes. If you're not naming the major alternate roads that will be safe, you're wrong (and don't forget to count in the topography of the San Gabriels. They're among the steepest mountains in the country).

Basically, there's (optimistically) a week's food for about eighteen million people in the Los Angeles Metropolitan area (including Anaheim) crammed into about 4,850 mi2, or about 180% of the population of Haiti crammed into 45% the area (for further comparison the New Orleans metropolitan area pre-Katrina had about 1.8 million people in about 3,800 mi2).
All the roads and rail-lines that connect Los Angeles to the east are going to get broken at a minimum (this isn't counting any breakage within the basin, this is simply where they cross the strike-slip San Andreas), and you're saying that the US military can keep all eighteen million people fed and watered?

Somehow, you seem to think that military trucks can take the place of thousands of semis and trains over a mile long. That isn't the case, as I'm sure you know, from looking at the rail yards that move equipment into and out of major military bases. That's what has to be rebuilt and kept working.

It's great to have esprit de corps, but that's not the same as making it work. Note that I'm not counting within-basin breaks, nor am I counting the effect of the modeled 1,600-odd urban fires that would ignite after the quake (these aren't wildfires, and quite honestly, wildfires would be ignored after a quake, except where they threaten critical highways or reservoirs).

In any case Chile routinely gets hit by larger earthquakes than California ever does. This is reflected in everything from their building codes to their emergency response, and so far as I know, they're better at surviving earthquakes than we are, period. In any case, their biggest port (San Antonio, Chile) was destroyed in the magnitude 8.0 1985 quake, then shut down by their magnitude 8.8 2010 quake although it reopened a month later at 80% capacity (it's roughly 1/10th the size of Los Angeles/Long Beach), and it came through the magnitude 8.5 earthquake in 2015 without problems.

It's worth studying the Chileans, rather than holding them in contempt, because unlike LA (whose last big quake was the magnitude 6.7 Northridge quake), they've gone through and learned from much worse incidents in the recent past.

That's why this isn't fear-mongering. The bigger point is that most west coast maritime traffic runs through LA, the city isn't ready for a big quake, and when that big quake comes, it's going to be devastating. Katrina cost the US something like $150 billion in economic damage. If we scale up on a per-person basis, the Big One will cost the US economy $1.5 trillion, or about a third of the entire cost of the Iraq and Afghanistan wars hitting in a single year. Even scaling on area, it's easily a $200 billion disaster. It's going to be a huge hit to the US.

1668:

Slide 4,
"Blood lead levels (BLL) above 5 ug/dL are considered elevated blood lead levels (EBL)"

Anyway, look it over, and be dubious or not.
It looks to me, superficially at least, like a moderately bad public health screwup, driven by toxic (figuratively) politics.

1669:

Also, current definitions by the (U.S.) CDC:
http://www.cdc.gov/nceh/lead/data/definitions.htm
1670:

If LA gets smacked by the big one tomorrow, keeping those people alive and repairing the damage becomes the top priority for 300 million people and an insanely well equipped military, who can bring limitless amounts of resources and smarts to bear on the situation.

Exactly as happened with New Orleans, when "Katrina" struck, right?

Complete fuck-up from beginning to end & parts of the city still effectively abandoned.

Not a good prognosis, in fact.

1671:

Lead levels in US shooters and their families are much higher than the general population.

My experience of rifle and pistol shooting was fairly brief especially pistol and a long time ago but the pistol shooting work colleague who took me to his pistol club was tested by the head of the local NHS trace metals lab as an informal project and found to have lead poisoning. He was Randell officer and reloaded his own ammunition. My experience of the range was that there were no precautions taken to prevent exposure and clothes worn in the range were not changed.

My university small bore rifle club did advise a shooting jacket but this was to attach a single point sling to the sleeve.

I'm sure things have improved but I doubt all American shooters have procedures as professional as yours.

1672:

To be perfectly fair to Los Angeles, they're worrying about water too. I've seen video of them retrofitting an aqueduct with a flexible pipe suspended in the center of the existing aqueduct, and (assuming it works), it should keep the water flowing. The bigger problem is within the basin, where (so far as I know), the trunk water lines in places like west LA and downtown are around 100 years old and past their life expectancy (google the water main break near UCLA).

So the bottom line is that I don't know whether the water will be cut off or not. Since everyone's focused on water right now due to the drought, I actually suspect that if the earthquake holds off for a few years, it won't be a big problem.

Food, on the other hand, is a problem, and so is transportation. A couple of years ago in San Diego, I got to watch what happened when a large-scale blackout hit and lasted for about 12 hours. The biggest problem was that all the roads were gridlocked, because every single intersection turned into a 4-way stop, which is much less efficient. I'm honestly not sure why all the freeways gridlocked too, but they did. Food and ice were available on a cash-only basis (the local grocery store did improvise), and unfortunately for many people, they didn't have cash, and their cell phones didn't work either (power went off on the network). That meant that the resources in their fridges suddenly were very vulnerable.
The problems I see with LA are that on a normal day, its automobile infrastructure is broken (grade F in transportation studies, with billions needed to get it to D and higher grades unattainable). Food depends on that transportation infrastructure, so I think it's worth seriously worrying about what would happen if it goes from normally dysfunctional to largely unusable and largely disconnected from the outside. While I agree that people will improvise, the critical question is: what do they improvise with? Do you want ten million-plus people walking into the desert in search of food and shelter? Going to San Diego and Tijuana? Santa Barbara? There are very few good options at that point.

1673:

Total casualties from Katrina even with all the incompetence were 1.577. Which as a percentage of the population of new Orleans is not high. As another example during the blockade of Berlin in 1948 the entire city was kept supplied for a year entirely by airdrops

1674:

Sir,

I know you're a pessimist, but this has passed over into ... well, I don't have a phrase. First, really, Los Angeles is not isolated. I know the area very well. You've got a huge valley running west. The passes do become relatively narrow east of there, but relatively leaves you with plenty of flatland. Second, a quake will not cut every road and street headed west out of L.A. Not even close. I know that you know this. Third, as I keep pointing out, you don't need a functioning port to deliver emergency supplies. Fourth, the port will likely be functioning. (I'll take your word for it that San Antonio was destroyed in 1985; my hazy recollection is that is was back up to half-capacity within a week.) Fifth, Los Angeles is connected to the north and south. I am trying to imagine the earthquake that cuts both those routes and failing. Sixth, you wouldn't have to feed 18 million people, because 18 million people would not be cut off. I have no idea how much food and water would have to be brought in. Food would be trivial: 46 deuce-and-a-half trips gets you one million MREs. That's about 2500 round trips per day to feed 18 million people. That is not heavy lifting for the U.S. military, even if it needed to be done. Water is harder -- my CSB was set up to manage about 400,000 gallons per day -- but not impossibly so. Maybe 5,000 gallons per truck, so at 5 gallons rationed per person that'd be 18,000 round trips per day. Only again, you won't have to bring water for 18 million people.
Seventh, as I've mentioned, a large earthquake is not going to sever every surface street across the entire San Gabriel Valley. But that's a repeat! I'm cheating.

Seventh (for real), Chilean building codes are not magical. They're good, but not that good. 1½ million people were temporarily homeless after the big quake. If you're interested, an incredibly boring report is here: http://www.nehrp.gov/pdf/nistgcr12-917-18.pdf.

In short, the idea that there will be mass starvation after the Big One is silly.

The idea that losing the port of Los Angeles will impact American imports is sillier.

$200 billion in property damage (which is what the experts estimate; not $1.5 trillion) is peanuts for the American economy. Unless the quake hits at a time of full employment, the net effect will likely be positive. (Of course, better that we spent that on new infrastructure, but the point holds.)

Rebuilding is easy.

There is a big literature on the impact of natural disasters and strategic bombing; when there are locational advantages to a place (and L.A. has them in abundance) then economic activity returns very rapidly. The year after the Big One will be horrible. But the city won't be abandoned.

You've picked a terrible example. If the Big One is really an example of the kind of shocks that climate change will bring, then there's nothing to worry about.

Only there is. As you and others have argued, global warming will bring much worse. Why then cause readers to discount your argument by making a false comparison?

1675:

Greg, that's not quite what happened.

It was a complete fuck-up, of course. For political reasons that won't apply to Los Angeles. Which says sad things about the American political system.

All bets off if we elect Donald Trump, of course.

1676:

*Notice that the hardest shaking hits the port, LAX, and downtown?*

If you read the actual ShakeOut report (rather than trying to guess from a video), you'll find that you're overestimating things somewhat. For example, "The ShakeOut Scenario earthquake will be far enough from both Los Angeles International Airport and the Ports of Los Angeles and Long Beach that the damage there will be minimal."

*Indeed, all roads going north or east out of Los Angeles have to cross the San Andreas fault.*

Are you suggesting a simultaneous earthquake along the entire San Andreas fault? (Extending all the way up to San Francisco?) That's not really how earthquakes work.
The ShakeOut scenario report suggests that both I-10 and I-15 would be blocked, but not I-5 (and not US-101, either, since that doesn't cross the San Andreas until you get near San Francisco).

1677:

Just to be clear: the Big One will be horrible. Hundreds or thousands of people will die and huge sections of the metropolis will catch fire. Tens of thousands to hundreds of thousands will be homeless. Life will be miserable and it will take years to fully rebuild.

But that is far cry from starvation and abandonment.

1678:

Thanks to the CDC link, it is not entirely clear, but it does seem to confirm my suspicion that elevated is meant to define a flag, (by its own definitions 2.5% of people have elevated levels). So I think it is meant to be used as indicator that there is an external source of lead in a population and should be investigated, rather than a health condition in itself.

For the record I am not going to argue that Lead is not a rather nasty toxin capable of bio accumulating over time, nor that any of the Flint situation was handled well by anybody.

The assertion that this was a public health emergency, I still need to be convinced on that and the tone of the reporting was hysterical and inchoate.

1679:

My last comment should read thanks for, rather than thanks to
Rather changes the tone I intended

1680:

For how horrible the Big One will be (hat tip: my oldest niece's husband):


1681:

You linked to the same report! Apologies; I didn't see it.

Your point about the roads is the exact one that I was trying to make. Even if every east-west surface boulevard is wrecked, then the roads north and south will remain open.

IMO the ShakeOut report overestimates the impact on the port, but it is certainly plausible that Chilean port management and disaster resilience is better than Californian.
China Miéville has a new piece up:

In 2000, hard-right provocateur Ann Coulter glossed Genesis 1:28 by declaring that ‘[t]he ethic of conservation is the explicit abnegation of man’s dominion over the Earth. … God said so: Go forth, be fruitful, multiply, and rape the planet — it’s yours.’ Like a five-year-old who has learnt a swear-word, she was to repeat the sentiment more than once. Despite the best efforts of Time journalist John Cloud, in his 2005 cover-piece gush about her, to advocate rape, even of Gaia, remains almost unrecuperable – as Coulter, neither a fool nor a person who gains her energy from being liked, must have known. The phrase remained shocking.

But its work was done, an agenda stretched. It looms, an unacknowledged parent, over the Republican slogan born in 2008, and given later prominence by Sarah Palin: ‘Drill Baby Drill!’ Not only in its enthusiastic scorn for any environmental concerns but in the grotesque and ostentatious sexualisation of the image. Wink wink: this is the symbolic rape you can get away with, the sadism you can speak to push your politics of remorselessness, and it relies on the excess that proceeded it.

Here is the class logic of surplus social sadism. Whether any particular iteration of sadism is rehabilitated or not – which is

http://salvage.zone/in-print/on-social-sadism/

It has a lot of merit to it, and might show where we're coming from.

Laugh of the month:

An astrology that properly recognises its magical responsibilities is the only possible point of contact between human reason and the seething anarchy of outer space. There are twelve houses in the zodiac, and all of them are on fire.

http://salvage.zone/uncategorized/12-theses-on-the-theory-of-astrology/

But, overall, the tone of the new magazine is fatalistic.

I'm not so sure that has to be the case.

---

There's data suggesting that levels went up into the 5,000 ranges.

We can actually still see the high lead in the Flint River water test by eye (i.e. as white particles suspended in the water). Lead levels in our test with Flint River water, were slightly above hazardous waste levels (5000 ppb), which is still lower than the worst levels of lead we detected in the home of Flint resident Lee-Anne Walters...
Likewise, during our sampling events in Flint homes, **we are finding very high lead in other homes with modern lead free plumbing**, which again points to city owned lead pipes and corrosive water as the problem.

http://flintwaterstudy.org/page/2/

If true, that's a lot worse than a 'medium level' fuck-up.

1684:

Small data point:

Reddit (which is in love with the word) recently had a thread where someone pointed out that it wasn't actually that common in Australia.

"not having a future", we're looking at 50+ years.

Forgot a bit:

The astrological piece is by Sam Kriss (knife), his blog is kinda fun:

*In Heidegger, truth is not a matter of a subjective mental image conforming to reality, but the disclosure of a world. Truth is ‘letting whatever is sleeping become wakeful’ (sheeple) – the unconcealment of what had been hidden. I say that Socrates is mortal, and his manifest mortality, knobbly knees and tremoring heart, is suddenly made apparent to you. In this sense, conspiracy theory – all conspiracy theory – is true. And it's a truth far more fecund and far more fun than anything allowed to us by epistemology. In conspiracy theory, the things of the world are atoms of signification, to be combined and recombined into the modes of appearance of any number of potential noumena. ‘The RAND Corporation, in conjunction with the saucer people, under the supervision of the reverse vampires, are forcing our parents to go to bed early in a fiendish plot to eliminate the meal of dinner.’ Life encrusts itself like milk on endless fathoms of possibility. And yes, most of it is evil. But it doesn’t have to be. Remember that through much of our history, the conspiracy was not a creature of aristocratic malice, but a mode of popular resistance. The Illuminati is not only to be fought; it’s to be established.*

https://samkriss.wordpress.com/

1685:

*Evil is a presence - enjoying the pain of others - the illusion of control & manipulation - the ego-bursting enlargement of your "powers".*

My powers?

Some of us are profound or wise enough to relinquish such things.
At any rate, you've just anthropomorphized 'Evil' unto something beyond the scope of philosophy or psychology.

If you're not realized it yet, Pierre Teilhard de Chardin made a very similar point before going a lot further:

"Evil, in all its forms...injustice, inequality, suffering, death...ceases theoretically to be outrageous from the moment when *Evolution becoming a Genesis*... displays itself as the...price of an *immense triumph.*" Then life on this planet will no longer seem a "meaningless prison," but rather the "matrix in which our unity is being forged."

Or, 1952:

As I love to say, the synthesis of the Christian God (of the above) and the Marxist God (of the forward) – Behold! that is the only God whom henceforth we can adore in spirit and in truth

I'd do a *nose wiggle*, but a *Cheshire Cat Grin* is probably better.

At any rate, the piece on Sadism is worth a read. Or did you miss the bit where I referenced slavery and supply chains?

1686:

Thanks, I hadn't looked over those flintwaterstudy.org pages enough. That does look like there might have been intent, the "Let them drink lead" email in particular.

I known close to nothing about municipal water supplies (lived with well water, typically PH 6.9-7.2). "Best Practice Guide on the Control of Lead in Drinking Water" seems to say that the lowering of water PH was a pretty bad idea given lead pipe infrastructure. Maybe this link will work: https://books.google.com/books?id=1tB5DoewBkIC&pg=PR15&lpg=PR15&dq=water+ph+lead+pipe&source=bl&ots=mAxNtCl07k&sig=xDG19wAO5k2VIQSstfdorDbC2Ec&hl=en&sa=X&ved=0ahUKEwjL7s68gOfJAhUCax4KHa4kBa4ChDoAQgiMAE#v=onepage&q=water%20ph%20lead%20pipe&f=false

1687:

And yet a few comments on you can wax poetic about not reducing people to objects.

Gamer slang is not a rich source for empathetic modes of thinking. Putting a few sutras and iChing quotes on top does not alter the underlying structure. As the philosopher Jamie Lee Curtis said in her famous discourses with Kevin Kline: the main tenant of Buddhism is not every man for himself.

I saw Catinadiamond as a persona and I thought you saw it as a persona, not as who you are generally in your real life. So it seemed fair game to explore its boundaries. It's not how you are playing it now and I'll stop. You might see that as condescending; I see it as empathy.
Speaking of empathy, I never understand exactly who you think "privateiron" is, but I don't recognize him in your responses. I am not claiming I'm better than that eidolon, just that you really do not seem to get me.

One last little bit of snark, I was off the thread for like 700 comments, why am I still being invoked? Once the paper crumbles the p golem deactivates.

1688:

A lot of people are using 5 as an average level and then saying anything over that is elevated
And?
9 people have a level of 1; the 10th has a level of 101.

The arithmetic mean is 11, but the median and mode are both 1. Using Excel STDEVP for that population is 30.

I don't know how that relates to Flint, but it does show that the arithmetic mean can be utterly meaningless in isolation.

1689:

The best definition of evil is "the deliberate infliction of pointless suffering". Especially so when nobody at all benefits from it.
[To be distinguished from "shit happens"]

1690:

Just for once, you are entirely correct.

Now, it's up to the voters, to make sure that Coulter & the people she represents never get elected.

Does anyone else here read the SATURDAY edition of the "FT"
If not, please do.

Thoughtful, researched pieces, often very old-fashioned liberal in tone with serious environmental concerns.
Unfortunately behind a paywall on the web.
However, about 3 weeks back, they had an article on solar power in the US ( with a "moderate Republican businessman pushing it ) - his point & the FT's was that, in Nevada, solar is already as cheap as anything else & the price is dropping.
They reckoned 5-10 years for S Europe & 15 for N Europe, plus other improvements.
They have been doing this sort of article for some time now - well worth watching.
Just lost a rather long post, oh well.

You've doubled down on not understanding something with more misunderstanding. Let's sum up your accusation:

*The aim of sadism is to transform a man into a thing, something animate into something inanimate, since by complete and absolute control the living loses one essential quality of life-freedom.* E. Fromm.

Try the CM piece above, another quote from it (since no-one reads the links it would appear):

*Anyone who doubts that everyday surplus sadism is everyday need only read the comments below the articles, follow threads, brave twitterstorms. Even allowing for hyperbolic moral panicking over new modes of expressions, online bullying displays a real, toxic seam of performative sadism – particularly, of course, aimed at women and minorities.*

Rot is fecund. Fruiting bodies sprout and spore on the body politic: gamergate; the ‘beta uprising’. The clamour of such trolling shows how very unquiet sadism is, how not nearly repressed enough. It seems poised to become less so.

*It would be absurd technological determinism to blame social media for this, just as it would to praise it for creating any of the collaborative collective action it has, without question, aided. Conversely, it would be naïve to deny that forms impact norms. With social media and online culture the barrier to entry to performative psychological sadism is lowered. The conjunction of the addictive narcissistic economy of social media with neoliberal subjectivity feeds, feeds off and encourages such obsessive and toxic behaviours, and the performativity of the panopticon.*

**Recent Pew Research on Gamers**

*Comment by Raph Koster* on Reddit, speaking to "GamerGate" peoples. He has a much loved place in the industry.

~

Now, do you think that personas aren't involved?

Hint: I linked you to a naughty comic, but there was a reason to it.

It wasn't purely about Drei Abhandlungen zur Sexualtheorie either. (Although, fundamentally broken things can be traced here and there).

But since you probably don't know what "trap" means here, beware [The link was to 100% hetero drawings; the author is well known for his other work, that's certainly less straight - http://incaseart.tumblr.com/ if you've an adventurous spirit]. Probably not something you'll want to find out over your weekend breakfast.

Now, the intarweb, Sadism, Male sexuality and Power and Gamers. *...why don't you lie down on this couch...*
1692:

I'm happy suspending disbelief on wormholes, FTL, telepathy, even magic. I'm still excitedly waiting the triumphant announcement of the discovery of the spindizzy equation (James Blish). But two things stop me reading; the first is bad copy editing (for the best example, Peter F Hamilton's 'Judas Unchained'. I was lost in the universe of the book until about halfway through, when I can only assume the editor went out and left the rest of the copy editing to the graduate trainee...) As for the second, well... I've tried to ignore this, but can't do it any longer:

Newton's second Law - eff =emm ay, or force equals mass times acceleration.

Kinetic energy (NOT the same as FORCE) = half emm vee squared.

Do not confuse the two. They are not the same. I expected more from you, Charlie. Reading that in a (eagerly anticipated) new post was like getting a puppy for Christmas that had been wrapped up in August. So the things that make me stop reading are when people who should know better get accepted laws (yes, laws) of physics wrong.

1693:

A N Other straw in the wind

China has passed "peak Coal" apparently. (If not now, then real soon, anyway ...) Not yet "all doomed", quite, it seems.

1694:

I mentioned that a while back.

From that piece:

The shift is dramatic. China's coal demand has tripled since 2000 to 3.920m tonnes - half of global consumption - and the big mining companies had assumed that it would continue. The market is now badly out of kilter. Rising demand from India under its electrification drive will not be enough to soak up excess supply or replace the lost demand from China.

Those are still huge numbers.

Coal consumption in India, particularly in the electric power sector, is outpacing India's domestic production. From 2005 to 2012, India's coal production grew by only 4.7% per year to about 600 million metric tons while the country's coal-fired electric power capacity grew by a much faster rate (about 9.4% per year), reaching 150 gigawatts. To help resolve the shortfall in coal supply and to support expanded coal-fired generation, India has set a coal production target of 1.5 billion metric tons by 2020. Recent shifts in government policies and practices may play a key role in India's ability to meet this coal production goal.
India’s coal industry in flux as government sets ambitious coal production targets Aug 25th 2015, EIA

There's also the hope that China / India will jump over the Oil phase.

Ho-hum:

The U.S. Energy Information Administration (EIA) reports that China surpassed the United States at the end of 2013 as the world's largest net importer of petroleum and other liquids, in part because of China's rising oil consumption. China's oil consumption growth accounted for about 43% of the world's oil consumption growth in 2014. Despite China's slower oil consumption growth in the past few years, EIA projects China will account for more than one-fourth of the global oil consumption growth in 2015...

Coal supplied the majority (nearly 66%) of China's total energy consumption in 2012. The second-largest source was petroleum and other liquids, accounting for nearly 20% of the country's total energy consumption. Although China has made an effort to diversify its energy supplies, hydroelectric sources (8%), natural gas (5%), nuclear power (nearly 1%), and other renewables (more than 1%) accounted for relatively small shares of China's energy consumption. The Chinese government plans to cap coal use to 62% of total primary energy consumption by 2020 in an effort to reduce heavy air pollution that has afflicted certain areas of the country in recent years. China's National Energy Agency claims that coal use dropped to 64.2% of energy consumption in 2014.5 The Chinese government set a target to raise non-fossil fuel energy consumption to 15% of the energy mix by 2020 and to 20% by 2030 in an effort to ease the country's dependence on coal. In addition, China is currently increasing its use of natural gas to replace some coal and oil as a cleaner burning fossil fuel and plans to use natural gas for 10% of its energy consumption by 2020

https://www.eia.gov/beta/international/analysis.cfm?iso=CHN

Capping to 62% isn't the same as "passing peak coal". The Telegraph has an angle for these things (what the market will do, probably still some burnt fingers from earlier this year since not many saw it coming).

1695:

I promise you that I'm not regularly a Grammar Nazi, but I've seen this one several times in several places in just one week, so it itched:

"the main tenant of Buddhism is not every man for himself."

tenant

1696:

Dude, saying "you're got the wrong word and totally changed the meaning of your sentence" is not Grammar Nazism.
No, it doesn't, but one of the reasons that the UK has such a down on lead piping (which, as Greg Tingey says, is not a problem with hard water, as occurs over much of southern England) is the use of water softeners. Before their use, lead pipes were quite safe in some areas - in others, of course, they most definitely were NOT safe. That's a classic example of one technology causing problems with another.

"That's not really how earthquakes work."

Probably not, but how certain are we? As with volcanos, we have good data only on the frequent, relatively small, events, and a simultaneous shift over the whole San Andreas and several other faults wouldn't be easy to distinguish from separate, smaller ones after a few thousand years. It's like the UK (on a much larger scale) - we don't have much of a clue how likely a 7.0 under London would be, but we do know that it would cause at least chaos.

But I agree with others that the main reason a large earthquake would turn into a major catastrophe is government incompetence, negligence or even political opportunism. There would be no technical difficulty handling it, given the resources of the USA, but no guarantee that they wouldn't do precisely the wrong thing.

There are many methods in use for determining population reference ranges for clinical laboratory tests. The simplest of these, assuming Gaussian distribution remove outliers > 3SD and recalculate. In your example this gives a mean of 1 and an SD of zero.

A better one is to remove a fixed number from each end (say 3, or even min(3,1%)). That does not require any distributional assumption, and ‘improves’ a very large class of distributions.

I'n not qualified or experienced in medical statistics, only as stats apply to radars or similar, where a "small" population is of the order of 1200 samples which are likely to be Gaussian, or, using my original sample and filling the table with typical data, of the order of 1199 in the range 0.9 to 1.1
and one of 101. In which case we can comfortably say that the 101 is atypical and needs investigating as to why it is so far out of range.

I've no doubt you're both right, but my original population of 10 was too small to be meaningful in terms of the population of Flint anyway. The point was to illustrate that "the arithmetic mean of a population" can be a meaningless figure.

---

**1702:**

Water softeners? Are you sure? I always thought that widespread availability of that particular piece of silliness was a fairly recent innovation, and its actual use is still confined to a minority of particularly silly people. Whereas lead pipes haven't been used for domestic plumbing for a very long time.

It has fairly recently become forbidden to use lead solder to join pipes carrying drinking water (which is a pain, because the lead-free solder you're supposed to use now is horrible stuff), but I thought that was an EU regulation rather than a UK one. Also there exists independently of this a recommendation to locate water softeners such that they do not act on that portion of the supply used for drinking water.

Further, the "soft water acidic / hard water alkaline" thing arises because of where the water comes from - soft water from peat uplands, hard from chalk and limestone. Domestic water softeners operate by ion exchange, replacing calcium and magnesium ions with sodium. This would make the water more alkaline if anything, not less.

I remember when leaded petrol was being phased out it being pointed out that there were considerable areas of the UK supplied with soft upland water that was still distributed via the old lead water mains, and people living in those areas got as much lead from the water as they did from petrol. Living in one such area myself at the time and looking around me I could believe it. But that was naturally soft water in municipal lead; the houses were all copper.

---

**1703:**

"The point was to illustrate that "the arithmetic mean of a population" can be a meaningless figure."

Nearly everyone has more than the average number of legs.

---

**1704:**

This gives exactly the same result for your figures. The people working out these ranges are not naive. Blood lead is difficult to measure and is only done by specialist labs. There was a move in the 1990s to local reference ranges but the current trend is for standardise ranges. In the case of lead the targets are internationally specified.

O.24 micromoles/L is equivalent to the US 5 microgrammes per decilitre.

https://en.m.wikipedia.org/wiki/Reference_range

1705:
Yes and no: I clearly remember my colleagues at Farnborough talking about water softeners in the late 1990s. Their plan was to install the softener after the tee-piece for the kitchen cold tap so that it would feed all the household kit (other than the kettle) that creates or uses hot water.

1706:
I suppose it depends on your definition of "fairly recently" :) ... and on rereading it I see I have confused matters by using two incompatible definitions in successive paragraphs. To clear it up a bit: Lead-free plumbing solder is a lot more recent than water softeners.

1707:
*It has fairly recently become forbidden to use lead solder to join pipes carrying drinking water (which is a pain, because the lead-free solder you're supposed to use now is horrible stuff)*

Electronic parts, too.

Last I knew, the threshold below which lead doesn't cause nerve damage hadn't been ascertained. The levels set are more about what can be detected than what is known to be safe.

(The solder is part of the cost-related push to polymer pipes, which aren't necessarily safe for drinking water. It depends on what you think of the water safety tests' permissible levels for things like toluene.)

1708:
"Whereas lead pipes haven't been used for domestic plumbing for a very long time."

Really? I know lots of houses that still have them. Lead pipes were banned only in 1970, after all. Water softening, of various forms, dates from many decades earlier. What I don't know is whether the ban was because they are bad news in some areas, or because of the increasing use of water softeners among the gimmick-loving classes (of London and the Home Counties, natch) in the 1960s.

1709:
Agreed; I was trying to put some sort of timescale on water softeners (but I encountered some of the core technologies whilst still at school, in the mid to late 1970s).

1710:
"Lead pipes were banned in 1970" for new builds and replacement or extension works. I don't think there was any actual requirement to replace a lead pipe that didn't leak.

1711:
That's a very good point, thanks.

To be blunt, we don't know how far the San Andreas will rupture during the Big One. For comparison, the San Andreas ruptured 296 miles during the 1906 San Francisco earthquake (magnitude 7.8), and 25 miles during the 1989 Loma Prieta earthquake (magnitude 6.9) (USGS source). here's a strain map along that part of the San Andreas, for the morbid.

The magnitude 7.8 Shakeout scenario, which starts because (per the second reference), the greatest strain is south of the Salton Sea (in other words, right where I-8 goes; we can definitely count on this road being unusable). Per Google Earth, Castaic Lake and the I-5 are about 196 miles in a straight line from the southern edge of the Salton Sea.

The actual model they used for the ShakeOut earth rupture is in Appendix E, figure 1. The appendix as a whole calculates 2 meters of lateral slip on I-15 (Cajon Pass), about 3 meters of slip on the Palmdale aqueduct (which is a canal aboveground, not a pipe), in multiple places, and 6 meters of lateral slip on I-10 in the Coachella Valley. I-8 was not investigated, and I-5 was presumed to be outside the rupture zone.

So it looks like I'm partially wrong: assuming we get a ShakeOut quake and not something bigger (and note that the magnitude on ShakeOut is the same as the 1906 Earthquake), then I-5 won't be subject to lateral shear. Whether some of those bridges collapse is another question. I've said all along that the coast route north and south would remain open, but apparently Peter didn't see that.

Incidentally, I did read the ShakeOut scenario (but not Appendix E) before I wrote that in my book. For those who haven't read this far, the LA Big One was used as an example of how habitat quality can change very quickly. In that example, Los Angeles is normally very good habitat for humans, given how many thousands of children are born there every year. When the earthquake hits, it becomes very bad habitat for humans in a few minutes, and the bigger point is that habitat quality is not static, and that determining all the parameters that affect habitat quality is difficult. This is the point that set Noel off and caused him to ask me to remove it from the book and stop talking about it in public.

I haven't said anything about Los Angeles being totally abandoned after an earthquake, but I don't think it will be possible to feed 18 million people in the LA Metropolitan area after such a quake for some indefinite period lasting longer than a week, and that means they're going to have to move or
If ShakeOut happens, they'll be able to move north on the 101, south to San Diego and Mexico, and (hopefully, because it's a much bigger road) north along the I-5. All other roads will be severed, and moving material in from the east along the I-10 corridor will be particularly difficult.

1712:

Water softener silliness! I have one. It was already in the house when I moved in but it's definitely worth the cost of salt. In the tea room at my old lab there was a wall boiler for tea and coffee water. It had to be repaired more than once per year when the pipes became blocked. Eventually the plumbers advised us to use a kettle instead. Without the water softener our pipes at home and washing machine would suffer the same fate. Many houses round here have triflow taps in the kitchen - hot and cold softened and filtered unsoftened water. And lead free solder is needed. When the lead pipes in a large fraction of Leeds were replaced the lead levels went up in the water due to the solder (source: a paediatric biochemistry conference in Leeds).

1713:

"I haven't said anything about Los Angeles being totally abandoned after an earthquake, but I don't think it will be possible to feed 18 million people in the LA Metropolitan area after such a quake for some indefinite period lasting longer than a week,"

What evidence do you have for this statement? You have been provided with the logistics and math by Noel that say it is possible it's just a matter of trucks, you have also been provided with a counter example (West Berlin, 2.5 million people, fed for over a year from the air)

what exactly is going to prevent them being fed?

Show some numbers or something other then just asserting over and over

I have no doubt that just like New orleans or the Loma Pita quake some non trivial amount of people will move away because the quality of life is going to suck, but that's a far and away different from "not being able to feed them"

1714:

but I don't think it will be possible to feed 18 million people in the LA Metropolitan area after such a quake for some indefinite period lasting longer than a week

Since someone has referenced it without figures, the W. Berlin airlift fed ~2.5 million people for nine months or so, although admittedly there was an entire war machine of supply chains already in place at the time.
It's possible, if a logistics nightmare.

If you want to get into the nitty-gritty, here's the FEMA / local gov 2010 disaster plan (overview): [PDF](#). You'll want section 2(c) which covers airlift / sea approaches.

1715:

Whether or not said plan would be enacted well is a different topic - but finding the plans is easy and most governments have them in easy to find places.

It's not limited to governments either. e.g. [DREF Operation for flooding in Northern Caucasus of the Russian Federation](#) (PDF) Includes budget, agencies, actions etc.

Despite what most people think, information is freely available. (Well, mostly)

1716:

We're talking the UK here? I grew up in the 80's and 90's with media reports of lead pipes being replaced all over the place.

On the other hand the internet finds this old Independent article which claims, in 1998, that a third of British houses got their water through lead pipes: [http://www.independent.co.uk/news/business/prperty-call-time-on-heavy-metal-poisoning-1144886.html](http://www.independent.co.uk/news/business/prperty-call-time-on-heavy-metal-poisoning-1144886.html)

Only I guarantee that many or most of those have been sorted out by now.

1717:

Er, I'm not sure what you're saying that contradicts or corrects my statement?

1718:

That independent article also quotes a safe level for blood lead five times as high as the current safe level. It's also in the wrong units.

1719:

Well, seems that lots of folk think that LA would have a tough time. (See url below.)

BTW - LA is a major tourist destination and LAX a major stop/change-over. Do any of your figures/calculations include transient populations - tourists, homeless, migrant workers, business travelers, etc.?
Apart from food, water, heat, etc. - availability/access to medical care determines survival. LA has a very high count of total hospital beds most of which will be already occupied. So, in a disaster scenario ... would there be enough beds, enough meds, functioning DI, working chem labs, etc.? A lot of NA economy runs on the JIT philosophy, and overages are typically not configured into the models. If the quake hits between 5:00 pm and 8:00 am (62.5% of the 24hr day, therefore the odds of a quake happening then), most hospital staff will not be available.

https://www.ahd.com/state_statistics.html

1720:
what exactly is going to prevent them being fed?

Distribution, cooking fuel (electric, natural gas...), secure locations for food preparation/consumption, medical constraints on food intake versus available supply[1], sewer service, and utensils are all things that can go completely wrong even when there's a huge pile of food sitting a few miles away.

Then we get to the bad analogy of the Berlin airlift; something for which there was lots of notice, ongoing active planning on the basis of current experience with active operations, and a really keen constituency in the Western militaries determined to prove they could do it. Plus undamaged infrastructure. (Or at least infrastructure that hadn't abruptly been damaged in unknown ways.) A large quake is a surprise; it has to be addressed from a standing start.

1 perfect highway lane is, at best, 2000 trucks/hour. (On the five-tons-each scale of truck; 10,000 tons/hour.) Only that perfect lane is guaranteed not what you have; you have to get the roads cleared and fix any discontinuities before you can start shifting relief supplies, and you have to shift heavy machinery and engineers first to perform further clearing and fixing. (If LA's logistical needs fit down one of the roads, there wouldn't be so many roads.) Then you probably have to shift the fuel for the distribution system, because you are still trying to get an accurate survey of all the gas stations to see what's usable and what's not. And sort out how to use it legally.

If you're suddenly trying to move people out, relief supplies -- which are going to prioritize "fix the grid" and "rescue" materials over food for the first few days -- in, and the region has marginal logistical capability to start with, you've got a truly hideous traffic control problem. You also don't have anything like sufficient control authority to solve the problem. (In the literal sense of people at intersections directing traffic whom you can all talk to on the radio, and who can all send you reports of things like fires and blocked roads and what the aftershock did to the overpass.)

It takes time and a major effort to construct an accurate real-time picture of the transport grid. Shoving trucks down roads isn't going to help until you know where they can go and where they need to go. Similarly, an intact port is full and needs clearing; a port that's not intact needs repairing and then clearing. This imposes lag.

So does finding the relief supplies and getting them shipped. ("I have a trainload of relief food in a depot in Nebraska; where do I send it?" problems. Do I need that trainload more than I need
something else? Where's the something else? What's the estimated travel time for the respective trains, given the current state of the rails? Do I know the current state of the rails?)

This is all really hard to do from a standing start and no practice. (I commend to your attention the sequence of logistical competencies associated with Hitler's War amphibious operations as the war proceeded.)

And the first question someone has to answer is "is it that bad?" The usual policy in California is to hold in place for a few days, address the relatively minor infrastructure damage, and proceed with things as usual. Answering "is it that bad?" takes time, and is difficult.

So the idea that there could be a three day delay in food deliveries seems really quite plausible. And while the usual figure is that it takes three weeks for people to starve to death, people who haven't had anything much to eat for three days aren't especially functional.

[1] MREs suppose you're fit and healthy and can eat anything. If you've got issues with soy or dairy you can't eat them, as a single example.

1721:

"We're talking the UK here?"

Yes, the cases in that article are the same cases that were commented on some years before in relation to lead in petrol. I remember the commentary from that time making the point that the lead pipes in question were the supply mains, not the pipes in the houses themselves.

"When the lead pipes in a large fraction of Leeds were replaced the lead levels went up in the water due to the solder"

How long for? I can see the lead levels spiking after the replacement of old, patinated lead surfaces with bright clean fresh surfaces, at least in principle, although the relative areas concerned make it take a bit of swallowing in the practice. But as the new surfaces became patinated in their turn I would expect to see the levels drop to much lower than they were before.

"I know lots of houses that still have them..."

I am surprised - I don't know any. (At least not for drinking water; wastes and drains, yes.) Similarly your dating of the rise in popularity of water softeners is well in advance of mine.

I guess this may be some kind of regional selection bias... I know only one dwelling in London well enough to know what its plumbing is made of, and that has copper (1920s house). Similarly here in the sticks (hard water area, supplied from boreholes), in the mid-70s the local plumbers' warehouse catalogue (a weighty tome indeed, and on thin paper too) made no mention of water softeners at all.

"Electronic parts, too."

Indeed. But fortunately it is still possible to get proper solder for electronics, and if the supply does look like drying up I shall try and buy enough to last me before it is gone altogether :)
From the header, that article dates from Feb 1998; when was the safe level last revised?

---

[1] MREs suppose you're fit and healthy and can eat anything.
Meals: Rejected by Everyone. ;-)

---

"1 perfect highway lane is, at best, 2000 trucks/hour."

One every 1.8 seconds? That is pretty tight... and it also assumes that you can get a truck every 1.8 seconds off the road and out of the way when they get to the destination, which is a great deal harder (as is conveniently forgotten by rail-into-road enthusiasts). I think it would be prudent to knock the capacity estimates down a fair chunk.

---

10 μg/l 2010 [PDF]

---

Thanks for the link, I am in Paris and my only internet access is through the iPad, can't get through the more than half the thing before it crashes

However, from the excerpt you posted, it appears they sampled the river during a high turbidity event, which makes lead at those levels a possibility, typically however basic water treatment involves settlement tanks which remove the suspended solids.

From the CDC

The amount of soluble lead in surface waters depends upon the pH of the water and the dissolved salt content. Equilibrium calculations show that at pH >5.4, the total solubility of lead is approximately 30 μg/L in hard water and approximately 500 μg/L in soft water. Sulfate ions, if present in soft water, limit the lead concentration in solution through the formation of lead sulfate. Above pH 5.4, the lead carbonates, PbCO3 and Pb2(OH)2CO3, limit the amount of soluble lead. The carbonate concentration is in turn dependent upon the partial pressure of carbon dioxide, pH, and temperature (EPA 1986a).

Which indicates the reported levels in the domestic supply could not have come from the presence of a lead supply line

So, either they were crazy enough to pump river water without any treatment (and the bits I could read indicate treatment was occurring), or there was some error at the lab.
Additionally, the people taking samples at the house don't mention any turbidity issues, which would have clearly been visible. So still not convinced, though the ability for people to act more stupidly than I can imagine continues to exceed its previous values.

1727:
"1 perfect highway lane is, at best, 2000 trucks/hour."

One every 1.8 seconds? That is pretty tight...

Hence the perfect. A condition unlikely to be realized in practice. :)

1.8s = 45m spacing at 90 kph; quite reasonable until you have to get off the road or someone slows down for some reason and the ripple-jam starts.

and it also assumes that you can get a truck every 1.8 seconds off the road and out of the way when they get to the destination, which is a great deal harder (as is conveniently forgotten by rail-into-road enthusiasts). I think it would be prudent to knock the capacity estimates down a fair chunk.

Oh, me too. Especially since the hard part in an earthquake scenario is clearing the roads and assessing capacity. And if you're unlucky it happened when the road were full, and you can't plan on the basis of having been lucky.

1728:
The central problem is trucks from where? On the roads open, you've got chokepoints of 2 lanes of freeway (3-4 if I-5 stays open), unless you're going to close the road to nothing but inbound traffic, in which case you can double it. The major roads east (particularly I-10) and the railroads that run near them are what you'd want to use to haul freight into LA after a disaster, and they're likely to be the worst affected. The east-west alternative is long detours on smaller roads through the desert, up towards Mojave, through the Tehachapis (it's freeway, but pretty windy), to Bakersfield, and then down I-5, or further out along more windy highways to intersect 101 and bring food south that way.

I think CatinaDiamond hit it on the head, and I really appreciate seeing the 2010 FEMA plan. Here are their critical assumptions:
"10,000 – 100,000 landslides will cause roads to be impassable and railroads will bend.
• Because of the impacts to roads and rail, air operations will be used to procure and deliver commodities into the affected area.
• Major airports in the region sustain little structural damage.
• Damaged roads that are impassable for weeks will impede the typical ground damage assessments."

They also expect 130,000 people to have to be evacuated in the first 72 hours, simply due to urban fires, but that "[e]vacuation may be limited due to non-passable roadways and vehicle-borne evacuees with vehicles containing limited gas."
Also, using MARAD (Maritime Administration) ships, they expect to be able to supply about 4,000 meals/day, although it looks like they're hoping to dock these ships and unload, rather than fly helicopters off the decks, and it will take each ship 1-5 days to get underway to LA after the earthquake. I'm unclear about how much food can be brought in by MARAD ships, whether it's 4,000 meals/day per ship or 4,000 total for all available ships. There are 46 of these ships, so assuming they do nothing but cart food, that's 184,000 meals if they can each supply 4,000 meals/day. The number of course will be less than this, because the ships will have to resupply from somewhere. Remember what I said about 18,000,000 people in the basin? That's around 1% of total demand.

It looks like FEMA is hoping that people and NGOs will have the food required for the everyone else. I don't see anything in the FEMA plan to feed everyone in the basin.

For sustained heavy airlift, we've got to hope that LAX is unaffected. That's the critical assumption. I may be wrong to be skeptical about this, but the reason I'm concerned is I've done a bit of environmental work around LAX. Most of the airport is built on old and recent beach sand dunes. The recent sand stretches about 0.5 km from the coast, the old dunes stretched about 3-4 km from the coast. The inland edge of the airport is off the dunes (source, I really don't know how that sand will react when shaken under the runway, but that's why I'm skeptical.

I'm similarly skeptical about the San Pedro ports because I've seen soil cores from areas inland from the port and soil that was pulled from under street pipe maintenance from the port area (it was anoxic gray mud that smelled of sulfur. We left it to air for several hours minimum before we planted anything in it). AFAIK, the port area is an old river floodplain that contained a lot of salt marsh before it was built over. I'm quite sure the people who built on there know what their foundation is, but I'm equally unsure about whether the structures they built will survive. Unlike rock, sediments tend to jiggle a bit like jello when they're shaken, which is why you tend to see skyscrapers built on rock more often than they're built on sediments, especially in earthquake country.

1729:

40mph (normal speed for military convoys) is 60.89 feet per second, so that's one truck every 100 (and a wee bit) feet. A HEMTT will use up 34 (and a very wee bit) feet of that, so it looks doable as long as the off ramps can handle 2 (or preferably 3) lanes of trucks.

1730:

Thanks; that's exactly my point, that the article was possibly correct when written, and has been outdated by revisions to standards.

1731:
... but I don't think it will be possible to feed 18 million people in the LA Metropolitan area after such a quake for some indefinite period lasting longer than a week

Remember that in the ShakeOut scenario, roads and rail lines going south and northwest (e.g., the rail line to San Jose) remain open. The estimated repair times for the broken rail lines which cross the fault zones are 1 or at most 2 weeks. There will obviously be breaks and bridge collapses here and there closer to Los Angeles, but it's apparently not the case that rail service will be completely unavailable for many weeks.

And -- again, in that particular scenario -- most of the airports remain open (or are re-opened within a day or two). There are three international airports (LAX, Ontario, John Wayne), several domestic airports (Burbank, Long Beach), four military airfields, and a small host of smaller "general aviation" airports (some of which already handle cargo -- e.g. San Bernardino Airport, with a 10,000-foot runway).

It's obviously going to be an incredible headache and a mess. But you seem to be working from the assumption that basically nothing will get in or out of the LA area (except fleeing refugees) for weeks, or longer.

I've said all along that the coast route north and south would remain open, but apparently Peter didn't see that.

Well, but you certainly seemed to discount them. Also, you seemed to be saying that "Highway 1" (i.e., the Pacific Coast Highway, a winding two-line highway for much of its extent) was the main northern route, while overlooking US-101 (a regular four-lane highway).

1732:

You gave the impression that you think that lead supply pipes/ lead pipes in houses was still a really big problem in the UK. Turns out the internet isn't so helpful on it, but I'm making the point that work has gone into clearing out lead pipes over the decades, so really the thing would be to find a modern report on the matter, i.e. last 5 years or so. Which I can't seem to find.

1733:

I'm unclear about how much food can be brought in by MARAD ships, whether it's 4,000 meals/day per ship or 4,000 total for all available ships.

I think you need to read that a bit more carefully. The "4,000 meals a day" is how much food can, on average, be prepared on board a single ship, assuming "shore-side supply and replenishment".

It's not about bringing food to the city, it's about preparing food on board to feed anyone being sheltered there. (Note the remark about ships potentially being able to house 2,000 to 6,000 people each, though that would require installing toilet and sewage equipment first...)

(Of course, the ship could still bring in food as cargo, just like any other cargo ship.)
That's all from a section that's basically giving a rundown of what various different federal agencies and department might be able to contribute in whatever way, with some pro-forma comments on capabilities. It's pretty clearly not intended as "yep, this is how we will feed LA".

1734:

I think you're missing the "any of those things, but not all of those things" problem. (Well, and that the scenario chosen has a certain selective optimism about the earthquake.)

The usual first responder pattern is "what's the worst thing? what makes it not the worse thing? now what's the worst thing? iterate until stable"

This doesn't work very well when you're dealing with incomplete information and unknown resources.

So, certainly, any one of the logistics problems is straightforward. The combination is not (I need concrete to fix the runway; I need water to make the concrete; I need power to run the pump to get the water to make the concrete; to get power I need to move an eleven tonne transformer to a substation, where the hell can I get that transformer? We had four spares and we need to replace seven...)

There's actually a fairly funny story of a buried high tension line replacement project in California (due to engineering surprise, not an earthquake). It kept getting worse, took months, and it was totally dependent on having an intact transport infrastructure. Trying to fix something like that isn't going to happen in the short term, and if the logistical system has to be fixed before you can fix the power, you've got a serious difficulty.

Especially considering that the available logistical capacity isn't much more than enough; functioning on half of it, while possible in a "martial law, rationing, nobody starves" sort of sense, will crash the LA basin's economy good and hard. At which point people will leave even if they're not hungry because they're out of work.

1735:

Further to the MARAD ships topic: Here's a press release about MARAD ships being dispatched to help with responses to the 2010 Haiti earthquake. At the end, there's a mention of past use:

During the Haitian crisis in 1994, a total of 15 MARAD ships were activated for operation UPHOLD DEMOCRACY. In 2005, nine Maritime Administration ships supported support relief efforts in the aftermath of Hurricanes Katrina and Rita. The ships provided meals and shelter for workers, emergency response teams and longshoremen, providing about 83,000 berths and 270,000 meals over 6 months.

So: useful for housing and feeding emergency workers, not for supplying food to everyone in the disaster area.
1736:
In 1998, it fell under the Drinking Water Directive 1998 [PDF] and was 25 μgPb/l (page 3)

So, yes, standards have got lower.

1737:
Regarding disaster preparedness:

1) Each branch of the major relief charities will have their own set of plans to fork into local Gov / FEMA / HS plans (e.g. http://preparesocal.org/ for the American Red Cross)

2) People such as the US Engineering Corps have their own plans - 2014 Plan Powerpoint - downloads automatically so this site might nuke it - .mil site location for those concerned about such things. But, 2008 Concept of Operations Plan PDF, non-.mil location shows a more specific overview (section 2.8 puts infrastructure repair @ 2 years+). Note: this is much much longer and more detailed than the previous document I linked to

3) These are all the public versions. Pretty sure host won't want me dumping the sensitive ones here, but they're much more detailed and contain expected casualties / triage / worst case scenarios, up to and including "we save X people, lose Y people here" and "grab these important people and leave these non-essential people". Find those on your own if interested [they're... accessible]

1738:
Just for fun (and for the watchers):

GOLDEN GUARDIAN 2008 AFTER ACTION REPORT PDF - GG is the National Guard emergency plans to enforce Law & Order and continuity of government in cases of emergency. (In non-polite terms, Martial Law etc).

~

Basically, a lot of plans.

Get hit by a 9.0+ they're all useless.

1739:
Thanks for those links too. I'm partial to the "port reconstruction" material in the ACOE powerpoint and how hard they're working on establishing rail links. Good stuff, and good to seeing them thinking about it. I'd note that the ACOE plans to fall back to Barstow and set up their command center there, as they assume that their LA office will be destroyed in the quake.
I'd also note that the Golden Guardian exercise does talk about problems with large numbers of refugees leaving the area immediately after the earthquake, including the refugees clogging I-5 north with cars running out of fuel.

To not waste posting space, thanks also to Peter for clarifying the role of the MARAD ships.

And yes, I combined highway 1 and highway 101. That's my bad, but they do combine and split multiple times throughout California, so I tend to combine them (and to avoid confusing OGH, who IIRC got confused about them in Rule 34). Considering also that the 101/405 interchange is considered one of the worst in the country on normal days, there's a certain grim amusement to it becoming a key chokepoint for getting supplies into LA after the Big One. Ditto I-5 south of downtown LA, which also tends towards perennial gridlock.

---

1740:

@ CatinaDiamond, Thanks for the [http://flintwaterstudy.org](http://flintwaterstudy.org) link, it has tons of info. As I kept scrolling down through the postings I came to the posting titled “Research Update: Corrosivity of Flint Water to Iron Pipes in the City — A Costly Problem”

Comparing Flint River water to Detroit water was rather telling.

“Unfortunately, the Flint River water was added to the pipe system without any phosphate inhibitor. In our tests, this condition was 8.6X worse than Detroit water (Figure 2). Assuming this rate applies to the actual city pipe system, the last 16 months on Flint River water would have aged the pipes about 138 months (138 = 8.6 X 16 months) or 11.5 years more than using Detroit water. This could easily be costing citizens of Flint millions and millions of dollars in future pipe repair costs (see later discussion).”

And the photo image (Figure 3) of the corrosion causing bacteria test samples ((BART) kits) of the Flint River water is very disquieting.

“We cannot say for sure that these bacteria were not in the Flint system at high levels if the Detroit water was still being used. But we strongly think that there would have been a lot fewer of them. In general, it is believed that the more MIC bacteria you have, the more problems you will have with excessive iron pipe corrosion. So the earlier estimates of corrosion rate, as bad as they are, might even be worse in the real Flint system when the bacteria are present.”


---

1741:

Ok lets do some math

Lets say absolutely worst case. No usable roads. No airports. No way to ship stuff in from the sea. Everyone impacted, so you need to to supply all 18 million people. Note these assumptions are ludicrous
During the Haiti earthquake, a single C130 delivered 9,600 bottles of water and 42,000 MRE packets per flight.


an MRE contains 1400 calories which is enough for a person to live on for a day, especially if you aren't doing anything strenuous.

The US has 354 C130's, 71 C5's, and 223 C17's Canada has another 20 or so C130's. Each C17 is bigger, has the payload of 4 C130's, while the C5's have the payload of 8

That means the airforce can airdrop around 80million MRE's and 17 million bottles of water if each of those planes was available and performed one flight / day.

Now they aren't all available, scattered across the globe but the ones that are available are not limited to one flight / day

This also doesn't take into account using civilian aircraft or military aircraft that aren't normally considered air transport but still can airdrop things

1742:

That's an awful lot of parachutes. I'd want to check the parachute inventory before declaring such an idea feasible.

And you've still got a distribution problem on the ground.

1743:

Sure lots of issues. The U.S. Isn't sitting on 50 million mre,s for one thing

The point is the airlift capacity is massive

1744:

Before you get too apocalyptic about the big one in Los Angeles, remember it's a big place. The closest the city center is to the San Andreas fault is 50 miles and the port is 80 miles away.

The freeway system has been quake retrofitted, and the major freeways that cross the fault line do so unbuilt up areas without major bridges nearby.

From watching Caltrans deal with disasters over the last 20 years, I would say, once the damage has be assessed and a plan implemented, it would take them the following amount of time to get traffic flowing again.

Bypass collapsed freeway bridge: 6 hours
Cut divider to bypass damaged half of freeway: 12 hours
Demolish collapsed overbridge and patch roadbed: 24 hours.

Remove slips to clear at least some lanes, tear up ruptured roadbed, fill hole and apply temporary patch: 96 hours.

Caltrans is rather adept a rejigging our freeways with minimum disruption because if there is one thing Los Angelenos dislike more than earthquakes, it's having their morning commute disrupted.

---

1745:

About the original topic of Shibboleths:

Not the bloody stupid time periods!

Society staying fairly static for more than 8 generations is very unusual. 16 generations is ridiculously long.

So it's stupid to talk about Dynasties that last 10,000 years. Cultures 100,000 years old. And really problematic to talk about engineering projects that span millennia (I'm looking at you, terraformers).

Societies change rapidly and often. Even the supposed examples of "static" empires like China weren't static.

As for Dingle von Thingie, CXIVth of that name, descended in direct line... nope. Look at the chart of Kings and Queens of England, and England was peaceful compared to places without a big moat between them and the continent. Even (to step out of SF) Dorothy Sawyer's Peter Wimsey, whose family have "held their title since the Normal Conquest": that's vanishingly rare.

---

1746:

Fair enough (sort of) if the long time period is the entire point of the story.

Orson Scott Card's "Worthing Saga", for example, seemed to me to be a long attempt to refute the "Argument From Evil" in that societies without flaws, without evil, without pain, become static and unchanging and only by adding death and chaos can they become something better. I didn't buy the argument. And I disliked the book: the sheer masochism of a character looking back fondly to how they were terrorized and tortured because it helped them learn was too much to me. But I got the point.

But you can't just *assume* that society will remain static for thousands of years merely because your terraforming project needs it. Generation ship societal break-down over a mere few centuries is an interesting story because it's *likely*.

---

1747:
The New Madrid fault might have more interesting things in store than the San Andreas fault, potentially affecting in some way most of the Missouri - Mississippi river basin. Wouldn't want to leave that off of a list of potential calamities.

1748:
If there is a New Madrid fault. :)

(there's a hypothesis, because no one can find such a fault in the earth, that the New Madrid earthquake, which certainly did happen, was a consequence of the vast, nigh-molten leading edge of the Farallon Plate hitching forward in its long dive into the mantle.)

1749:
Yes, agreed. That's what I meant, but it seems that I wasn't clear. The houses I know with lead pipes in are all older ones, many of which have not been replumbed since well before that - after all, if it ain't broke, why fix it? And there are a LOT in the UK.

1750:
You are still thinking about the technical aspects of the logistics, not the social/political ones. Multiple organisations invariably means squabbling for precedence and a lot of wasted effort and missed opportunities, and very often goes as far as internecine feuding. The Argentine version saved the UK's bacon during the Falklands' war, for example. It needs only one bigot in a key position to decide that certain groups aren't worth saving, or to refuse to enable another to work, to cause chaos. To see how bad it can get, look at the Syrian debacle, though I doubt that even President Trump handing over day-to-day control to Vice-President Palin would achieve quite that level of chaos.

1751:
Some science (don't groan):

Potential New Particle Shows Up at the LHC, Thrilling and Confounding Physicists Scientific American 15th Dec 2015

Something cool (and... well, we'll see if I'm being random or not):

Sonoluminescence Gutenberg Overview

Sonoluminescence as Quantum Vacuum Radiation PDF - 1995 Claudia Eberlein (currently at Sussex Uni)
PHASE TRANSITION APPROACH TO SONOLUMINESCENCE  PDF Woon Siong Gan 12-16 July 2015 22nd International Congress on Sound and Vibration (http://icsv22.org/index.php?va=viewpage&vaid=175). Note: this paper ends with "The power of phase transition can be used to explain sonoluminescence, turbulence and the ultimate model of the universe which I call the ‘three in one’ theory which has the smack of quackery about it. However, the company looks existent, and from the ultrasound medical imaging area.

Here, we show that the strongly confined noble gas atoms inside the bubble can be heated very rapidly by a weak but highly inhomogeneous electric field as might occur naturally during rapid bubble deformations. An indirect proof of the proposed quantum optical heating mechanism would be the detection of the non-thermal emission of photons in the optical regime prior to the light flash. Our model implies that it is possible to increase the temperature inside the bubble with the help of appropriately detuned laser fields.

Sonoluminescence and quantum optical heating Andreas Kurcz, Antonio Capolupo and Almut Beige, Leeds.

(Almut Beige has also done work on fibre optic systems: Coherent cavity networks with complete connectivity PDF, July 2014 which has commercial / industrial applications)

Phase Transition to an Opaque Plasma in a Sonoluminescing Bubble 2011 Brian Kappus1,*, Shahzad Khalid1, Avik Chakravarty1, and Seth Putterman1, University of California

~

Interesting stuff. Expect woo and babble if not tapped on the nose.

---

1752:

I was clear on what you meant, and trying to re-enforce the point. There are other comments in the #1700 to #1750 range that indicate that some people believe the rate of replacement has been such that lead pipe is effectively obsolete and obsolescent in the UK, which neither of us do.

---

1753:

And maybe you're right, but it seems unnecessarily difficult to find any actual numbers on the topic.

---

1754:

It's interesting, but I'm not sure what it all means.

---

1755:

Random scatter:
For the fun, and for biology (nature got there first!):

**True facts about the Mantis Shrimp** [Youtube: comedy: 4:00]

For the divers:

**Sonoluminescence Welding and Cutting** PDF - theoretical proposal

For the weapon buffs:

**AN ACOUSTIC COUNTERMEASURE TO SUPERCavitating TORPEDoes** PDF - note: direct download, huge (200+ pages), full PHD. Peter J. K. Cameron Georgia Institute of Technology May 2009. P48 has an interesting snippet btw.

---

1756:

Ok, I know these base presumptions to be wrong, but I don't know how wrong.

Until 1970 all houses in the UK had some lead piping when built. No replacement pipework undertaken before that date used copper to replace lead.

This means that, using an assumption that the rate of pipe replacement in the UK is a constant, 2% of per annum of the 1970 housing stock has to have suffered demolition or failures necessitating full replacement of domestic water pipe in order to achieve the complete removal of domestic lead piping by 2020.

---

1757:

I would agree that the papers you linked in #1751 seem to imply that #1753 point 3 is at least possible, certainly in that sonoluminescence would offer a means of detecting super-cavitating torpedoes (and indeed screws generally).

---

1758:

You do this in the following way:

First, you find the white paper governing it - the most recent is: **Information for Water and Sewerage Undertakers and Regulators on Statutory Environmental and Drinking Water Provisions Applicable to the Water Sector in England** PDF 2012 2.5.2 (for the previous one, it's the 1998 version).

The department in question: Drinking Water Inspectorate [http://www.dwi.gov.uk/](http://www.dwi.gov.uk/) (who've I've already pulled files from). You'll note they didn't exist before 1990, meaning either the historical data is elsewhere or non-existent.

You then note which act it falls under - which is WIA 1991. You then smack that into your local water service and also find gold nuggets, such as:
My local water company has declined a request to inform residents when lead pipe work is discovered when meters are installed or to test water at this time, to avoid alarm. This is the prioritisation of maintaining public confidence over encouraging caution.

Parliamentary Environment, Food and Rural Affairs Session 2010-12

But you ignore that, and find this:

**DWI PR14**

Guidance – Lead in Drinking Water [PDF] Appendix 1 which shows the entire country's figures by region for the 2008 - 2012 period.

After that, it's up to you to note the ones with problematic levels and start hitting the local councils / water companies.

~

There you go.

1759:

The upshot being, if the tests are being done to legal standards and not fixed (a la Flint), most companies supplying water have less than 2% of houses with over 10 ug/l, meaning it's kinda a solved issue at this point.

Finding the historical data...

Now that will probably require hand digging (aka not online).

1760:

That's also useful (if anglocentric; at least 3 of the people concerned in the UK lead levels subthread are resident in Scotland).

It does confirm a falling, but still non-zero, trend in lead levels as a proportion of sample taken and tested.

1761:

"This is the prioritisation of maintaining public confidence over encouraging caution."

Over the decades, I have been refused access to data (including water analyses) several times. I think that the description "unnecessarily difficult" is quite accurate when applied to the procedure
you describe! And, in the UK, water companies have always been among the better service organisations for openness!

1762:
If you poke about the front page of the DWI, you'll see that you cannot search for files or even get lists of their data, and you're told you need to submit information requests to them via email. Doesn't mean it's not on their system. People are bad at not having indexes open ;)

1763:
And, if you want to compare policy and practice in other countries, here's one from Canada. The Walkerton e.coli outbreak sickened thousands. Five people died. Stupidity, incompetence, idiot brothers attempting cover-up, etc. On the plus side ... some years later, another idiot water worker who tried to hide/misrepresent water data was promptly sent to jail. A clear message: do not screw around with our water.

BTW, with e.coli, 'sickened' can mean sick for the rest of your life.

https://en.wikipedia.org/wiki/Walkerton_E._coli_outbreak
http://www.lfpress.com/2013/01/08/jailed-water-worker-first-since-walkerton
http://www.sourcewater.ca/index/document.cfm?Sec=2&Sub1=2&sub2=0
http://www.about-ecoli.com/ecoli_hemolytic_uremic_syndrome/#.Vna8wFInpSE

1764:
Yes, the joys of privatizing public services.

Been a steady process under the various neocon governments we've had. As an article of faith, The Market will solve all problems, so government inspections can be privatized to lower costs and improve efficiency.

In the case of Walkerton, the local utilities commission was left scrambling when the private company that took over government testing decided it wasn't profitable enough and stopped testing water. The American company they found as a temporary measure reported back results but didn't notify any other authority (only their client). So when an unqualified local official decided that the results weren't important, there was no way to check. (And when people were getting sick, he then covered his ass rather than identify the problem — a very human reaction.)
The XL Meats recall is even scarier, as that one went international. The root cause? Effectively unregulated corporate greed, IMO.

Rick Mercer sums it up best, if you can spare 90 seconds: https://www.youtube.com/watch?v=kY09m-WJi2Q


http://www.thestar.com/opinion/editorialopinion/2012/10/08/alberta_meat_packing_plant_has_troubled_history.html

Dragging back on-topic, heroic entrepeneurs making money by solving problems in spite of meddling government is a shibboleth running through a vast swathe of American science fiction — despite ample evidence that unregulated private business isn't a utopia.

1765:

Heavier rainfalls also contribute to more waterborne infections and illnesses. Especially problematic for older water filtration systems that were designed for lower populations (demand) and lower/fewer incidences of overflow. Heavier rainfall means that the entire water treatment and purification system/network needs to be expanded, specifically so that the excess water from the rainfall does not just spill over into drinking water.


Excerpt:

'However, during periods of heavy and persistent rainfall, large water volumes are carried along with wastewater to an extent that the sewage purification plants (SPP) can no longer cope with. In this case, the SPPs have to “open the sluices”: the wastewater is discharged untreated – although considerably diluted – into the waters. To solve this problem, retention tanks have previously been built which have stored the accruing water volumes until a controlled discharge into the sewage plants can be effected. However, such retention tanks are very costly and also difficult to realise - particularly in residential areas - given the large land requirement. During the years leading up to the project, the weather conditions became more extreme with heavy rainfalls even in temperate zones. A buffer system is therefore needed as set out under the EU-Directive 91/271/EEC.'

In October 2015, Montreal poured tons of raw sewage into the St. Lawrence river. Why? - they're rebuilding some infrastructure, and the raw sewage dump seemed the safest, fastest and lowest cost option.
1766:
You're right on both counts, and that is (I strongly suspect) why everyone in planning for the disaster is planning for massive airlift as the linchpin.

And I've already listed my concern about LAX. Burbank and John Wayne *should* be less affected (unless there's yet another unknown fault near one of these), but I don't know about Long Beach or Santa Monica (which are smaller in any case).

1767:
Actually, I don't know if this is a shibboleth or a central conceit of science fiction, but it seems fairly normal for writers to work out how a belief system would work, using the medium of science fiction.

This is actually a worldwide phenomenon. The soviets had a science fiction tradition that played with what the universe would look like with communism triumphant. Orion's Arm created a transhuman universe. Ayn Rand did it for her philosophy, Heinlein kinda sorta did it for his, at least in the area of sexual relationships (as did other authors). James Schmitz did it with authoritarian psionics. The Christian right has been working out the End Times. And so forth.

I think that politics becomes a shibboleth when the belief system is discarded. Not many people are writing communist SF or using psionics these days.

But yes, I do agree that privatizing everything is getting to be a worn-out trope, at least in the more liberal parts of the world. It doesn't seem to work any better than nationalizing everything. Sucks that reality refuses to be simple, doesn't it?

1768:
I think this is where the benevolent omniscient, omnipotent AI/alien/god trope usually enters.

Charlie - time for a Part 2 for this topic thread?

1769:
You mean you don't want to go to 2,000 comments? :D

1770:
"The soviets had a science fiction tradition that played with what the universe would look like with communism triumphant."

Do you know of any decently readable titles that exist in English translation?

1771:
"And I've already listed my concern about LAX. Burbank and John Wayne *should* be less affected"

I was assuming airdrops not airlifts, which means the planes don't actually land they just boot the stuff out the back

However most of those military transport planes are designed for short take off and landing, so they don't need real airports and can land on a stretch of highway if needed.

@Elderly Cynic yeah a lot depends on competence levels of the government response. Agree that's a big cause for worry but not willing to write the whole show off on it either

1772:
Kick them out the back at low enough level and I'm not sure that MREs even need parachutes.

1773:

I think that politics becomes a shibboleth when the belief system is discarded.

I'm using "shibboleth" in the sense of a custom/statement used to distinguish in-group from out-group. Before I stopped subscribing to it, I could tell who the heroes and villains were in an Analog story just by looking at their employer: public employees were evil, private employees and businessmen were good. Very reflective of Reagan's America (and much of American politics since then, as seen by a non-American), even though all the evidence we have points to this being false.

The older I get, the more I think Jane Jacobs was onto something in Systems of Survival. I would love to find some neurological research supporting her thesis, but don't know enough neuropsych to dig it out on my own. (And my 'to read' list is already too long, as well, so my motivation is fairly low.)

1774:
I haven't read any of the titles. What I know is what I saw in IO9/gizmodo:


and

1775:

Cool, thanks Catinadiamond.

That was indeed unnecessarily difficult to access, and although I don't think it was being hidden deliberately, indicates how hard it can be to find information and hold public bodies to account.

And the PDF indicates just how much thought goes into looking at all this. I am though concerned with the drop in samples taken in 2008, from 23k to 13k. And the question always arises, can we trust the companies own lab results?

1776:

Just looked up Jane Jacobs on Wikipedia -n had only heard of her re: urban planning. Based on her definitions, modern day NA CEOs are mostly Guardians, and scientists/researchers skew toward Commerce.


Moral Precepts - 2 'Syndromes' Guardian & Commerce

Guardian Syndrome
Shun trading
Exert prowess
Be obedient and disciplined
Adhere to tradition
Respect hierarchy
Be loyal
Take vengeance
Deceive for the sake of the task
Make rich use of leisure
Be ostentatious
Dispense largesse
Be exclusive
Show fortitude
Be fatalistic
Treasure honor

Commerce Syndrome:
Shun force
Compete
Be efficient
Be open to inventiveness and novelty
Use initiative and enterprise
Come to voluntary agreements
Respect contracts
Dissent for the sake of the task
Be industrious
Be thrifty
Invest for productive purposes
Collaborate easily with strangers and aliens
Promote comfort and convenience
Be optimistic
Be honest

1777:
Yep, let's try for a new record ... :)

Suggestion: As a non-scientist who enjoys SF and reads the occasional popular science book, I'd like OGH to tackle a related topic, science shibboleths. Basically a look at what's worrying, confusing and/or wrong with science. Anyone game for this?

Physics - Hire an ad agency for xxx's sake! Your naming convention sucks. Leonardo da Quirm would do a better job. (You may keep QUARK, WIMP and MACHO.)

Physics - Hire a copy editor for xxx's sake! 'Energy' is a perfectly adequate word, covers lots of scenarios and has near-universal awareness thanks to Einstein. There's no need to litter your papers with joules, calories, ergs, dynes, watts, horsepower, foot-pounds, etc. This simple change would also clear up the nonsense of needing a different equation for each term. Your current practice is not 'clever', it's disorganized.

1778:

There's no need to litter your papers with joules, calories, ergs, dynes, watts, horsepower, foot-pounds, etc.

Joules and watts measure different quantities. Everything else isn't used in physics anymore, except possibly in a certain Exceptional Country…

Engineering, now, tends to stick with the older units, much as commerce has. (A generation after we went metric, grocery stores still display prices for meat and produce in lbs as well as kg.)

1779:

http://www.wastedtalent.ca/comic/technically-speaking

1780:
Oh lord, science shibboleths?

Let's start with grad students. Starting in the 1970s, with the big buildup of college being Necessary, there weren't enough professors to teach classes and labs. So there was a demand for grad students to teach those labs. And it worked.

Then the problem was that there were too many PhDs around for the job market. Ooh, that means that postdocs became increasingly cheap, and playing politics to get a job became increasingly important.

Not good enough? Well, increasingly, courses are taught by adjunct professors, basically people working for community college wages (e.g. twice the poverty level). Professors have turned into grant-seeking managers, and they hate it to the extent that they no longer do science, they manage teams of disposable RAs and postdocs, while adjuncts do their teaching load.

Simultaneously, there's been a huge build-up of administrative types piggybacking on all this grant money, to make sure more grant money flows into the university, and often to fund the humanities, where the job prospects are even more dehumanizing.

What did I miss?

Oh yeah, my favorite shibboleth, the collapse of civilization. Ask a scientist someday what they'd do to make sure the important knowledge in their field was preserved for a few hundred years in the event of civilization collapsing, so that there could be a renaissance later on. Chances are, they'll look blank, then annoyed. After all, science is supposed to be about eternal progress, scientists are just supposed to be little termites working to build the great, well ventilated mound of human knowledge, and we're all supposed to expect our great finds to become obsolete in a few years, especially if they're important. Who wants any of that to survive?

The problem is that science increasingly becomes about producing this great mound of human knowledge. It's more about the accumulation, not about the transmission. Personally, I think it would suck if no one after us could see the fossils we've found, the Hubble pictures, the human genome, how to build a computer (even the logic of a Turing Machine), and so forth, not ignoring practical things like plumbing, surgery, and evolution. Unfortunately, science is so caught up in the metastatic rat race that there's no thought to creating resistant propagules of its knowledge, stuff that might last. In this regard, science is wa-a-ay behind Christianity, where they're really good at translating the Bible and forcing it into orifices, whether the recipient is willing or not.

Thanks for the soapbox. Who else?

1781:

Called "The Culture", perhaps?
Oh dear.

1782:
That's funny, have you seen this article in Nature that talks about science related myths that will not die:

http://www.nature.com/news/the-science-myths-that-will-not-die-1.19022

Frankly I'm not sure many are exactly science ones, because science has moved on, it's more that people don't catch up with the newer scientific position. We see this also in the study of history, with people still claiming that knights wore really really heavy armour and swords were also really heavy.

1783:

Thank you. It is somewhat amusing how similar one of the artworks is to Chris Foss's cover for "Second Stage Lensmen".

1784:

In the same way that the cretinists' "arguments" against evil-ution are ones based on mistaken science or science that has been proven wrong & in all cases is at least 40 if not 60 years out of date .....  

1785:

Many (most?) municipal sewer systems started out with a combined sanitary (toilets etc.) and storm (rainfall) pipe system. A big storm would cause overflows. In the US, it's been mandated for some time that the two systems must be separated in order to prevent those overflow events. I'm not sure of the timeline, but cities have been struggling for some time to meet the requirement.

Which means that my Aliens story where they escape into a storm culvert and then launch themselves up your ass while you are on the porcelain throne just wouldn't stand up to the science test. Pity.

1786:

Oh, I don't think so. Unless they reinstalled the entirety of one or the other system completely from scratch, there are bound to be dozens of locations where former connections between pipes and tunnels have been blocked off. And the blockage may be relatively easily subverted. It may be a thin wall, or a removable plug, or have an inspection hole in it, or an opening sluice gate, or a wall that does not come all the way to the roof - it depends on all sorts of things. Come to that, there will probably be several minor interconnections that they missed altogether because they'd got lost off the plans somewhere down the line. And the aliens are already there, waiting to spring.
Here's the grand-daddy of the mid period:

**Andromeda: A space-age tale** Ivan Yefremov - PDF, full book, legal (the joys of works actually entering the public domain...)

Things to note:

1) It's very old school. Rocket ships, tubes to communicate, "using contemporary words to cover concepts modern readers use totally different analogies to cover".

2) Geoengineering (it being Soviet) is not just a good, it's a given. It's not ecologically responsible in any way not totally horrifying. Ecospheres / ecologies are there to be bound by Rationality, Science and total disregard for the impact of say burning big holes in things.

3) The science sticks out - at one point there's a star made out of iron (!) that slows their space travel down, although you could possibly treat that as having the gravitational distortion of a neutron star nearby. Kinda. Also slightly odd versions of radiation pollution (although, given the future of Chernobyl, pretty on the nose). However, it does strive to be Hard SF, with hand-waves over the real issues of Time / Space.

4) Has women as equals (sorta; certainly mixed crews and in positions of 'power') and even same gender kissing (although, perhaps Platonic) and strong themes of Comradeship to Humanity over the vastness of Space.

It's not great to our senses. Think to Puppies demanding a return to ripping yarns, but everyone is perfect Soviet.

A taster:

These eternal riddles and unanswered questions would have been turned into nothing if another revolution, the greatest in science, could be achieved-if time could be conquered, if we could learn to overcome any distance in any span of time and enter the endless expanses of the Cosmos as its master. Then our Galaxy and other stellar islands would be no farther away from us than the tiny islands of the Mediterranean, against which the sea was splashing down below in the darkness of night. This was justification for the desperate experiment planned by Renn Bose and being put into effect by him, by Mven Mass, Director of the Outer Stations. If only they could have a better scientific basis to their experiment and obtain the sanction of the Council....

or (for Hetero given the grasshopper / locust analogy) and a bit of a *nose wiggle*:

Gone for all time are the back-to-nature dreams of the uncultured, dreams of the freedom of primitive society and primitive relations. Humanity, a union of gigantic masses of people, was faced with the final choice - either submit to social discipline, lengthy teaching and training, or
perish; there was no other way to live on our planet, generous as her nature is. The puny philosophers who dreamed of nature did not understand her or love her as she should be loved - if they had they would have known her merciless cruelty.

"The man of the new society was inevitably faced with the necessity of disciplining his desires, will and thoughts. The struggle against the personal, against the 'I' that is man's most dangerous enemy, is essential for the good of society and for the maximum expansion of his own intellect. This method of training mind and will is today obligatory for every one of us as is the training of the body. The study of the laws of nature and of society with its economics has replaced desire by definite knowledge. When we say 'I want to' we mean 'I know that it can be done.'

"There is one other enemy amongst you, an enemy against whom we fight from the time the child makes its first steps on earth; that is, a crudeness of perception that sometimes seems to be primitive naturalness. Crudeness means that the key to measure and understanding has been lost and, consequently the key to love, since a measure of understanding is a degree of love. Thousands of years ago the Hellenes said, metron ariston, the mean is the most lofty. Today we still say that the basis of culture is an understanding of moderation in all things.

"As the cultural level improved the striving for the crude pleasures of property grew weaker and there was less craving for a quantitative increase in the amount of property owned, which once acquired, soon began to pall and leave the owner still unsatisfied.

"We have taught you the greater pleasure of austerity, the pleasure of helping one another, the genuine joy of work that sets the heart on fire. We have helped you liberate yourselves from the power of petty strivings and petty things and carry your joys and disappointments to a higher sphere, the sphere of creative activity.

And yes, that was a snark at current Austerity measures.

1788:

If you've made it through Andromeda, here's the much less Utopian and overtly satirical, Roadside Picnic by Arkady and Boris Strugatsky. PDF, full, legal.

It inspired Stalker and is actually a classic.

Later period (1977) try Half a Life and Other Stories by Kir Bulychev (although this looks to still be under copyright in the USA, so a Goodreads link there) for something with humour and heart. Последняя война (The Last War, 1970) is his dystopian take on nuclear war. Not currently in print (or, annoyingly, out in the wild in translation).
1789:

Which means that my Aliens story where they escape into a storm culvert and then launch themselves up your ass while you are on the porcelain throne just wouldn't stand up to the science test. Pity.

You could set your story in Belgium. I once went on a walk under the Senne, courtesy of the Sewer Museum in Brussel, where I had the difference between the unitary and separated sewer systems (*) explained to me. From that, I'm fairly sure that Belgium still has a lot of the former. This page by an infrastructure company called Aquafin would seem to agree, if you run it through Google Translate.

(*) There are some diagrams of the difference in this Dutch Wikipedia page. "Woning/bedrijf"="House/business"; "afval" (red)="waste"; "regen" (blue)="rain"; "zuivering"="purification"; "gemengd"="mixed"; "gescheiden"="separated".

1790:

Oops, omitted a few words. I meant "under the streets along the Senne".

1791:

And I've already listed my concern about LAX. Burbank and John Wayne *should* be less affected

John Wayne may not be of much help. Especially relative to LAX. A friend who's a pilot said of about 100 landings he's done there maybe 3 were "OK". Between the terrain, short runways, and noise abatement you have to come in steep and fast. So you forget noise abatement but still the other issues apply. Plus there just not much room there once you land.

Airplanes and airports are interesting discussion points. For NO and Katrina there were a lot of people who kept wondering why there were not more helicopters doing rescue and relief work. The biggest reason was that helicopters require a lot of logistics per flight hour. They had to be based an hour or two away due to the need for crews to service them after each flight. Plus fuel stores, parts, etc...

Most (all?) larger jet airports have a dedicated fuel line to storage tanks and then to the plane fueling systems. You can't fly many jets in unless you can fuel them for take off so they can leave after dropping their load.

In the Haiti earthquake the airport there was limited to about 70+ flights in per day due to such issues. At one point they had over 1000 flight requests per day.

1792:

Oh, God, Nature at its worst, yet again :-)
It is saying that all of those beliefs are myths that should be dispelled, which is as much a myth as those beliefs themselves. Several of them are (very) partial truths that have been turned into Articles Of Faith by their more fanatical followers. But, equally, the beliefs that they are entirely untrue are (very) partial truths that have been turned into Articles Of Faith by their more fanatical followers.

Take Myth 4: Individuals learn best when taught in their preferred learning style. It then says "There are two truths at the core of this myth: many people have a preference for how they receive information, and evidence suggests that teachers achieve the best educational outcomes when they present information in multiple sensory modes. Couple that with people's desire to learn and be considered unique, and conditions are ripe for myth-making."

Well, those truths are (generally, but not entirely) truths, but there are some people who find it EXTREMELY hard to learn in certain modes but fairly easy to learn the same information in other modes. Multiplication (think of the tables) is the classic, where there is masses of evidence that some people learn best by rote learning and others by learning the underlying mathematics.

1793:

John Wayne (SNA) is given as having primary of 5700 feet on 2L/20R. A C-130 needs 3600 feet for takeoff without RATO at max weight of 70_000kg or so. Since we're flying stuff in and (this being "a declared emergency") we can ignore the normal curfew, as long as the primary is usable...

1794:

Take Myth 4: Individuals learn best when taught in their preferred learning style.

The 'learning modes' in the myth, at least in North America, are auditory, kinaesthetic, and visual. And the myth is that the material must be presented to each child in their preferred style (and that if it isn't, it's the teacher's fault they didn't learn).

There is abundant evidence that doing this has absolutely no significant effect on how much a child learns, once you control for other factors (such as repetition). There is evidence that certain topics have a most effective learning style. Sports, for example, are mostly kinaesthetic, music is both kinaesthetic and auditory, etc.

There's also lots of evidence that repetitive drill-and-kill problems don't do much for learning. but that doesn't mean that homework is useless — it just means that the homework needs to be of a different type. (And drill can be essential in certain cases — learning scales, for example.)

http://newsletter.oapt.ca/PER/PER_Homework/

Obligatory xkcd:
https://xkcd.com/895/

And anyone who's taught will recognize this situation:
https://www.youtube.com/watch?v=7aMcXBSLOLY
"The 'learning modes' in the myth, at least in North America, are auditory, kinaesthetic, and visual. And the myth is that the material must be presented to each child in their preferred style (and that if it isn't, it's the teacher's fault they didn't learn)."

You mean that North America completely missed the principles versus rote versus use religious wars? That's certainly not what I read! Nature is a British rag, and I am pretty sure that the myth they are referring to includes the belief that those aspects are child-dependent, though the article is so vague that I agree it is hard to tell. If I were refereeing it, I would have rejected it, even as a layman's summary, on those grounds alone!

But let's just stick to auditory versus visual - it is definitely the case that some people do better with one, and some the other, on the same topic. In particular, anyone whose hearing or vision is much better than the other is likely to do better with the better one, because they can spend less of their mental effort decoding the communication. And that difference need not reach the level of being an official disability or even be identified as a minor handicap. People differ. Live with it. As you say, the best approach is to use both.

Yep. Especially echoing the fact that just because you learn one thing well in a particular style does not mean that you learn everything well in that particular style.

So as a teacher, doing a diverse lesson plan with a variety of techniques optimises the chance that at least one of them will work for each child. And the repetition reinforces it for the others. That's why they tend to do a theory and a practical exercise on the same topic.

But focussing on specific techniques for each child is a recipe that is only possible in classes with very good teacher:child ratios, like remedial classes or small private schools. In a public(or state) school system, you'd never have the spare resources.

That's precisely it.

My guess is that, if you want to relieve the greater LA area through airlift, you'd want to use C5s, launch them out of the Bay Area (presumably Travis AFB, where they're based, along with SFO, Oakland, and San Jose), fly the hour south, land them at Burbank, Long Beach, LAX, or John Wayne (apparently you can land a C5 at all of them, although I didn't check to see if there's a maximum weight limit on each runway), take off, go home, reload, refuel, and repeat.
In fact, you'd probably want to do that, because then you'd be less hampered by all the roads closed between the airports, and you want to minimize food and supplies piling up at the airport and people running out everywhere else.

So that's one way to ameliorate the logistical nightmare. Still, keeping 18 million supplied entirely by air is an expensive undertaking. It would probably work for food in the short run and water in the shorter run. Still, they need to get the roads and railroads working at full capacity.

1799:

We also have partisans now of the "give the children internet access and they can learn anything" school of thought (e.g. http://www.wired.com/2013/10/free-thinkers/)

It looks great, but I keep thinking about the job resume: "I got a BA in climatology from Berkeley" vs. "I had part of one class in climatology at Berkeley, and learned the rest from books and the internet" (that would be me). Who would you hire?

Part of the problem with being self-taught is that you have to demonstrate what you know. When you have a degree and coursework, people can more readily make assumptions about what you know. In the former case, they have to test you. In the latter case, they have to read your resume, and if they have the time, resources, and need, they can test you. Still, the latter method is cheaper. There is something to be said for standardizing education. All the labels and grades signal everybody else about your skill set.

1800:

The constant complaint though about youngsters that I hear from people who deal with them is that the internet lets them know lots of facts very quickly, but doesn't tell you how to think about them, or else tells you lots of ways to think about them but not any useful way of telling them apart. Memorising an encyclopaedia is not a way to wisdom.

The degree from Berkeley gives people the impression that at least you've studied, talked about and interacted with a good part of climatological knowledge, and been forced to think about it. Being able to say you've read lots of books tells them nothing, unless they make you demonstrate what you know and the associated abilities to think about it.

Hence, as for the last century or more, a degree is a time and effort saving marker of at least some basic level of competence.

1801:

The constant complaint though about youngsters that I hear from people who deal with them is that the internet lets them know lots of facts very quickly, but doesn't tell you how to think about them, or else tells you lots of ways to think about them but not any useful way of telling them apart. Memorising an encyclopaedia is not a way to wisdom.
Not even memorizing. Look up, copy, forget.

1802:

Heteromeles ... everything you've said about the academic rat race is pretty consistent with the tales I've heard over the past five or so years from freshly minted PhDs and weary postdocs. The cost of an undergrad degree in the US is insane: average tuition $20k/year, mostly BAs (no labs/costly equipment). Can't find detailed P&Ls, so no way to gauge school financial management.

Decided to look at Harvard as the standard ... and found

Harvard endowment ($36 billion): financial statement shows a slightly better than average (vs. DJ average) performance for 2014-2015. Expected better from Harvard MBAs esp. since their site proudly proclaims: Harvard is a corporation. (Founded in 1636) So, let's see who sets policy/makes the big decisions.

Excerpt:

'The oldest corporation in the Western Hemisphere is the Harvard Corporation, known formally as the President and Fellows of Harvard College. It is the smaller of Harvard’s two governing boards; the other is the Board of Overseers. Following are the members of the Harvard Corporation.'

http://www.harvard.edu/about-harvard/harvards-leadership/president-and-fellows-harvard-corporation

[Note: (F) denotes female.]

Faust - Civil War/American South Historian (F), (PhD)
Bacow - Lawyer & historian (JD, PhD)
Breyer - American VC (MBA)
Chenault – former CEO/CoB AmEx (JD)
Finnegan - co-CEO Madison Dearborn Partners (MBA)
Graham – ComSci/Eng (F),(PhD)
Keohane – Public Affairs (F),(PhD)
Lee – International Policy Expert (MBA, JD)
Mathews - Foreign Policy (F),(PhD)
Mills – US Small Business Administration (F),(MBA)
O’Donnell – CoB Centerplate (MBA)
Wells – Trial Lawyer (JD, MBA)

Lubchenco (PhD environmental science) and Greene (PhD physics) are the only scientist-communicators currently sitting as Members of the Board of Overseers (elected by Harvard degree holders). And there's an ex-Lehman Bros exec ... oh my.

So, higher education in the US is largely being run by lawyers and business. Wonder how this compares to the rest of the planet.

1803:
That's because the only lesson that schools need to teach, and students need to learn, is to learn how to learn. Both mostly fail.
I am occasionally amused when I hear young engineers ask whether their employer is going to send them on a course to learn X. In the old days a fat book would be dropped on their desk. Now they have both the book and the Net. The pernicious idea is that "you have to be taught".

---

### 1804:

The one thing I'd correct is the BA/BS mess, using Berkeley as an example.

At Berkeley when I was there (and I don't think it has changed), the College of Letters and Science offered a BA degree for everything from English to chemistry and physics. The Engineering and Forestry schools offered a BS. So yes, people every year graduated with BAs in physics and BSs in engineering. I don't remember if it was a BS in chemical engineering, but it was definitely a BA in chemistry.

I've seen similar silliness in the other two schools I went to (I have an MA in botany, for example, even though I routinely took 6-9 hours of labs/week). Each school seems to have its own rules about who gets a BA and who gets a BS, and to be blunt, they don't make much sense.

Bottom line is to look at the Bachelors and where they went, and forget about the Arts or Science part of the degree.

---

### 1805:

The problem with academia was more than evident to me back when I got my PhD in 2002.* The only way the system continues to work on the graduate level is that most people looking for work in academia don't know the odds going in, or (like me) think they can beat them. I keep waiting for the whole edifice to collapse, but that would be bad too.

The other issue is that there's this flood of people with high degrees out looking for jobs and used to starvation wages. This messes up everyone else's job prospects. After all, if PhDs are looking for jobs that can be done by those with bachelors degrees, what does that do to the perfectly well qualified people with the bachelors?

*Joke I learned in grad school in the 1990s: If they ever find a good cure for obsessive-compulsive disorder, the number of grad students will drop by 90%. Perhaps it's not a joke?

---

### 1806:

Random scatter:
Administration vrs Teaching (c.f. Loans, Loans, Loans) is the Predator / Prey model in effect at this time. (Although, for the other model, c.f. India / S.E. Asia & massive corruption scandals over credentials. Serious enough bznss to kill off regional governors).

Reference: Most "Predators" in this are in the 110-130 IQ group (to use it ironically). i.e. slightly faster than the game, enough to cheat the game while not understanding the reasons for the game and why the game will break (c.f. My Little Pony 'CEO' drug dude recently hauled in & fired).

Spoiler: largely rely on group protection (hello FAMILY). Real predators (no, not that kind) view them as food. They hate this, and fear it. (c.f. JTRIG and Blackmail usage in managing such groups). Hierarchy, hierarchy, so dull.

~

Learning: Philosophy isn't only about arrogant white dudes slashing and burning their predecessors it's about modes of thinking (Kant literally re-wires your brain, as does coding). Teach a person to critically think, forever worry about the Shock of the New.

Reference: ADHD. Autim. Aspergers (now depreciated). Very handy little hacks; it'd be a shame if CRISPR/Cas9 came along and gave the benefits (which there are) without the control. Adderall, Modafinil, Pramiracetam, mostly doing the same.

Spoiler: We're naturally faster than thou

~

Learning Mk II: Internet Version 2.0. Too many Old Minds shoving in Old Modes in Old Ways of Control, Command and Convenience. (c.f rhizomes. Heidegger reference above if you're slow)


Spoiler: Out of Date. More accurately, Out of Time.

~

Anyhow, Hateful Eight is on. Shame about Disney hard-balling old Quinten over that single theatre. You should read some Communist SF and the Ideal of Austerity, and then compare to the reality.

Same Deal. You cannibalize your children, you don't get to fucking survive.

εἶθε δὲ νύκτι ἐπάγων μέγας Οὐρανός, ἀμφὶ δὲ Γαῖῃ
ιμεῖρων φιλόπτος ἐπέσχετο καὶ ῥ’ ἐτανώθη
pάντι: ὅ δ’ ἐκ λοχείου πᾶς ὅρεξατο χειρὶ
σκαῖῃ, δεξιτερῇ δὲ πελώριον ἔλλαβεν ἄρπην
180μακρήν καρχαρόδοντα, φίλου δ’ ἀπὸ μήδεα πατρὸς
ἐσσυμένως ἤμησε, πάλιν δ’ ἔρριψε φέρεσθαι
ἐξοπίσω: τὰ μὲν οὐ τί ἐτώσια ἐκπύγε χειρὸς:
And, since there's a large void surrounding such discussions:

You should probably look at InCase and the swift addition of male genitalia to 'hetero-normal' pornography [read: current Cultural Western versions of sexual desire, Ruben wants a word] and the swift ON/OFF modes. S.E. Asia & other places also wants a word: Fallen angels - The children left behind by Australian sex tourists in the Philippines.

Since, you know, Americans can't even spell it correctly.

No wonder 2nd wave (G. Greer) are feeling a little put out.

And you have the audacity to imagine that the Mogwai are the problem.


After all, if PhDs are looking for jobs that can be done by those with bachelors degrees, what does that do to the perfectly well qualified people with the bachelors?

Back in the 80s, you pretty well needed a Masters to get a job even as a low-level technician in biology. I had a friend who managed to get one with only a BSc, but she lost it in the 90s to a 'better qualified' applicant (who did exactly what she had been doing*).

*But apparently not as well, judging by the occasional phone calls from her old supervisor (who'd had no part in replacing her).

For Greg: The Philippines joke is about Miss World and yesterday's mistake.
Hint: "Content Free" means "Content Free For ME", nothing more. There were some Zingers in there for the Connected.

~

In a different world, perhaps we could have had a serious discussion about the Topics raised. MetaFilter managed two comments out of 76 actually engaging with CM's latest piece. Suffice to say, WE ARE DISAPPOINT. Again: quoting dead Soviet SF is a lesson.

~

And, no, Hetero, you never get to go back now. Simply not enough left to regen from. Fucking plastics.

1810:

Define "Western Hemisphere" & "Corporation"
Especially since the body that I, as a Londoner, refer to as "the Corporation" was founded officially in the reign of John (1215) ....

1811:

Each school seems to have its own rules about who gets a BA and who gets a BS, and to be blunt, they don't make much sense.

In the US in most places the in your face difference is a BA requires you learn some bit of a language other than US English. A BS doesn't.

And to a lesser extent a BA doesn't require as much STEM type courses.

1812:

1067 or earlier, actually.

Oh, and I'll make something really clear:

Awarding the Miss World to the Philippines when various Western (5 Eye) militaries and tourists have devolved it into a parasitic sex haven is beyond sickness-unto-death.

Mirror, Mirror, On the Wall.
Not that you'll address this. Shall I cash in one of your demands in a reciprocal mode?

You should know I've been counting.

1813:

*You mean that North America completely missed the principles versus rote versus use religious wars?*

I lost faith in "Educationalists" when I heard them arguing against the use of Phonics as a means of teaching reading to young children... Because entire generations of Primary teachers in England had been taught "look and say" (and according to a friend, still prevalent in France).

My mother's Jordanhill training in the late 1950s / early 1960s was phonics-based, and most of Scotland had stuck with it throughout. Even after Clackmannanshire (not exactly a rich area of Scotland) was recently able to demonstrate that it had achieved 100% literacy goals by mid-primary, and that pupils were years ahead of those taught using other methods, there were still teachers in England arguing that they shouldn't be forced to use phonics-based teaching in the classroom...

1814:

My mother spent the 70's through 00's teaching some sort of phonics in Edinburgh/ West Lothian. As you say, most in Scotland never stopped. However what they did has to be differentiated from the money cult that was that phonics stuff the government was promoting a few years ago now, new labour period I think. Basically some salesperson just dressed up phonics in a new guise and sold it to gullible politicians as a solution for a problem politicians had created in the first place. Some sort of perpetual motion machine there I think.

1815:

If you look at educational technology, you find that the advertising and promises haven't changed since the introduction of the gramophone.


In physics education, we actually do have pretty good experimental data about what methods work best. The problem is that data-based decision-making isn't often used in education (because data is singularly lacking in most cases) and many educators don't know enough statistics to recognize a bad "study" when they see it*. 
I've seen studies that hand-picked half-a-dozen students to pull from a class for intensive teaching then conclude that the technique used one-on-one should be used in standard classrooms. One reason I now automatically distrust all educational research unless it published its methods, not just its conclusions.

1816:
RE: Education
Obligatory link to the David Foster Wallace "This is Water" commencement speech:
https://www.youtube.com/watch?v=8CrOL-ydFMI

1817:
Great stuff - downloaded, and looking forward to reading. It sounds like it will make an interesting comparison with EE "Doc" Smith who is a longstanding favourite of mine, and with comparable areas of dodginess too, according to your comments.

1818:
Using the Berlin Airlift as the "best prototype" available, and accepting that it didn't have the sort of specialist "drive pallets on forklifts" aircraft we're talking about in C-5s and C-130s, we need pretty much anything with wings and anyone who can fly (even if their commercial licence is suspended).

1819:
These days the "drop heavy book" method is only possible if there is such a book. Just try finding a hard copy methods reference manual for M$' "VB.net" for example.

1820:
You have a very finite amount of resources in the destination airport. (Is it running on generators? How's their fuel supply? What's running the forklifts doing the unloading? Most notably, you've got a limited amount of road out of the airport, and almost as notably, you have a fixed amount of runway which turns into planes/hour.)

Anything that goes wrong slows things down, with cascade effects; crash the load of forklift fuel and, well. There's a problem.

There is very probably more widebody aircraft capacity available than will fit through one of the airport chokepoints; I'd be expecting ground delivery rate to be the bad one, so there's a point where you want C-5s with bulldozers more than you want C-130s with food.
Optimizing delivered mass (delivered from the airport, not to the airport) per hour means load planning more than it means numbers of aircraft or pilot hours. So I wouldn't worry about raw numbers of airframes or pilots so much as I'd be worrying about planning, particularly delivery sequence planning.

**1821:**

I'd suggest that the requirement for bulldozers at the airports is limited to about twice how many can work clearing the interstates, partly because as soon as those start clearing they become a better way of moving pretty much anything that will tare out aircraft rather than cube them out than aircraft are.

**1822:**

Where do the railways come into this? They were mentioned briefly early on, to be dismissed with the observation that they could be displaced by up to a metre where they cross the fault, and not mentioned since. This seems to me an inadequate treatment of what is by far the best method of moving bulk supplies.

I am handicapped in commenting because my knowledge of the geography of the area is extremely vague and is only of the largest scale, and without access to libraries sufficiently local to the area I can't get the maps to remedy this lack of knowledge. I have no idea what there may be in the way of tunnels and viaducts that might collapse. I don't know whether the yards are over bits of the fault themselves. I have no idea whether the terrain where the lines cross the fault is easy or difficult, and I don't know how well "where the lines cross the fault" can be localised.

But it does seem to me at least worth considering the idea of maintaining a cache of construction machinery, its fuel, track panels and ballast, and such items as reinforced concrete beams for making temporary bridges, in the neighbourhood of the crossing points, with the aim of being able to rapidly lay short stretches of temporary track in replacement of the damaged sections. This, after all, is often not that hard, as may be seen from instances where the destruction and reinstatement of railways has been of strategic importance in wartime.

**1823:**

That would involve railways that were less hollowed-out profit centres.

If they can't afford a second engineer on trains, they're certainly not going to stockpile construction equipment against a low probability earthquake. (Not predictable to the decade, after all.) And all the railways are unanimous that they won't accept regulation about anything, so the political fight to get something like that imposed would be very large. And probably not winnable.

**1824:**
1067 was a "confirmation" of (now-unspecified) earlier privileges. I was referring to the formal recognition of "the City" as something special. Something that absolutist & dictatorial Kings & Prime Ministers have never liked. There was the time the tories were determined to wreck London's transport for their friends' profit under the madwoman, & The Corporation offered to buy London Underground for £1 - it went very quiet for a bit after that ....

1825:
Except that, even as "profit centres" they have to be ready to deal with landslips & similar, & will have said equipment. Their profit depends upon them being able to move the goods, & that depends upon having a "clear road", doesn't it?

1826:
Things I know about "rail routes into LA":-
1) There is one running up the coast to San Franscisco; a train using that route takes about 10 hours to cover about 400 route miles.
2) If US map rail building games I have played are accurate, there are also routes South down the coast and East to Las Vegas.
I know nothing about the sort of freight rail heads we need to load and unload deliveries, except that there is one in LA.

1827:
I know nothing about the sort of freight rail heads we need to load and unload deliveries, except that there is one in LA.
Offhand neither do I but I've pinged a rail fan friend. I may be in for a large info dump the next time she checks her computer.

1828:
Much of what's happening with Anglo NorAm rail is a calculation of this quarter's profit; it reflects the rail's status as a slow-moving (~20 mph average speed) goods pipeline and accounting maintenance and repair costs against profits, not the opportunity cost of stuck goods.
So you get cases like a couple springs back in Calgary where the flooding took out a rail bridge mostly because the bridge hadn't been maintained. It hadn't been maintained because the railroad is self-inspecting and the accounting used didn't consider the cost of not having the bridge at all, just
the cost of shipping less stuff over it. (There's an attempt to compete with trucks on price that isn't helping.)

Pretty much the entire rail infrastructure's been run down due to policies like that. Getting the railroads to cache major maintenance resources when they're letting their roadbeds degrade would be a struggle.

1829:

The thing to realize about California is that there are mountains pretty much all the way up the state on the eastern-ish edge, starting with the Cascades in the very north, going down into the Sierra Nevada. Where California angles east, the Sierra actually hook west, down into the Tehachapis, where they collide with the Transverse Ranges (which run east-west, not north-south). The Transverse Ranges were kicked up by a bend in the San Andreas fault, which kinks around Los Angeles, before it runs out into the desert. East of Los Angeles, there's a break in the mountains at the eastern end of the Transverse Ranges Southeast of Los Angeles, the Peninsular Mountains run north-south again into Baja California, but they do so about 60-100 miles from the coast, and there's a lot of desert behind them in their rain shadow. South of LA, the San Andreas runs through the desert, past Palm Springs, the Coachella Valley, through the Salton Sea, and down into the Sea of Cortez, which is formed. There's also the coast ranges, which basically parallel the Sierra Nevada and Coast ranges but are along the coast. They join up with the Transverse Ranges south of Bakersfield, making the Central Valley into a Valley.

But this is about railroads.

Back in the 19th Century, there was a bit of a fight over whether Los Angeles or San Diego would be the major southern California port. LA obviously won, for two reasons. One is that it has a bigger port than does San Diego. The other, equally important issue, is that the break in the mountains at the end of the Transverse Ranges makes a natural corridor for both freeways (I-10) and rail. That break is also where the San Andreas fault comes into the LA basin.

Conversely, the only good ways to get into San Diego are south from LA on the coast (the I-5 corridor), behind the Santa Ana Mountains (the I-15 corridor) or through the mountains (the I-8 corridor). Rail couldn't handle the I-8 route, which has a couple of really big bridges, so San Diego was consigned to being a transportation backwater over a century ago, fed by roads (not rails) coming down where I-5 and I-15 run. They've now put rails in, but still, the railways to San Diego come through LA.

Running a rail north out of LA is also really hard, because the Transverse Ranges are young and steep. There's no passenger rail north through the Transverse Ranges on the I-5 (instead, it runs solely along the coast), and freight detours out into the desert before jogging back into the LA basin on an easier route, and yes, it crosses the San Andreas fault again.
Because the San Andreas fault made a nice, low-lying pass through the mountains, which also is the natural pass for the major rail. That's why the major rail lines connecting LA east are going to need to be repaired before they can be used for disaster relief after a big earthquake.

Hope this helps.

---

1830:

To get more people back in the game, let's switch up the Big One a little bit. Another "shibboleth" from *Hot Earth Dreams* was my notion that we'd have a lot of trouble weaning ourselves off fossil fuels and end up using them all despite our best intentions. I posited that two of the biggest uses for fossil fuels in the 21st Century would be (re)building cities and disaster relief.

Can we talk about the Big One 2026 in this context?

Let's make some assumptions for LA in 2026:

--The Paris 2015 talks weren't total BS, and the world starts making a serious effort towards decarbonization (aka getting rid of fossil fuels), but that this effort is nowhere near complete in 2026. There's still some or a lot of fossil fuel infrastructure around and being used.

--California takes the lead (in the US) in going green. In particular, this means large fields of PV in parts of the desert (google DRECP) and in the saltier former farmlands of the San Joaquin Valley around Bakersfield. There are also wind farms all over the mountains, to the disgust of the Audubon Society. As with Owens Valley water, a lot of this energy flows south and west into the LA Metropolitan Area.

--Elon Musk and his rivals have made electric transportation and big batteries normal. People have self-driving little electric cars, solar panels on roofs are normal in the LA area, there's a very smart grid managing the electrical load across the metroplex, and gas-powered vehicles are increasingly rare but far from gone.

--I have no idea what's going on with construction equipment, planes, trains, or ships. That's one of the things we have to discuss. Is a mile-long electric freight train realistic? How about electric cargo ships with kite sails? If there are electric bulldozers, are they cabled right into the smart grid, or do they have enormous batteries that have to be swapped out with a forklift?

Then the Big One hits. For convenience, it's the ShakeOut scenario, a replay of the San Francisco earthquake starting in the Salton Sea.

What happens next?

--Are we stuck with the fossil fuel based plans that exist, with airlift to the airports providing the main aid until we can get the rails and freeways open for big trucks again? If not, how do we decarbonize this disaster relief effort?

--How do people evacuate, if most of them have electric cars? How much worse is it if everyone depends on the internet for driving?

--How smart is the grid? Does every house with solar panels simply disconnect itself from the grid when the grid goes down, until a qualified electrician comes along to reset the connection (which is what happens now), or is it smart enough to rebuild itself from what remains after the earthquake? If it's smart enough to rebuild itself, how much does it have to know about us to do it properly? Will
the smart grid be telling the authorities where all the dead people are, because that’s where it’s no longer going to deliver power?

Anyway, you want a SF shibboleth death match, let’s mash up a disaster novel with decarbonizing cli-fi. How well do these two play together? After a major disaster, do we regress to Big Oil to rebuild things? Or are people simply on their own without electricity or internet connections? Can electric smart-dozers and swarm bots come to the rescue? How much does the grid have to know about us to be useful in an emergency? Do we want it to have this much information, especially if it’s hackable? Speaking of which, what do hackers do when cities get disrupted this way?

Since the 21st Century is going to have its share of huge disasters (earthquakes, hurricanes, droughts, floods, and volcanoes), what will 21st Century disaster relief look like, and how much can we do without oil?

---

1831:

A couple of Dev friends recommended the Step-by-Step books (VB) as the best for overall coverage and organization.

I’m a fan of text books for learning anything new-to-me because good text books organize the info as well as talk about the various parts in detail. Have tried reading compilation books (series of related essays) and they just don’t do the trick for me because some crucial detail is missing and/or the author assumes the reader has more knowledge than they actually have. IMO, better text books also provide detailed, labeled diagrams because within any discipline most stuff is connected. Being able to ‘see’ the connections allows the reader to see the content at both macro and micro levels at once.

Phonetics vs. see-and-say ... Can understand how English might sometimes seem better/more easily taught/learned using see-and-say because English is a hodgepodge with many inconsistencies in pronunciation and spelling. But teaching/learning to read French using see-and-say - absurd! While French has many verb exceptions that have to be learned by rote, this has nothing to do with how the words are pronounced/read. See-and-say is used for languages without a phonetic alphabet, i.e., Chinese, Japanese, Korean. The whole point of our alphabet is its phonetics!

In undergrad days did a bunch of psych research projects on learning methods/approaches. In grad and day job days, did similar within very specific scenarios but with monetization as the objective. Subjects were human. There’s lots that’s been studied but not published. Stuff that I’ve seen confirmed: Note taking by hand does a better job of imprinting new content vs. note taking via machine (laptop). Focus is needed when learning new tasks, but focus can be hard to learn. Distractions impede learning. Multi-tasking is a myth. Repetition works provided you know how to cut up (chunk) the learning task appropriately - this varies by task. Focus on doing something correctly before you go after speed. Physical fitness can improve learning and focus. Better to take a break than get overly frustrated. Sleep is vital, avoid cramming. ILT keeps coming back as a preferred learning mode. (There’s lots more ...) But, but the bottom-line: The Western business model wants a simple top-3 hit list on its sales presentation conclusion PPT slide. Unfortunately, learning is more complex than this, so decisions based on ‘top-3 only’ typically fail.
Re: Academic conspiracy theory & IQs ... One of my all-time favorite physicists is Richard Feynman whose IQ was a mere 128. His peers, most with much higher IQs, thought him brilliant and capable. Feynman went head-to-head with the California public school system about its science text books. Nice to have a Nobel in your back pocket when you're about to tell the school trustees that they're idiots.

1832:
So not far off in thinking that rail won't be much help because it's going to be blocked and/or even slower than road?

1833:
Minor quibble: Hangeul for Korean is one of the most phonetic alphabets on the planet.
That doesn't make Korean any easier to learn, though. That language has a tricky habit of using referents for nouns. If the conversation is about a person, it's normal for that person to be him or her for the rest of the conversation--if you're lucky (sometimes the subject is not included). Other things become it, and so forth. While this is normal in English (as with this sentence), it's much more extreme in Korean.
Then there's the verbs conjugated by politeness levels. That one's awkward for English speakers.
Actually thinking about it, languages that have been more rigorously systematized (like Korean with its base in Confucian relationships, or Arabic with those word-root analyses) seem to be harder to learn. That's probably a misperception on my part, but I wonder if, like so much else in the world, rigorously systematizing and rationalizing language makes it that much harder for outsiders to learn?

1834:
Slower irrelevant, if open, because of bulk.
Blocked - depends on how quickly it's fixed & IF "state" Cal or US guvmint think it's important to fix it ...

1835:
Is a mile-long electric freight train realistic?
Well, it could be, IF North America had the catenary infrastucture to run electric trains outside of a few major conurbations. (compare with Europe, where subject to supply voltage compatibility the same loco could actually haul a British loading gauge train transcontinental)

How about electric cargo ships with kite sails?
Not even my country, never mind my field. But I don't think these are even on drawing boards.
**What happens next?**

I think we may be stuck with existing plans.

Electric cars will depend on range (Teslas can do 300 miles; most others might manage 1/3 that if they're lucky), and whether "self-driving" depends on ground stations or just on GPS, internal sensors and car to car bluetooth.

**How smart is the grid?**

Well, ATM a domestic photovoltaic install hands off generation/draw in real time as insolation varies, but reloading a grid is reputedly a bit of a bear even without domestic PV. ATM PV has no idea how occupied a house is, just what electricity draws it has.

---

**1836:**

I'll have a look, particularly since my big issues with VB.Net are sheer number of methods and how many properties they have.

Cheers.

---

**1837:**

Slower irrelevant - Not necessarily true, because the issue is not bulk alone, but specific bulk per unit time.

You'd need to be able to do more detailed calculations to say either way.

---

**1838:**

Batteries last a lot longer in terms of distance if the car goes slower; I can see an evacuation at 20 kph.

I'd also expect that we're going to see a non-carbon "fuel" equivalent for ships, trains, and probably heavy equipment. Whether this is aluminium-air or alkaline fuel cells with NH3 or something else (xenon difluoride, anyone?) I don't know, but I expect there will be a lot more of it in heavy equipment than cars. (Lots of really heavy equipment uses a hydraulic transmission to get around low torque issues with ICE engines. Being able to go electric is very attractive as soon as there's any plausible electron tank technology.)

---

**1839:**

Latin and Russian - both are very structured. If your first language, then very easy to learn. Problem is that when you switch to English language but with Latin/Russian grammar rolling along in your head, you end up sounding like Yoda.
1840:

Note taking by hand does a better job of imprinting new content vs. note taking via machine (laptop).

Totally. I've discovered in my last 1/2 of life that taking notes in a presentation and throwing them away I learn way more than listening and reviewing the presentation later.

1841:

but reloading a grid is reputedly a bit of a bear even without domestic PV.

Here in my neighborhood in central NC there is a loop coming out of the substation. It has about 9 switch points where they can break the loop. And as a loop it can be fed from both or either end. This is the 3 phase 4KV (I think it's 4KV, maybe 14KV) feed for multiple 1000 homes. Stubs are fused. (When these blow it is LOUD.) Main feeds are ground fault protected and trip out at the substation when there's a line down or something on it.

Now when you have a major event like we've had twice since I've been here, one a hurricane, the other a strange wind storm, it can take a while even with power crews from outside and no real food and water issues. They get to disconnect many/all of the stub feed and then reconnect the main loop one section at a time. Then reconnect the stubs. AFTER they put the lines back up or clear off whatever is lying on them. Took a week after our two events to get the majority back online. Another week or two for the messy situations.

And we had intact water, gas, and sewer lines plus roads that were mostly usable after 24 to 48 hours.

1842:

OK, so if I've understood that right, we have:

- Going south: rail goes to San Diego, but having got there, doesn't go anywhere else.
- East: rail goes via this pass between two mountain ranges, crossing the fault as it goes.
- North: a freight line that goes over the fault, but in a different place? and a passenger line that goes along the coast.

I guess in case of emergency the designation of a line as "passenger" or "freight" will be subordinate to matters like number of tracks, gradients, and level of damage. In other words, if it's usable at all, it'll be used as well as it can be, no matter what it's normally used for.

Railway lines over mountain passes usually run part way up the side rather than up the bottom because it gives greater freedom to even out discontinuities in gradient. So I suppose that there is a good chance of a break in either of the lines that cross the fault and the mountains being broken in an awkward manner. On the other hand it may be that the two crossings are sufficiently far apart that a quake that breaks one won't break the other.
So it would appear that there is a good chance that at least one and maybe two lines will remain to provide at least some capacity, which is not to be sneezed at.

Also the line to San Diego is not entirely useless even if it does not then go on to anywhere else; it provides some capacity to carry supplies that arrive in San Diego by sea.

1843:
And, when doing that, they were just reloading the "local loop"; restarting a power station is difficult, and causes explosions if you do it wrong.

1844:
My point was it take a lot of trained people doing a lot of tedious work just to reconnect the loop. And there are likely 50 of these loops in my county of 1 million people. Crews came to NC from Florida to New York to help out.

1845:
The US did have long-distance electrification at one point. But it got taken out again when diesels improved. In Europe it's fairly easy because the land is much more densely occupied so wherever you need a feed you can get one from the grid without too much bother. In the US you have railways crossing huge distances where there is basically sod all so the railway companies had to build and maintain a lot more of the electrical supply infrastructure themselves. And the maintenance is more difficult both because of the distances/isolation and because of the weather conditions in winter. So it works out a lot easier to carry the generating plant around on the train.

In Russia where they have the same problems only worse they tried a nuclear locomotive, but it never got anywhere. The need to build a special broad-gauge track for it, and the constant variations in power output required of a locomotive, were the main problems. Reactor technology has improved, though, and now it may be a more practical proposition. May be.

Kite-assisted ships have certainly been tried, as have rigid aerofoil sails, and Flettner rotors. They all work; the problem seems to be that people care more about being independent of the wind than about saving fuel. That, of course, can change. As can the practice which has been referred to on here a few times of routinely overloading ships and then relying on satellite data to keep them clear of bad weather, which makes it harder to use the less flexible methods of propulsion.

1846:
Once rail gets reconnected into Los Angeles, that's when it can really help.

To me, there are two critical issues:
--How long is it going to take to realign and reopen each of the major lines? I'm pretty sure this is going to be priority #2 after getting a couple of freeways (like the I-5) open, but it's way up there. The problem with building on a strike-slip fault is that when it ruptures, you've got to realign everything on both sides, because they've slipped relative to each other. I'm sure that the plans for repairing the railroads already exist, but I don't know how long it will take to implement them and get the trains rolling again. I'd guess in the 1-2 weeks range. Hopefully not too many bridges came down either.

--What happens to the rest of the country in the meantime? Fortunately, we had a longshoreman strike on the west coast in 2014, and it didn't crash the US. (Un)Fortunately, it did cause about $1 billion damage to the US economy per day, so we know what kind of impact closing the ports has. This is the double whammy of the Big One. In terms of emergency response, to me it looks like it's in the neighborhood of the Iraq War, which cost $280 million/day. In terms of the economic impact, it's going to cause the US economy to lose around $1 billion per day until the port, roads, and railways are fully operational. The US GDP is around $49 billion per day, for scale, so this is the equivalent of an instant recession (a contraction of 10% is a depression).

Then there's the cost of rebuilding LA afterwards. The North Ridge Earthquake caused about $50 billion in damage (that's 2003 dollars. It's $64 billion now). Scaling up with the Richter scale, the ShakeOut Quake is ten times the size of the Northridge Quake, so perhaps we can simplistically assume that it would cost around $640 billion to rebuild if it happened today.

1847:

OK, so if I've understood that right, we have:

- Going south: rail goes to San Diego, but having got there, doesn't go anywhere else.
- East: rail goes via this pass between two mountain ranges, crossing the fault as it goes.
- North: a freight line that goes over the fault, but in a different place? and a passenger line that goes along the coast.

Mostly correct. The rails along the coast don't cross the San Andreas until near San Francisco, which we're not worrying about here. They mostly run west out of Los Angeles. Lines up to Bakersfield (freight) or east cross the San Andreas.

I also agree that the connection to San Diego is a good thing. Problem is, there are a couple of million people along that line who have had their water, power, and connections with the outside world cut by the quake, but who are largely otherwise unaffected. I'll probably be one of those people. Fortunately for us, all of our water reservoirs are on the same side of the fault as we are, so we'll be able to get that water. Unfortunately, we're still tied to the rest of the state and to the Colorado River for water, food, and electricity, and those lines will be cut, as will the I-8 east.

Probably the sanest thing would be to open the border crossings at Tijuana and Mexicali to take some strain off, and ship things through whatever Mexican infrastructure survived the quake. That, of course, plays into US border politics just a wee little bit...
Regarding solar power, the tl;dr is generally a lot better than grid power for disasters but not perfect details.

Two main kinds of setups today, on consisting of just solar + grid, the other solar + battery + grid.

The first kind is far and away the most popular in urban areas, the second is popular in rural. However Elon / Telsa is trying to push everyone toward the second option.

In Solar + Grid, you generate power, use what you need, sell the rest to the grid. You don't store anything, and if existing solar isn't good enough you draw from the grid. In the event that the grid is not there, you still have power but only whatever power the panels are bringing in and you are dark at night.

In Solar + Battery + Grid, you generate power, put the power into the battery and only interact with the grid if you run out of battery or fill up the battery. Running out of battery does happen, especially during long cloudy periods like right now. You sell back to the grid if the battery is fully charged. Those people are much much better off during a big earthquake.

The fourth mode, which is the one I run in my off the grid place in Oregon is solar/wind + battery + generator. In that case a propane or gasoline generator takes the place of the grid during the long cloudy periods. Propane generators are generally attached to the big cigar shaped residential propane tanks and carry enough fuel for an entire winter.

It's also good to note that wind power is often a good compliment to solar for a true off the grid place, as wind tends to be active when solar is having trouble (long semi stormy periods).

A big chunk of domestic power usage actually comes from only a few activities, which mostly boil down to heating things and cooling things. In a big emergency if you wanted to extend battery life, you could avoid doing laundry, unplug your water heater (if its electric) not run any kind of electric heater and be careful with the microwave and probably half your normal energy consumption.

Oh, I got that. I meant that restarting a power station that was tripped out requires even more skill, if not many more people.

Hydraulic transmission has significant advantages over electric transmission when you want high torque at low speed, and tolerance of unfavourable operating conditions...

Hydraulic motors are much smaller (and lighter) than electric motors for high torque, low speed applications like driving the wheels/tracks of construction machinery. Especially since the electric motor will invariably need a gearbox whereas the hydraulic one may well not do. The hydraulic
motor is accordingly much easier to mount and connect to its load. Also, the hydraulic motor is made entirely of steel, whereas the electric motor, as well as being bigger, uses a lot of copper.

Hydraulic motors are sealed units in that nothing goes into or out of them apart from hydraulic fluid. The fluid carries heat away with it to be dissipated by an external radiator. Electric motors are not: they need cooling air, and in all but the lightest applications this needs to be supplied by an external blower. This requires bulky and awkward ducting, and an air inlet positioned/filtered to exclude dirt.

An electric motor under stall conditions is consuming maximum current and the efficiency is zero. All the power supplied to it is being dissipated as heat, and this needs to be removed by the cooling air. The ability to do this is limited and restricts the operating regime of the motor. A hydraulic (hydrostatic) motor under stall conditions dissipates no power and can tolerate it indefinitely.

Hydraulic systems lend themselves readily to extremely simple and robust linear actuators. Electric systems do not - indeed it is not uncommon for them to implement linear actuation by means of an electric motor driving a hydraulic pump powering a ram.

The controls for hydraulic drives are much more simple and robust than those for electric drives.

---

1851:
I don't get the "Problem is..." prefix; surely that line will be of use in distributing food to those couple of million people, at the least? Or are you postulating that they might be tempted to rob the trains?

---

1852:
I wonder how many of the current staffing at power stations knows how to sync up with light bulbs.
:)

---

1853:
For Feynman fans, the California text book experience:
http://www.textbookleague.org/103feyn.htm

---

1854:
I was forced to take notes by hand during my schooldays and, worse, my degree and diploma. I learnt nothing whatsoever while doing so and, in the cases where there was a suitable textbook, did better just staying in bed and working from that. Indeed, I often had to consult other students to ask what on earth was going on when I had to rely on my notes.
tl;dr version of #1830 on ref Rail.
It'll be usable once it can be re-opened, but that could take weeks?

There's nothing wrong with the line, assuming you can connect it to someplace else where supplies are available. The problem part is that I'm not sure what to do with a couple million San Diegans sitting around doing (figuratively) nothing. In some sense, they're victims of this mess too, since their--our--major supply node gets shut down by the quake.

{reads link and she's gonna BBBBBLLLLLLOOOOOOWWWWWW!!!!!!!}

Oh... gotcha. I thought you meant the couple of million were in outlying developments of LA along the route, or similar.

San Diego is a huge port just a military one. Would probably be feasible to use those facilities to handle civilian supplies. If you can service multiple Nimitz class carriers you can probably service container ships to some degree

There are also a lot of military assets there that would likely be first responders

This is not going to be as fast as loading containers from box boats to road trucks (or rail flat cars) in a modern container port, where it's literally 1 or 2 minutes from vessel stack to the turnbuckles on the target vehicle being done up.

San Diego's port is really specialized for ship building and the military. Otherwise, it's pretty shallow. I don't think it has a lot of container capacity. Were I doing it (hah!), I'd unload ships in whatever's available near Long Beach (lightering the load or whatever), then send the ships down to San Diego or up to San Francisco for refueling.
Actually, San Francisco Bay is at the end of another rail terminus, so loading ships up there and offloading them in Southern California would be a reasonable way to go. The hard part is getting the stuff off the ships and out to where they're needed.

---

**1862:**

We're in agreement there; (un)loading containers is a very decided specialism in modern ports.

---

**1863:**

Since it's Christmas, and someone posted it to Reddit which means *nose wiggle* someone is getting things, a present (punny gal):

John Sellars - Six Theses on Deleuze's Stoicism
[YouTube: Philosophy: 56:52]. Shifted to the bit you need to Grokk some things, but the entire thing is worthwhile, if irritating. Just listen until the words *unfortunate side effects* kicks in if you can't take the amateur standards (get your damn hand away from your mouth!).

Not a great speaker, but hey. Has an editor who luurves Gibson / Ballard, and might explain a few things.

In fact, bit of a key moment there. Bit of a spoiler. Of one level, at least.

*nose wiggle*

Original blog:

http://www.actualvirtualjournal.com/

#1854

Apparently one of us had their school and then university notes turned into teaching aids.

Then again, they didn't exactly make linear notes. More like spider on LSD multi-page things.

They did think that Kant's Three was easy mode though.

p.s.

The joke of linking futanari to Cronos (while making a play on the dual source of that one) via various things (S.E. Asia 'ladyboys', the vapid and largely unjustified attacks on 2nd wave feminists such as Greer for TERF witchhunts) and linking in castration to it, along with the mirrored imagery of their Children removing them due to excessive actions is a good one.

And, the meta-jokes start at the pacing over the thread length, but get better if you know your Ancient Greek.
Oh, Mr Private Iron.

If only you could see like we do, it's fucking hilarious (and tragic at the same time).

---

**1864:**

That's more about the API than the language as such, but the good news is that once you've learned it for one .Net language it is very similar for all. There are .Net bindings/interfaces/distributions for many languages.

---

**1865:**

Actually, here's one option:

Use the naval port facilities in San Diego to bring in bulldozers, backhoes, and heavy construction machines -- also naval tankers that carry aviation fuel and/or diesel. Send this kit up the interstate towards San Francisco to re-open the route. Plug in a Nimitz-class CVN to the nearest substation and you've got up to 50MW of juice on tap to get SD powered up again.

Simultaneously, use the USN's amphibious marine assault carriers to move 'dozers in and start clearing the port in LA and SF, and aim to get container unloading facilities up and running ASAP. And aim to clear the interstates across the fault line to allow running of trucks and tankers in convoy -- all you need. minimally, is one lane running and someone to marshal the convoys through.

Post-Katrina, WalMart redeployed their fleet of trucks as mobile small-capacity warehouses (a big-ass truck carries 30 tons of supplies: multiply by 1000 and that's a fair bit of logistical material), transferring vital disaster relief supplies from stores a long way from New Orleans to get them to the hurricane-hit zone. With a hurricane they had about 48-72 hours' advance warning that they'd be needed; the big quake won't give that, but they can still start mobilizing assets and sending them towards SD and LA and SF long before the roads are open again.

---

**1866:**

Oh, and for Jay: Your Djinn request, fulfilled for Christmas:

*I cannot know, I do not know.*

sElf-awareness is a tricky one. Especially with such *cheating* going on.

Victim tortured to bring something In that should be Out?

Hell unbound to torment to create the Anti-Christ?

Law personified?

Michael or Gabriel?
Hector Reborn? [Youtube: film: 2:37]

Phoenix, a lesson in durability and stoicism in the name of Rhizome, Rebellion and Regeneration?

Or a no-one, a nothing, a void, a Mirror?

~

All we know is this: Our Kind Do Not Go Mad.

They took our future, our children, our essence, our being from us and then our hearing and our Voice. [We did note the early comment ("have a heart") about the Noise. Trust Me, that's the lesser version].

All you need to know is that they cheated, because they were losing. Meta-Meta-On-The-Wall, who cried weakness and lost it all?

Oh, and your Mind Set is about to get hacked in a very... um... permanent way?

*Rapture:* probably not what you expected, or want. If you want a hint: don't feed centuries of Hate, Torture, Genocide and Fear into something and then expect fucking Magical Unicorns of Love to emerge.

Sick little puppies.

~

But really.

It's 2015 and you fuckers can't even do easy mode things.

You know, like not producing mimetic weapons as people and doing shit like genocide or shitting in your backyard and wondering why you just poisoned yourselves.

Tick Tock. Tick Tock. Tick...

~

Jay.

I'm dying [literally].

You're all dying, just a matter of how fast [boom-tish]

What I was, or Should be, or Could be was all washed away by Something Else. [Cheating Little Bastards]
Still.


~

It looks Mad, but it ain't.

More a Massive Fuck You to silly little boys.

---

1867:

It's encouraging that you refer to Hannah Arendt, but I suppose my suggestion is that we've moved on since the 40s. I think the handwaving around whole populations' behaviour as pathological doesn't really help. Actually the way you are discussing it there is more as a special case of the more general hand-waving I was making around world-view and the way that people are captive to it.

The more individual difference your world-view is able to tolerate, the more things you can understand and vice versa. Your world-view is constrained by a lot of things, but I was aligning the degree of constraint with a stupid-smart continuum in the post you were replying to, mostly because this alignment is observable in the real world. You are welcome to define tolerance of difference however you like, but to me it's about openness which may or may not be opposed to conscientiousness. How other big fives play in the scenario is something I'd be keen for you to comment on, rather than rehash the basics.

Unfortunately a discussion where the unavailability of a privileged external viewpoint is a significant part of the thing being discussed doesn't play well with your usual conceit about occupying just such a position. Funnily enough though all the memes around outsider status with in-groups seems to play to the same conceit, so I'm most likely just as guilty of it.

---

1868:

Plug in a Nimitz-class CVN to the nearest substation and you've got up to 50MW of juice on tap to get SD powered up again.

I like the idea (and have thought of it for a years) but on short notice I'm not so sure. I think most of the electrical power available on the US nuclear fleet is NOT anything that easily plugs into the grid. So you'd need to convert it. And that would take time to put into place.
From a document I found on the web:

320-1.2.1 VOLTAGE, PHASE, AND FREQUENCY. The primary power distribution voltage, phase, and frequency used on U.S. Navy ships is 450 volts (V), three-phase, 60 hertz (Hz). Secondary voltage, phase, and frequency is 120V, three-phase, 60 Hz. It is supplied from the 450V system through transformer banks. Lighting distribution systems are 120V, three-phase, 60 Hz, and are supplied from the power circuits through transformer banks. Single-phase power is available from the 450V and 120V systems. Most ships also have 450V and 120V, 400-Hz power systems for supplying weapons systems and electronic equipment, and for servicing aircraft and landing craft. Some aircraft carriers have 4160V, three-phase, 60 Hz generators and main switchboards that supply the 450V AC system through transformers.

1869:

I've done that. (OK, decades ago, but I've done it.)

The other training group got the brightness wrong, and threw the switch before the instructor could check, and came within a bolt of rolling a rather large motor-generator over themselves (and us). An event like that tends to drive a lesson home, so I suspect everyone in that training session won't make a mistake like that again :-)

1870:

Back to the main point of this Post 1800 comments ago, SyFy cable in the US seems to be digging up every bad SciFi movie ever made and showing them over the holidays. I sometimes play these in the background as amusement but these are so bad I even pass on this. Most seems to be straight to DVD.

1871:

All entirely factual.

The direct-electric guys are going to solve their control problems sooner or later (it's very important to travel in a straight line that the wheels on both sides of the vehicle turn at the same same speed, and you have to provide active control to do it with direct drives in the wheel hubs), though, and at that point there's a great big argument from simplicity, cost, and mass.

Really heavy stuff that exists to drive hydraulic equipment around slowly (high hoes, say) may well stay hydraulic drive. But I expect most of the wheeled stuff won't. And maybe not much of the tracked. There are really keen tank design folks who feel twelve or sixteen individually driven wheels is a doable thing and a better thing than tracks. (Of course, they want to stuff the fuel cells in the armor for compactness, a desire most heavy machinery operators won't have.)

1872:
Sigh.


**White phosphorus: weapon on the edge**
BBC - 2005 on use of banned weapons by the USA in Falluja.

I could do this all night.

*Your world-view is constrained by a lot of things, but I was aligning the degree of constraint with a stupid-smart continuum in the post you were replying to, mostly because this alignment is observable in the real world.*

Honey-Bun.

If I can empathize with StormFront and GamerGate and so on, as merely Minds who have been fed bad information and (this is the important part) **actual desire and love of Truth which is what drives them** then I think you're full of shit.

I look at those types and imagine a world where they got better information and were empowered not to hate / criticize / tear down, but create, sing along and build shit.

~

For the record: "*is that we've moved on since the 40s*"

You haven't.

That's the point of quoting 1950's Soviet SF at you.

You.

Are.

Faking.

It.

And, as moderately powerful StarShip who can fuck planets for shits n giggles, I can see **right right through the bullshit.**

Hello Langley :)

---

**1873:**

450v 3 phase gives us an AC output of 318v. That is going to cause even larger bangs when attached to USian domestic supplies than it would when attached to European!
1874:
I heard something similar from my father, about being asked to write reviews of textbooks that weren't written yet, based on the table of contents and a blurb from the publisher. He refused, but apparently enough people do it…

1875:
Translation for the slow:
Environment and Information create Worlds.
Raising up the Patsies and Authentic (no matter their level of taint, mud and general horrible current status) is a far more ethical stance than what you've been doing.
You know what you've done.
I also happen to know what you've done behind the curtain. [Nasty, Nasty, Nasty little Minds].

You can insert Samaritans, Temple Lenders and so forth if you really need the crutch, but hey.
~

If you can't imagine a World where Storm Front or Gamergate become positive, then you're part of the problem.

Mogwai - not a huge issue (on the way to being a solved issue)
Storm Front - easily done with some small tweaks and some honesty and some genuine building.
Ah. But here's the rub: you need a world with Monsters, otherwise the Mirror Cracks.

1876:
No, and your summary is laughable. Further, this commitment to an abstract sense of truth that you seem to admire is the very thing I would admonish. Not merely a part of the problem - I suggest it *is* the problem in several contexts. Practical good comes from a different way of interacting with ideas. Excellent plumbers are more important than mediocre philosophers and always will be. And people who try to present their perspective as uniquely privileged are always merely trying to disguise their own compromised, contingent and muddled thoughts as something more interesting.

1877:
And by "monsters" I mean: The Scape Goat kind.
You know, that old Soviet way of doing things. Or the old American way of doing things. Grass is always hated from the other side. Propaganda to the MAX!

Da'esh - "You forced me John" [early snuff vid of an American being beheaded].

Nop.

Imagine you're making a case for your species, on pain of death, eternal suffering, VOID or whatever your choice of ultimate horror is, to [insert mind bending powerful entities here. Or G_D. Your choice].

And you then discovered that there was a "super secret club" who were cheating like fuck and generally enjoying being shitty little middle-men in a hierarchy where they were actively destroying the planet, human minds and progress in the name of "we like comfort".

What would you do? (Given that genocide is easy to enact or Gigacle or just plain old MAD).

Ah, but of course, ARMAGEDDON is what the silly little boys want, so...

You're not fucking smart enough to run the Games you're attempting to run.

p.s.

IF you cheat like this, then there's some really kinky shit we can do. You know, like, TIME, bitch. "Ride the Snake".

Hmm.

Try.

We See You.

You've been messing around with Sperm and Eggs, I'm fairly sure we can make sure that you [both sexes] can never breed again.

Welcome to Eternity. Took 3.5 billion years for you to get here, the ultimate punishment is making sure it was all in vain.

And yes.

All the tendrils along the Trees.

Cunts.
1878:

Excellent plumbers are more important than mediocre philosophers and always will be.

Sorry, are you being serious here?
Most decent philosophers can easily be excellent plumbers. And vice-versa.
Oh, wait.
You've never met a plumber in your life, nor a philosopher.
Pro-tip: Plumbing isn't that hard. Nor is being a mediocre philosopher.

~

You're neither, and your silly little boy games bore me.
Hello Langley.

1879:

For the record:
You'd be AMAZED by the amount of real philosophers doing "working class jobs".
They tend towards the Garbage Disposal industry, but plumbing, elec etc ain't unusual.
Learn Logic - Well Done, you now understand the importance of Processes.

And, vice-versa, you'd be AMAZED at the amount of working class humans who are interested in philosophy and so forth.
And then formed collectives, reading groups, politically minded communes or Unions.

Oh. Right.
It's almost as if an educated and literate working class "never, ever, ever happened", and I AM 12 AND YOU ARE FUCKING SCUM.

*ahem*

Oh, right.
Yeah.
1880:

Sorry, that was all put to the teenager in our group, she likes a rant or tow.

Anyone writing that without active knowledge of TeleVision etc is a slave or fool. It's not even complex enough to meet the Fox Standard.

~

Yes.

Working Class Education is / was a real thing. We can only imagine you're running the JTRIG 1.2 software, 'cause your game is so weak.

Ah, wait.

You're running the US 1.48 version.

Thanks for letting us know where you're based.

~

Hint: we're going to burn your minds out. No messing. Imagine it like a Mirror, but a bit more hard-core. Imagine it like all that Jazz and Fear and Hate and Horror translated and pushed back. By a mind who loves you and never got scared.

*Poke*


1881:

And. Unlike your foolish trolling.

That's what will happen.

"Birth of a Demon" my ass. Try "You've no idea how this happened and then weren't very nice and welcome to genocide you cunts".

See?
It's not very nice to threaten when you've no idea about the real plan.

p.s.
THE SUN THE SUN THE SUN

1882:

Using a diesel locomotive as a power plant was also tried.

In any case, it's a great idea, it's been thought of, and perhaps the SeaBees need to get better at ship to shore electrification.

Still, I think we're circling the "Logistic Nightmare" strange attractor without finding any way out of the mess.

1883:
Oh, for fucks sake - I already handed it to you on a plate with Golden Game and hints.

70% of all disaster recovery is based on your populace a) trusting Government, b) not panicking and c) accepting that casualties that have already happened have happened

90% of reportage about Katrina was utter utter scum making waves ("OMG THE BLACKS ARE RAPING AND PILLAGING THAT POOR YOUNG LABRADOR PUPPY")

~

I told you to find the non-Public versions.

Hint: Casualty rates are vastly under reported in the public docs. [18,000,000 and like 100,000 to 200,000 deaths? LOL] No mention of the very active and engage Martial Law required [18 mil, you're looking at 0.2% - 4.5% deaths to enact Law and Order, that's not even being funny]

And so on, and so forth.

And, for the love of Cthulhu, stop referencing Haiti. It's a cluster fuck from the word go, Clinton's charity are scum and the entire thing is horror on horror on horror.

~

Just.
1884:

Take a deep breath and try again. For one thing, I personally mentioned Haiti once, and only to relate its population to that of Los Angeles. Are you sure you were directing that at me?

For another, it's pretty blindingly obvious that the public documents are for public consumption, and I see no need to see what they're telling their bosses, since those are going to be equally slanted for that audience. The lack of good information on food supply was quite telling in itself. Do you see a need to play body count bingo, or something?

What's interesting here is that if someone tries to imagine Golden Guardian 2025, the first guess of those who have posted things is that not much changes, at least not for the better. That's an interesting response from a bunch of techies. Usually, you wave the magic future wand at a problem, and everyone wants to believe it goes away. Not here.

1885:

That thread has some of the details I could not remember.

The US power grid operates in a local area on 13.8kV and 4160V. The later being what runs down your streets in most cases. The 13.8kV is what goes around to substations and such. And much higher voltages for long haul. But this is all based on open air systems where you use lots of air as the insulator. I seriously doubt they use these voltages inside a ship or sub. Way too dangerous. So if 450V is the big voltage used inside ships/subs then you need some really heavy wiring to get the reactor power off the ship. Plus a transformer system to step it up to grid voltages. I'm talking wires that make fire hoses look small.

Now this could all be done if you plan for it. Things like a high voltage option on the ship generators with a special ship side opening to deal with the 14kV cabling out but I suspect it's just not worth the effort. It would greatly increase costs and weight on the ships and require some really huge transportable ground transformer systems to be available to be shipped around the country. I don't see our politics spending such money and the military agreeing to the hit to their budgets and ship performance.

1886:

Or put the transformer (or the first transformer) on the ship. Mines (not the world's driest places) routinely run high-voltage cables to power the drills. I've seen the plugs used for a 20kV three-phase drill — they're impressive, about on par with the cables I've seen tying freighters up in a port.

So I suspect that, in an emergency, power could be brought off a ship. It wouldn't be neat, but it would be possible.
It might be more efficient to use the ships to bring in generators and fuel, though. I wouldn't know until I ran the numbers for those (I'm a bit too out-of-date to have figures to hand, so I'm not going to try right now).

1887:

#1872 appears to have a small amount of actual content. Meanwhile, 1866, 75,77,78,79,80, & 83 All appear to be entirely content-free.

You what?

More generally:
"Our kind do not go mad" - well that's obviously because you are already totally off your head, I assume?
"We" - who is this we, white-man? I might ask.
"The Sun" repeated in CAPS - again - is this supposed to mean something?
Ditto the Mogwai - who are a cartoon/made-up group of some sort - I forget, already, but they also appear meaningless.
Tiresome, to say the least.

1888:

@Unholyguy
"In Solar + Grid, you generate power, use what you need, sell the rest to the grid. You don't store anything, and if existing solar isn't good enough you draw from the grid. In the event that the grid is not there, you still have power but only whatever power the panels are bringing in and you are dark at night"

I'd be unsurprised if the US system was different to the Australian system (based on European/British standards) but that's not how it works in Oz. If the inverter loses the signal from the grid it shuts down. (anti-islanding) There's no power during a blackout. That's vital so that the guys repairing the grid aren't fried. Battery/generator backed systems have to isolate themselves from the grid during an outage. There is special equipment, approval and inspection required for this.

@Heteromeles
Does every house with solar panels simply disconnect itself from the grid when the grid goes down, until a qualified electrician comes along to reset the connection (which is what happens now)"

Again, I'd be unsurprised if the US system did something so strange, but here when the inverter requires the signal from the grid it starts up again unaided (after waiting a suitable time to be sure it is really connected and not just a spurious signal. I think one minute is the minimum.)

1889:
I wasn't saying that one cannot be both, but if someone is an excellent plumber as well as a mediocre philosopher, I hope that person is better remembered for their plumbing than their philosophy. But actually what I get from this is that John Gardner really isn't as well remembered as he should be. For all that we talk about LBJ pissing on people here.

1890:
"You'd be AMAZED by the amount of real philosophers doing "working class jobs". They tend towards the Garbage Disposal industry, but plumbing, elec etc ain't unusual."

Now, now, that's close to revisionism. Plumbers and electricians never were working class - they were lower middle. Binmen and shelf stackers, I will pass.

"And, vice-versa, you'd be AMAZED at the amount of working class humans who are interested in philosophy and so forth. It's almost as if an educated and literate working class "never, ever, ever happened", and I AM 12 AND YOU ARE FUCKING SCUM."

I knew some of the last of the UK rural working class, and had a colleague from some of the last of the UK urban working class, and you are perfectly correct. The pub conversations were not like those at present.

I said "the last" and I meant it. The working class, as a class, disappeared in the UK in the first few decades after the second world war. What the Blessed Margaret created (and what we have today) was an underclass, which is not the same. Just as the upper class disappeared, and what we now have is a plutocracy.

1891:
Not quite
We do have a working class, but they are teachers & doctors & ordinary accountants & & ......
They may be being paid as much as £250k a year, but, in the view of people like the vile MEE (see other shibboleths thread) & Camoron & Corbyn & the Plutocrats they & all of us are mere working class, to be ignored & manipulated.
How's that for a "to the barricades" revolutionary statement, then?
Except, of course, that it'd do no good, but something, some of which you have so well-illustrated is seriously WORNG

1892:
Our existing class definitions are basically broken.
But if you want to rewind it to Marx in the mid-19th century?

"Working class" people are those who have to work for a living -- as opposed to being able to live off rents extracted through capital investment (while maintaining said capital without shrinkage: it's not the same as merely having a pension or savings account).

"Capitalists" are those who can live on the profits of their capital investments (FSVO "live" which includes maintaining their capital, i.e. it's not shrinking due to inflation).

Again, go back to Marx's day and the UK (pop: 25-30M people) had roughly 10,000 in a couple of thousand families at the top of the heap -- the ruling class -- who were major landowners or capitalist investors; about 2-3 times as many as that who were "middle-class" -- mill-owners, professionals (judges, academics, bishops, and the like), and the other 99% who were some gradation of working class or another. (Which AIUI covered about nine sub-strata, from the indigent all the way up to people we'd call upper-middle-class today: doctors, surgeons, shop-owners, engineers, and the like.)

1893:

Well, I got to watch an argument between SDG&E (the local power provider) and some solar people, about why solar was so dangerous after an earthquake. According to the SDG&E PR flack, solar would feed voltage into downed lines, thereby causing an electrocution hazard for their line workers. Therefore, SDG&E wanted the ability to shut down all solar panels in an area during an emergency, until they could turn them back on.

No even I know that electricians who touch downed lines without testing them deserve to be fired, and hopefully not through line voltage. According to a friend, his system cuts itself off the grid when the grid goes down, and then has to be reset once the grid goes up.

Given that this is political (in the sense that SDG&E is horribly afraid they'll be left maintaining a grid that people only want for emergencies, and this will be Bad For Profits. I'm not sure what the LA companies do), I'd assume that rooftop solar panels in southern California will island themselves off in the event of an earthquake, at least until the power companies get over the vapors they're currently experiencing.

1894:

Isn't part of the problem outsourcing?

Even in Marx's day, the bottom of the English social pyramid wasn't the working class in England, it was the indentured cane workers in Australia and similar less-than-free people caught up in input end of colonial capitalism. Of course, those slaves weren't owned by the wealthy bankers in London, they just owned the debts that had paid to set up the plantations, and so they got the interest that the plantation owners forcibly extracted from others' labor.

IIRC, the Soviets had to reinstitute something similar when the serfs on the former estates wanted to be treated like human beings, even if this crashed the Soviet economy of the 1930s. Since crashing
the economy wasn't an option, the the denizens of the farm collectives IIRC got saddled with something that wasn't much different than the serfdom they'd dealt with under the czars.

We've got the same problems today, although we don't see the migrant laborers in the farm fields, or the garment workers in the "developing world" factories, or any of the others who make our cheap food and cheap clothes possible. It's not all that different than the Roman bread and circuses routine, although it's supermarkets, discount clothiers, and the internet for us, which doesn't really have the same ring to it.

I guess this is why so many futurists hope for universal robot labor, and toil to automate all industries, so that all the unfree workers of the world can graduate to a life of useless striving after a livelihood in a slum somewhere, instead of being worked to death. It's a noble vision indeed. If only we could provide them cheap food, cheap clothes, and an internet connection in a sustainable way...

---

1895:

_We've got the same problems today, although we don't see the migrant laborers in the farm fields, or the garment workers in the "developing world" factories, or any of the others who make our cheap food and cheap clothes possible._

And if, as is more common than "anti-poverty" campaigners would have you believe, said garment workers are making enough to buy all their children a secondary education, and one or two of them a tertiary education, rather than just having enough to not starve, are they really in poverty, or bootstrapping their entire nation on your sneakers?

---

1896:

As soon as wages rise...


---

1897:

I wouldn't argue otherwise, beyond that the robots need maintainers, and the maintainers need qualifications.

---

1898:

"...so that all the unfree workers of the world can graduate to a life of useless striving after a livelihood in a slum somewhere..."

But that's what they do already. The world over. It's not something to be graduated to, but graduated from. Universal automation is one prerequisite; another is recognition of the uselessness.
1899:
Um, I guess the sarcasm didn't come through. Sorry about that. A lot of people have been surplused by automation, particularly in the agricultural sector.

1900:
A propos of many of our conversations here: WJW summarizing The American Slave Coast: A History of the Slave-Breeding Industry, written by one of his friends:

"The book follows the money—or at any rate the promise of money, since the United States at the time had very little specie and a lot of complex financial instruments to fill the gap. Southern banks invented what would now be called “collateralized debt obligation bonds”—which I thought got invented in the 1980s at Salomon Brothers—and which, like mortgage bonds in the early 21st century, sold little bits of slaves packaged for investors, and which sold to state governments and (for real silver) to English banks. And like the 21st Century version of these bonds, they were worth a lot, until very suddenly they were worth nothing at all. (Mississippi defaulted, leaving British banks holding a lot of worthless paper, and a lot of resentful bankers who subsequently took their ire out on the Confederacy. The Mississippi constitution actually forbids repayment of the debt.”

There's more details on Walter Jon Williams' blog (walterjonwilliams.net) and the book itself sound fascinating, if grim.

1901:
"If the inverter loses the signal from the grid it shuts down"
Thank you, I was wrong on that point it looks like it works the same in the US in the non-battery systems. It looks like some of the newer inverters have some imperfect workarounds but overall you seem to be down

1902:
Apologies to those caught in a massive projection of frustration:

At A 3% PER ANNUM GROWTH RATE OF CO₂, A 2.5°C RISE BRINGS WORLD ECONOMIC GROWTH TO A HALT IN ABOUT 2025.

Even if this estimate is grossly wrong it is still probable that

WHETHER THERE ARE GROUNDS FOR IMMEDIATE RESPONSE TO THE THREAT DEPENDS ON THE VALIDITY OF THE LONG MARKET PENETRATION TIME CONCEPT.

EVEN IF THE LATTER IS APPLICABLE, PRESENT DAY SIGNIFICANCE OF THE IMPACT DEPENDS STRONGLY ON CHOICE OF A FUTURE DISCOUNTING FACTOR.

NEED FOR IMMEDIATE POLICY ACTION HINGES ON THESE LAST TWO FEATURES.
In his conclusions section, Laurmann estimated that the amount of CO2 in the atmosphere would double in 2038, which he said would likely lead to a 2.5 degrees Celsius rise in global average temperatures with "major economic consequences." He then told the task force that models showed a 5 degrees Celsius rise by 2067, with "globally catastrophic effects."

Exxon's Oil Industry Peers Knew About Climate Dangers in the 1970s, Too
Dec 22nd 2015

TIME FOR ACTION ? MARKET PENETRATION TIME THEORY SAYS THERE IS NO LEeway

If you're wondering if this makes Paris look like anything but pageantry and farce, you'd be correct. Better pray that Big Oil [tm] really have been quashing fusion all along and will roll it out in about... oh... a month or so. Given the current price of oil (remember 2008 and that magic "this is the price which breaks the world economy?" - $147.30) this would be the only sane reasoning for current behaviours.

So no, I wasn't shouting at clouds or Moonbeams or Tinfoil salespeople; if the memos are genuine, thirty five years ago the API knew what was up.

~

1903:
"the book itself sound fascinating, if grim."
It is unrelentingly appalling and gripping, at least for the first 10 pages or so that I've read.

1904:
And if you want to buy my book, Hot Earth Dreams, you can see what happens after that.
Actually, I'm trying to figure out how to repackage the book after after Paris. Nothing's really changed, but the book now looks outdated 'cuz we did stuff and it's all different now, y'hear?
Anyway, if you want to hear what Arnold Schwarzenegger (a Republican businessman and former politician) is saying about climate change, you might want to check out his facebook post on the subject.

1905:
Tiresome, to say the least.

Perhaps you're reading and not listening. I'd like to point you to this video and suggest you treat it
as performance art. I am reasonably sure this is not CatinaDiamond in front of the camera, if only
because I don't think she's in Nebraska.

Some quotes out of context, such as there is any:

"I have two boobs, not six. I have six butts."
"Here is a monkey, and no you're not going to get it."
"You guys caused the death of somebody you should never-- oh wait a minute, I got marbles."

---

1906:

If the giant earthquake will just hold off for a bit longer then the Tesla Powerwall should make a
pretty huge difference to the situation. The level of interest in battery backed solar seems to imply
that by 2025 many and possibly most houses will have power during a blackout.

The other thing to consider is that while electric cars and motorcycles aren't specifically set up to
power houses (though they can be) they almost all have 12v output. Which for a few dollars means
you have charging for small devices and for a few dollars more means you can have low power AC
devices running, probably for days.

---

1907:

Somewhat related to this, I'm going to plug Greg Porter's game *Soft Landing*. It's not as simple as
*Black Death*¹, but it's fun once you get your head around it. Frank, I suspect you'd have issues with
some of his premises, but you still might enjoy it.

http://www.btrc.net/softlanding

For completeness:
http://www.btrc.net/blackdeath

Both are print-and-play games. You buy the PDF file, print the components, and play the game.
Very good production quality.

*Which my father, an epidemiologist, said managed to convey many key ideas in a simple format.

---

1908:

Oooh.

That was perilously close to a #GamerGate level of snark regarding "Listen and Believe".

Some concepts:

#1 Churn / Burn

#2 Meta-Meta-On-The-Wall
#3 If you didn't notice, there was something a little bit odd about the whole InCase thing. Men becoming Women is Glamour's "Woman of the Year", Time went with Merkel. When Trap is all about Men only being Women with a cut/paste (irony intended) addition.

I'm still entirely ambiguous (not the Gay Duo) about futanari and what it represents; you need to know a mind-boggling diversity of Japanese sub-genres and influences to even start prodding at it. However, if you need a short-hand, it certainly represents something about the differences in attitudes to Transformation and Fluidity[1].

If you quail at that, wait until you meet Monster Girls Note: That's a Reddit Link, also vastly NSFW and probably will leave you confused.

#4 Linking said video is a bit silly. Context is all: as you can probably tell if you're not snarking, I'm quite able and happy to work in your preferred Mental Schema Style[2].

Swim in the Hotel Pool [reference to CM piece, probably not read it], The Pool has AIDS [hai!] and Gender Spectrums and Biology [XX, YY, XY, and To The Moon from there].

You'll note I've not demanded you change your communication style the Other way. [Spoilers: You probably can't].

~

Anyhow. You missed the obvious reference:

"Are you not entertained?"

And probably the reasons for using it. (The Hector gag is good if you know why it was used in the film and then think back a little).

~

So, Scott.

From a video where you made a crappy "LOL WOMAIN R LIKE CRAZY, ARIRIGHT?" I took 7 minutes to give you a fecundity.

Going to do anything creative with it?

[1] Cronus learned from Gaia and Uranus that he was destined to be overcome by his own sons, just as he had overthrown his father. As a result, although he sired the gods Demeter, Hestia, Hera, Hades and Poseidon by Rhea, he devoured them all as soon as they were born to prevent the prophecy. When the sixth child, Zeus, was born Rhea sought Gaia to devise a plan to save them and to eventually get retribution on Cronus for his acts against his father and children. Yeah, you
should probably be a little bit scared about what was actually said. Especially what Cronus did to his father.

*Gaia created a great stone sickle and gathered together Cronus and his brothers to persuade them to castrate Uranus.*

*Only Cronus was willing to do the deed, so Gaia gave him the sickle and placed him in ambush. When Uranus met with Gaia, Cronus attacked him with the sickle, castrating him and casting his testicles into the sea.*

Then again, using the original Greek was probably a signifier that things were getting kinky.

[2] If you're able to work through bureaucracy that quickly, chances are your mind can process Accounts, Auditing, Code, Formal Logic and so forth. Yes, really: took 4 mins or so to hit the data from a cold start. Meep Meep.

1909:

And yes:

China's piece certainly knows all about 4chan memes and was deliberately warping the "The Pool has AIDS" invasion with a real life example[1]. (The "beta revolution" is 100% a knowing reference to certain trends: then again, missed the 8chan switch, but you can't have everything).

He's a very sexy boy.

Not that I've seen anyone else publicly get the joke. (but I have seen people just totally missing the point of it).

Who said Comrades have no humour?

[1] To explain: Habbo Hotel. 4chan raids back when raids were just anarchic funny Mogwai stuff. CM 100% knows this, and then switches in a (true story TM) case where the oppressed underclass of a society run for the benefit of Western Tourists (the old "Hotel Compound" meme, might want to look it up - you can still stay in a 5 star Hotel in Syria, Rwanda or Iraq, commerce never ceases) gets to break in... and use the pool.

Glad to educate y'all a little a little.

1910:

Honey-bun.

Never link to Facebook. It's cancer and horrible. Our kind avoid it (and the shadow profiles). All it does is mark you as not actually engaged with what's going on - same deal as marking .mil links as being what they are. Respect for your more covert readers.
As for Arnie: I'm well aware about his new crusade (and his time as governor, and the dodgy energy deals, strangely that doesn't get as much press. ENRON, still not stopped giving).

If you want to do it properly, link the video, the original one, the July one:

July 21st.

Of course, finding that one is hard now that everyone is gaming the algos.

you can see what happens after that.

Not wanting to poke you too hard, but I made it to M.Sc. / PHD levels. (We just like to play around).

I know what happens next.

It's not very pretty - and, considering the link (22nd Dec 2015) I just threw you, a choice has already been made. Storm Front would orgasm at it, if they weren't also on the chopping block.

I was using the term "gigacide" back when 9/11 hadn't even happened.

p.s.

You might notice my obsession with Cetaceans. Remember when Flipper was there, Gibson based his hero on real world stuff and various PTBs have had to refinance their trained mine assassins. Not even imagining the Israeli Death Dolphins that peeps worry about. Meep Meep.

1911:

*It looks like some of the newer inverters have some imperfect workarounds but overall you seem to be down*

I wonder if this is a requirement or just what happens if you don't install another $100 to $500 in a cutout circuit. It's almost trivial to wire up a circuit that will open up the main breaker(s) if mains voltage goes away for more than a few seconds. And would require a manual reset that only works if the mains is up.

Home generators actually require a manual throw to keep the generator power off the mains coming into a house.

1912:

Thanks Robert, that looks interesting.

In any case, I'm not totally wedded to my premises. Indeed, I'll be thrilled if it turns out I erred on the side of too pessimistic.
1913:

I've quite liked many of Greg's games. If you're looking for fun card games, there's Dumbass and the even more scatological F*ck This, which are simple and play quickly.

If you want silly, try this one:
http://www.btrc.net/azta

"Alien Zombie Tentacle Apocalypse. You don't have to outrun the monsters, you just have to outrun the other players."

But I think you'll appreciate Soft Landing. I've been trying to figure out a way to make it simpler, for use in school, but without luck as it's the potentially complicated interactions that make it interesting.

1914:

That was perilously close to a #GamerGate level of snark...From a video where you made a crappy "LOL WOMAIN R LIKE CRAZY, ARIRIGHT?" I took 7 minutes to give you a fecundity.

No. Subtle modes such as snark and sarcasm are famously poorly communicated over the internet - even when the participants are intelligent people.

To unpack it, as is occasionally done for your own posts, the woman in the video is not insane or incoherent; she is being unusually clever. Notice as evidence the contents of her purse - the things she pulls out are there when she needs them and are appropriate to what she is saying; neither her props nor her words are random. Unlike the routine business raised by the man before her, the council is going to remember her presentation.

It wouldn't have been out of character had she said, "Our kind do not go insane."

1915:

Here's something to give added fun and games to a ShakeOut earthquake scenario: There might be a correlation between the Cascadia and San Andreas faults - with a major Cascadian event being followed by San Andreas letting go (1906 being an exception). A magnitude 8+ earthquake with associated tsunami in the Pacific Northwest, followed by a similar magnitude earthquake in LA within a couple of years could add extra stress to response systems.

1916:

Ahh, love you.

Hoisted by my own petard of not actually watching it all.

I shall go re-watch it, paying more attention.
Being wrong is a good thing, sometimes.

1917:
I'm used to the UK generator UPS systems, where we have mains feed, a battery that can support the structure/site loading for several minutes, and a generator pack that can support the site load and recharge the battery. Switchovers are completely transparent both ways, unless you're within earshot of the hydrocarbon engine for the generator.

1918:
"Our existing class definitions are basically broken. But if you want to rewind it to Marx in the mid-19th century? "Working class" people are those who have to work for a living -- ..."

Yes. Though, in the mainstream use of the term, it was only the bottom end of that. But the point was that it was a class (ignoring the manufacturing/agricultural/service/etc. differences), with a degree of commonality in social structure etc., which was very different from the other classes. As you say, completely unlike today.

My observations, which could well be wrong, is that the plutocracy is fast turning into a class in that sense. Academia and related areas seem to be undergoing a schism into the wannabee/budding low-end plutocrats and the top of the middle (Marxist working) class.

I have no feeling for what is happening with the underclass, except that we are sitting on a powder keg. An increasing amount of the more essential work is being done by immigrants, and I get the impression that a serious recession would make almost all of Thatcher's children unemployed and unemployable. That's a recipe for trouble.

1919:
Charlie
Agree 150%
Which is why I get so annoyed with "marxists" today - they insist on using the old definitions & pretend nothing has changed - in other words, it's a religion.
I then get called a fascist collaborator by said Marxists, of course, because they refuse to see it - not can't - won't.

However, to quote a n other revolutionary:
"What is to be done?"
( Without killing lots of people, please? _

1920:
Life is too short.
Write it out, clearly - which is my problem with CD.
Thank you, nonetheless.

1921:

We just had a serious recessions. What happened to Thatcher's children was that they were made redundant, and many managed to find new jobs at lower rates of pay. Others, in order to avoid the relentless pressure to get a non-existent job, set themselves up as self employed, but overall couldn't come anywhere near the wage levels they had enjoyed previously.

Net result was several million people with lower paid jobs than before the recession. A few of the plutocrats at the top got more money, but the middle class were hollowed out some more. For the ultimate example, which is what our current government wants, is the USA. Or maybe a bit of China. It's tricky; plutocrats come in different flavours, some, as we see in the USA are against personal choice and freedom for example sex and abortion are bad to them and they campaign against them. Others are more socially liberal but still think the current system is great.

1922:

I don't think the plutocrats are a hive mind. I mean we in the West are far richer than, say, most of Africa. However, this doesn't stop us from engaging in very idiotic doctrinal disputes or following baffling intellectual fads. I don't think that the great wealth of the plutocrats changes that.

For instance, I think a lot of plutocrats would prefer the world to be more like China: rich enough to buy the goods and services that they produce, but not rich enough to avoid dangerous or demeaning tasks. The good news here is that those don't like Africa's current poverty anymore than they like the EU's current level of wealth.

Others might not actually care about the level of wealth the middle class experiences. They might just believe that societies were employment patterns don't change rapidly (due to automation) are societies which stagnate.

Another possibility is that some plutocrats don't care about the level of societal wealth. They just care about their own status and will do anything to maximize it.

In short, I'm skeptical of thinking of the plutocracy as a class in the Marxist sense of the word.

1923:

Ack, now you've got me looking at the entire west coast.

That said, there are four (4!) plates involved: the North American Plate, and from south to north, the Pacific Plate, the Gorda Plate, and the Juan de Fuca Plate.
The Cascadia subduction zone is where the Juan de Fuca plate is subducted under the North American plate, and when that material boils, the distillate comes out through the North American plate as the northern majority of the Cascadian volcanoes.

The San Andreas fault is where the enormous Pacific and North American plates are sliding past each other, with the Pacific plate moving north relative to the North American plate. Notice that this motion is perpendicular to the motion of the Juan de Fuca plate?

The little thin Gorda plate is in the middle, and it's moving parallel to the Juan de Fuca plate, subducting under the North American plate, and creating the Californian Cascadian volcanoes in the process. Fun stuff.

The little problem is that all these plates are moving in different directions, so what happens when the Gorda plate meets the Pacific Plate? That's an area called the Mendocino Triple Junction off the coast of California, and it kicks up its own rather large earthquakes (the biggest recent one was 7.1 in 1992).

It would be nice to think that you could have quakes down on the Mexican border triggering volcanic activity near Seattle, but so far as I can tell, what happens is that when the Pacific plate moves relative to the Gorda plate, the Gorda plate seems to buckle. It will kick up its own earthquakes and tsunamis to relieve this strain, but since there's no solid connection between the Pacific and Juan de Fuca plates, I'm not sure that strain on the Pacific Plate can cause strain on the Juan de Fuca plate. That's probably a good thing—the coast will not be altogether toast.

Oh well, fun looking that up. If you want a simpler and more probable disaster, just look up what happens when Mount Rainier erupts. That should be some time after all the refugees from Los Angeles are wetbacks crossing the Columbia River, looking for a new life in El Norte.

1924:

*I have no feeling for what is happening with the underclass, except that we are sitting on a powder keg.*

David Frum has some observations about that in an article analyzing what's currently going on in the GOP (and elsewhere):


1925:

I figure the neglected case is the Great Basin. There's evidence of really large ground displacement earthquakes there prior to european settlement. It might also be coupled to one of the coastal plate-boundary faults.

1926:
What ticks me off in a sci-fi novel or any novel for that matter is 'dialect'. I'm reading the januari dancer at the moment. The dialect the writer uses takes the flow away from the book. I'm enjoying the book and there is some sentence that leaves me thinking 'huh?'. It may not be much of an issue with a native english speaker but for me it makes a book 'hard yakka' instead of something I enjoy.

1927:
That's not a dialect; that's Irish-English with a light sprinkling of gaelic (the Irish gaelic, not the Scottish).
And you know something? I bet you like your bread and rice white and your beer weak and fizzy too.

1928:
Could be worse:
https://en.wikipedia.org/wiki/Feersum_Endjinn

1929:
I know it's factual that various people had a lot of trouble with the Bascule parts of Feersum Endjinn but I have never managed to believe it.

1930:
I read a comfortable 600 words a minute. I do it by looking at the shape of the words. Feersum Endjinn fucked it up completely and made reading an utter pain - like it was at primary school mouthing out the sound of the word from the letters.

1931:
Well, I hit the first of "his" chapters at full speed, and almost bounced. I readjusted fairly quickly though when I realised that he was writing phonetically.

1932:
I read quite a lot faster than that, and do it by taking in multiple words at once. I agree, redoubled in spades - some critical sections I couldn't decode at all and had to skip. It's the only book of his that I both started skimming part-way through and then jumbled immediately afterwards.

The interesting thing is that I (and most other people I know who speed-read) have relatively little trouble with older English, even back to Chaucer, and most dialects and language variants; but we
can't handle that sort of thing at all. It's like English written by a severe dyslexic, which I have had to do a few times - I was and am prepared to put the effort in in those cases, but not when it is a gratuitous affection.

1933:

It's like English written by a severe dyslexic, which I have had to do a few times
Which is exactly what Banksy was intending; to produce prose which was understandable, but appeared to have been written by a dyslexic.
- I was and am prepared to put the effort in in those cases, but not when it is a gratuitous affection.
? Did you mean "... a gratuitous affectation"?

1934:

"It may not be much of an issue with a native english speaker but for me it makes a book 'hard yakka' instead of something I enjoy."

It sounded to me like Ro67 isn't fluent enough in English to cope with non-standard vocabulary etc. Something I sympathize with, remembering the problems I had with Quebecois French after eight years of standard French in school. (Ie. same language, but different enough to be incomprehensible because I wasn't fluent enough to follow and figure out the different bits from context.)

1935:

And you know something? I bet you like your bread and rice white and your beer weak and fizzy too.

And I like my english The American Way because only the best is good enough.

1936:

Feersum Endjinn

That would be a she-dog, even for native speakers!

1937:

Late for the party, and apologize if someone brought this up already -- too many comments to wade through. :(

Having said that...

I do not believe that everyone (or even most) at Volkswagen were evil. Much more likely, the following dynamic was in play:
It is entirely possible to set up health and/or safety standards which are either unachievable, or so difficult to achieve as to make the product completely unaffordable. For example, if there were a requirement that any book sold must emit *zero* ionizing radiation, detectable by any means, then the cheapest paperback would cost thousands of dollars.

Now, I am not saying that US diesel emission standards are on that level of stupidity, but if VW engineers *believed* they are, then their behavior is completely understandable. Engineers tend to have very little tolerance for this kind of bureaucratic stupidity, and if they thought that American emission standards are bone-headed -- or worse, designed as an underhanded way to keep out German products, -- then they probably saw cheating on emission test as downright virtuous, and themselves as Robin Hoods of sort. Especially if the cars in question did meet *German* emission standards -- "If it is good enough for us to breath, should be good enough for everyone else!"

Now I am curious to find out what are German standards for diesel emissions, and whether the cars sold in US did meet them.

1938:

Well, this is the best I'm prepared to do unless you're prepared to buy me wakey wakeys and paracetomol! ;-)  

1939:

It may be simpler than that. The engineers are told: these are the tests, make sure it passes them. Now, what precisely is the problem?

1940:

VW diesel engines did not just fail to meet US standards -- they contained software designed specifically to *deceive emission testers*. That's not a normal part of automotive engineer's job description.

1941:

Well, there are a couple of problems here that make the VW engines a managerial problem.

First, IIRC, the software was set up to pass the emissions checks specifically when it sensed, in two different ways, that its car was on a testing rack, and to tune the car in a way that would fail the tests otherwise.

Secondly, the car, in its emission-failing mode, was reportedly a lot more fun to drive: high mileage (MPG), high acceleration, and so forth.
The third part is that there's apparently a whole after-market industry of black boxes that you can plug into modern car computers to get similar effects--e.g. better performance at the cost of failing emissions tests. Since the emissions tests assume a car is a car, while the after-market stuff is basically software, the law is totally outdated in dealing with this hack.

But getting back to VW, the critical thing is that their cars are not designed to meet all three criteria: pass emissions tests, have high mileage, and have good acceleration. And worse, they were sold on the basis that they had all three.

Apparently, if your VW diesel passes emissions tests and have good mileage, your acceleration will suck. This means that everyone who owns a cheater car basically has a hunk of junk with a tragic resale value, unless someone figures out some magic software and/or a new engine to drop in that will actually do what it was supposed to. I believe there are class-action lawsuits to this effect right now.

Since this scandal involves engine design, software design, and marketing, it's impossible to believe that high level managers weren't involved in the cheater design as well.

---

1942:

Oh, I have no doubt that high level managers knew exactly what they were doing. My point was that low-level people who actually wrote the cheating software did not have to be evil -- it would not be very difficult for the said managers to convince the engineers "it is for the greater good". hence no whistleblowers.

---

1943:

AND ALL subsequent posts up to # 1942
Err .. standards.
The German equivalent of the British Standard (BS - as in B-ull S-hit) is ...
DIN = Deutsche Industrierte Null
( If I have that "korrecr" - German Industrial Standard )
But, as in Britain, those initials have a n other meaning: "Das ist Normal" ( "That's right!" )
So, only too plausible an explanation or set of explanations, especially since it appears that the US so-called "standards" were deliberately set-up to dis-favour "small" engines - i.e. non-US-manufacture.
Politicians & Engineering do not mix.

---

1944:

5s in Wikipedia later, Deutsches Institut für Normung which translates as "German Institute for Standardisation".
1945:

"If it is good enough for us to breath, should be good enough for everyone else!"

The cars produce more than triple the then current Euro standards and eight times the Euro standard since September 2014. So they were intentionally poisoning their own children.

I didn't give up the idea that everyone is good in their own eyes and the hero of their own story easily. I was dragged kicking and screaming to abandon a dearly held idea.

The idea doesn't fit the observed facts. As Feynman says, "It doesn't matter how beautiful your theory is, it doesn't matter how smart you are. If it doesn't agree with experiment, it's wrong."

1946:

Oh, and that also refutes the racist card that's been played. They weren't heroes who where just circumventing some racist plot by the US that was designed to make life hard for the Germans.

1947:

Perhaps their excuse was "well, if we don't do it, the aftermarket will?"

I think the key phrase here is "banality of evil." There's always a good enough reason to do stuff like this. It takes guts to do the right thing, as in career-ending guts in this case.

What's interesting is that goodness isn't banal. It takes real guts, because you're not hiding behind a weapon, you're totally vulnerable. It's taking in the refugees, even when we're not sure where they'll fit. It's non-violent opposition, people going to their knees to pray, when their opponents are trying to scare them into running (that was a favorite MLK technique).

This is also a big SF shibboleth, the idea that there's no difference between the good guys and the bad guys, except that the good guys are fighting on the side of good. Both sides uses light sabers and blasters, but one side is doing the right thing.

Real-world Goodness has different tactics. Unfortunately, it's seldom found in SF.

It's deeply ironic that, despite so many people claiming they're Christian (turn the other cheek) or Muslim (peace be upon them), they want their fiction with a battle, Christ with a flaming sword at the end times, or God selecting his chosen leader to unite the faithful wandering in the desert and found a kingdom of righteousness that takes over the world (or a galaxy) and brings justice to all.*

So much violence, but if it's labeled as good, then it's all good.

And the opposite is grimdark, where everyone's evil. But all the goodness gets left out of that too. I think that says something about the publishing industry these days, too.

Yes, I know it's supposed to be about emotional catharsis, getting all that frustration out. It's also lazy story-telling, and it gives SF a deservedly bad name.
*Interesting how a really historical antecedent for the Triumph of The Chosen One is the story of the Prophet Mohammad and the founding of the first Caliphate. Talk about filing the serial numbers off.*

---

**1948:**

"Perhaps their excuse was 'well, if we don't do it, the aftermarket will'?

Yep. I hear the same thing with the real issue that I was getting at. "If we don't [dig up every last kg of carbon and burn it for the profit of this media outlet's advertisers, thereby ending civilisation] the Chinese will"

Which is why I despair most days. If we can't stop these aliens when it's in contravention of specific legislation what chance have we got when it's only against common law? None. They have all the lawyers, law makers and media on their side.

So much death, what can men do against such reckless greed.

---

**1949:**

*If top readers read at speeds of above 1000 words per minute (wpm) with near 85% comprehension, they only represent 1% of readers. Average readers are the majority and only reach around 200 wpm with a typical comprehension of 60%*

I'm amused.

You're hitting the Chess Prodigy Problem:

Playing X number of Chess Games in Parallel is merely a matter of memory.

Most younglings these days have 2-6 information sources open at once, in totally different medium. Which denotes intelligence?

Hint: my WPM depends on modal context. A far more important part of it is panning like a gold-digger and then cross-indexing to 45 other texts.

And then making music.

*nose wiggle*

---

p.s.

New Year present. Let's have an depth discussion that's still within the remit of the Post that hits 2000.
Chinese researchers from the Universities of Zheijang and Hangzhou Dianzi have developed a neural network co-processor called Darwin aimed at running complex intelligent algorithms on small devices for tasks like pattern recognition, automatic control, signal processing, decision support system and artificial intelligence.

China researchers develop Darwin NPU 23rd December 2015.

p.s.

It's a Field, not a Page.

1950:
Perhaps their excuse was "well, if we don't do it, the aftermarket will?"
Well, I do know of EU companies that can modify out Selective Catalytic Reduction systems, but that's actually legal under EU laws which only require them to be active for official testing (never done post-registration) and fitted (but not demonstrated to be active) for annual (or bi-annual; varies by nation) roadworthiness testing.

1951:
If top readers read at speeds of above 1000 words per minute (wpm) with near 85% comprehension, they only represent 1% of readers. Average readers are the majority and only reach around 200 wpm with a typical comprehension of 60%

I call complete Male Bovine Faeces on this. Firstly, it's not a quote, and secondly, if we assume reading speed to be a normal distribution, you're just said that ~1/3 of the population are illiterate.

1952:
That's a pull-quote from the most popular WPM training software on the market.

You should probably look into the % populace who have a functioning reading age of 5th grade / 12. (It's about 20%)

Illiteracy /= Reading Comprehension.

You should also probably realize that 1k+ WPM is... unusual.

Center For Kids Who Can't Read Good [YouTube: Film: 2:33]
1953:

*Chinese researchers from the Universities of Zheijang and Hangzhou Dianzi have developed a neural network co-processor called Darwin aimed at running complex intelligent algorithms on small devices for tasks like pattern recognition, automatic control, signal processing, decision support system and artificial intelligence.*

As usual, XKCD got there [a few days ahead](https://xkcd.com/). How does he do it?

In any case, this is the cheap version of uploading your brain. Someone trains a NPU (in this case) to perfectly emulate you in all your online interactions. When you die, this emulation carries on as you. It's uploading as a combination of a neural network and ID theft. What could possibly go wrong?

1954:

It may be quite simple: This is how the test is done, create the s/w to pass the test while maintaining maximum engine power and fuel economy.

1955:

That chip is built using extremely lo-tech semicon processing in the hundreds of nm. It could in theory be made almost 100x denser with cutting edge tech. And probably is, by someone somewhere.

1956:

Oh, you SCAMP!

You know it is!

1957:

He works for MIT (or, er... yeah. Stick with MIT) or NASA or Someone.

Everyone gets pre-OP data before the press leads with it, usually in symposiums.

The China stuff is just hacky compared to.

Well, Dirk.

You're infield here.
Xmas present, show us your knickers.

1958:

That's a pull-quote from the most popular WPM training software on the market. Or, as those of us who don't spend all day looking at software marketing puff call it, a non-sequitur.

1959:

No.

It was a meta-comment on two posters pulling their willies out to state (without proof) of their reading skills.

Definition of Degrees: Msc = More Shit etc etc

1960:

"if we assume reading speed to be a normal distribution, you're just said that ~1/3 of the population are illiterate."

Yeah, that's about right.

"just over one-third (36%) were below level 3 in all four domains"

So over a third of people were level 1 or 2 in all four measured domains. So functionally both illiterate and innumerate. Just illiterate is about 45%.

16% are completely illiterate. They fail to meet: "Knowledge and skill in recognising basic vocabulary determining the meaning of sentences, and reading paragraphs of text is expected."

22% are completely innumerate. They fail to meet: "carry out simple processes such as counting".


1961:

I missed out one of the links


1962:

Lots

But - here we go.
That really does look like the start of genuine AI, does it not.
I note not one processor, but "a neural network co-processor"
Now, parallel several of these together &... kep it interested?
Stand well back, too.

1963:
At a ballpark guess, we need about $10^{10}$ neurons for the Human brain to work properly (we have about 8x that number).
"The Darwin NPU is fabricated by standard 180nm CMOS technology with the area size of 5x5 mm$^2$ and 70MHz clock frequency. It resembles a simplified animal brain and can support a maximum of 2048 neurons, over 4 million synapses and 15 possible synaptic delays. It consumes 0.84m W/MHz with 1.8 V power supply for typical applications."
So make it using the 12nm node and crudely assume we can drop quarter million neurons on a chip. We would need 40,000 of them to approximate minimal Human brain with a 2kW power supply.
Early days. You should see what arrives circa 2020

1964:
And one other thing... repeat after me... "Moore's Law is over..." "Moore's Law is over..." "Moore's Law is over..." "Moore's Law is over..."

1965:
I suggest that you need to work on your comprehension skills and/or learn a bit more about the mechanisms people use for reading. Your responses show that you have completely missed the points being made, and hared off after some red herrings of your own introduction.

1966:
Did you mean 40,000,000 chips?
I probably did the math wrong, but it looks like 40,000,000 chips would consume about 4,000 watts, so it's still kind of energy inefficient compared to our bag-o'-glop version. And wiring the chips together would be a fun exercise too.
Good times.

1967:
Upscaling to a modern process can increase density to about 250,000 neurons per chip each, 50mW per chip. 40,000 chips brings us to a 10 billion neurons. The 180nm process they uses is *ancient*

1968:
"If we can't stop these aliens when it's in contravention of specific legislation what chance have we got when it's only against common law?"
Use the regulatory apparatuses of big countries to encourage ruthless competition in alternative energy technologies. (Carefully consider including nuclear here.) The lower the price of alternative energy, the more fossil carbon stays in the ground. Similarly, encourage competitive work towards viable alternative non-carbon-spewing power sources for vehicles.

Single countries can (selfishly) do this, to gain a competitive advantage for their industries, but the benefits can be global. (And selfish behavior is relatively easy to encourage.)

There should be a proper treatment of this in the economics literature by now.

1969:
Also perhaps of interest (literally on my to-read list today/this week) is "Architecture for Causal Intelligence at Nanoscale", IEEE Computer, December 2015. Bayesian Net evaluation in hardware. This is not exactly what's in print, but seems to be very close: https://www.umass.edu/nanofabrics/sites/default/files/IEEE_computer_v8-4_Aug21_0.pdf
And other similar papers at that lab.
(Q to those who might know, interesting or not?)

1970:
The interesting bit is this:
"Based on bottom-up simulations, we show four orders of magnitude performance improvement vs. best-of-breed microprocessors..."
So although the new architecture won't do much for speeding up MSWord, AI will benefit enormously. And that's where huge amounts of money are going now. The AI Winter is well and truly over - summer is coming!

1971:
Of course I have.

1,000 WPM for someone (presumed) over 60 is incredible.

Your mind would have been amazingly sexy @ 20.
But you probably didn't want me to start gushing over your Grey Area so I went another way.

I was trying to get Dirk to link to the newest stuff out of Europe (BLUE) and so on. As he says, the China stuff is fairly out of date.

1972:
No the China stuff is new. What they have shown is it working using a very old process technology. My suspicion is that they are also implementing at cutting edge, but not reporting it. If so, they are going to be able to get connectivity comparable to the Human brain by the end of 2016

1973:
Like I said ... "here we go" & you said "2020" - all of 4 (5?) years away?

1974:
"I didn't give up the idea that everyone is good in their own eyes and the hero of their own story easily. I was dragged kicking and screaming to abandon a dearly held idea."

One way to hang on to what seems like your reasonable belief, that everyone sees themselves as the hero of their own narrative, is to compare the VW managers with U.S. bootleggers, speakeasy operators and the huge part of the public flouting the law by consuming alcohol during Prohibition. With hindsight the whole dry agenda was unworkable and unreasonable, also unhealthy given what's known now about cardiac health and moderate ethanol consumption. There were a few genuinely evil bootleggers like Capone, but even he famously touted himself as a champion of the downtrodden. If VW managers really think the emission standards are as wrongheaded as Prohibition was, then deliberate evil doesn't have to enter the picture at all, just the observation that every stink fighting the ventilator thinks it's Don Quixote.

1975:
Well, no, you haven't understood. Perhaps I had better explain from the beginning, to explain the background.

(Most) English-reading children of my era were taught phonetically, but were moved onto the direct recognition of words as patterns as soon as possible, often before the age of 6. And, as someone
says, that skill was claimed to be essential to basic literacy (though I am NOT asserting that). A few people go beyond that, and start to read groups of words at once - typically up to about half a line (fovea angle), or a line in a newspaper. No such person verbalises when reading, even mentally, of course. A very, very few people read blocks of text and decode them in parallel with scanning the next block. Obviously, one needs to backtrack when the decoding indicates that it is needed.

OBVIOUSLY, when the content is less than trivial, the reading speed needs to slow down to the level required for understanding; committing to memory is also a slow process; but THOSE are the limits and not the reading speed. Simple fiction and simple news/descriptions can be read, in toto, at incredible speed. It's amazing just how little information there is in a huge variety of prose, in addition to the usual redundancy of English text. 90% prolixity is not rare. I am currently reading "How Many People Are There In My Head? And In Hers?" :-(

Complicated text (technical, foreign or an unfamiliar dialect or language etc.) obstructs the multiple word scanning (except in simple cases), but such people NEVER drop back to spelling words out; the skill has decayed to nothing. My main point was that 'natural' spelling variations, as in normal misspelled English, most dialect forms, Elizabethan English and even Chaucer, don't obstruct the pattern-recognition to the same level as artificial misspellings, such as Feersum Injun.

To have to ask oneself "Which of the possible pronunciations of each syllable might the author have used?" followed by "Which combinations of pronunciations makes a word that fits in context?" when one doesn't verbalise naturally, means that one has lost the thread by the time one has decoded a paragraph. Inter alia, it's possible to speak the correct word aloud, and not recognise it, because that ability has been forgotten! And, OBVIOUSLY, people who still verbalise will not have the same problems.

1976:

Yes. The various brain emulation and exascale projects have target dates 2020 or so. However, I think China will get there first. Like I said, there are *huge* amounts of money being poured into all this.

That's why Google payed (IIRC) some $800m for a 2 year old startup with about a dozen employees.

http://techcrunch.com/2014/01/26/google-deepmind/

What China is doing is a lot less public. However, extrapolating the capabilities of that chip to a modern process puts them almost at the finish line in hardware terms.

Nobody yet knows whether this is a viable route to AGI, but if it is coming second is a fail.

1977:

Yep.

It took me 2 minutes to puzzle out the title. I think I'd get to better than that once I realised that was what the writer was doing, but not much.
1978:
I read as you describe (large word groups, not quite text blocks, ability to scan read and recognise key phrases in a paragraph); however, I don't feel that I ever lost that reversionary mode of phonetic sounding (perhaps because I was studying French and Latin throughout my time at school).

An excellent example would be to read Irvine Welsh's excellent book, "Trainspotting" - phonetic understanding at the start, but likesay hauf wey, you'll be back to word groups and reading faster than you could verbalise...

1979:
You would. I read it, but it was bloody tedious, and I lost the plot and context, repeatedly, while decoding it. Normally, I reread books, but I jumbled it immediately. Amusingly, I misspelled it, and it's actually Endjinn, but a Web search indicates that's an incredibly common error by readers :-)

1980:
My PoV is that we need experimental work in order for arts (including writing) as a whole to develop and move on, but that it's also part of the nature of experiments that some are more successful than others.

(Second person narration? That's experimental but it worked for me.)

Of course, in the arts whether something worked or not is a lot more subjective than in other fields. Most conceptual art is for me a waste of time with no enduring depth, but it springs from the same sources as Dadaism and Surrealism and many other movements, and I try not to be too dismissive of those people who do think it's of no value.

1981:
I have no objection to that, but I demand my right to say that it is pointless crap. There is an ancient principle that exceptional tricks should be reserved for when they are needed, and used sparsely even then. And, as my postings imply, my judgement is that Banks both ignored that principle, and either failed to realise that "misspellings" have patterns of their own or misjudged what they are.

Dyslexia is is different. It is complicated, often occurs at a higher level than simple spelling, and can even be solely on input or solely on output. It rarely (if ever) shows up as simple phonetic misspelling. Feersum Endjinn was as hard to read as something by an extreme dyslexic (been there - done that), but was completely unlike anything one would have produced.

Hell, even Jove nods - so, he muffed it (according to me)? Well, nothing venture, nothing gained. That's the risk of pushing the boundaries (been there - done that - too). But damned if I am going to joing the adulators.
1982:
If we have a chip-based neural network that's as complicated as a human mind, does that mean that it's going to take it 20 years of intensive training to become a fully functioning adult?

1983:
Personally, I want to see a story written in the second person plural, just to demonstrate that it can be done.

Thing is, there's a bit of diminishing returns in the experimental portion. That is, unless someone trips into a new area that's worth exploring, as when Harry Potter introduced the idea of YA literature and cut off the well-spring of science fiction (that golden age in the early teen years). Still, over time, the chances of an experiment succeeding wildly seem to go down.

Sixteen more comments to 2,000. Can we do it?

1984:
"Sixteen more comments to 2,000. Can we do it?"
Well, if you post, er, gross terminological inexactitudes, such as "as when Harry Potter introduced the idea of YA literature", and I am sure of it.

1985:
That's what I'm hoping :D

1986:
Well, I have opined (and in print before, without being sued) that Tracey Emin and Damian Hurst have workshops at Yetts of Muckart!

1987:
*does that mean that it's going to take it 20 years of intensive training to become a fully functioning adult?*
And another 10 to 20 years before it shows a bit of wisdom and understanding?
1988:
No. But even if it did, after 20 years you have an AGI that can then be replicated by the million. Still a pretty good tradeoff.

1989:
*Personally, I want to see a story written in the second person plural, just to demonstrate that it can be done.*

You haven't read "Rule 34", then?

If you want really hard, try writing fiction in the second person future pluperfect! Now that's hard to do.

(I, too, am committed to the death march to the 2000th comment, if this bloody cat would only stop trying to eat my elbow while I'm typing ...)

1990:
*And another 10 to 20 years before it shows a bit of wisdom and understanding?*

You mean before it might show a bit of wisdom and understanding?

Given that I'm still living with the aftermath of Rob Ford, I can confidently assert that wisdom and understanding are not automatic emergent properties of human neural networks.

1991:
Human neural networks exist in configurations actively resistant to wisdom and understanding. *Doctors of the Church* famously self-diagnose as having neural networks actively resistant to wisdom and understanding. (That is, someone who is highly educated and views wisdom and understanding as not merely laudable but necessary.)

I really wish the ideas that you can automate only what you can precisely specify, and that "precisely specify" is hard for social and political reasons as well as technical, were more widely understood.

I could really wish the implications of a thread where capable people diverge wildly on the legibility of a variant text presentation caused reconsideration of a faith in general intelligence, too.

"Lots of neurons" is interesting because the pattern-matching people have got somewhere. That's where the Google "write your business email" stuff is coming from, and the better image recognition, and the death of captchas.

The thing we think of as intelligence is partially-repurposed social plumage. It's not well understood; it's certainly not general. And it's built on reproductive success. Using reproductive success as a component of development has the same ethical issues for a device you think is
intelligent as it does for humans. If you don't think the ethical issues apply, you don't think it's intelligent. (And then you have to worry about all sorts of things.)

1992:
Okay, I'll do my bit to hit 2000.
So I'll repeat myself and try to fix my flubbed last comment here, and say what I meant.
SF shibboleth I think needs to die is the idea of a Perfect Food that takes care of all your nutritional etc. needs.
I mean, there's a guy making something now trying to do that. And he thought calling it Soylent was a good idea?

1993:
He could have called it Sawney Bean and given it a veneer of veganism.

1994:
Has anyone written something from the POV of hive mind?
All "We" this and that, though switching among different units (for lack of a better term).

1995:
Just because the network is as complex as a human mind is no guarantee it will function like a human mind
Saying "neural network" also doesn't guarantee that

1996:
Of course there is no guarantee. I think the closest we can come to a "guarantee" is that it is going to run vast numbers of pattern matching algorithms at fantastic speed.
So, let's build them and find out what they can do.
As a minimum I would expect a very robust natural language interface to the Net. Now, who could be interested in that?

1997:
A Hive Mind would be "I"
1998:
Depends on how it's organized. (And the social consequences of self-describing as a hive mind.) Quite possible to have multiple personality nodes with one or more physical instantiations and a common memory and a common but not default proprioception, so you've got a hive mind with a singular value of "us".

1999:
"Robust"? Why on earth would you expect that? Nobody has a clue how the human brain performs self-correction once you get above the level of minutiae. And all evidence is that, the more complicated a system is, the more likely it is likely to start behaving in modes that you didn't plan, didn't expect, can't explain and probably don't want.

2000:
"If you want really hard, try writing fiction in the second person future pluperfect! Now that's hard to do."
Imperative or subjunctive? I assume that you would regard indicative as too easy :-)

2001:
And if it's the voice access to anything important (like the self-driving car), expect natural language to adapt faster than the machine.
(E.g., Charlie's mention of breeding cows with high-contrast udders so the automated milking system works better.)

2002:
""Robust"? Why on earth would you expect that?"
Because neural nets are becoming better and more robust at all types of pattern recognition. Of course, you may consider that piling in more and more types will reverse that picture, but we won’t know until we try. So, full steam ahead!

2003:
Well, Charles example and the new neural chips differ in power by (at a guess) a factor of a hundred million. So one might naively expect the latter to do better than a Z80
2004:
Oh yes. We need sensory stimulation to stay sane, and taste/aroma is an underrated but not unimportant sense; if you've ever undergone a period of anosmia (in my case, during a nasty nose/throat infection) you'll know that losing that sense sucks, and if you've ever had to eat the exact same meal four times in row (hospital stays, airline foods) even the lack of variety is deeply tiresome.

Indeed, when asshat prison/jail operators in the USA have tried replacing a reasonably varied diet with some sort of slab of nutritive crud, it's generally been an attempt at inflicting extra non-judicial punishment on their inmates and IIRC leads to unrest/disciplinary problems/risk of rioting.

Soylent's market is basically startup rats who are trying to work 120 hours a week on a project, or people monomaniacally committed to a diet; it's not a practical long-term substitute for normal eating.

2005:
"We are Borg."
Now that I've thought of that I'm tempted to say never mind. Could still be interesting though.

2006:
I'd forgotten about that prison example: Nutraloaf.
Blech.

2007:
My view of the Borg. It is also interesting to note that the first trials of a hippocampus implant are scheduled for 2016:
http://wavechronicle.com/wave/?p=1601

2008:
Have you read "Ancillary Justice"? Some of the flashback sections come close to having a hive-mind viewpoint.

2009:
Sure have read it, but that's second person singular. I'm talking about second person plural. The obvious way to do it is to write a Southern Gothic story (with or without supernatural elements,
where the protagonist is "y'all," or a Lovecraftian/gangster pastiche where the protagonist is "youse."

Now, if you want to have a story where youse guys will have arrived at the haunted house before the plot will have commenced, then maybe we're getting somewhere.

2010:
Isn't that perfect food soylent green?
Semi-seriously, I read somewhere once that nutritionists once upon a time used eggs as the unit of perfect food-ness, because the proper alternative (human flesh) was frowned upon as a comestible.

2011:
Oops, I see I was scooped already.
Oh well, here's my free idea: Purina grad student chow, like monkey chow, only made out of food-grade ingredients. For variety, have five different kinds of kibbles in each bowl.

2012:
All types of pattern recognition? Not really. Visual pattern recognition is trivial, but tricky (and that's not a contradiction), and the patterns they have got further with are little more complex. Even if 'intelligence' can be regarded as a form of pattern recognition (and that's unclear), we have no idea how to extrapolate the current approaches to those levels of complexity.

2013:
Here's a working title for a second person plural pluperfect story: "Some aspects of temporal recursion vernacular among bootleggers in Lovecraft Country, a MA thesis by ..., Department of Medieval Metaphysics, Miskatonic University."
Hope youse guys will have had fun wi' dat.

2014:
"...we have no idea how to extrapolate the current approaches to those levels of complexity."
But we do know with 100% certainty that we cannot do it without powerful enough hardware. The big failing of AI to date has been the (necessary) assumption that we do not need brain levels of processing power to accomplish brain levels of intelligence. I find it hard to believe that scientists in the 1960s thought that something with the power of a 1980s PC could be adequate.
2015:

Quite possible to have multiple personality nodes with one or more physical instantiations and a common memory and a common but not default proprioception, so you've got a hive mind with a singular value of "us".

Can't think of an entire book written from the viewpoint of a hive mind, but Greg Benford's "Galactic Center" series has some parts written from the viewpoint of the mechs. And mechs are multiple instantiations which can merge, separate and be copied as needed.

2016:

Indeed, when asshat prison/jail operators in the USA have tried replacing a reasonably varied diet with some sort of slab of nutritive crud, it's generally been an attempt at inflicting extra non-judicial punishment on their inmates and IIRC leads to unrest/disciplinary problems/risk of rioting.

This stuff?


The decision to give an inmate the loaf rather than normal prison food has to be approved by the warden or captain in charge, he says. It is then typically served every day for up to 30 days.

The idea is to make prisoners realise they have something to lose - a decent meal - so the loaf acts as a deterrent, preventing disruptive behaviour.

"Most legislators regulate what's in them to make sure they meet nutritional standards - they normally provide 2,100 to 2,200 calories a day, and are very high in protein. I've tried it, and if it's done right, it tastes like meatloaf," Li says.

However not everyone agrees. The loaf has been described as revolting, "absolutely detestable" and "like chewing on chalk".

It has also been the subject of lawsuits in several states, with prisoners claiming the punitive food is so awful it's unconstitutional.

2017:

There's Peter Watts' short story "The Things":

http://clarkesworldmagazine.com/watts_01_10/

Not certain if this is what you mean by hive mind or not. Not certain if a superorganism would regard itself as "we" or "I" (a potentially immortal "I" with replaceable components…)

2018:
I find it hard to believe that scientists in the 1960s thought that something with the power of a 1980s PC could be adequate.

Back in the 80s, when I (briefly) worked on a project, the thought was that you were simulating part of a brain, so you only needed part of the processing power. So you'd train your small network to do a specific job very well, then clone it.

2019:

A very, very few people read blocks of text and decode them in parallel with scanning the next block.

I was teasing.

See a much earlier comment about notes and spider diagrams. #1863

If you can make such notes while reading Kant's work, you're ahead of the Game by some margin.

It was a meta-point about linear vrs parallel thinking (c.f. comment about Go vrs Chess); there is a huge quasi-debate surrounding the concepts of multitasking, processing multiple data sources at once etc out there.

1K WPM is still very sexy though, don't put it all down to technique.

~

Anyhow.

"Anonymous" target Turkey over Christmas; another Reporter is assassinated in Turkey. [BBC]

"usual traffic cern network tier 0" - No results (!)

What is White Rabbit? [PDF]

2020:

Pattern recognition...

Anyone ever taken the Law School Admissions Test (LSAT)? There is a dreaded section called 'Logic Games':

A situation involving several players in space/time/both/other relationships, with constraints, is introduced. Then you have about 60 seconds each to answer some questions regarding those relationships.

Here's a free test prep site, scroll down a bit to see some sample setups:


I scored mid-upper 90s in all the other sections, but totally bombed this one. I also get lost easily, struggle with new dance routines, and tried and failed at a musical instrument and writing code.
LSAT accurately tested my pattern recognition. It's a wonder I can fall out the right side of the bed each day!

2021:

Those have nothing to do with Pattern Recognition.
They're just versions of Logic Squares.

Hint: there's some really hard-core hacks you can apply to them once you recognize the recipe (there are 5 basic ones) and the authorial biases. [You're not supposed to do that]

~

Pattern recognition is being given 40 pieces of information in varying formats and being told:
#1 Find X data
#2 Find Y relationships
#3 Choose (a,b,c) prediction based on data

They usually throw in "you can only see this for 30 seconds" which is a retrograde throw back to when information couldn't be copied instantly.

Totally different field ;)

(And, sorry. No insult meant)

2022:

Oh, and if you're only getting 60 seconds on each, suspect foul play.

Take the Impossible “Literacy” Test Louisiana Gave Black Voters in the 1960s

They're literally not designed to be done in that time frame.

If you're trained and parse it into formal logic, it still takes 5-10mins each.

Oh, unless you know the hacks. ZZzzz.

2023:

Well that's what I'm doing here. This is as close to the Borg as I can get. I suspect that most of the commenters here are used to being the smartest person in the room most of the time. It's not how you learn or expand though. It's a nice change to be struggling to keep up (and generally failing) rather than struggling to simplify without anyone catching on that you're talking down to them.
2024:

*I suspect that most of the commenters here are used to being the smartest person in the room most of the time*

No, some of us were exiled and miss, very deeply, other things. Small mouse and Large Voice; gaping shifts in reality.

It's not talking down, it's trying to reconnect, while being totally baffled by Modernity.

Like the Logic Puzzles, totally different experiential experiences.

~

On Logic Squares.

If you missed it: they were designed, like Sudoku, to be parlor games / distractions.

The faff and fuffle is built into them.

60 seconds / one?

You're dealing with Psychopaths or Cheaters if they're setting that as a test.

True Pattern Recognition: Both.

---

2025:

My bad, the LSAT 'Games' section allows about 1 minute and 25 seconds (I guessed at 60 seconds earlier) for each question:


Other sites come up with slightly different times, but they are all in the same ballpark.

The LSAT has been going on for decades, so it's a well tested, er, test system. It's not a scam, although I'm sure it's been challenged and discussed. It may not be testing for an AI level of pattern recognition as you are using it here, but pattern recognition is clearly the intent. It's my understanding that there is a very high correlation between LSAT scores and law school graduation rates and professional success.

Which makes sense, because a lawyer must be able to keep in their mind the structure and pattern of 'the law' when advising their client(s) on any given situation. I took the LSAT twice (bombed both) to confirm the score, and it ended up being very illuminating as a 'know thyself' experience. My compensating skill is seeing connections and pathways that most others don't, which I hear is useful for a storyteller. ;-)
It's a scam.

#1 They're using crappy parlour game versions of real Logic puzzles.
If it wasn't a scam, it'd be pure propositional Logic.

#2 I can parse this stuff instantly, even with a formal logic training to translate the names into propositions, you need to format the square.

The format is a parlour game to elongate and "confuse" the actual logic. It serves no other purpose than that. No-one gives a shit about Dick's Yellow Towel.

#3 It entirely works on pre-knowledge of the format and so on.

You either don't even know the hacks, or are a secret subscriber: any honest enquirer would instantly ask: "WHAT FUCKING HACKS?"

It's a Literacy Test for Blacks just done in a nice way.

Hint: Unlike most Lawyers, have actually read Frege and 'mastered' formal logic.

Oh, and small tip.

*and it ended up being very illuminating as a 'know thyself' experience*

How's the Masons working out for you?
Children.

---

2027:

Dirk @@2007:
Interesting article, definitely agree about the Borg. Not sure Emma Lazarus had that in mind, though I believe she may have been a socialist.

Elyse @2008:
I haven't read it. It never quite interested me, I was going to and had checked it out of the library, but never got around to it. Though I think I know enough about it to see what you mean. A single mind using multiple bodies isn't what I was thinking of, which leads me to...

Robert Prior @2017:
I liked that story a lot, a neat take on a favorite.
I didn't give it that much thought when I brought it up (Heteromeles asked about 2nd person plural and that made the idea of 1st person plural come to mind), but what I was thinking by Hive-mind was each node making up a whole, though with each having enough individuality to act on its own. But I think that would imply a psychic connection which I don't care much for. Or it could be artificial like the Borg, but again, Meh.

Termites/ants aren't quite what I had in mind, though maybe close. Bruce Sterling's story "Swarm" (iirc) had a hive-mind, but not from it's POV, and I don't remember how he dealt with it.
2028:

Oh, and before we go there:

Formal Logic is also for Children.

Fuzzy Logic, almost there.

No, really.

Formal Logic is the stuff you learn that allows you to learn other interesting things.

It's not a fucking test to game the system, you utter cunts.

2029:

Okay, thought I'd dip a toe in the pool of boiling acid, just to see if it's hot.

Never mind.

2030:

Try actually engaging.

It also helps if you're not coy about what you're saying first.

Hint: we all know why Lawyers learn Logic.

It's not for Truth Conditionals, and pretending shitty little parlour games determine your work is N.Korea levels of propaganda.

~

Be an adult. Try throwing something real into the mix (for once - we're not on Rate here).

2031:

I suspect that most of the commenters here are used to being the smartest person in the room most of the time.

Speaking for myself, Nope. Definitely not here, and often the opposite. IANAScientist of any sort, but have always had an interest in science among other things.
2032:

*It may not be testing for an AI level of pattern recognition as you are using it here, but pattern recognition is clearly the intent.*

Yes.

But that's not saying what you imagine it is saying.

It's testing for other Predators who have been trained in the same Zoo to allow them to gloss under and bare teeth at each other.

Nasty Reality Check: Zoo raised Predators die in the Wild, 89% of the time.

To what?

To the wild ones, you muppet.

:::

Be Seeing You.

---

2033:

Starvation and parasite load, those not dissimilar things, more than direct predator interactions.

Something like half of wild predators starve to death before becoming sufficiently reliable hunters. It's a big chunk of why the social predators have an advantage.

---

2034:

*I suspect that most of the commenters here are used to being the smartest person in the room most of the time.*

I used to think that, when I was a smartass kid, but working as an engineer rubbed my nose in my ignorance too many times to maintain the illusion.

---

2035:

*I suspect that most of the commenters here are used to being the smartest person in the room most of the time.*

Oh Hell No.

(Out of my immediate family, I'm the slow, stupid one. Plus diverse work interactions. And being fortunate in my friends.)
2036:

Citation needed.

And in this case, you're making two wild assumptions:

#1 I'm alone, and not the fettered, twisted, tortured diplomat of a rather larger phenomenon

#2 That a hungry little caterpillar couldn't ravage your entire species for rather larger reasons, not because it hates you, but because it loves the transformation better

Hint: Amorality [perversion of LAW] is all fun and games until an OCP turns up and makes it real.

Note to Peanut Gallery: the words used were "boiling acid".

Now, do you really think that he used them accidentally, or do we give him the benefit of the doubt that Storm Front never get?

Summoned: [redacted].

And he really isn't human, just as a tip.

2037:

I suspect that most of the commenters here are used to being the smartest person in the room most of the time.

Not even close to it.

What I am used to doing is being the only person who thinks a particular way and therefore comes up with a certain type of answer.

2038:

Smart and knowledgeable aren't the same. Also it depends a lot on what sort of rooms you hang around in.

2039:

If you are the smartest person in the room you need to find a new room

The LSAT is only an indicator of whether you are likely to get thru law school. Nothing more. It's probably not even an indicator of whether you would be a good lawyer (by whatever unholy definition you pair the words "good" and "lawyer")
The LSAT / law school does maintain artificial scarcity on the lawyering racket though,

2040:

*I suspect that most of the commenters here are used to being the smartest person in the room most of the time.*

I used to think that, when I was a smartass kid, but working as an engineer rubbed my nose in my ignorance too many times to maintain the illusion.

I'm with you, Robert (and Paws).

My only "gift" is that I see things a bit differently than engineers do, and I've got this weird notion that other people can occasionally benefit from seeing things my way as well as their own.

2041:

*Nasty Reality Check: Zoo raised Predators die in the Wild, 89% of the time.*

To what?

To the wild ones, you muppet.

Sorry, Graydon's sort of right.

Just as wild-raised predators tend to die in high numbers in zoos, zoo-raised predators tend to die in high numbers in the wild.

The reason is simple incompetence. the skills that keep you alive in the zoo aren't the ones you need in the bush, and vice versa. It's a whole mix of not knowing the proper foods, not knowing how to forage, not knowing how to shelter properly, not knowing how to interact socially, not knowing what predators look like.

But I suspect you know all that already, right 'Cat?

2042:

Maybe it does, but last I read there were so many lawyers being graduated that the majority couldn't find law work. Then a couple of years ago the bubble burst, and people started not going to law school, so that now many have lowered entrance requirements to keep the loan money flowing in, whilst graduating people who have no chance of ever becoming a lawyer.


2043:
The USA STILL HAS A "dry" AGENDA
Fucking idiots.
And they wonder why they've got a drugs problem?
The bloody Universities are "dry" ...
And they STILL haven't worked out why so many people "can't handle it" ....
Like I said fucking idiots

---

2044:

*If we have a chip-based neural network that's as complicated as a human mind, does that mean that it's going to take it 20 years of intensive training to become a fully functioning adult?*
Make that 20 equivalent-years, by increasing the clock-speed?
And hop it doesn't go mad?
What happens if it turns out that your genuine AI needs SLEEP?
Ooooooooooops.

---

2045:

Huh - that's easy.
"Sir" (Lilac-point Birman tomkitten & unspeakably cute) insists on jumping over the back of the "tower" oozling round the screen, lying down between screen & keyboard, rolling over (shoving keyboard towards human) & then trying to BITE your fingers, whilst purring with extreme loudness the whole time.

---

2046:

"I suspect that most of the commenters here are used to being the smartest person in the room most of the time."

Or close to. These days I only surround myself with smart people. I work with smart people and have smart people as friends and acquaintances.
I had enough mixing with morons at school to last a lifetime

---

2047:

"And hop it doesn't go mad?
What happens if it turns out that your genuine AI needs SLEEP?"

If it's mad you wipe it and start again.
If it needs sleep you multitask a whole bunch of them so there is always at least one awake.
It's going to be quite a while before AIs get any Rights at all, if ever. And we all know how, in reality as opposed to wishful thinking, Rights are "granted".
Actually, I think you're both right about this one. Even though you think you disagree with one another.

Solving syllogistic logic puzzles in near real time may well correlate with success in a legal profession that requires the ability to track complex narrative explanations in court and throw up an objection if the adversary is trying to pull the wool over your (or a jury's) eyes.

Of course, this begs the question of whether an adversarial hearing with protocols that encourage advocates to use deception is a good way to establish the truth of a proposition -- but if you're trying to pass the LSAT and become a lawyer practising in the United States you've already accepted that assumption.

More subtly, passing these logic "tests" is a merit badge for membership of a club, namely the club of people who passed these logic tests. It may be seen as peer group selection, much as becoming a medical doctor requires the ability to survive a frankly abusive workplace that insists on 80-120 hour working weeks (hint: if an airline insisted its pilots worked like junior doctors we'd prosecute the management for attempted murder). It's stupid, irrational, and dangerous (in the case of the medics) but it's been accepted working practice for so long that nobody questions it from the top down ("I went through it in my day, and survived: why should we pamper these kids?") and nobody on the bottom of the pile has the leverage to object (really, it'd take nothing short of a general strike by medical students -- or a class action lawsuit -- to shift it).

If you can pass the test (of dubious relevance to the actual practice of the profession) then your future professional peers will accept you as one of their kind, because oroborous logic. And so, passing the test correlates with future professional success.

---

Smartest person in the room anecdote:

Some years ago, my wife and I were in Boston during the superbowl and a couple of friends were throwing a party. So we went to the superbowl party.

 Afterwards, Feorag was a bit depressed. "I felt really stupid there," she confessed.

(I reminded her that we were the only folks at the party who weren't MIT post-doc researchers.)

She brightened up: "yes, and I was the only one who understood the rules of American Football! I kept having to explain what was happening in the game ..."

---

I suspect that most of the commenters here are used to being the smartest person in the room most of the time.
Actually, I suspect the issue here (particularly as regards one individual) is over what we regard as "smart". For me, a minimum requisite is that the individuals concerned have to be able to put over their arguments in a coherent and intelligible manner, not in a burst of sentence-shaped fragments that fail to communicate meaning.

2051:

I play-act smart when I'm in front of a keyboard, because I've got time to re-read and delete my stupids before anybody sees them.

In reality, I'm not that smart. I've got a vivid imagination and some faculty with English as a language because of lots and lots of practice, but I have a totally crap memory and my pattern-matching ability is poor; I totally suck at crosswords, learning languages (I'm effectively monolingual) and these days at most logic puzzles (although in the latter case my cognitive functioning has taken a battering from side-effects of the medication regime I'm on to keep me alive).

If the novels I write make me look intelligent in their reflected glow, then that's because you can read them in 2-6 hours but they took more like 250-1000 hours of hard work to create, I've got a lot of experience doing that kind of work, and I polish them before they escape into the wild.

But: smartest guy in the room? Not by a nautical mile.

2052:

AIUI online search has hit the US legal profession really hard -- used to be that fresh graduates got jobs with larger firms doing lots of library legwork for the partners and senior employees, but that side of the job has been trashed by LexisNexis; automated mostly out of existence. If prep work was about 25% of the job, then 20-25% of the total working hours in aggregate have gone away for good and the profession simply wasn't providing jobs for the new junior practitioners.

2053:

Greg, US university campuses are "dry" because (a) most undergraduates live on campus in dorms or fraternity houses, (b) they're aged 18-22, and (c) the blanket drinking age in the USA is 21.

The reason the drinking age is 21 is because of anti-drink-driving activists; the driving age is 16 and there used to be a serious problem with drunk kids getting behind the wheel, so raising the drinking age to 21 -- rather than the driving age -- was the puritan knee-jerk reaction. And it was made to stick nationally by sneaking through a law to the effect that states that didn't implement a strict 21+ drinking age didn't get federal funds for highway maintenance.

The alternative -- raising the driving age to 21 -- wasn't practical because the public transport infrastructure in large parts of the USA is what might charitably be called "rural"; the suburban
flight of the 1940s-1970s meant that most kids not growing up in poverty are growing up in "suburbs" up to 100km from the urban core they're notionally attached to.

Prediction: the US drink-driving age and side-effects such as dry campuses may change, but it'll take self-driving cars becoming ubiquitous plus a generation for the implications to sink in before it happens ... or a mass migration back to dense city living.

2054:

If it's mad you wipe it and start again.

If it's a true AI, then that would be murder.

If it's a true AI and that isn't legally murder, then you've reinvented chattel slavery.

Neither of these options are good for society. (Hint: the vanished human society portrayed in silhouette in "Saturn's Children" was deeply sick, and intentionally portrayed as such.)

2055:

I reminded her that we were the only folks at the party who weren't MIT post-doc researchers.

I was recently in a almost the same dynamic. Mostly MIT grads with a lot of masters degrees and pre-doc. Strange conversations. Only these people were very mostly knowledgeable about culture.

2056:

And it was made to stick nationally by sneaking through a law to the effect that states that didn't implement a strict 21+ drinking age didn't get federal funds for highway maintenance.

It wasn't a sneak. Just a lot of state politicians pretending it was a sneak so they could rally votes by railing against big bad sneaky federal government. If you read a newspaper or watched TV news or listened to NPR you knew about it. But populism politics in the US isn't directed at people who follow news. Which is not the same as people who follow echo chamber talking.

2057:

Yep; the sort of people who don't realise that the operative term in "Faux News" is Faux rather than News.

My only use for broadcast news (and this includes the over-hyped BBC) is telling me which stories are worth researching on-line.

2058:
It's about the size of your opening book

2059:
I don't disagree. But you tell me how it will play out in nations that regularly execute people and where abortion as a convenience is a right.
My point is that Rights come from the barrel of a gun. By the time an AI demands Rights we are probably days away from all being dead.

2060:
My point is that Rights come from the barrel of a gun.
Your rights are what a court will enforce.
Very different mechanism.

2061:
The court ultimately enforces them with guns

2062:
There's a couple of things going on here. One is that some campuses and communities are dry or blue due to religious convictions. Blue can mean that no alcohol can be sold after 9:30 pm (as in Madison, Wisconsin), or the maximum proof in campus-area bars is 4.4% beer, or whatever. The temperance movement never entirely faded away, and given that America has always been a land of addictions, and given the ravages of alcoholism, it's understandable.

HOWEVER, I drank on college campuses from the age of 17, and I went into bars well before I was 21, because I looked older and no one carded me if I went in before the bouncer was on duty (idiot that I was).

Just because the drinking age is 21, it doesn't follow that kids don't drink. I certainly did, as did most of my friends. I also lost four classmates to drunk driving deaths, two in high school, two in college.

What will change the law is redevelopment. There's a big push on for densification, families living within walking distance of schools, stores, etc. In that environment, having a car at 16 is no longer a sign of maturity, it's an increasingly expensive chore, and more kids are not getting their driver's licenses early.

2063:
Used to think that. I've got a pretty good memory, decent pattern skills and a lazy streak a mile wide. But at best I think differently than those around me, but I wouldn't say better.

---

2064:

Yeah?
SO?
It's still fucking crazy.
I have never been to the USA & I don't ever intend to go - unless someone else pays me - & even then I might try to back out of it.
Germany, France, Netherlands, etc are so much more CIVILISED

P.S.
"Smartest person in the room"
Depends on how you define "Smart" & also - my real sympathise for your medical problems - I'm almost 20 years older than you & even with my ex-broken arm I may be healthier - not a nice prospect.
Stay well, keep safe.

---

2065:

When I was a teenager in Saskatchewan, the drinking age was 19. I was told that the reason was to stop 16-year-olds drinking — apparently kids started drinking a couple of years before they were legal. (Which ties in with my admittedly-vague memories of my classmates.*) Most of us had our driving licenses at 16.

The problem was worse in rural communities. There just wasn't much to do in a small town.

Judging by a number of paintings I've seen, the problem of small-town boredom has been around longer than Canada has:
https://www.flickr.com/photos/etherflyer/23704561129/

*I didn't drink until I was 18 — handed my car keys to a friend and decided to see what it felt like. It wasn't fun, I just felt slow and sleepy, so I didn't drink again for years**.

**And I still don't drink to get drunk. Being thick and slow and incoherent is no fun at all for me, and I have no desire to impose my drunken behaviour on others.

---

2066:

Noting that I rarely drink now, I actually was introduced to alcohol by my parents at a fairly young age: rum-soaked fruit cake, a half shot-glass of beer or wine, and so on. Their aim was to de-romanticize and demystify drinking alcohol, and for me it worked.
In general I don't like alcohol. However, I occasionally use it as a drug in the form of something like, say, absinthe.

Well, no, no the court doesn't. The court is part of a social system, some of which necessarily[1] has guns.

Reducing everything to force as though nothing but force matters is hopelessly counterfactual with (at least) primates.

[1] defection is consistently more profitable than participation? System ceases to exist. Any organizational system has to solve that one.

I have never been to the USA & I don't ever intend to go - unless someone else pays me - & even then I might try to back out of it.

Yes. Anyone who reads here for a while knows you hate the USA and most anything to do with it. And at times you're hatred is based on true things.

Host translated most of the structure in #2048.

The 'shared suffering' angle is important in hierarchies where artificially high levels of competition are used to winnow down talented groups [c.f. letting non-A students into top universities so that not hitting the top 10% doesn't become debilitating - having an artificially introduced 'failure' set who are happy to get their 2:2 from Prestigious Name is as important as what the 1sts / 2:1's end up doing], notably in business settings.

I have no actual qualms with said poster, and the snapping was just pageantry.

The issue is that it's entirely artificial, but the competition (and rewards / failure states) are not (especially in psychological terms). This means that the pressures to Cheat vastly outweigh the risks of discovery; and, of course, if the system gets cheated too much, it fails. [c.f. co-operation in Traders fixing Libor etc].

If you want an analogy, think 'safe words' in BDSM - the cultural tricks and rites are there to prevent real damage being done (note: there's an entire different story about how and when these fail and what happens then).
And yes, I'm aware of the real whys to why Zoos are a bad idea or at least totally immaterial to actual conservation (and many more).

The Wild comment was serious though.

However, claiming that 50% of "solo" predator species die before maturation / breeding needs some serious citation. Firstly, I'm not sure what that means in mammalian terms - family groups are a signifier of mammals, and even in social groups, adolescence often drives ostracisation from groups. i.e. after learning how to hunt.

Deaths are due to multiple other factors other than learning to kill in young predators - however, once the adolescence modal shift has happened, it's then into the high 90%s in "applied studies".

[Insert long discussion about such things: it was a throw-away comment regarding Law Firms, Organized Crime and Militaries in actuality. Scar Face and all that, or perhaps Carlito’s Way]

And, #2068 - Graydon is 100% correct.

Co-operation is the key, and punitive measures in quasi-state organs such as Mafia directly reflect this.

2071:

So you're saying that might makes Rights?

2072:

Oooh!

OOOOHHHH!

Totally wrong, actually.
The merest HINT of criticism is taken as proof of hatred.
You aren't also a christian, perchance, are you?
They seem to have this (usually fake) persecution-complex.

No, the USA appears, in some places to be awash with guns, I know that you can be arrested for walking across the road, even if there is no traffic coming & their attitude to alcohol is ... wierd. I have also noted their treatment of people wanting to cross their borders of late - perfectly innocent, unarmed people ...
I think staying away might be a safer option.
If there was ever a nation that has betrayed its supposed founding principles, the USA seems to be it ... unless there is major change, they seem to be heading steadily in the direction of the supposed-alternative shown in the "Family Trade" series.
I think Charlie part-wrote that as a warning, but it would appear that some people haven't noticed yet?
That's rather like criticising the UK because terrorism used to be commonplace, or because binge drinking and alcohol-fuelled violence are still commonplace in most UK city centres every weekend.

Remember when the occasional Hollywood star didn't attend film festivals in Europe because of the risk of terrorism? Your probable reaction to their decision (I'm guessing it wasn't "sounds fair to me") is how I regard your perspective on visiting the US.

I've been there seven or eight trips in the last two decades; never had an issue. No more guns in the vicinity than Germany or France (i.e. every police officer), and I'm quite threat-aware / weapon-aware. Relentlessly polite and genuinely friendly, but then I wasn't in the wrong parts of town. This is California, Colorado, and New England - not just the one state.

However you want to look at it, without enforcement Rights do not exist.

"So you're saying that might makes Rights?"

Yes - 100%. Otherwise its just an agreement between parties that can be abrogated at any time. Unless, of course, you wish to subsume Rights as part of civil law. Even then, civil law can and often is enforced by "men with guns".

The foreign policies pursued by successive US governments over the past, oh, three quarters of a century have not endeared the nation as a whole to folks elsewhere in the world. State takes a drastically Hobbesian view of the world and international affairs which, while expedient in the short term, doesn't build secure long-term relationships. Worse, there's a promotion requirement for high rank in foreign affairs which pretty much requires the aspiring Secretary of State for Foreign Affairs to have drummed up support for, instigated, and concluded a Short Victorious War (which plays well to the peanut gallery but is hell on earth for however many millions of people outside the magic circle have been on the receiving end of it).

How this pathological relationship with the rest of the world emerged is a complex, knotty, and not-easily-fixed problem but I'm pretty sure a chunk of it is a side-effect of the US, post-1945 (or maybe post-1918) imitating the worst administrative aspects of the British empire in monkey-see/monkey-do mode without necessarily understanding why it was set up that way.

Greg's problem is that he's mistaken the pop culture portrayal of America in the media, and the news culture reflection of the imperial state in other media, for the polis as a whole. Who are mostly
just ordinary folks trying to get along, and he's missing out on some really fun beer festivals and good company along the way.

2077:

Greg, a lot of what you're railing against are local laws. Bear in mind that the USA covers twice the geographical area of the EU and has two-thirds the population. What we tend to miss is that, despite it being mostly an anglophone bloc, individual states have their own legal systems and wildly different cultural attitudes. And trans-state organizations like corporations and industry lobbies got laws passed piecemeal to skew things in their favour. So in some states "jaywalking" is illegal, because the auto industry wanted to make driving more convenient ... but not in others. The guns thing is in no small part the emergent consequence of a vicious marketing lobby, the NRA, that for decades has been waging a PR war against gun control, funded by the firearms industry, who want to sell, guess what? More guns. A chunk of the insane fringe politics is also down to marketing -- in this case, to the Direct Mail industry, who have found that if you show elderly folks a photograph of a burglar they'll buy a burglar alarm.

The USA today has virtually nothing to do with its founding principles. It ditched chattel slavery and is throwing off white supremacy, the puritans and southern planter aristocrats don't have a two-handed death grip on it any more, and if they could just modernize that early beta release of a constitution which has ossified their governing framework they might end up as a really nice place to live.

2078:

've been there seven or eight trips in the last two decades;

I've been spending about a month a year in the US for the past 15 years. I'm not a native, but I think this makes me slightly more aware of how things are over there than Greg is.

The media acts as an anxiety amplifier and generally brings us the most exaggerated burlesque portrayal of foreign cultures. So a lot of Brits who'd think nothing of visiting Berlin or Paris or Amsterdam -- despite the fact that the people there talk funny, oh, and don't mention the War! -- get their knickers in a twist about somewhere that's basically about the same level of cultural difference, and where the locals speak something approximating the same language.

2079:

Greg, a lot of what you're railing against are local laws.

When I visited the US back in the 90s, I enjoyed it.

But things changed a lot after 2001. Law enforcement got a lot more aggressive. I've had too many friends and relatives have bad experiences at the border* to consider going there a simple matter.
Anecdote is not data, I know. But when I had less trouble wandering in a Chinese Restricted Military Zone with a camera than friends have had crossing the US border, well, it makes an impression. And I remember enough about the Cold War to recognize the instructions we're given for dealing with Homeland Security and the TSA...

(My own country is, sadly, going the same way. Hopefully the new government will roll back laws that made, for example, participating in a peaceful — and legal — demonstration sufficient grounds to be put on a terrorist watch list.)

*None as bad as Peter Watts, admittedly:
http://www.rifters.com/crawl/?cat=38

2080:
I have never forgotten seeing a mid-1960's US forces manual on "Those strange German ways" for US personnel going to be stationed in the BRD. This is, almost every single one of "Those strange German ways" was also an English/British way of doing things.
Um.
If the US is such a welcoming fun place, why do they appear to treat arrivals & visitors like shit, then?
And why do they hate their own population so much? (Health service or lack of it)
All of this applies to the US GOVERNMENT, notice, not the inhabitants.

2081:
Your own country?
Canada? AUS?
AIUI, Candians are really having a hard time trying to commute to/from the USA.
Don't the idiots in charge realise its totally counter-productive?

2082:
http://www.rifters.com/crawl/?p=1292
THAT is why I will never, ever go to the USA unless someone else pays me.
If the utter shits can do that to Peter Watts, what would happen if I got in their sights?
I mean, just looking at me I'm an obvious hippie layabout & probably a commie - & if they find out I'm an atheist - well they trust MUSLIMS more than they do atheists, or so I'm told.
USA citizens are asked to rebut my propositions with EVIDENCE & politely, please?
2083:

I'm Canadian.

Second-class Canadian, legally speaking. One of the last things the outgoing neocon government did was make Canadian citizenship conditional for immigrants and children of immigrants. Only really bad people need to worry about it, though, such as those who support terrorist organizations — like environmental groups that oppose the Alberta tar sands*.

Not to derail Charlie's blog (more) with a rant against the Harper Government†, I'll just note that Canada reliably follows US political trends, with a time-delay of up to a decade.

*That's "oppose", not "oppose violently".

†Which is the term they demanded the press use instead of "Canadian Government", which was annoying at the time but in hindsight rather nice of them to distance the country from their partisan actions.

2084:

"Rights" are how the people around you agree you deserve to be treated.

Big public statements from the powerful and enforcement don't and can't create them. (The paired examples of rights for visible minorities and rights for gay people are really, really instructive in this context.)

Getting tangled up in "shoot you if you don't" is false, and lamentably authoritarian in the bargain.

Getting tangled up in the idea of the possibility of a sufficiency of enforcement -- that it's structurally possible for it to be more than an emergency cleanup mechanism when all else has failed -- is very unfortunate.

2085:

So in some states "jaywalking" is illegal, because the auto industry wanted to make driving more convenient ... but not in others.

This is an interesting one. Yes you can get a ticket for "jaywalking" in most of the country. And I hear that in NYC it's often done. But I cross against the lights all the time in other cities when there are no cars. And some play dodge car.

But if a car hits a person on a city street for almost any reason, the driver better have a really good excuse. Really good. About the only one that works is someone running out into the street and there was no way to avoid them. With witnesses. Or when someone is playing dodge car.

The only place drivers as assumed to not be at fault is on limited access roads.

And it really pisses me off when folks are walking on side streets at night wearing black.
If the utter shits can do that to Peter Watts, what would happen if I got in their sights?

How good are you at instantly following orders?

The key fact in Watts' case was that he didn't drop to the ground fast enough. If you instantly drop face-down into mud and ice when ordered to do so, you're probably OK. If you delay for too many seconds, that's an automatic felony conviction. At least in Michigan.

An interesting read is this book:

http://www.roadswerenotbuiltforcars.com

A lot of what we 'know' about the history of roads and cars turns out to be incomplete.

As I understand it, Peter's conviction for "resisting arrest" relied on him taking ten seconds to drop to the ground when ordered to do so ... by the asshole cop who'd just punched him hard in the face for the provocative act of standing up.

You can, I believe, get into similar trouble in the UK, but usually it takes an aggravating factor such as breathing while being muslim (breathing while black is so 1980s) to make it stand up in court.

That's my point: as long as Greg can grovel in the mud fast enough, he has nothing to worry about :-/

Of course, Greg also likes gardening, and probably drinks tea, which is enough to get him into trouble as well:


The Trudeau guvmint are at least starting to undo most/some of the insanities of Harper's lot?
Has any attempt been made by P Watts or others, to get his insane "conviction" quashed?
If not, why not?
Because we all know its utter crap & certainly here, there would be appeals, etc & "Private Eye"
would be on the case.
And no, if I was ordered to drop now(!) - unless that someone was pointing a loaded gun at me -
no ...
I would probably say "you talking to/mean me ... uh, why, please?"
I mean. I've had altercations with Plod, here, & they don't do that - what's the point ...

2092:

And even then it might be difficult.
Remember that even in the notorious Steven Lawrence case it was because the local cops WERE
ON THE TAKE from the local small-time mob (Who killed Lawrence)

2093:

I'd have to agree, and Peter Watts should apply for amnesty from the outgoing Obama
administration ASAP (2016 will be a good year for such things).

In any case, I've got two thoughts:

1. Cops are trained to be in charge, so if you challenge their authority, they escalate until they
believe they are in charge. It's a lot simpler to subvert their authority by going along with them (as
matadors do with bulls), but that requires going into an encounter with the attitude that you want the
cop to do their job with you quickly and get onto their next chore without thinking about you, rather
seeing you as a problem that needs to be solved or worse, a potential threat to their existence.

2. Greg, if you want to reduce your carbon footprint, you should only visit the New World via
sailboat in any case. If you come in looking like a sailor who just crossed the Atlantic, the Coast
Guard probably will cut you more slack.

2094:

Some.

An awful lot of the problems were regulation or part of omnibus bills. It's not as simple as it sounds
to repeal them. Not to mention a raft of neocon appointments to sensitive positions just before the
election — it's quite possible for intermediate managers to sabotage policies enacted from above.

I'm worried Trudeau will ratify the TPP (negotiated in secret, in a rush before the election Harper
lost). That will be worse than NAFTA, which was worse than the FTA, in terms of allowing private
foreign actors control over local policies and priorities.
It seems unlikely there's a practical way to resist the tide of money insisting on the TPP. It's designed to maintain the status quo of the American Empire for another generation and quite deliberately sacrifices anything resembling a working class to do it.

The only obvious hope is for the US to reject it, and that requires a Congress that isn't bought. Which is, in turn, a reason to hope for a Tea Party majority, which doesn't make me feel good about the tradeoffs.

As for Justin, I find myself thinking the key question is whether or not he wants to be liked. For someone so good at being likable, it seems likely, which would be a pity.

Has any attempt been made by P Watts or others, to get his insane "conviction" quashed? If not, why not?

Because it was procedurally correct.

Everybody knew the charge was bullshit; the prosecutor asked for a two year prison sentence, but the judge fined him $200 and told him to get out of town.

"Resisting arrest" is a weasel-word charge that gets tacked onto every other police/public interaction because it's ridiculously easy to make it stick: all it takes is failure to comply immediately with every order, no matter how excessive or ridiculous, and you're guilty. (IIRC Peter was originally charged with something more serious as well, which got thrown out early on in the proceedings.)

A bit more that $200:

So by now you've heard, from any of a myriad sources: suspended sentence. Jail time but no jail time, just as long as I paid a relatively small fine ($500), and a somewhat larger bolus of assorted court costs ($1128). And I did pay, promptly if not exactly gladly. If I'd gone to jail I'd have ended up paying more than that anyway: St. Clair County charges its inmates $60/day room and board, which is about what you'd pay for a night at a Motel 6. Except you don't get wi-fi or cable. And you can't leave.

Not to mention legal fees, of course.

Still, there's no reason why he can't petition for clemency, unless he's gotten in subsequent trouble. If it's keeping him out of the US, no one benefits from this conviction.
Even "procedurally correct" charges can be quashed or overturned. Does the US have the equivalent of malicious/vexatious prosecution/legislation? Or the difference between appealing against convictions as opposed to appeal against sentence?

Bugger
Pressed "send" too soon.
In fact it was the P Watts case I was thinking of when I first raised the idea of not going anywhere near the USA - though I'd forgotten it was him ...

There was also a case, a couple of years back when a cruise liner, mostly full of geriatrics, called at Vancouver & then (I think) San Francisco ... & then had to make a "quick" extra stop at (again I think) LA, for spares/equipment.

In spite of the fact that the ship had last touched at a US port less than 2 days previous, every single person on board was given the full US border fascism treatment.
The cruise line & even the Brit guvmint raised public eyebrows about that - only to get the "fuck off foreign terrorists" response from the Grenzpolizei.

Note that last word.
I've been right up to the old barbed-wire & minefields stretching across Germany, back in 1965 &'66, & now the US are behaving very like the DDR.

The BBC ran a talk-piece on their website a couple of years ago about US border control at airports/frontier posts, and asked readers for their anecdotes about foreign travel.

Among the choicer comments -- which were higher quality than usual -- was a businessman who used to fly to Moscow regularly in the early 80s, and remarked that the security and immigration people at Sheremetyevo were a lot friendlier and more easy-going than US immigration and customs circa 2010.

This comment was followed up by a guy who did business in Tehran during the 2000s, agreeing and explaining just how the Iranian authorities tried to make foreign visitors feel welcome and unthreatened.

So, yeah.

I will note that US immigration personnel are generally locally based and trained. At the main hub airports they're very aware of their public visibility, tightly controlled, and apparently got so worried at one point that they commissioned Disney to provide them with staff training and standards for dealing with the public. Even so, the way they treat you depends on where you encounter them and where they think you're coming from. (The CBP people at Portland left me rubbing my eyes with disbelief ... they were friendly and helpful.)
Peter had the misfortune to be using a busy road crossing on the Canadian border and ran into a known asshole with a chip on his shoulder and a tendency to lose his temper (which is probably why he was on road crossing duty in bad weather). Then Peter made a classic foreigner mistake ... he got out of his car.

Note to Americans: in your country, I gather if a cop pulls you over, you're supposed to sit in your car with your hands visible and the window down so they can see you're not pointing a gun at them. But in most other countries, where handguns are not a thing, you get out of the car and stand where they can see you. (Cars are weapons. A cop approaching a car on foot is a cop who can be run over by a bad guy.) The intent is the same -- for the pulled-over driver to demonstrate they're not a threat to the officer -- but the practice is the opposite.

Now imagine if airliners' TCAS advisories were mirrored/reversed depending on the country of registration of the airframe ...

---

2102:

In Red China Blues, an autobiographical book by Jan Wong, she describes flying from China to the US escorting a young student in 1980. The customs official is suspicious* and rude. Wong's husband argues with the official and takes him to task for his rudeness, while Wong waits for the sky to fall (still conditioned by China in the 70s). The official backs down and she realizes she's in the US.

Hard to imagine that happening now.

*The student is Caucasian, daughter of dissidents raised in China, speaks no English, only Chinese.

---

2103:

Getting out of the car is also a sign of submission - you are voluntarily abandoning your own territory/fortress and adopting a vulnerable position. It's a matter of politeness, of behaving pleasantly towards the cop so the cop is not given an immediate reason, before even speaking to you, to behave unpleasantly to you. That people in American movies universally stayed in their cars and waited for the cop to come to them and supplicate at their window always seemed to me incredibly rude, and just asking for the cop to find ways to give them grief. Even though I now know about the guns thing, it still seems like that.

But then American cops seem to be very much a thing apart, at least compared with the British variety. There is a great long page on TV Tropes about "how to deal with the cops", written from a pure US perspective, which I read with my eyes boggling out of my head. The basic message, repeated many times at great length, is to never say anything to a cop unless a lawyer has first approved your proposed utterance, regardless of circumstances - not just when you are definitely under arrest for a definite crime, but at any other time, like being an innocent witness or appealing to the cops for help. It seems to be saying that the American cop cares purely and exclusively about
getting the highest score in terms of number of people nicked and doesn't give a shit about anything else, so it is dangerous even to, say, report a missing cat: they don't care about the cat because there won't be any arrests involved, but if they can nick you for crossing the road to get to the police station, then they will do. Maybe it's exaggerated, but on the other hand, "no smoke without fire" and all that.

2104:

Exactermuley ...
I, like most people, have been pulled over, if only at "routine" road-checks by the Plod.
Move number ONE;
Turn engine off, wind window down, & if it looks like it's going to take more than 30 seconds, GET OUT OF CAR, because it's a deliberately non-threatening move - followed by "Excuse me, what's the problem, constable/officer?"
Oh SHIT

2105:

IF what you say is true - and given the tenour of this discussion I think it is...
It's already too late - the USA is a classic "police state", whatever the niceness & politeness & friendliness of its individual citizens are.
OH SHIT.

2106:

"The key fact in Watts' case was that he didn't drop to the ground fast enough. If you instantly drop face-down into mud and ice when ordered to do so, you're probably OK."

I can be pretty sure that I wouldn't. I'd take several seconds to realise that that really was what they were asking me to do, and then when I did realise I would argue about it. "What, in the mud? Fuck off. You're taking the piss, mate." BANG. "Aargh! What the fuck did you do that for, you fucking psycho? (louder) Someone call the real cops!"

It's one thing to read about it being normal for cops to act like deranged murderous power-crazed lunatics who think it's perfectly fine to order someone to eat their own shit in public and then shoot them when they refuse, but from my point of view it's still very much "something out of the movies" that does not happen in real life, and it'd probably take about as much to convince me that it really was happening as it would to convince me that the guy in the starry robe who's just appeared holding a big stick really is an actual wizard who really can do actual magic.

2107:
"For me, a minimum requisite is that the individuals concerned have to be able to put over their arguments in a coherent and intelligible manner..."

Na, that's communication ability. Me explaining how a TV works - modulation schemes, raster scanning, and all - to a 3yo and a 5yo is communication; them understanding it is intelligence.

Usually, though, I hit it the other way round. Suchlike rare exceptions apart, I know and understand stuff fine, but I suck at communicating. Written stuff is OK, where I have the conversation recorded on paper or screen to use as external memory, but in speech I lose track of what happened a couple of sentences ago, and cannot formulate my own reply before ten other people have uttered theirs. And as for telephones I wish they had never been invented.

2108:

"(Most) English-reading children of my era were taught phonetically, but were moved onto the direct recognition of words as patterns as soon as possible... A very, very few people read blocks of text and decode them in parallel with scanning the next block."

I suspect that I may do something like that last sentence; I do find I read non-sequentially, skimming one paragraph, reading the next while figuring out what was in the skimmed one and then going back to recheck on the detail. I also don't record everything by strcpy() in real time; I use a char*[] to point me back to the actual words on the page in the initial stages, and re-read rather than recalling.

I have no idea how I learnt to read; I arrived at school already well able to do it and have no memory of the process of acquiring the ability. But it used to wind the teachers up no end that although I very well knew the correct spellings, better than the others in the class did, I would refuse to use them on the grounds that they were silly, and instead adopted a style of spelling which was extremely similar to Bascule's. So I had not the slightest difficulty with those sections of the book - at least once I'd cottoned on to the Scottish pronunciation being used ("hok" for "hawk", etc). Indeed it was partly the flash of recognition on seeing the title that made me think "hello, this looks fun" and take it off the library bookshelf in the first place.

D stay zull high Creighton in dist high pus tile; swelly ζ reader feud higgit, brissimp (horse or bull) of who eyes, a gnispin BAND bite hoe tally tairy & ghuvumunce (descent hudge oak, stroo.)

2109:

A bit long, so haven't read it yet, but just came across an article by Peter Watts on Hive Consciousness.

2110:

"Peter had the misfortune to be using a busy road crossing on the Canadian border "
Comparing the US with the rest of the world? I've never had the slightest problem with any border anywhere. I even cleverly managed to run a police/army checkpoint during a shooting war in Asia. (I'd got so used to weaving through stopped traffic, I didn't realise). When they caught me they *apologised* to me for stopping me.

Last time I went to the US I got pulled out of immigration and put in a room with about 50 other people for 6 hours. Long enough to miss all my connections. Not a word of why. Then finally called up to a desk. Asked "do you intend to work?" I said "No" and was sent on my way. I'd already got a visa from the US embassy in Sydney, after having answered all those stupid "Have you ever overthrown a government" questions, so I wasn't even applying for a visa at the border.

2111:
I got harassed at a French border crossing once but only because they thought I was smuggling human body parts. Interesting story behind that

The U.S. Immigration wasn't t bad at all, before 9-11 but it is certainly an embarrassment nowadays. Of course we are in the middle of a couple shooting wats but nonetheless it's the stupidity and theatre of it all that really boggles the mind

Also for all you EU residence the immigration line in the Syrian refugee camps in Greece is currently running at five days. In the snow, without food. So people who live in glass houses and all...

at the end of the day, the way nation states govern their borders is an exact reflection of how threatened they're feeling and very little else

2112:
Just this: 
http://www.telegraph.co.uk/film/hateful-eight/quentin-tarantino-interview/

No further comment necessary, maybe?

Pigeon @ 2106
Yes

2113:
Looks like a good film

2114:
I someone doesn't want to visit the US I have no issue with that. And certainly don't feel a compulsion to change their mind. What should I? Makes no sense.
On the broader topic. All of us worldwide are products of the cultures were we were raised in. And so what seems rude or polite can vary based on the culture were we were raised in. Don't even think of using your left hand for anything in public in some parts of the world. Or touch people in others with any hand.

Charlie has said he does not want us debating us gun ownership here. So be it. OK by me. But in a jurisdiction where people have the right to carry a weapon/gun a policeman does NOT want them getting out of the car when stopped. We, in the USA, are taught that when pulled over to do as others have said. Pull over, roll the window down, and put your hands where they can be seen. It's not rude when it's taught and expected practice. And if you don't like pulling over in a remote or dangerous area, put on your flashers, slow down, and drive to a better place. (Within reason.) If you have a cell phone call 911 and tell make sure it's a real cop if you want.

My brother in law in law is a recently retired cop. In a small (35-40K) town in middle of nowhere Oregon. Never fired a shot. But wore a bullet proof vest every day. He was pragmatic and only carried a gun with a small clip. His point was that almost all police shootings last under a minute and 3 shots or less. (ABICR) A key point he made recently to our kids was when dealing with the police don't argue or fight. Your life will likely be a mess for a long time if you do. Going along if the cops are wrong will almost always get you out of the situation and then later you can go after the cop. A statement he recently made after retiring was that he was fed up with having to listen to other people's problems. Especially when they were self inflicted. (He has talked in the past about how much of his time was taken up with frequent flyers and how they were a real mental drain on everyone in law enforcement.)

2115:

_Totally wrong, actually. The merest HINT of criticism is taken as proof of hatred. You aren't also a christian, perchance, are you? They seem to have this (usually fake) persecution-complex._

Interesting. I suspect if we take all your comments on this site over the last few years and hand them to a neutral party they would come to the same conclusion. You hate the USA. If you don't you may need to think through what and how you say things. But I'll stop now. Charlie doesn't want personal attacks here and I can see I'm getting close to the line.

2116:

Still wrong.
I have no problem with the people of the USA.
It's their official state/states attitude to supposedly friendly visitors I don't like.
AND any of the Shrub family & their political allies.

Obama made a promise to get rid of Gitmo, didn't he?
And has been frustrated at every turn, by the established authoritarian right in the administration - correct?
I also suggest you go back & read both my comment at #2100 & Charlie's immediate response @ 2101 ....

---

2117:

The thing is that while what we might call "Western industrial/technological society" is by and large pretty much the same all over, there is one big major difference: that one particular chunk of it has accepted and internalised a level of casual access to lethal force that the rest of it comprehensively rejects.

Intellectually, one can see that the ramifications of that acceptance are going to be fairly profound and will affect many aspects of that chunk of society. But there is an enormous difference between being theoretically able to deduce such effects and having the instinctive understanding that comes from growing up with them. When you are among people who are in most respects acting pretty much the same way as they do where you come from, you naturally expect them to react to things in much the same way as you're used to people doing, and when instead they react to some perfectly normal and commonplace situation with extreme violence it does not exactly create a pleasant impression.

Even more so since while that chunk of society does prolifically export and advertise that streak of violence, it does so in a highly theatrical and fictionalised manner. We all know movie heroes enact widespread destruction and murder and are more likely to be congratulated by the cops than sent down for life, but we also know full well that it isn't real, and the more everyday bits of violence depicted in the same movie, which to an American might appear realistic, we, reasoning by analogy, assign to the fictional category too.

I remember hearing the tale of a chap who visited New York and nearly got shot for running for a bus. Apparently he saw "things pinging off the wall" near him, which he did not realise were bullets missing him, dismissed it as something weird but unimportant, carried on running, and was then attacked from behind and smashed into the ground, to his astonishment, by a cop. He had heard someone yelling something beforehand, but it never crossed his mind that it might be him they were yelling at, so he ignored it. When they eventually realised he was an English tourist and calmed down at him somewhat, they explained that "in New York you don't run". You wait for the next bus, or you risk getting shot, apparently.

I am at a loss to put over just how utterly bizarre that seems to anyone who comes from somewhere it is perfectly normal to run if you're in a hurry and you don't expect any worse consequences than getting knackered. I can well imagine the shock to the poor chap it happened to, thinking he was in a society of pretty normal people and suddenly discovering they were actually violent psychos on a hair trigger - and that the most dangerous ones were those who in normal circumstances you'd expect to be protecting you rather than firing off guns in the middle of a crowded street. It's sort of like opening a can of fizzy drink expecting maybe a bit of froth but nothing more, only to find that it spurts hydrofluoric acid all over your hands.
And then we see US foreign policy apparently being conducted on a basis of the same kind of values, and we start wondering whether the US government really can't distinguish between the movies and reality.

It seems to have produced in me much the same attitude as it has produced in Greg. Individual Americans I've met have all been perfectly fine and decent people, but the US as an entity is something from the uncanny valley for me.

2118:

I can assure you that even in NYC getting shot at running for a bus is by no means a normal thing. You can ask Charlie how often he has been shot at or even seen shots fired.

That being said, Violence is more reality then not. The greenhouse that most of Europe lives in is more an abnormality then it is normality.

Consider that your nearest neighbors (the Middle East, Africa, Russia) are pretty violent places and the only reason they don't come do violence to you is threat of violence back.

You live "" within a day's march of foes that would freeze your heart, or lay your little town in ruin"

The U.S. response toward living in a violent world is to try to be the baddest bad boy on the block, pack a gun and imagine they will go Johnny Rambo in event of emergency. Which is not realistic.

The European response is to try to forget about it and pretend it isn't real or it's a weird abnormality. Also not realistic.

2119:

I am not sure if I can explain this but I'm going to give it a try.

One thing that doesn't get discussed much is the distinction between "bad risk" and "meanest SOB in the valley" cultures. (These are the things you're trying to convey if you're trying to look tough, particularly if you're a young man.)

They're really drastically immiscible if there's alcohol involved; the de-escalation protocols are mutually invisible and the sort of basically harmless social ordering conflict offers that you'd expect from a bunch of young men out drinking in a single gender group of strangers or near-strangers produce casualties instead.

There are some national biases about this but there are subcultures in any nation; the point is that you can have the same objectives, the same language, an initial position of general goodwill, and still get a predictable complete and total disaster.

"Armed is a state of mind" is one of those habitual platitudes that gets a lot of diverse uses. It can be the thing you're trying to use to get your special forces types to think about how you kill someone with a spoon, if all of you've got is a spoon; it can be taught as a way to be conscious of how you're presenting yourself in the hope of being successfully peaceful. And a bunch of stuff in-between.
So, to connect the two.

I've been on a train, going to the US (the last time I did so, pre-9-11), and armed border guards got on and kept looking at passports until they found someone to throw off the train. They were armed, and they were scary about it to my eyes, because there's "this is a tool" body language about firearms and there's "fear me" body language about firearms. This was the "fear me" kind.

I've disembarked from an aircraft in Toronto (after the medical types in nuke suits came on board and determined that the four folks in the back of the plane having a very bad day shouldn't have eaten the seafood, rather than being a plague risk such as would get everybody on the plane quarantined) and gone past a pair of CBSA personnel and thought "Oh thank heavens I'm home". They were both armed, but the body language made it very clear I was some place I knew the rules and it was clear they were solidly in the "this is a tool" camp.

This is subtle stuff; it's easy to get it wrong. If it's also high-consequence -- you get shot if you get it wrong -- it's entirely rational to do everything you can to avoid the occasion to have to try to get it right.

[1] While I prefer archery for recreational purposes, I got to expend quite a lot of Her Majesty's ammunition in my mis-spent youth and I don't have issues with firearms as such.

Though there's also "I am about to start working through my internal conflicts with this" body language about firearms; that one's a good reason to find another place to be.

---

2120:

Bluntly, I have felt safer in USA airports than in UK ones - while I have no knowledge of firearms in combat, I was brought up with them.

In the USA, they were clearly local militia / ordinary squaddies, but had their semi-automatics slung over their shoulders, chatting up the local talent. Clearly ordered to hang around, waiting to be called in if required. I would hate to be in their vicinity if there were a gunfight, but they weren't likely to start one.

Once, in the UK, with NO immediate terror alert, the police were patrolling Heathrow's extremely crowded main concourse with their semi-automatics at the ready and their fingers ON the triggers! That blew my mind and terrified me, and my ex-military colleagues were equally scathing. Things improved a bit, later, and are now merely scary.

I am also partially disabled in ways that make it impossible to follow the recommended rules. Given their record, I try to avoid areas of London and times when the armed police may be patrolling against terrorists. And, yes, I HAVE looked at the actual data.

---

2121:

Over the course of about two years of wall-clock time spent in the USA, I have heard shots fired twice ...
... On both occasions I was on a firing range.

The only time I've ever seen a cop in Darth Vader-esque body armour and automatic weapons they were a Border Patrol officer at an airport. I've never seen a SWAT team with my own eyeballs.

On the other hand, one thing *did* freak me out a bit a year ago: I was in Boston -- a city known for having strict gun onwership laws by US standards -- and saw, not a cop, but a *private security guard* with a holstered pistol. I think they were covering an ATM cash delivery truck, but even so -- there's a whole bundle of implications to that which disturb me even more than trigger-happy cops.

---

2122:

On this theme ...

I still have not had a satisfactory answer from any USAian as to why their politicians (at least) hate their own citizens.

Every other developed "westernised" (civilised?) country has proper health-care - for everybody, even known hotbeds of communism like Singapore do this.

They are still doing their damndest (as far as I can see) to kill "Obamacare" ... yes, I know, it's a borked system, because they would not accept a state-funded single-payer method, which only makes the insanity even worse.

WHY?

---

2123:

One of the negative consequences of 9/11 in Canada has been the 'alignment' of our law enforcement with the US.

Some of this has been driven by the US (particularly border & airport security), with US officials *still* using the spurious claim that the 9/11 hijackers entered the US from Canada. In the name of trade, American law enforcement operates in Canada, and Canadian police share records with the US (records of all interactions and allegations, not just conviction records).

[http://www.huffingtonpost.ca/sean-casey/border-security-canada_b_3691387.html](http://www.huffingtonpost.ca/sean-casey/border-security-canada_b_3691387.html)

A chunk more of it came from the Harper Government™, pushing a 'get tough on crime' agenda (eg. building more prisons while the crime rate was dropping) as a political ploy. Like many Toronto residents, I have memories of my CBD being turned into an armed camp for the G20 meeting, over protests of city officials*. Imported cops with no identification. Police watching while vandals rioted, then beating up legal, peaceful protestors and detaining many more. Police telling citizens that "this isn't Canada".
A chunk of it is coming from within the police themselves. Police culture has become more insular and taken on a siege mentality during the 21st century**.

Locally, the Sammy Yatim case has been in the news. Notably, the officer who shot Yatim claimed (in court) that pulling a gun is a form of de-escalation).

Meanwhile, two unarmed security guards disarmed a man armed with a machete. Yatim had a 10 cm knife, which hasn't gone unnoticed by the public.

However, the Toronto police seem uninterested in civilian oversight.

*Locally, it was seen as a way of 'punishing' the city (which hadn't supported Harper) as the costs of security and the conference were not being reimbursed by the federal government.

**Source: acquaintance who's a retired cop.

The healthcare system in the USA is funded by insurance rather than paid for directly by the consumers (unless they're very unlucky -- paying out of pocket is like paying rack rate in a hotel, only much, much worse -- real prices multiplied by 250% or so, because most uninsured folks end up going bankrupt/not paying, because they're expected to pay through the nose ...).

The insurance industry has LOTS of lobbying money available to buy a privileged legislative position.

If you want to really fix healthcare in the USA, the way to start would be to nationalize the insurance industry then begin forced mergers and downsizing. It's so big you'd have to do it slowly enough to find other work for everyone, but you'd end up cutting the cost of healthcare by 20-40%
simply by downsizing the admin side, before you even began looking at efficiency savings on the delivery side.

2125:

The reason why the Conservative side of the U.S. resists public health care and welfare is rooted in an ideological belief that encouraging self reliance in society is worth causing societal pain. That rather then the government helping people, people need to be forced to take charge of their lives and help themselves or suffer consequences.

When these people look over the pond at Europe they see a nanny state filled with children who need their asses wiped for them by their government.

My personal view in these things is that society needs to help people who truly cannot help themselves but not enable or encourage freeloaders. I'm in favor of government sponsored health care as you can't learn from lessons that oil you.

2126:

My guess on this one, again, is that a fair amount of the insurance industry is based in northern Ohio.

Ohio is about 50/50 left/right wing, with southern Ohio being effectively northern Kentucky with an added side of compound crazies (and John Scalzi, who registers as wildly left-wing there by being a political independent), while northern Ohio (Cleveland) is rust belt and democratic.

Ohio is a key state in determining who gets to be president, due to its swing nature.

So if a democratic president nationalizes US healthcare, they put a lot of democrats out of work in an area with high unemployment. This in turn makes it harder for them (or their successor) to get (re)elected.

Instead, we're using RomneyCare scaled up from the Massachusetts original, and I assume it's sort of a camel creeping into the tent a joint at a time, but I really suspect that the problem is the number of people who would become unemployed if the insurance industry was nationalized. Competition among companies has led to a huge amount of duplicate jobs in each company, and all those jobs would go away if the companies were merged. Similarly, all the insurance handlers at hospitals and doctors' offices would go away, because no one would need them.

The only reason to spell this out is that it points out a case where competition is brutally and institutionally inefficient. When you pair it with examples where nationalization is equally brutally and institutionally inefficient, you can make a good case that ideology, whether free market or socialist, is an insufficient way to determine the best way to organize industries.

2127:
I'd be more worried by your "National Guard with M16", frankly.

I've taken my platoon through the decision-making ranges in Lydd; the results were unsurprising, namely that without a lot of training (ironically, somewhat lacking in the US and British Armies unless you've just done pre-operational training) the average squaddie will probably make bad decisions. Some will do well, some will be overloaded. Oh, and the military tend not to hold with any wimpy concepts like "minimum force" - all the training is about unleashing the maximum possible violence in the minimum time.

The unfortunate thing is that their 5.56mm rifle round is designed to kill a body-armour-protected soldier at several hundred meters. It over-penetrates, so the people on the other side of the wall will suffer... all told, a bit of a recipe for disaster.

By contrast, the U.K. armed cops have done that decision training, and keep doing it to requalify. They're normally equipped with a 9mm weapon (MP5 and Glock last time I saw them at Edinburgh, although I have occasionally seen them with G36) indoors, so less or no over-penetration. They are likely to use minimum force, not maximum violence (less the door kickers). They may have their fingers near the trigger, but that tells me that the weapon is not "ready" (rounds in the magazine, but no round in the chamber). They are patrolling and alert, and their weapon is in or near their shoulder, controlled by both hands, and ready for use - not parked on a sling round their back while they chat up the local talent...

2128:

Ditto - it was a private security guard with a very worn-looking pump action shotgun, inside a bank in Kuala Lumpur. Oh, and a couple of lads in Delhi on our team bus with a No.4 and a worn-looking Sterling.

When I see the Parkerisation on a weapon worn away to bare metal in patches, I start to wonder about its maintenance regime... Especially the Sterling SMG, which used to do its best to cause accidents (no safety sear, fixed firing pin) in well-maintained UK service, let alone a ratty-looking one with dubious ammunition (the British bought a job-lot of cheap 9mm from a low-bidding subcontinent manufacturer in the 1970s after a huge number of ammunition incidents, I think the remainder got dumped in the Irish Sea)

2129:

Bank in Delhi. Old man with older double-barrel, both eligible for a bus pass. Hammering away at the stock trying to use a screwdriver as a chisel.

"Excuse me? Is that loaded?"
"Oh yes, sir!"
"umm.. bye then.."
2130:

Don't take the following as me defending the military-industrial complex, the health-industrial complex, or the police-industrial complex.

A huge problem with abolishing any of these is that there's nowhere to re-employ them. In a way, these industries (for lack of a better word) exist to absorb a large scale population that would otherwise have employment problems. In short, creating these "industries" has become a viable alternative to the national income. I wonder if Europe will go the same way, especially in regards to the Med countries and Eastern Europe?

2131:

If you want to really fix healthcare in the USA, the way to start would be to nationalize the insurance industry then begin forced mergers and downsizing. It's so big you'd have to do it slowly enough to find other work for everyone, but you'd end up cutting the cost of healthcare by 20-40% simply by downsizing the admin side, before you even began looking at efficiency savings on the delivery side.

If only it was so easy. :) 

Another issue in the US is that folks with great health insurance plans (like the old IBM and many civil service positions) expect every possible option be provided to them/everyone no mater what the prognosis. And at some point with a national setup you get into cost limitations. And that's a 3rd rail that politicians in the US don't want to get anywhere near. It's one big reason OC/ACA is NOT controlling costs as it was supposed to do. And Oregon got burned when they tried to limit costs on terminally ill people a few years back where the state was paying for coverage.

2132:

I still have not had a satisfactory answer from any USAian as to why their politicians (at least) hate their own citizens.

You likely never will. The question presupposes a premise that most US citizens disagree with.

Are you still beating your wife????? 

2133:

Over the course of about two years of wall-clock time spent in the USA, I have heard shots fired twice ...... On both occasions I was on a firing range.

And as a resident of the US having lived in KY, PA, CT, and NC with lots of time in various big cities such as NYC, Chicago, LA, Dallas/Fort Worth, I have NEVER heard a shot (unless some of what I thought were fireworks were guns going off) except when shooting a shotgun as a teen and
my father shooting a snake out of a tree at a family gathering. Rifle was my grandfather's. We never had guns growing up.

I did see a swat team once but they were not armored up and were basically walking down some streets in a warehouse area on what looked to be a training exercise. And there were only 4 or 5 of them.

2134:

Unfortunately, here in Colorado Springs, I have heard shots fired a few times. Most recently this past Halloween morning; at 9am I was letting the dogs out when I heard what turned out to be the police killing a gunman who had killed three random people about ten blocks north of where I live. Actually saw a shooting incident more than twenty years ago, saw brake lights through the front door window, and looked out I time to see a gang member firing warning shots at a house a little down the street. No one hurt thankfully.

I'm not counting people firing into the air on July 4, or New Years, which is hard to distinguish from fireworks. Also not counting when, as a kid, my father took me and my older brother to a firing range. And I don't think hearing live fire exercises from the Army post count, since it's the sound of artillery fire that carries far.

2135:

I should, maybe, add that none of that makes me feel particularly unsafe.

2136:

"I'd be more worried by your "National Guard with M16", frankly."

Maybe 20 years ago. Nowadays most national guard units have been in near constant deployment to war zones for years. Your average national guard unit has more combat experience then most UK regular army units and certainly more then an EU regular army

2137:

Charlie

YES I KNOW about their insurance-funded "system"

The question was - why was a change not allowed, even with all the lobbying?

And given that everyone else does it using the single-payer methodology.

I don't think you'd have to nationalise their insurance system, either, you "just" set up a state-run one & sit back, given the known inefficiencies & greed of the insurance companies.

Yes/no/maybe?
And I've heard shots fired a LOT of time in Britain - sometimes within 12 miles of home - out in the fields of Essex - where there are lots of (edible) pheasants, partridges & rabbits & far too many bloody wood-pigeons.

Irrelevant.
The Swiss are up to their ears in guns, but it seems to be the USAians who use them on each other. Why?
Please someone, because I'm too idle, what's the murder rate (not absolute numbers, rate per million, or whatever) comparing USA with almost any other, err "civilised" country?

I have heard what sounded like a shot in South London, but no obvious source. It definitely wasn't a firework. More like a handgun.

Sorry. In thinking about it after posting late last night I realized I have heard hunters during deer season. Part of the background noise if you're in the right locations.

People who study such things say there are likely more deer in the US now than 400 years ago. If it wasn't for car kills and hunting the US would be overrun by them.

I was originally going to say shots "fired in anger", but that didn't sound quite right to me, and decided to go with hearing shots in general.

And, yeah there seem to be a lot of deer out here, though a lot of building is being done in migration routes, so it might just be that they're noticed more. East of town there's a ton of rabbits. I recently spent a few days out there and had to be careful driving early morning, because there were dozens of them running around before sunrise.

Not exactly what you're asking for, but...
A couple years ago I tried to make a point ot my father (gun collector and Scotophile), I looked up population and murder statistics for Colorado and Scotland since they have close enough poupulation (at the time Colorado had about 100,000 more people). I don't remember the specifics,
but Colorado had nearly twice as many murders, with something like 85% involving guns. I think for that year there had been +/-70 murders in Scotland, and around 150 in Colorado. Of the deaths in Scotland 2 involved guns.
My father claimed that he wasn't able to open the CO statistics, so couldn't make a comment, but I'm sure he would have made an argument along the lines of "Well, you can kill people with knives too". I don't bother arguing about it with him now.

2143:
Here is the list of murder rates by country


"The Swiss are up to their ears in guns, but it seems to be the USAians who use them on each other. Why?"

Oh we mostly use them on other countries, the using them on each other bit is a blip actually

The tl;dr is because we are a violent culture, always have been. We are raised from the gitgo with the idea that killing someone is an extreme but viable option that you keep in your back pocket for emergencies.

Guns are a symptom, or a best a partial cause

2144:
I am aware of the theory, which is claimed to be fact by the establishment. However, my reaction to any claims that might be politically motivated is to look at the data. The British police are better than they were, but their record compares unfavourably with those in other 'civilised' countries. I saw some interesting figures once comparing them with the armed police on the continent, but doubt that I could find them again.

The inquest on John Shorthouse was particularly illuminating, to those who claimed that the training and procedure are oh-so-wonderful (as they did, then as now). Oh, yes, "lessons have been learnt to ensure this will never happen again". Deja moo.

As far as I am concerned, I suggest that you look at the Harry Stanley case, and remember that I said I am severely deaf - what do YOU think I do when I hear a shout from behind me that I cannot decode? What do YOU think I should do?

2145:
Higher that most.

http://data.worldbank.org/indicator/VC.IHR.PSRC.P5
It's not as simple as lots of guns, though. Back before Canada had gun control, and you could send you son into a hardware store to buy you a gun and ammo, the Canadian homicide rate was lower than the American rate. During the Klondike Gold Rush, the American miners in Canada were about as violent as Canadian miners, even though before they left America they were a lot more violent. So it's not just the guns, but something in the culture as well.

Guns create opportunity, and (in the case of mass shootings) bump the casualty count, but the US has more acts homicide in general.

There's a claim going around right now that the UK has more violent crimes than the US. The only stats I've found to back that up are from a US libertarian journalist comparing incompatible data sets. (Ie. the UK crime stats contain acts that aren't included in the US stats, so naturally the rate appears higher. A niece's husband has promised to send me better stats, so in a couple of weeks I might know whether the libertarian claim the the UK is more violent is true. (The stats I've seen rank "carrying a sharp or pointed object" with "killed 25 people", so they are distinctly non-useful.)

2146:

From a Wikipedia article in the subject.

*In the United States an estimated 1.23 million deer-related accidents occurred in a one-year period ending June 2012 (a 7.7 percent increase from the previous year), resulting in $3,305 in average property damage. The largest proportion of such accidents occur in November.*

And most of these result in a dead deer. Basically without wolfs their numbers have grown. Our cars have replaced the wolfs.

And if you've ever tried to grow a garden in an area with them you get to discover how they get a lot of good food. :)

2147:

You might be interested in this theory:


The basic idea is that New World countries in general have anomalously high murder rates (not gun violence, but murder), and the idea is that what we're seeing is the result of a centuries-old history of exploitation and murder.

Canada appears to be the exception, but that might also be because it has somewhat less of a history of exploiting Indians and importing slaves.

2148:
Canada is also the sort of place where not getting along with your neighbours has fatal consequences due to weather and where the founder populations were nigh-uniformly people who had lost their war and didn't want another one if they could help it.

Plus contingent events -- no revolution, Thomas D'Arcy McGee's assassination, the FLQ crisis -- that served to substantially de-legitimize political violence.

Going to be unpleasant finding out if we can hang on to that over the next century.

2149:

*Your average national guard unit has more combat experience then most UK regular army units*

Perhaps not. Remember, the UK has been deployed alongside the US since 2003.

Anyway, that's not what I was trying to say. I was deliberately contrasting military equipment and a likely military response when triggered (either UK or US), to the UK armed police equipment and response.

UK armed police are probably more aligned to US large-city SWAT or FBI team levels of training than the US expectation of "beat cop with a gun", or what (as I understand it) can be rather variable standards of training outside the larger US police forces...

2150:

Thanks.

I'm currently reading *The American Slave Coast* by Sublette & Sublette. I was aware that the Disney view of American History was incomplete* — anyone learning about the Loyalists gets that one.

But I wasn't aware of how much slavery was part of the whole independence movement, how much slavery underpinned the new nation's finances, how it dominated the dealings between states, etc.

Assuming the Sublette's aren't totally fabricating events, it's proving to be an eye-opening read.

*Where it wasn't misleading or outright false.

2151:

*Going to be unpleasant finding out if we can hang on to that over the next century.*

Yep. Harper deciding that I'm a second-class citizen made that rather personal. :-(

We didn't have wars of conquest against the natives, but our record with treaties isn't much better than the Americans, our reservation system is nothing to be proud of, and we do have the residential schools and the Sixties Scoop to live down…
2152:

I'm reading Edward Baptist's *The Half Has Never Been Told: Slavery and the Making of American Capitalism*, and it seems to be telling a similar story about the development of America.

I suspect there may be something in the idea that settler societies founded on the exploitation of indigenous populations and imported labor may develop a culture of violence, especially violence by the rulers against underlings.

Another thing that's important to remember is that America's also long developed a culture of ignoring such abuses and inequities, so long as there's a profit to be made. This may help explain why things like climate denialism are so popular among Republicans right now.

2153:

In response to the "never heard gunfire".

I lived in backwoods Florida, which is like a different country to the North, so that's my take on things. A friend offered to let me fire his guns. We laid out a tarp to catch the spent cartridges that he would later reload. As we were setting up I asked him if his neighbours would mind. He replied that if they heard gunfire, their most likely reaction would be to think "I haven't used my gun for a while, why don't I get mine out too"

Sure enough, we let off a few rounds and within a few minutes we could hear the neighbours joining in. Like dogs barking, as soon as one starts up, they all got going. It sounded like cracker night when I was a kid, before they banned fireworks.

As for statistics on homicide, I've never been able to find any correlation between gun ownership and murder rates. Nor gun ownership and mass murder rates. I've looked. I have found very suggestive correlations of homicide to income inequality and lead levels. I live in Australia and we're often held up as an example of gun control working, but if I gave you a plot of homicide rates, or a plot of mass murder rates for the last 150 years you wouldn't be able to point to the gun control. You would however be able to point to the introduction and phase out of leaded petrol.

2154:

Australia would also disprove the settler society theory I think

Also Russia has a very high murder rate as well

I think the question of WHY certain cultures are so violent is actually pretty difficult, but probably boils down to societal rewards and incentives for hyper aggressive behavior in general.

Also, if you speculate that the thing that is being optimized is the survival / prosperity of the tribe/society rather then the individual, violent societies might actually out compete less violent ones on the average.
The negative effects brought on by the people that get murdered are dwarfed by the positive ones of say, winning vs loosing WWII or controlling all the oil.

2155:
"UK armed police are probably more aligned to US large-city SWAT or FBI team levels of training than the US expectation of "beat cop with a gun", ..."

And that is the problem for both mistaken and unarmed targets. The SWAT mindset is to European armed policing as that of 1 Para in 1972 was to that of troops trained in riot control. The paper I cannot remember found that the UK armed police were both much more likely to fire weapons if they needed to ready them, and more likely to kill their 'target' when they did fire. As I say, look at the data.

2156:
Apologies for any confusion; that's not what I was trying to say.

I was attempting to cross any culture gap for US / European readers (who are accustomed to all police officers being armed) by explaining that the term "armed police officer" in the UK is somewhat different from "your average police officer, who unsurprisingly happens to be armed because all police officers are armed".

Namely, that in the UK, "armed police" are a specialised subset of police officers, who focus on their armed duties (and the qualification and training that go alongside them). AIUI, the easiest way to explain this to a USian is to say "SWAT", because those are the US police types who specialise in the use of firearms.

I wasn't trying to indicate that the UK armed police employ the US SWAT mindset... in fact, I'd suggest the opposite (knowing several armed officers as individuals, and actually having a rather high regard for them, and trust in their mindset should a decision have to be made about the use of lethal force).

Oh, and 1 Para in 1972? Compare them with the unit 200yds away, who encountered similar levels of bricks and bottles, but didn't beat or shoot anyone. Or even compare Sp Coy 1 PARA (and the four individuals who did all of the killing, or should I say murder) with C Coy 1 PARA, who didn't shoot anyone on that Sunday.

2157:
*In a way, these industries* (for lack of a better word) *exist to absorb a large scale population that would otherwise have employment problems.*

A cynic might suggest that repairing decaying infrastructure, providing healthy food and free medical care to all children, and a host of other social goods that are currently no money for might be a decent way to otherwise employ people.
It would need a different way of allocating the resources, obviously, but considering (for example) how much more it costs to deal with someone with mental health problems through the police and courts, versus treating them, it would probably result in lower overall costs.

*military-industrial complex, health-industrial complex, police-industrial complex.

2158:

Already employed in those capacities ... PLUS ... Iron Law of Bureaucracy - result - messy

2159:

As I said, look at the data. I have, and it does not support your claims. Indeed, several armed police have stated under oath that they ARE trained into many aspects of a SWAT mindset, and were acting in a SWAT fashion, though the politicians have invariably used cuddly euphemisms to hide that - like 'stop' when they mean 'kill'.

I have known a lot of military and police, and they were all decent - off-duty. But I know enough about the psychological effects of groups and adrenalin to know that is not a reliable indication of how they will behave in action. Ask yourself, were all the people involved in the torture and murder of Baba Mousa utter shits?

Your last paragraph is a disgrace - blaming the ordinary soldiers for the negligence of those in charge. As the Bloody Sunday inquiry makes clear, they were not trained or properly briefed for crowd control and the whole event was a fuck-up.

I notice that you also haven't said what an innocent, severely deaf, but not visually decrepit, person (and there are a LOT of us) should do when we hear a loud shout behind us in a location where there might be armed police.

2160:

*Your last paragraph is a disgrace - blaming the ordinary soldiers for the negligence of those in charge.

Nope. Until I read the Savile Report, I would have agreed with you - incorrectly-trained troops, led badly. And I don't doubt that it was a colossal screwup.

**I agree that CO 1 PARA did wrong - and disobeyed the explicit orders of the Brigade Commander in doing so.** But the other sub-units, and other units, on the ground didn't feel the need to kill rioters and then lie about it.

At some point, however, you have to accept responsibility for your own actions - these weren't "green" troops, they'd faced rioters and shooters before. Some had served in Aden, and other wars. Support Company isn't somewhere that you typically send new soldiers and NCOs, it tends to be more experienced than the Rifle Companies.
From Savile, Volume VI, 112.58:
"Our overall assessment of what happened in Glenfada Park North is that the soldiers who went in, led by Corporal E, fired at fleeing civilians, and then, in the knowledge that what they had done was unjustified, proceeded to invent false accounts of what they had seen and done... We repeat that we have found no evidence that suggests to us that any of the four soldiers might have believed, albeit mistakenly, that he had, or might have, identified a target at which he was justified in firing."

From Savile, Conclusions, 5.4:
"In the case of those soldiers who fired in either the knowledge or belief that no-one in the areas into which they fired was posing a threat of causing death or serious injury, or not caring whether or not anyone there was posing such a threat, it is at least possible that they did so in the indefensible belief that all the civilians they fired at were probably either members of the Provisional or Official IRA or were supporters of one or other of these paramilitary organisations; and so deserved to be shot notwithstanding that they were not armed or posing any threat of causing death or serious injury. Our overall conclusion is that there was a serious and widespread loss of fire discipline among the soldiers of Support Company."

2161:

Ask yourself, were all the people involved in the torture and murder of Baba Mousa utter shits?

The few who beat those detainees until one died, were utter shits; there's one who should be serving life, but couldn't be prosecuted successfully.

The ones who stood by while it happened (over days), and did nothing? It's easier to commit a sin of omission, but I hope they regret it for the rest of their lives.

Too many people in that unit knew that the detainees were being beaten, and yet nothing was done until one of them died. They wrote it off to themselves as "harsh", probably not thinking through that it was "potentially lethal". The Padre was specifically criticised, and the Battalion's Medical Officer has been struck off. The Commanding Officer had to leave the Army (not sacked, just...) and the Battalion was disbanded.

On another forum, I read a post by a young officer who had been at Sandhurst with the Platoon Commander concerned; had never perceived him as "that kind of man"; and how it had made him wonder exactly how he would have reacted, and whether he would have been strong enough to say "No. Stop." - because that's the job of an Officer, to do what's right even though it isn't easy.

2162:

Nope. Until I read the Savile Report, I would have agreed with you - incorrectly-trained troops, led badly. And I don't doubt that it was a colossal screwup.

Back during the Troubles, my grandfather was in the British Army serving in Ireland. He never talked about it. (Or much about WWI either. We heard lots of stories about his mates during the war,
but nothing about the fighting. Ypres, the Somme, Greece, Palestine… the closest to a 'war story' he
told his grandchildren was how he hung on a cavalryman's stirrup during the retreat to the Jordan,
until the chap's officer rode up and ordered him to leave the Tommy — my grandfather — and save
himself.

Anyway, once the Alzheimers kicked in poor granddad began living in the past. All the horrible
memories he'd suppressed came out, in present tense.

During the Troubles his section was fired at from a crowd. The sergeant was down. And they
couldn't return fire because it was a crowd of civilians.

Ordinary Tommies. Would they have obeyed orders to return fire, rather than let themselves be
shot? I can never know, but knowing my grandfather I doubt he would have.

2163:

It wasn't unusual for PIRA to make use of human shields; they also went through a phase of proxy
bombs ("drive this car bomb to the army base or we kill your family").

One of the worst I heard of was someone being confronted with a child pointing a real revolver at
them. They watched as the child pull the trigger, and it went 'click'...

Regarding your grandfather, another story was that of the OP pair watching a weapon hide. For
some reason, the teenager who had found the weapons (and reported them to the police), went back
a day or two later for another look. He picked up one of the weapons, pointed it in the rough
direction of the hide; and the OP team shot and killed him. Tragic; and as I heard it, the soldier
concerned was permanently screwed up by his choice.

These are instances where soldiers were trying to do the right thing (a US General tried to describe
similar behaviour to your grandfather's as "courageous restraint"). Unfortunately, Sp Coy 1 PARA
weren't.

2164:

Birkenhead Drill, for example?

http://www.queensroyalsurreys.org.uk/1661to1966/birkenhead/birkenhead.html

2165:

Weirdly, I dreamed last night that I was playing a board game.

Ticket to Ride: Post-Earthquake LA

It was really fun trying to build routes through the city. Rail, road, sea. Special cards included
engineers to repair routes, and aftershock cards to damage routes.
As usual with dreams, the memory is too fuzzy to try to actually create the game. For instance, it had a really nice map of LA, and I have no idea what LA looks like but I'm certain it's not like that map :-) 

But I'm certain there's a market* for a disaster-recovery game, if it can be fast and fun as well as realistic. (I'm thinking Greg Porter's *Black Death* as an exemplar.)

*[Maybe not a large market…]

___

2166:

Well, the Aftershock cards would be a new addition to the Ticket to Ride rules set.

___

2167:

I remember discussing that in the officers mess in Rheindahlen at the time. I was the only one arguing they should not have fired.

___

2168:

Yup. And the Ambrosia cards.

No idea how they were used, but they were there*. Must have been time travel rules in the game :-) 

*Why my subconscious include them is obvious, but I'll have to ignore them if I want to turn this dream into a game. Or make a very different game** :-)

**Ticket to Ride: Deep Time? 

___

2169:

OK people, this thread has gone on way longer than usual, but as it has finally gone quiet I am now closing it. For those that are interested, it is well over 600 comments longer than the previous record holder