The Ministry of the Future - A Crooked Timber Seminar

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May 17, 2021

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1 Introduction

This is a Crooked Timber seminar on Kim Stanley Robinson's recent novel about climate change and how our political and economic system might have to change to stop it, The Ministry for the Future. Since it came out, it's had an enormously enthusiastic reception (see e.g. Barack Obama and Ezra Klein). What we want to do in this seminar is not to celebrate it further (although it certainly deserves celebration) but to help it do its work in the world. So we've asked a number of people to respond to the book, by arguing it through and, as needs be, arguing with it. The seminar can be shared or remixed under a Creative Commons Attribution-NonCommercial-ShareAlike 4.0 International (CC BY-NC-SA 4.0) license. In plain language: you can probably do what you want with it so long as you don't try to make money from it, and so long as you are willing to share whatever changes you make under the same conditions as we are sharing it. The participants in the seminar:

- Henry Farrell blogs at Crooked Timber.
- Maria Farrell blogs at Crooked Timber.
- Jessica Green is an associate professor of political science at the University of Toronto.
- Oliver Morton is The Economist's briefings editor.
- Suresh Naidu is a professor of economics and international and public affairs at Columbia University.
- John Quiggin blogs at Crooked Timber.
- Olufemi O. Taiwo is an assistant professor of philosophy at Georgetown University.
- Todd Tucker is director of governance studies at the Roosevelt Institute.
- Belle Waring blogs at Crooked Timber.

- Kim Stanley Robinson is a writer.

Olufemi O. Taiwo - What's In Our Way?

In 2019, Cyclone Idai generated the fastest wind speeds ever recorded on the African continent. Mozambique, Malawi, and Zimbabwe were all affected – the Mozambican city of Beira was levelled, and hundreds of thousands of people in the region were displaced. Many died from the heavy rains before the hurricane landed, many more died from the hurricane itself, and still more from the cholera outbreak in the wake of the first two calamities: a month after the storm, over a thousand lives had been confirmed lost. A year after the crisis, over 40,000 Zimbabweans and nearly 100,000 Mozambicans were still living in makeshift shelters, and nearly ten million in the region were still in need of food aid.

The response from the international community was muted – it grabbed a headline or two in more cosmopolitan outlets like the BBC and al-Jazeera, but was quickly forgotten even in these places. Crisis in Mozambique still garners international attention today in 2021: but more readily with respect to the aspiring "al Shabab" insurgency, which aims to establish an Islamic State of Mozambique. Its advance has been steady and deadly over the past years, accelerating with last summer's offensive to seize the port city of Mocimboa da Praia, endangering a nearby $60 billion dollar natural gas industry.

In 2012, New York City faced a similar crisis: Hurricane Sandy. The storm was a thousand miles wide and flooded some 17% of the land mass of the city, doing nearly some $75 billion in economic damage. The hurricane ravaged Jamaica, Haiti, and the Dominican Republic in addition to the United States, where the storm claimed 106 lives, 43 of whom were New Yorkers.

So far so good: the obvious contrast of disaster response in the different zones of the world – across the divide between a "high income" country and "least developed" (Mozambique and Malawi) and "lower middle income" (Zimbabwe), or between a member of the Global North and the Global South, or of the First World and the Third World if

you can stomach Cold War lingo. In terms of natural systems, there are many similarities between New York and Beira's calamities – while Idai was the more intense of the storms, the difference between those we call "hurricanes" and "cyclones" have to do with their location on Earth rather than their intensity.

The difference maker was, of course, the social systems. In the much richer US, the hurricane activated a variety of social support mechanisms that constrained the vulnerability of the affected populations: vast public and private bureaucracies enabling the coordination of hundreds of millions of dollars in funding for federal disaster relief organizations like FEMA, private insurance payouts. That version of disaster response represents a city that was "hardly prepared" for the disaster - the regulatory reckoning with various levels of mismanagement continued seven years later, with revamped building codes, disaster safe zone maps, and new smartphone-ready alert systems. The Mozambican government organized an effective health intervention to the cholera outbreak, aided by Médecins Sans Frontières, the World Health Organization, and the usual cast of other NGO characters – but the difference in the scale of what was made possible there and in New York is nevertheless clear.

Among the interesting aspects of Kim Stanley Robinson's new climate fiction book *The Ministry For the Future* is its attention to a much different version of the North/South contrast. The book opens with a calamitous heatwave in Uttar Pradesh, which claims the lives of millions of people in horrific fashion. The responses in Indian politics are deep, wide ranging, and difficult to categorize in blanket, positive or negative terms. The incumbent BJP is removed from power, in favor of a multi-party coalition that gets to work refashioning Indian politics. The agricultural system shifts, switching to the kinds of labor intensive, regenerative agricultural approaches practiced in Sikkim and Bengal with strong local administration modeled off the governance practices of Kerala, a Communist state.

The Indian Air Force begins running missions into the stratosphere, spraying aerosols to reflect sunlight back upwards. A network christening itself the "Children of Kali" targets passenger airplanes and surgically assassinates corporate executives it deems responsible for continued carbon emissions, and thus the tragedy the book begins with.

Later in the book, another calamity happens: this time in the Global North. The waters rise up and claim the entire city of Los Angeles. If they are anything like me, the reader braces for a sweeping political change of the kind they saw earlier in the book: a reconstruction of the formal political system, an immediate reckoning and recalibration of all productive industries, a radical break with business as usual. But what comes is interesting: there's an immediate coordinated attack on the international system – the IMF, the Swiss banks, and the Ministry of the Future (the titular organization that aims to reshape the global political system).

The destruction of Los Angeles opens the breach for the Ministry of the Future. Suddenly, Mary Murphy is able to corral the leaders of major central banks into minting a carbon coin tied to sequestration, which they govern in a Climate Coalition for Central Banks. Meanwhile, the African Union sends drones to remove the guards operating a foreign owned mine in Namibia – ownership of which is then given to the workers, to be held cooperatively by whoever wishes to stay.

What is most interesting about this contrast is the level of centralization in the political responses to the two calamities. What the tragedy of Uttar Pradesh sets into motion in India is a full social transformation, stewarded most broadly by peasant leadership. There are transformations at the top, of course, but these mainly take the form of reconstituting the state so as to get out of people's way, to put it somewhat polemically. The opposite seems to be the story in the North's response to the tragedy of Los Angeles: while there are certainly people's movements involved, the protests at the various major capitals at

the world where people engage in alternative economies, what is important to the plot of the book at that point in the story is the response of the titans of capital. Neither Los Angeles' disaster, nor a subsequent one in Arizona, leads to an immediate reshuffling of domestic political systems.

In one sense, Robinson's narrative choice is equal parts fatalism, pragmatism, and optimism. One can read into the text a thought something like this: the capacities of a rich state express themselves in both directions: positively, when responding to calamities like Hurricane Sandy, and also negatively, when responding to threats to the established order. The same vat of resources which provides housing assistance payments also keeps COINTELPRO running – this radically circumscribes the space of transformative politics in the North in the ways it does not in the South. This is why calamity in Los Angeles and Arizona leads to symbolic political protest where tragedy and destruction in Namibia Uttar Pradesh ignites more holistic transformations of social and even natural systems (through agricultural and stratospheric aerosol injection).

On the other hand, maybe this lets us Northerners off the hook too easily: the idea that a fuller transformation is possible in the South than in the North is at the very least compatible with a radical imagination in which it is their job to take the revolutionary actions that liberate us all – taking their share of the risks on their land and at their dinner tables while Mary Murphy and the Ministry take their share at conference tables. If Robinson's description of the horizon of political possibility is correct, then perhaps this is an objection of the wrong kind – if we object to this arrangement, we're really objecting to the embedded unfairnesses of world history, and to direct this charge at Robinson is to shoot the messenger. But stakes should motivate us to, at the very least, double check the message: is it, in fact, true that the best we can do is cajole the elites of the elites into capitulations as slight as the construction of a new financial instrument?

To put the question another way: what prevents us from learning from Kerala and Sikkim, in the very same way that the incomprehensibly diverse and massive country of India manages to do in Robinson's telling? What prevents us from giving the mines to the workers, as the Namibian government and the African Union manages to do in this same novel?

And what stories might we have to tell to make this possible?

Maria Farrell - What is Ours is Only Ours to Give

Kim Stanley Robinson's books are how I think about the future. I'm not exaggerating when I say they're how I manage to think about it at all. They provide much of the temporal and political context in which I do my work, which is to say, they educate me and let me know I'm not alone. Future uses of data and networks are a tiny part of The Ministry for the Future (TMFTF), just as tech policy only counts, now, insofar as it serves our species-wide effort to survive and perhaps flourish. TMFTF does some thinking on how network and information technology – specifically, social media and blockchain – can do the genuinely liberatory work they've long been hailed as making possible. I've worked in tech policy since the late nineties and will talk mostly in this piece about ways that might work sooner and better to get us to a desirable tech future, and one that gets less in the way of dealing with climate crisis. (I use 'climate crisis' as shorthand for the cluster of anthropogenic extinction events described in TMFTF.)

About blockchain and the future; yes, there are some nice, decentralized uses this methodology can be put to, particularly in potentially transparent registration of ownership of many kinds of asset. But the genuine use cases are narrow and, to me, the projected application of this technology in TMFTF to secure a currency that's independent of states and generates good works seems not massively more revealing than observing that some people will also use more e-bikes in the future. Blockchain's really not a core technology / methodology, and focusing on it means missing the real work needed to change how we do tech. Most of my piece aims to show how, without the distortion field of 'we'll just blockchain our way out of this', we've already started the tricky, collaborative re-structuring of the current tech ecosystem. In the meantime, I can't help thinking the 'blockchain bro' solutionism within tech mirrors the 'adaptation through innovation' discourse at the edge of many climate discussions.

Right now, most of the blockchain mining in the world happens in China, where provinces with the cheapest energy set up mining operations to do the 'proof of work' calculations that the dominant paradigm of blockchain requires. Factories that ostensibly make other things now acquire significant computing hardware and dedicate energy in order to, essentially, print money that's then stored offshore. A recent study shows that 40% of China's mostly bitcoin mining is powered by coal-burning. We also already know that non-blockchain server farms in cheap energy countries consume so much energy they distort national grids, and throw off huge amounts of heat that then need cooling for the servers to operate, creating a vicious cycle of energy consumption. All to say, I don't see how a global blockchain currency as envisaged in TMFTF can be a good thing. Best possible case scenario; it uses mostly renewable energy to generate the proofs of work, displacing other, better uses for that energy. Worst case; it puts more zeroes on the end of the total carbon emissions we currently dedicate to computing.

I didn't spot anything in the novel about how or even if the carbon produced by the pointless computation for the new currency would be mitigated. Maybe the implicit explanation is that in a future where social media gets fixed, and the energy-intensive, pointless computation of adtech lessens, we'll be able to hold our noses about the energy-intensive, pointless computation of proof-of-work-based blockchain? Every year, blockchain's country-sized amount of energy consumption increases. It's Sweden-sized, now. I'm unconvinced by the, as yet, patchy research on environmental mitigation of blockchain. Proof of work in the current, dominant paradigm is not an acceptable way to secure the blockchain today, let alone when carbon will consistently breach 400 parts per million.

I know my concern with blockchain computation and CO2 emissions is a pretty common observation about TMFTF, and would be glad to see a solution to that in the world of

the novel, or elsewhere. Humans waste energy in many and profligate ways, of course, but, in climate terms, the dominant form of blockchain is utterly obscene. If TMFTF's assumption is just that, thanks to the carbon coin's broader impacts, the net amount of carbon emissions will be lower over time, well, I don't think Frank May would be happy. He might have to take up a gun and find another clever Irish woman to kidnap and terrorise.

Cards on table; I'm allergic to blockchain. I was briefly involved in a project to replace part of the current, multi-stakeholder Internet architecture with a closed, proprietary blockchain 'solution'. The designers and backers of that project believed states would collapse within a decade and no longer be able to backstop core technical functions. Call me crazy, but if the governance crisis is that imminent, I'd rather put the time and resources into saving democracy. So yes, I'm now quite hostile to the starting premises of the many cultists determined for the world to give them blockchain-sized problems that make them the hero. I'm a little surprised to see tech solutionism resurface here – KSR is a much better novelist than that, as shown by his comic dispatching of New York 2140's naïve but adorable coders, Mutt and Jeff, to a box under the Hudson river.

Happily, here in 2021, the necessary structural changes to how we use the Internet and related technologies are both more urgent and more amenable to cooperative and commons-based approaches than TMFTF envisions.

Let's talk about social media functionality and how its current, virulently diseased business model might be amputated. In TMFTF, the specific problem posed by social media and solved by the AI adept, Janus Athena, is not spelled out in his scheme to supplant it with an alternative dominant platform. It's simply implicit that social media can do good work if cut free of the abusive, predatory, American firms who use it as the lure for an adtech economy unmoored from real value or social purpose.

Superficially, I'm fine with that. Social media as currently construed is terrible in truly

nonlinear ways, acting as both metaphor and amplifier for the worst of late capitalism. But this doesn't get us far enough in a near-future where we're figuring out and implementing radical and essential change. Freeing people from Facebook etc. is presented largely as an opportunity to create a commons that also gets individuals generating carbon coin to be spent on good projects. All well and good, but – a bit like with blockchain – this feels like a truncated problem statement contorted into just the right shape for the technological solution on hand. Just as TMFTF doesn't have much to say about how hard-right, populist authoritarianism is deliberately wrecking intra-national capacity for the regional and global coordination needed to address climate crisis, it doesn't seem to get how the vicious circle of hard right *plus* social media is hollowing out the capacity of states to fulfil the social contract that makes democracy possible.

That's why we need to destroy Big Tech, not just because doing so might provide an (anti)-business model for emergent forms of technology-amplified cooperation. US social media companies' business model is directly preventing people from understanding the climate crisis, and from forming the coalitions needed to work on it. It's destroying the necessary structures of feeling and political institutions we need to get civilization through the eye of the needle that is this century. *That* is the problem statement. Understanding what we're up against provides the necessary urgency and will to act radically to destroy how we currently 'Internet'.

I know tech policy pretty well, and this absolute dumpster fire of a policy area isn't just a cool new place to build a blockchain-based commons, but a hard-right haven of male libertarians asset-stripping the social democratic state to build global monopolies that re-run nineteenth century colonialism, but bigger.

I get that hegemony is fractal. And the Gibsonian 'jackpot' is self-reinforcing. Every policy area that needs to be fixed to support the work on climate crisis turns out itself to

conceal a myriad of hard problems, each one both enacting and entrenching in miniature the planetary clusterfuck.

But.

The problem-statement matters because it determines who you invite to the table to fix it. And, crucially, who you do not.

We don't need blockchain to fix social media. It's a pointless distraction that centres the worldview of the very tech bros who created the platforms, with its narrow understanding of the possibilities for change . We need data portability, technical interoperability and the forcible break-up of dominant platforms. We don't particularly need quantum encryption to secure our data – basic information security practices and currently available strong encryption will easily do it. To change incentives so that personal data is treated with appropriate care, we need criminal penalties for the Facebook executives who left vulnerable half a billion people's personal data, unleashing a lifetime of phishing attacks, and who now point to an FTC deal indemnifying them from liability because our phone numbers and unchangeable dates of birth are "old" data.

And, this isn't mentioned in TMFTF, probably as, to most people, only the visible application layer of the network is 'the Internet', but to secure access to a non-predatory form of Internet use, we need to coercively prevent consumer-facing monopolies from providing Internet infrastructure all the way up and down the technological stack. Just as regulators separated infrastructure from value-added services to prevent old-school telcos from building proprietary, command and control, in-house Internets back in the 1990s, they now need to avulse the rotten meat of adtech social media from the backbone of network connectivity.

This isn't a criticism of TMFTF/KSR – the novel is vast and delightful, and utterly orchestral in how it both stimulates and soothes my inner policy wonk – but most people

don't seem to understand that while social media is not the Internet, social media companies have *taken over* the 'deep Internet' in ways that foreclose innovative and liberatory possibilities for different uses and future generations. Facebook/Google have reached down from the web and into infrastructure provision, binding it together with their profoundly damaging adtech-driven radicalization engines to offer all the Internet connectivity you want, and all the rage that goes with it, as long as you remain trapped in their open prisons. Both companies – and Amazon, who through back-end service provision now grip countries' entire SME sectors - now occupy and are consolidating the entire Internet 'stack', from pipes / satellites / undersea cables to protocols / standards / proprietary APIs and all the way to trade associations / regulators / parliaments. These companies dominate most open standards and protocol development, both through numbers of employees who dominate working groups, and market power to determine standards adoption or rejection. The open standards process is nominally open, but increasingly, if a new standard or protocol doesn't fit big tech's business model, it either doesn't happen or never gets implemented. At the same time, these companies use the open processes as a rubber-stamp for their own, all-but-proprietary standards. Back up the stack to the apps layer, and especially in developing and middle income countries, you cannot build or do anything Internet-connected at any level unless it's contributing to the big US firms' business model. (Apple occupies a different, troubling, but not equally catastrophic niche in the Internet ecosystem.)

This global domination of the underlying communications architecture isn't just a problem for us, now. It's a one-way valve for the technological imaginary that blocks and dissolves future and truly disruptive innovation, or absorbs it into its own (and I thank KSR for this term) mega-structure.

We still have options, and maybe just enough time. I think of my life's work in pretty humble terms. It's not trying to build the one big thing that will save us, but trying to

ensure just enough technological openness and possibility – or even simply the idea or memory of them – pass on to future technologists and dreamers so *they* can build good, new, and genuinely different things. (I've written about how decentering Western heroes and their inevitable, red pill death-drive is central to the work and hope for what comes next.)

How the platforms are poisoning political institutions is entwined with adtech and its cross-subsidisation of connectivity, so we need first to separate connectivity from social media / adtech. We need to make Internet access either a pure utility – with companies that provide it barred from interfering or inserting themselves into how it is used – or, better still, a public good provided free, out of general taxation. Think of Internet connectivity as either like water – the water company doesn't get to insert nano-particles in your supply that talk to you about how you wash your face and then sell that conversation to a military contractor or a face-cream company – or like education – a public good and literal human right that, secondarily, everyone benefits from everyone else having. We need to stop the companies built on spying on everyone, laundering their information, supplanting state functions and dodging taxes from redesigning the entire, global, physical communications infrastructure in ways that lock in their dominance for the next century. A sprinkling of blockchain over the visible parts of a suborned infrastructure in twenty years time is not going to do it.

I'm not saying TMFTF needs to go into all this – of course it doesn't – but we do, here, in our lives that are currently running their courses in the oligopoly-captured economies US Big Tech has converted into a new kind of global feudalism. (By the by, I've also written about China's no less corrosive version of the Internet and how it's marketed to developing and middle income countries as "Autocracy-as-a-Service".) The problem with US Big Tech is bigger, deeper – iceberg-dimensioned, you might say – and not even remotely blockchain-

sized or shaped. Leslie Daigle has described the consolidation of the entire Internet stack under the hierarchical and totalizing business models of US tech firms as "climate change for the Internet'. If we don't fix it, I personally do not believe we will be able to fix much else. That's why my life's work is helping to fix it. And by fix, I mean destroy.

Some good stuff about how we do this happens in the short silences when MFTF draws breath to speak; in the important bits necessarily skipped over.

One such is when Janus Athena says, in the planning stages of his new social media initiative, YourLock;

> "The AI group is making open source instruments that mimic the functions of all the big social media sites."

And then a little later, when YourLock soft-launches;

> ".. you could transfer everything going on in the rest of your internet life into a single account on YourLock".

First, the genuinely revolutionary thing; how we exfiltrate our data from the rapacious companies who say they own it. You can do that today; file a subject access request (SAR) under existing data protection law (if you live in a country/state with such a law). However, you may just get a huge pile of CDs or an enormous .xml or .json with many gigabytes of data. This is both over-kill intended to deter you from asking, and also simply the amount of data generated about you by that platform and other sources with which it colludes. The good stuff is in there, but obscured by rubbish. As Andreas Guadamuz said about his recent Spotify SAR, a huge amount is inferences about behaviour and personality driven by third-party data, much of it erroneous.

We need to be able to export what the predatory social media companies call "the social graph". The graph is a somewhat under-determined and evolving set of data that includes

our name, date of birth, phone number, etc. but, crucially, is our links to the people we interact with or know, plus how we like to interact with them – probably including the content of those interactions – plus some other artefacts of our preferences and interests.

Early-ish efforts to make this stuff usable elsewhere focused just on portability –getting a copy of the data off the platform. I understand that a now possibly defunct Google internal working group called itself the Data Liberation Front. (Everywhere there are good people trying to do good work.) More recently, the push has been to appreciate the dynamic, evolving nature of the data that makes up the social graph, and make it usable and accessible on multiple platforms, more or less simultaneously. (To really get the challenge of moving it around in ways that maintain its essential form, think of this information not as a cross-section from an MRI but rather a small, wriggling, furry animal.) The European Commission has prepared to legislate to require interoperability, and it calls being able to use your data wherever and whenever you like "multi-homing". (Not many other people like this term, but it describes something important – the ability for people to move easily between platforms, bringing their small furry animals with them.) Legislative efforts include the US (2019's draft Access Act) and the European Union (The Digital Markets Act). However, a leaked version of the most recent draft of the Digital Markets Act shows that the corporate lobbyists have gutted the requirements for real, usable interoperability.

What TMFTF gets wrong about its alternative social media model is 1) that it assumes social media can easily be sundered from adtech and the underlying architecture it subsidizes, and 2) it posits a future where one smart tech person and their team designs an elaborate new system based on a single, mammoth-sized competitor to Facebook, etc. The single alternative platform is absolutely not the Facebook-killer.

What keeps Facebook up at night, and its lobbyists busy donating to Republican voter

suppression funds, is the fear that real interoperability will enable dozens or even thousands of competitors. A former FB executive and long-standing friend of Zuckerberg emailed him in 2012 (page 31) to say *"The number one threat to Facebook is not another scaled social network, it is the fracturing of information / death by a thousand small vertical apps which are loosely integrated together."* He thought that was just a risk of FB's API (application programming interface) strategy at that point. He did not remotely anticipate powerful regulators making real interoperability obligatory. This is why we must hold the European Commission's feet to the fire on the Digital Markets Act.

(I thought there would be room to get into protocols versus/plus APIs in this piece, but here we are, 3,000 words in. If you read one thing, make it Ian Brown on competition and interoperability, or Cory Doctorow and Bennett Cyphers on mitigation for interoperability's privacy issues, both real and confected.)

Ensuring real interoperability is at least a medium problem, if not quite a hard one. Interoperability would mean I could tailor and export the good stuff from Facebook or Twitter – primarily, my relationships – and plug them in elsewhere. I would also be able to move back and forth if I wanted, maybe returning to the big platforms for my public-facing work. Crucially, as a woman online, I could bring and update my block-lists wherever I go. (I can't go into detail as it was client work, but I've briefly encountered really excellent Big Tech technical people working on precisely that issue. Everywhere there are good people, etc. Just, really, *really* not their lobbyists.)

With comprehensive, user-friendly and dynamic interoperability, we would finally have a real choice about the platforms we use. (There might soon be so many of them we'd no longer call them platforms – which bring to mind deep-sea oil-drilling operations – but maybe docks or pontoons, because using social media could be like swimming between the docks scattered around a Zurich or Geneva lake on a summer evening.) With all that choice

would come new offerings that the current, implicitly state-sanctioned monopoly under-provides. Few would choose the maddening open spaces with their engagement (let's be honest, 'enragement') metrics. We would also have to figure out new and varied funding methods, but in a world where vast profits aren't hoarded on offshore islands and states aren't starved of tax revenues, the numbers would start to look different. It could be really wonderful.

Charlotte Jee recently wrote a lovely fictional intro to a piece on a "feminist Internet" that crystallized something I can't quite believe I never saw before; if girls, women and non-binary people really got to choose where they spent their time online, we would *never* choose to be corralled into the hostile, dangerous spaces that endanger us and make us feel so, so bad. It's obvious when you think about it. The current platforms are perfectly designed for misogyny and drive literally countless women from public life, or dissuade them from entering it. Online abuse, doxing, blue-tick dogpiling, pro-stalking and rape-enabling 'features' (like Strava broadcasting runners' names and routes, or Slack's recent direct-messaging fiasco) only happen because we are herded into a quasi-public sphere where we don't make the rules and have literally nowhere else to go.

This work is urgent. Tech policy, like everything else, needs to serve and enable our direct responses to climate crisis. Time and again, the toxic predation of winner-takes-all monopolies, founded and run by tech bros, enable, amplify and are fundamentally conjoined with individual acts of male predation and abuse. Code is law, and that code is misogyny. We won't get the non-patriarchal responses that TMFTF rightly describes as essential, if we permit another decade of violent regression on gender. All the people that would have the ideas, develop the projects and form the networks that our species needs are being driven out, now. We don't have decades more of human potential to burn.

An aside on violent misogyny, its omnipresence in the lives of women, girls and the

nonbinary, and the fictional uses to which it is put; I see what KSR is wanting to do with Mary Murphy and Frank May, and the place their story ends is touching and beautiful, with shards of biting truth. But I am *not here* for the idea that the moment of revelation, the big radicalizing reveal that arrives in the middle of a successful, female politician's professional life is delivered at the point of a gun. This is the revenge fantasy of every enraged and entitled man who has ever threatened (and worse) a woman in public and quasi-public life, to force her to mend her errant ways.

Does Mary Murphy need to be radicalized? Is this the best or only way to do it?

Because I am radicalized by the fact of male violence every. Single. Day. Of. My. Life.

TMFTF does not get to be sanguine about the impact of violent abduction and the omnipresent threat of rape and murder, just because a female character can be said to have learned a valuable lesson – no more than a judge at a sentencing hearing gets to impose a lighter, noncustodial sentence because the violated woman somehow managed to put her life back together. We live under patriarchy, many of us mortally injured by it. Not all good things are in the gift of all people.

I love that a main character is an Irish woman and a political technocrat to boot. Of course I do! And I can confirm the peculiar agency in international policy circles that goes with being white, English-speaking, not from a threatening or unpopular country, and, yes, apparently able to deliver tough messages in-person because of some underlying charm. In my experience, a Mary Murphy would spend at least half her time managing up, to limit interference and ensure renewal of her term, but I get that's not the book's focus.

(I do see that the abduction by Frank May is to be the hinge around which Mary Murphy's story turns. But look, she's a fictional former Irish Minister for Foreign Affairs. Half her previous job would have been the Northern Ireland peace process, and involve dealing with current and former terrorists, managing international legal cases on the British

military's systematic use of torture, and checking under her own car for explosive devices. Mary Murphy should need no introduction to the harsh reality of the end justifying the means. On a lighter note, my Irish diplomat sister observes that a slightly more true to life Mary Murphy would frequently irritate her Zurich staff in public speeches as, yet again, she quotes Seamus Heaney's poetry and mistily anticipates the possibility that, this time, hope and history rhyme.)

Back to Janus Athena's grand scheme.

TMFTF tells us; *"The AI group is making open source instruments that mimic the functions of all the big social media sites."* For this to be possible – or for a vast archipelago of interoperable social media islands to emerge – we'll also need to ensure that someone like Janus Athena can even exist, i.e. that someone with their talent has the training and professional opportunities to fully develop to the point where they can conceive and build a new paradigm.

Right now, fewer than half a dozen tech firms concentrate huge resources on a small number of global post-graduate AI programmes around the world. They directly and indirectly influence the training and content of those programmes, especially through access to data-sets. Compliance of senior academics is easy to gain, however they individually rationalise it. The mini-industry of AI 'ethics' – as opposed to AI regulation – speaks to that. The biggest tech firms buy each successive cohort of top graduates to absorb into their own structures or simply prevent from going elsewhere. The firms complain about a global skills shortage in AI, but in practice seem content to ensure – strange, this – the dominance of a tiny number of resource and prestige-sucking programmes whose graduates they hire. The firms also work to undermine critical research in computer science, social science and the liberal arts.

So, if we want diverse, cohorts of independently-minded AI specialists like Janus Athena

to exist, we'll need to reverse the capture of AI programmes at global brand-name universities by US tech firms.

Finally, the data commons. TMFTF celebrates everywhere the possibility for cooperative structures and commons to emerge, bottom-up. I particularly enjoyed the California water commons, with its quiet nod to Elinor Ostrom's original post-graduate research on emergent cooperation between county water-boards. In the technology-sphere, the novel envisages a data commons that underlies a reformed social media with a dominant, carbon coin-generating platform. This was thrilling to read about, though the data commons envisaged seems overly dependent on the idea of data as property, and unaware of how data-as-property drives inequality because – surprise – some people's data is judged more valuable in the market than others'. In my policy world, the libertarian pedigree of personal data as private property idea tends to strongly determine the roles and goals of initiatives to self-organize around data-ownership. Freedom of contract is the one true freedom, etc. etc. I've probably spent too much time standing around at receptions, drinking bad white wine to get me through yet another twenty-eight year old from the Cato Institute droning about how the completely new paradigm of data-ownership is going to 'fix privacy'. (These guys are a menace. Even in Brussels!)

I worked on a recent project to sketch out for a centre-right German think-tank how a European data commons might work. I tried to steer it away from property rights and towards what you'd get if you started with the commons and then worked back to what data could be harnessed, and to which *collective* purposes. This is eminently do-able, and pushes you towards two distinct areas; groups of people who are served poorly or not at all by current data regimes, and existing cooperatives, unions and mutual societies who could collect and process their members' data to improve collective bargaining, or licence access to it to generate revenue and boost affiliate membership. Viewing personal data as a

collective asset points towards all sorts of currently under-provided public goods (I briefly describe several, on p. 74 here - yes, oddly enough, this stuff got shoved into an annex).

When you ditch Janus Athena's starting point that the least-worst thing to do with data is transfer its property rights so its rents can be reallocated to good causes, you realise there is a whole world of under-provided data-pools that will help solve big, collective problems. Real public access to energy usage data, realtime location data in urban management, indemnified and public-good data-donation in public health settings, in infectious but also rare and genetic diseases, and of course access to granular pay and employment data to end workplace information asymmetry – there is so much more we can do. We're just blinded by the current paradigm of data as little more than a way for adtech to drive consumer purchasing.

The EU is working on explicitly strengthening and formalizing the legal space for data commons in Europe, and much data commons and cooperative work is being done elsewhere, building on existing legal rights of access and correction to data. (Some other countries, and a couple of US states including California, are also beginning to move.) Access to these pro-commons capabilities is still limited and non-intuitive, and undermined by supine data protection agencies, particularly the Irish one which provides a fig leaf of regulatory cover for US tech firms in Europe. But they're a foundation we're building on for a more open, equitable and non-adtech-based future. And from this start-point, I think we can get somewhere better than Janus Athena's admittedly extremely fun but rather brittle scenario.

I want to leave the last word on this to one of my heroes, Abigail Echo-Hawk. I don't know her; I just know of her work. Echo-Hawk is a member of one of the bands of the Pawnee Nation of Oklahoma, and works in public health data in Seattle. She started off collecting data about violence against Native American women and girls in urban settings.

The data wasn't there, so nor were the needed policies and supports. She first went to community elders for permission and guidance, and the way she thinks about how – or if – we should use data completely changed how I now see it:

> "Monetising what we see as sacred knowledge, our way of being - driving, walking - is sacred knowledge and the only people who should have any purview over that is our community. ... What if we look at what the data could do for our community and how to achieve that? ... We are gathering our data because we love our people, we want a better future for the next generations. What if all data was gathered for those reasons? What would it look like?"

There's a way of thinking about data – and about how we use the linked technologies to connect, communicate and organise – that grows out of the seven generations view KSR talks about in TMFTF. It's something that serves us, and which never stops being *of us*. It's not an asset so much as a gift, but not all gifts can be given or received by all people. Once you start thinking of it this way, you can never go back.

Just as in climate policy, we're not going to be saved by an AI genius, even one called after a two-faced god and a god of wisdom. The work is collective, it's structural, and most of it happens offstage. But a book like TMFTF, with its kaleidoscopic and profoundly humane view of all the stuff we need to try, fail at and improve on, puts my policy area in its proper context. Everything we now do serves the work on climate. In tech, our job is mostly to fix (destroy) the current business models of the planetary information structures, because they currently make everything else harder. That's my job, my life's work, and it's inexpressibly important to feel my shoulder is put to the wheel of that many-wheeled and almost infinitely shouldered vehicle we are collectively trying to push into the next century.

I hope my reservation about Mary Murphy's motivation wasn't unkind, because my

abiding feeling for the Ministry for the Future and its author is gratitude, both for this novel and for New York 2140. Thank you for making it bearable to look at our future, see it for what it is, and still want to get there.

2 Oliver Morton - On Solar Geoengineering and Kim Stanley Robinson

The solar-geoengineering effort in *The Ministry for the Future* takes place shortly after the book's harrowing opening. It is presented as part of a continuum of responses to that extraordinarily lethal Indian heat wave, one which stretches from domestic politics—the full nationalisation of the electricity industry—to transnational armed struggle by means of support, at a level never fully revealed, for the revolutionary violence of the "Children of Kali".

The solar-geoengineering effort, which takes the form of the injection of tens of millions of tonnes of sulphate into the upper atmosphere, providing a cooling effect similar to that of a large volcanic eruption, is represented as a unilateral measure explicitly contrary to international law, and one that carries with it the risk of military reprisal: in effect, an act of war. It is also represented as, broadly, benign and/or beneficial and justified. This is an unusual position in left-wing discussions of climate action where views of solar geoengineering along the lines of Naomi Klein's—"a doubling down on exactly the kind of reckless, short-term thinking that got us into this mess"—are much more common.

It is hardly surprising that an author whose most celebrated achievement is an account of the terraforming of Mars might have things to say about geoengineering. The fundamental novum of the Mars books (*Red Mars* (1992), *Green Mars* (1993) and *Blue Mars* (1996)) is the engineered transformation of Mars from a barren and inhuman planet to a fertile, productive and human world replete with forests, flowers and oceans. The process is central to the books' story and to their generation of meaning; the ways in which their long-lived characters come to understand themselves, their changing relationships, that which they have lost and forgotten and that which they may yet reclaim or mend are

bound up in the transformation of the world they inhabit. Terraforming is also central to the books' aesthetic. The sublime energies of the planet's fictive transformation inform its representation in prose, from the delicate plants of its alpine meadows to the great shafts dug to release its mantle's heat. An author who has written this way about Mars could clearly not leave aside ideas of geoengineering when looking at the Anthropocene on Earth.

Crucial as it is to the plot and aesthetics of the novels, terraforming is not simply accepted: it is represented as a contested process, opposed by "Reds" who endow the purely mineral status quo with a surpassing intrinsic value and promoted by "Greens" with motives that range from the pragmatic to the extractive to the spiritual. The conflicts between them take place within both an economic context—Mars as an arena for the deployment of terrestrial capital—and a political one. The political and economic self-actualisation of the Martian people as they struggle for independence from the trans-national capitalism of Earth requires the geophysical/biogeochemical transformations provided by terraforming not just in practical ways but also to provide them with the subject of a common life and a distinct history. At the same time, the terraforming renders a would-be-independent Mars less its authentic self. The links and contrasts are made manifest when the extreme violence of Mars's first political revolution proves to be a powerful act of terraforming in and of itself, its spindly mushroom clouds heating the atmosphere, its destruction of landscape amplified by the unleashing of subterranean seas.

The conflicts between the Red and the Green are to some extent reconciled in *Blue Mars* through an inspired manoeuvre which has something of the feeling of a "spatio-temporal fix" (though, given that the economy is in the process of becoming post-capitalist at this point in the narrative, not quite in David Harvey's sense): the constitutional regulation of atmospheric pressure. The heightened surface relief of Mars allows air pressure in the lowlands to be high enough to support a somewhat Earthly ecology while the air of the

highest mountains is kept thin enough for their above-the-weather surfaces to retain some approximation of the original Mars, islands rising out of the atmosphere into space as the mountains of Hawaii or the Canaries rise out of the ocean into the air. Green, even blue, below: a remnant of red above.

Solar geoengineering can be imagined as a similar way of allowing sustained contradiction; and that is, for many on the left, fundamental to their distrust of the idea. Climate geoengineering, either through interventions in the planetary energy budget—solar geoengineering—or its carbon cycle—carbon geoengineering, also known as carbon-dioxide removal or negative emissions—represents an attempt to decouple climate outcomes from cumulative emissions. If you view the climate crisis primarily as a crisis in the relationship between capitalism and the planet, as Klein and many others do, such an ahistorical "decoupling" obscures both the roots of the issue and the nature of the necessary responses. As Kevin Surprise argues, solar geoengineering provides a spatio-temporal fix to the contradictions of green capitalism, effectively increasing the amount of room for carbon dioxide in the atmosphere. It is, in Surprise's Gramscian terms, a tool of "passive revolution to ensure the continued hegemony of the ruling classes and capitalist states by maintaining the prevailing political and economic relations currently under threat."[1]

Robinson reverses the assumption that solar geoengineering is to be realised as a way of defending the capitalist status quo. In the chapter following that in which the geoengineering effort is introduced, the newly unified Indian people are identified as "formerly the working class of the world" bringing their "long post-colonial subalternity" to an end. The Indian actions, as a whole, are not intended as a way of sustaining the world as it is, but as the beginning of a new world to come, and the geoengineering is a part of that—part of a

[1]Surprise, Kevin "Gramsci in the stratosphere: Solar geoengineering and capitalist hegemony" in *Has it Come to This?: The Promises and Perils of Geoengineering on the Brink*, J. P. Sapinski, Holly Jean Buck and Andreas Malm, eds, Rutgers University Press (2021)

new and intended relationship between political economy and the climate. The violence of geoengineering is imposed not by the hegemons, but by the victims, and justified in their eyes by their recent experience of the normally slow violence of climate upping its tempo in the most shocking way to deliver a war's worth of casualties in a matter of weeks. The martial nature of the undertaking is reinforced by the harassment which the geoengineering effort suffers at the hands of enemy air forces.

This conceptualisation of solar geoengineering is not unlike that outlined in a recent paper by Marcus Hedahl and Kyle Fruh which looks at the subject in the context of the just war tradition, and the resonance is deepened by the fact that the consideration of other acts of potentially unjustifiable violence in the service of emissions reduction is another of the ways that *The Ministry for the Future* goes against the norms of most narratives of climate action.[2] Hedahl and Fruh argue that the incursion into the essential affairs of other sovereign nations that is a seemingly unavoidable aspect of solar geoengineering might under some circumstances be defended in this way, taking from that the conclusion that greenhouse-gas driven climate change can be seen as unjust war. Geoengineering, like terraforming in the Mars books, thus becomes part of a political struggle in a way that goes beyond (though does not necessarily outrank) the politics of economic structure.

Remarks Robinson made in an interview in 2019 reinforce a reading of *The Ministry for the Future* which sees it endorsing the Indian solar geoengineering effort as at least compatible with a narrative of system change and possibly as part of a greater turn. However the rest of the novel somewhat undercuts this picture. The solar geoengineering is effectively a large pulse of aerosols injected into the stratosphere and then allowed to dissipate (it is also logistically highly improbable, but that is not structurally relevant). Almost all academic discussion of plausible solar geoengineering initiatives imagines efforts

[2]Hedahl, Marcus and Fruh, Kyle "Climate Change is Unjust War" *The Southern Journal of Philosophy* **57** (2019)

which are both much slower in their ramp up and much longer in their duration, thus serving as a long term check on either the rate of warming or its maximum extent. If the Indians had taken this approach *The Ministry of the Future* would be a very different book; one which went beyond endorsing the idea of solar geoengineering to having it embedded throughout the narrative.

This is in some ways salutary. A frequent criticism of solar geoengineering research is that real-world deployment would come about as a result of specific political pressures on and within the nation or nations doing the deploying. As my friend Pablo Suarez has pointed out to me, thinking that the first use of solar geoengineering would be "really" about reducing climatic harm is like thinking that the Argentinian invasion of the Falklands was "really" in defence of a legal point of principle as to sovereignty. To think that the deployment of solar geoengineering would not be the product of a complex conjuncture of disparate political factors is to misunderstand the difference between the world and the world as represented in climate models.

Nevertheless, it is hard to avoid the idea that *The Ministry for the Future*'s carbon geoengineering is much dearer to Robinson's heart, and more central to his politics, than its solar geoengineering. The way that carbon is, over the course of the book, reincorporated into the lived practices of the peasantry, turned into a tool of development and built into the world's monetary system is far more richly detailed than the treatment of solar geoengineering, fundamental to a realignment of the human economy and the economy of nature, top-down and bottom-up, distributed yet particular. In the terms of the Mars books, the transformation described in *The Ministry for the Future* is more aligned with the viriditas of Hiroko Ai than the soletta and orbiting mirrors of the transnationals.

This seems reasonable. It is in the relationship between the global economy and the carbon cycle that the roots of the climate crisis lie, whether you see those roots as funda-

mentally structural, in the way, say, of Andreas Malm, or something more like a happenstance to be corrected, in the way of green capitalists. Solar geoengineering seems at best an adjunct to the realignment of the two, at worst a way to keep that realignment from happening. Central as the Earth's energy balance is to earthsystem science, its variation by political fiat does not fit into a structural story about the way humans, their economy, their rights and their planet should act on each other in the way that the changing political economy of the carbon cycle does. It is a tool for reworking the climate, but not one which can, in its implementation, reciprocally rework political economy to a desirable end. It is thin, insubstantial, airy, where the politics of carbon are thick, reactive and earthy. Andreas Malm warns us that to hope for any utopian substance in such thin technocracy is to partake in "one of the more remarkable" psychopolitical bourgeois pathologies.

This may explain why, though solar geoengineering turns up early in *The Ministry for the Future*, the political system needed to govern solar geoengineering as a long-term project is not available until close to the book's end, or even, perhaps, beyond it. Only when the revolution in the political economy of the carbon cycle has run its course—when we have reached, as it were, the *Blue Mars* phase—is a just form of sustained global action truly possible, at which point the now-governable option is no longer needed in the same way as it was before.

The problem is that if it is to play a role in averting horrifying scenarios such as that with which the book opens, solar geoengineering would be needed before the transformation that its critics on the left fear it could forestall. And no one has, as yet, plausibly outlined in fact or fiction a way in which the politics which lead to and follow from a deployment of solar geoengineering could in themselves help bring that transformation about. As this reading of The Ministry for the Future seeks to suggest, it is a question which deserves further examination.

3 Jessica Green - Can the World's Bankers Really Save the Climate?

The Ministry for the Future (TMFTF) should be lauded for reimagining global climate governance. It recognizes what many climate scholars do not: climate change is in large measure, a problem of extreme wealth and wealth inequality. Thus, addressing the climate crisis requires discussing "potential alternatives to the global neoliberal order" (155). Moreover, the Ministry is keenly aware of the shrinking window for action. Addressing climate change is a race against time, rather than a "tragedy of the commons." Thus, we should be less worried about getting everyone to participate in international agreements, and more worried about acting quickly, since delay will make climate problems harder to solve, and could result in irreversible changes. What follows from these two premises is nothing less than a wholesale reimagining of the global economy, as enacted through coordinated efforts by the world's biggest central banks. However, the Ministry's proposed technocratic solutions overlook the messiness of domestic politics, and the huge challenge of constraining powerful anti-climate interests.

In essence, TMFTF trades one technocratic solution for another – bankers instead of climate wonks, converting tons of carbon dioxide into "carbon coins." Robinson acknowledges this, noting that "all central banks [are] undemocratic technocracies" (291). Indeed, the appeal of the Ministry's proposal to the central bankers is precisely the extent to which it bypasses the politics of democratic decision-making.

There are three reforms that follow. First, banks will create a new "carbon coin" – essentially a form of green quantitative easing. Carbon coins will be backed by central banks and convertible to other currencies. Thus, *not* emitting carbon becomes a moneymaking endeavor. The coins will be securitized by long-term bonds with a guaranteed payout, to

incentivize capital to "go long" on climate. Second, blockchain technology will assign digital identification to each carbon coin. Everyone will know how many coins are in circulation and where. Combined with strict regulations, this would prevent currency speculation. Third, as a result of fully trackable currencies, the use of tax havens to avoid taxes would no longer be possible. As the Ministry's legal expert notes, "That's maybe the best thing about blockchain for fiat money—we know where it is. There aren't any hiding places left. If you do manage to hide it, it isn't really money anymore. Only money on the books has any real value now" (403). This means that the world's wealthy would actually pay their fair share of taxes, making tax regimes more progressive. Thus, "if you want to stay rich in the current moneyscape, it's best to take the haircut and accept your fifty million and walk" (404). Compared to the trillions now estimated to be parked in tax havens, this would be a marked improvement. TMFTF further posits the possibility that a fully digital, trackable currency "could quickly stimulate rapid change in behavior and wealth distribution" (333), though it's not entirely clear why.

Why would central bankers consent to such an approach? The linchpin of the TMFTF strategy is a threat of greater control over central banks. An International Credit Union, where individuals can trade carbon credits, would be an alternative to private banks. When private banks crash, as TMFTF predicts, they would be absorbed by central banks, but only on condition of more stringent oversight by legislatures. The Ministry thus plots a "double action" which reorganizes control over carbon capital. If plan A doesn't work, then plan B would also create a credible threat to central banks: The Ministry could simply call upon allies in key governments to expand legislative control over central banks, curtailing their independence and enhancing their accountability.

This strategy stands in stark contrast with the current policy approaches in the Paris Agreement to the UN Framework Convention on Climate Change (UNFCCC): countries

pledge to reduce emissions and ratchet up the ambition of those pledges every five years. These "Nationally Determined Contributions" aim to get every country to address climate change, no matter their carbon footprint. Every pledge is viewed as an important contribution to continued international cooperation. However, it is abundantly clear that this approach is failing in our race against the climate clock. Currently, countries' collective pledges set us on a pathway to between 2 and 4 degrees of warming.

In addition, non-state actors are also invited to take voluntary actions to address climate change through the UNFCCC. The Marrakech Partnership was created to involve non-state actors more directly in the UNFCCC process, promoting cooperation between governments, cities, regions, businesses and investors. Along with 5 countries with net zero legislation, a growing number of corporations are increasingly pledging to go net-zero by 2050, in accordance with the goals set forth in the Paris Agreement.

But net-zero pledges and domestic regulations are constantly butting up against the structural power of those actors who stand to lose the most from decarbonization. These "climate-forcing asset holders" include fossil fuel and mining companies, electric utilities and heavy manufacturers among others. A recent study finds that of the 61% of global emissions and more than half the world's population are now covered by a net zero pledge. Yet only 20% of these meet basic robustness criteria, such as outlining clear interim targets, publishing a clear plan and using a reporting mechanism.

And for these climate-forcing asset holders, climate policy has become existential – a profound threat to the value, and perhaps even the existence, of their assets. Decarbonization cannot be successful without addressing their obstructionism. The Ministry understands that real progress on decarbonization requires the power of the purse *combined* with the power of the state. TMFTF should be lauded for emphasizing the critical role of the state as the route to decarbonization.

Though we should not expect cli-fi to provide realistic roadmaps for policy reform, the book falls short in its political imagination of mobilization. Beyond the Children of Kali – the climate vigilantes who target the ultra-wealthy – there is no mass mobilization, no political demand for change from the citizenry. Indeed, any possibility of such mobilization is quickly dismissed: "Demonstrations are parties. People party and go home. Nothing changes" (156).

While the imaginary of TMFTF actually gets much closer to the true sources of the climate crisis, it wishes away the obstructionism of the powerful through the magic of a new international banking system. Setting aside the real problems with creating a carbon coin (see current critiques and concerns about the performance of carbon pricing policies), there is little in the way of politics here. In the end, domestic interests will be the central component of any real efforts to meet the goal of the Paris Agreement of limiting warming to 1.5 degrees, and while TMFTF points us in the right direction, it doesn't dig into the conflicts that continue to slow our race against the climate clock.

4 Todd Tucker - Ministry for Your Future Soul

"The Ministry for the Future" should be required reading for anyone that writes white papers for a living.

A few reflections and (potential) spoilers.

Like Black Mirror, it's the latest in a wave of artworks that envision a very near term reality — in this case, the mid 2020s. Unlike Black Mirror, it is utopian, not dystopian, so you don't want to claw your eyes out and actually walk away somewhat inspired.

The titular Ministry is the Subsidiary Body for Implementation of the Agreement, an organization set up at the 2023 Conference of Parties (COP-29) to help make the Paris climate accords a meaningful reality.

Over the course of 106 chapters (some little more than a paragraph long), Robinson narrates the efforts of the scientists, economists, and diplomats in the Ministry to push decarbonization without having (at least at the outset) substantial formal enforcement powers.

The central contribution of the book is to marry an appealing fictional format with compelling characters (on the one hand) with (on the other) pithy explainers on the numerous technical, legal, and economic challenges to decarbonization, including on everything from geoengineering to trade law to modern monetary theory (MMT). I could say this is an efficient way to make the policy medicine go down, but even the policy interludes are informative and fun reads.

Robinson is perhaps the preeminent Gramscian science fictionologist working today. Towards the beginning of the book, Robinson explores the hegemonies that make decarbonization seem impossible now, such as an economics discipline and cost-benefit analysis that force even critical perspectives to speak in their language. He then thrillingly imagines those hegemonies getting displaced through changing the "facts on the ground." Clandes-

tine groups make it impossible for non-green ships to dock. New socialized social media platforms break tech monopolies that create pro-inaction echo chambers. Oil pipes are repurposed to refreeze Antarctica. Central banks change how they do risk analysis, which lead large petrostates to change the way they think about their economic development futures. Large developing countries that suffer the worst effects from climate change simply stop playing multilateral ball and take matters into their own hands. All these things reinforce one another and create a new (real and discursive) reality.

This dynamic imagination exercise is what makes the book valuable to policy nerds. Often, we isolate specific chunks of the problem we deem to be manageable as individual writers, researchers, and advocates. However, success on a problem this large will require a systemic overhaul where science, economics, culture, and politics are reinforcing one another. Cultivating the "spirit of 1848" is how Robinson describes the needed leap. It's an apt one to what is needed now but still far short of where some policymakers seem to be.

Specific chapters illustrate how fiction can inform planning. In one passage, Robinson imagines nationalization of the entire financial system. If someone advocated for that today, it would be seen as radical. But Robinson is an adept social planner: he starts with the outcome, and then walks back to what sequence of events would have to occur to bring it about. This is much like so-called "theory of change" practices employed by social change organizations and movements. It's a useful antidote to reflexive incrementalism. Indeed, the solution to the thorniest problems in the short run may be to create *more* problems, or as the fictional Ministry's motto goes in the book: "Overcome difficulties by multiplying them."

There is some basis for this theory of the world: one read of the failure of the WTO Doha Round — and subsequent talks on environmental goods and fishery subsidies — is that

the Uruguay Round (1985–94) was *too* successful at liberalizing, such that there was not enough to negotiate over afterwards. Now, with the Trump administration's reintroduction of tariffs, there is stuff the US has (market access and removal of the tariffs) that US allies want. I, for one, am more confident of introduction of new issues like climate into the WTO than ever in two decades working on these questions, precisely because of that dynamic.

In short, in a world where we are debating whether the filibuster should come or go, it's relieving to think of a world where all veto points and resource constraints melt away. That the book follows this melting away with mostly good things happening speaks to Robinson's utopian faith in humanity. I want to imbibe some of that, to balance out the bitter taste of a lifetime of very little changing.

I came away with a few specific questions for Robinson:

First, how reliant is his theory of change on MMT? The Ministry unleashes several highly productive reactive sequences by opening up the monetary spigots, including through creation of new currencies.

On the one hand, I came away from reading the novel more sold on MMT-adjacent ideas like a jobs guarantee. That's the magic of storytelling as opposed to white papers. With the latter, my mind as a reader immediately goes to implementation challenges, like, how would this entitlement be enforced in courts and would that ultimately destigmatize marginalized workers. However, through chapters exploring how fossil fuel towns would be shut down and repurposed — and workers transitioned into specific conservation functions — it's easier to imagine how a JG could work in the context of a total economic transformation and repeated feedback loops. Indeed, as one passage notes, the people doing activities like soil remediation "would be getting paid for what we had to do anyway to keep from starving."

On the other, I found some of the proposals discordant with any more traditional

resource scarcity / value creation framework. On page 420, Robinson imagines that people in the future would be paid for not doing things, e.g. "Coal had become just a black rock you could turn into money by leaving it alone." How would this work? If I'm a worker or a firm that is doing something with a piece of coal, that is rivalrous and excludable activities so that this value-adder is paid, and those that don't value add are not. But loads of people — an infinite number — can *not* add value to the goal. Who gets the benefit? Who doesn't? Hard to imagine this working without a liberal-for-even-MMT money creation.

Second, and relatedly, Robinson's narrators have a fondness for blockchain technologies. However, we know that this can be significantly environmentally destructive. How to square this with the climate objectives?

Third, some of the early events that set the decarbonization sequence into motion were rather violent acts of sabotage and even murder. How critical is such a strategy to creating a critical juncture at scale?

Fourth, there is a passing mention on page 454 to increased strikes as a method of constitutional governance and checks and balances. I am fascinated by that idea, and have written on related themes. I want to hear more!

Fifth, there is a passing mention on page 476 to depopulation as a reason for optimism around energy trajectories. How crucial is this to the framework?

Finally, the character of Frank is someone who pursues very individualized forms of direct action, often portrayed as futile and risible compared with more coordinated collective action. Is that a fair reading of Frank?

5 Belle Waring - The Sudden Tempest of Ultimate Summer

O Kali's feet are red lotuses wherein lie heaps of holy places.

All sins are destroyed by Kali's name as heaps of cotton are burnt by fire. How can a headless man have a headache?

I am irresponsible, cruel and arrogant,

I am the king of the great upheaval,

I am cyclone, I am destruction,

I am the great fear, the curse of the universe.

I have no mercy,

I grind all to pieces.

I am disorderly and lawless,

I trample under my feet all rules and discipline!

I am Durjati, I am the sudden tempest of ultimate summer,

I am the rebel, the rebel-son of mother-earth!

Say, Valiant,

Ever high is my head!

—Kazi Nazrul Islam

[Translation: Kabir Chowdhury]

We can think of two versions of *The Ministry of The Future*, each of which invites us to imagine a world in which we make difficult, creative choices to mitigate the effects of climate change, and ultimately prevail. In the first book, a whirl of technological, sociological and financial solutions are attempted. Some are cautious science, some desperate acts of brute

force, such as filling the atmosphere with particles to rival the cooling effects of the 1991 Mount Pinatubo eruption (and indeed, scientists are seriously considering this, which I have always thought would be the first true action on climate change). In the second book, a careful ruthlessness prevails. People still use container ships? They are sunk in spots to create new reefs. Billionaires have gotten rich on carbon fuels, and have no plans to stop? They are brutally stabbed to death in their own beds before their companions can even grasp what's happening. But, which of these two books above has Kim Stanley Robinson written? Having written the first seems to say he can't write the second, and yet can he still have written both?

I'm not going to go through what the first book would be like; it would be like *The Ministry of the Future!* Our heroine Mary Murphy, head of the Ministry of the Future, makes the rounds, doggedly insisting that the central banks issue a carbon-backed coin, helping push most of the people in any given country into a smaller area than they occupy now, doing the hard boring work that saves the world. My initial feeling was that *this* is the real book, the wildlife corridors and rewilding, the solar power, the self-sustaining farms in India, caste system erased along with kerosene. It follows that Kim Stanley Robinson does *not* want us to feel a visceral attraction to violence. Or that he himself does not find it attractive? So that perhaps any appealing parts were accidental. Taken as the first book, The Ministry of the Future offers a thousand *non*-violent ways to deal with climate change. The book is genuinely so hopeful, optimistic—a love letter both to profoundly creative thinking and to the long slog of successful bureaucratic progress. And also a love letter to the pleasant orderliness and orderly pleasures of Zurich, which no act of violence can unseat as the safest place in the world. It made me want to move to Zurich. This version seems the most like a Kim Stanley Robinson book in any case (though as I recall there's violence in the Mars trilogy.) So I will present my case for the second book, and

its problems—and its solutions.

The Ministry of the Future opens with an act of climactic violence in Uttar Pradesh, where the pre-monsoon heat has become humid, with disastrous results. I have been in India during the pre-monsoon time when it was 45, which I do not recommend except for the genuinely hallucinatory effects, but it was dry, I'll give it that. My childhood home of the S.C. Low Country, by contrast, is regularly 37-39 in midsummer, with 65% humidity. We had fans, though rarely A/C, and so as a 6-year-old I learned I could count to 1000 sheep. This was even after I realized you had to make the sheep distinctive to occupy enough of your mental bandwidth to force the hypnagogic state. So, this one has a floppy ear, and this one a few freckles of black around the mouth, and this one a smear of yellow in its eyes, and so forth. More and more damaged, maybe. But it was in vain, I just lay on the sleeping porch waiting for the increasingly loud clamor of birds and the headache white dawn. So this spoke to me.

In the end, helpless, everyone goes into the lake, where the above-body-temperature water cooks them in a stew of drowning and decay. The reverse of what my father taught me: even in the blood-warm waters a hurricane forces ashore, you will die of hypothermia. After the attacks on Hiroshima and Nagasaki people did the same, walking down into the lakes in the parks to cool a fire burning inside them, unslakable. This has always been a source of nighttime horror to me. In the end only American clinic-volunteer Frank May is left alive, forever scarred by the knowledge that he had a thermos of cool water he shared with no one.

This isn't a natural disaster, rather the violent convulsions of a wounded planet, and it triggers human violence immediately. Even before the exodus to the lake, men steal Frank's generator and window A/C unit, which he is using to try to keep people alive in his clinic. They force him to look down the all-consuming black circle that is the barrel of

a gun, and tell him, "this is your fault" and, "you did this." Ambiguous. Him personally flaunting resources with his clinic, drawing people there? More like: you white people did all this, and what's more you want to tell us what to do with the feeble means we have left.

There are three things in the novel which I think advocate most earnestly for violence. Firstly, an unknown group manages to capture everyone at Davos. (So far so good, we are all thinking.) They are deprived of basics like running water and end up having to carry their own shit outside in buckets. (Again, seems eminently fair.) This is all narrated by a nauseating billionaire whose main concern probably is lacking the ability to upload to the future version of Tik Tok. She mocks the propaganda they are shown about world hunger. The only one that gains any traction is a series of interviews with the billionaires' children, whom she thinks must have been selected for awfulness, until the parents in the room begin to fall silent in pained recognition. But then ... the worst violence they are subjected to is *earnest PowerPoint presentations!* And while we can all agree this is probably excruciating, perhaps there's something more? The narrator is triumphant upon release, insists that she has learned nothing, and is happy she will get to dine out on this story for the rest of her life! Again, perhaps a different ending to this section seems better? Like, for example, **killing everyone?** There is absolutely no way I am alone in wanting everyone to be lined up against the wall and shot. Fictionally, I mean. And no way, to my mind, that Kim Stanley Robinson isn't absolutely expecting you to be disappointed by rationality, and instead to call for blood.

I am a person forgiving in life but vengeful in fiction. When I was in group therapy one time the others had to deliver a kind of verdict on your life near the end and theirs was *unanimously*, why do you even talk to your parents? I have a lot of good reasons here, and am right, and people can change, and you can love them even if they are ... difficult and so

on. But what did I love best as a girl? The end of *The Little Princess*: the destruction of the headmistresses' life, and her meek sister's sudden, vengeful pronouncement: you're a hard, cruel woman, Maria Minchin! And in life what is best? Book 22 of the Odyssey: the death of the suitors. When Odysseus strings the bow, shoots through the axes, and then Antinous' white throat, it is a beautiful thing. So, fictionally, I want everyone at Davos to get killed. Or can I cloak a genuine vengeful design on billionaires as a mere fantasy by wrapping it up in a very attractive wrapping paper printed with plans to stop Antarctic glaciers from sliding down into the sea by pumping the meltwater from the lower regions back up to the top, using power from Russian nuclear submarines, hoping eventually to create a dry area beneath, such that the glaciers will be nearly stopped as they grind, dry, against the stone below, unlubricated by melt and not hastened further by friction-created heat. See? There was barely any violence in there at all. Shiny white and blue sastrugi!

And here we come to the second aspect of *The Ministry of the Future* which makes it seem the second of my two proposed books rather than the first. One that invites us to be ruthless. Grimly ready to do what is necessary. The Children of Kali are a terrorist organization formed in the wake of the heat wave. I was excited when they were introduced. I wanted them to blow things up and then retreat into the arms of Mother Kali, black with the dust of the graves. And this is what they do, more or less. A black obverse to the shining coin of the Ministry. But their killings are so targeted, their plans so careful, that you realize they must have a chairman too, and points of order. Board meetings in the charnel house.

My family's carbon budget is busted by one thing: round-trip 26-hour trans-Pacific plane flights. Not last year, of course. But every other year. Sometimes twice. If someone would take me on a dirigible I would absolutely go, (or would it be too slow, in all honesty?). So how would we get to no plane flights? The Children of Kali would crash my plane, my

children on it and all, forcing a mass of small drones into the engines, along with 59 other planes in a single hour. And however much people might discover they were mostly private jets or commercial aviation, I would still be dead, and just pray there was no moment, not a single one, when my children and I looked at each other in the eyes, still alive, stomachs in our throats, falling, falling. But would it work, assuming I weren't killed? Would I book a flight after that? Realistically, I would still want to do it and my family would refuse. I am a stupid risk-taker. But after the second round? No. And then, the development of commercial airships, eventually so good with solar and wind that they produced rather than consumed energy, offloading it when they docked.

The Children of Kali also force down the consumption of beef to negligible amounts in a beautifully ingenious and quite necessary way. How? "Later that same year the group announced that mad cow disease, bovine spongiform encephalopathy, had been cultured and introduced by drone dart into millions of cattle all over the world." Kim Stanley Robinson gives us innumerable fascinating and peaceful ideas about how to change the world, but isn't this also a fascinating non-peaceful idea (insofar as there will be idiot Americans who continue to eat beef on principle and fall terrifyingly ill)? To note, none of our characters is upset by the Children of Kali's actions. We're not given any words or thoughts about it from them, but I think we can take it to mean they're not denouncing it. And why would they? At two fell swoops the Children of Kali have eliminated two of the most serious obstacles to fighting climate change (and they do more).* And if a few people had to struggle to embrace both their children equally as they plummeted into the cold Atlantic, then so be it. After all, "[e]ven those earrings/—children's corpses—/look stunning against the Mother's ears." "How Can That Black Woman Seem So Beautiful", Kamalakanta Bhattacarya

The third aspect of a ruthless *The Ministry of the Future* is subtle. At the start,

Frank wants to join the then newly-formed Children of Kali, but they won't have him; just another do-gooder white boy. He wants to help anyway, somehow, by hurting people, freelancing terrorism. Eventually, he contrives to kidnap our heroine Mary for a short time. This strangely appeals to the worse angels of her—and our—nature. Being the victim of a violent crime paradoxically leads Mary to seriously consider Frank's idea, delivered with wild-eyed conviction, that *some* violence is the only solution to climate change. To cut the Gordian knot with weaponized drones, a black wing of the Ministry? When she brings it up with her Nepali second, Badim, his response is, "imagine that there might already be a black wing of The Ministry for the Future." This is a startling thought to Mary, (and to the reader); up till now the Ministry's biggest conflicts have been with staidly grasping bankers unwilling to consider the issue of carbon-backed currency. Are there already UN-backed terrorists out there, terrorizing billionaires? Mary is enraged. She wants to know, but also, not to know. Not a recoil from violence so much as from the idea of violence. But only after Badim explains: "One aspect of a black agency is that ... [n]othing can be written down, nothing can be hacked, no one can talk to outsiders. The people in charge aren't to know about them." In the end Mary makes a curious leap of faith, as if to say: there are some acts of violence— even most acts of violence—that I won't tolerate, that I know will lead to cycles of violence. And I want to know everything that you do. But I also accept that you're not going to tell me what you do, and that you may well commit the very acts of violence I deplore. This isn't really cowardice on her part. On the one hand she has been convinced by Frank—by his terrorizing her! (She goes on to have a long relationship with him in what amounts to an extended act of kindness on her part.) Like Frank, she looked down the barrel of the gun and felt a sudden need for it to be pointed at someone else in particular. So she commits to Badim's plans with clear eyes. But on the other she is really, although she might not like to think of herself as such, a lynchpin in

the world's fight for survival. Her generosity of spirit, which is tempered by a willingness to make people very uncomfortable, has to stay itself for her work to go on. If she were the leader of a terrorist cell she would not be herself.

The strange generosity of spirit that moved this commitment is made plain at the book's close. Retired, Mary considers all the internet rumors that The Ministry for the Future had a thousands-strong group performing extra-judicial acts of violence and changing the world through the most direct sort of direct action — an idea she rejects with an equivocal acknowledgement that lots of money disappeared into Badim's division. She asks Badim, now head of the Ministry, 'do you have someone the way I had you?'....'Someone to do the dirty work, you mean¿. . . 'Yes' He laughed. 'No' he said. 'No one I trust the way you trusted me. I don't know how you did it ....What I think now is that what you did was way harder than I thought it was.' 'What do you mean?' 'You trusted me.' She regarded him. She wondered if it were true. Maybe it was. 'Sometimes you have to,' she said finally. 'You just throw yourself out there. Throw yourself off the cliff and start making the parachute.' 'Or start to fly,' he suggested. She nodded dubiously. She didn't think she could fly. 'Let me know if I can help, she said. 'I will,' he said, but he was shaking his head very slightly. No one could help him with this.

Only now has Badim realized what Mary did in trusting him. And that by being unable to trust he has left himself beyond help, trying to work both the glittering ice and the blue-black works of the Ministry at once (if one imagines so great a black wing, like an iceberg—and who can say?) Mary decided to endorse violence *and* non-violence. It worked! Is it different from one of the creative solutions given elsewhere, dyeing the remaining ice in the Arctic yellow, creating vast corridors for the animals and rewilding of the land? A hydraulic paradox, merely, requiring the steady, unstoppable power of Mary's personality to work? And so Kim Stanley Robinson has written the first book after all,

with a creative solution to fold the violence into the peaceful?

But a part of me worries that this super-position of violence and non-violence will collapse into violence, so that Kim Stanley Robinson *is* endorsing a violent approach to climate change as being necessary, fully as necessary as the other measures. It wouldn't be meaningful to speak of Gandhi as non-violent if it were the case that he also delegated some people to commit acts of violence. Downing planes, killing billionaires with laser-like precision—do any of us object? The UN's blue helmets turned black, and suddenly someone to fear? Colonializers doing the glamorous work with dirigibles and elk, and leaving the dark men and women from India to do the difficult, working as gardeners for years to get close to a well-guarded victim, same as always? I am honestly not sure how you could write both books without the second book becoming the "real" book, and the one the characters themselves would object to, *if* you let characters do that sort of thing. But perhaps there's no need to worry about a contradiction on this front, because perhaps we straightforwardly need terrorists if we are going to make real progress in fighting climate change, and Kim Stanley Robinson sees this. Yet it seems to me he is more like Mary, wanting to fight climate change with reasonable and creative solutions, buffalo back on the Great Plains. And it is not as if he is a terrorist! But still there are two books, and if we interleave books one and two we will get a sheaf of alternating pages, some advocating for organic farming in Kerala, some for murder. In the end, maybe this is just and right.

*This was meant to be somewhat handwavy and dramatic but it seems it is so handwavy and dramatic as to be aggressively wrong. Please read the comments for helpful corrections.

6 John Quiggin - Half the Earth?

When I read fiction, it's mostly either the 19th century classics or speculative fiction - what was and what might be, as opposed to what is. I live in the present, and spend most of my waking hours analysing the economy and society of today, along with the recent past and near future. In doing that, I am, for the most part, in agreement with Mr Gradgrind - what I want is facts, nothing but facts. But in relation to the future (and, in many ways, the past) we don't have facts, only possibilities. And, unlike the present, we don't have lived experience to help us understand those possibilities. Speculative fiction, at its best, extends our thinking to encompass possibilities we wouldn't otherwise consider, and to imagine ways of life no one has actually experienced. Thought of this way, The Ministry for the Future is like an all-you-can-eat buffet with more possibilities, both dystopian and utopian than it's possible to digest in one sitting. I'm just going to pick out one morsel - the idea of returning half the earth to a more or less wild state. The Half Earth idea isn't Robinson's invention - there's an active society promoting it. But Robinson's presentation makes it seem more real than an advocacy organization. Once I'm captured by an idea like this, I tend to go back the analytical mode, and ask whether this is really a possibility. The first thought that occurred to me is was a memory from high school,. One of my friends was a keen conservationists (he was later responsible for management of environmental water allocations in Australia) who pushed the idea that 5 per cent of Australia's land area should be national park. That proposal seemed radical at the time, but we now have a 'National Reserve System' covering nearly 20 per cent of the country. It encompasses national, state and territory reserves, indigenous lands and protected areas run by non-profit conservation organisations and ecosystems protected by farmers on their private working properties. That National Reserve System is still growing, with a particular emphasis on the wildlife corridors central to Half Earth. Australia is a big, sparsely populated country, much of

which isn't particularly well suited for any economic use, including food production. We can grow enough to feed ourselves, export lots of grain and meat, and still have plenty of land left over. But is it possible to feed, clothe and house the whole world using only half its land and oceans? In large part that depends on how many people there are in the future. That in turn depends almost entirely on what happens to birth rates in Africa, since most of the world is already near, or below, replacement levels of fertility. In Robinson's Future, net births per woman fall rapidly to around 1.8, so population is already declining in the second half of the 20th century. That's partly optimism and partly a predictable outcome of the climatic disasters that destroy much of our existing social order in the opening chapters of the book. I'm an agricultural economist by training, so I've spent a fair bit of time looking at food production. We are already producing more than enough to feed the entire population of the world. 800 million people are undernourished simply because they don't have enough money to buy food; they are outnumbered three to one by the obese, many of whom also lack the resources and education needed for a healthier diet. It will however, be difficult to feed a growing population if everyone is to eat the amounts of meat and fish typical of the diets of high-income countries. Conversely, if we are to return lots of land to a wild state, everyone will have to eat a largely plant-based diet. Whether meat animals are fed on grain or on grass, it takes a lot more land to produce animal protein than to do produce the same quantity of plant-based food. As well as farmland, we would need to reduce the area of land we live on, moving from small towns and suburbs into cities. The scene in Future where the residents of a declining country town agree to sell en masse and move to the city makes this seem like a realistic, if emotionally challenging, possibility. But as the narrator says, with a much smaller population, it might be possible to move back to village life further in the future. We are, suddenly and surprisingly, at a point in history when radical change seems not just possible but likely. Whether it is change for

the better or for the worse is in our collective hands. The Ministry for the Future gives us hope that, out of disaster, we may build something much better.

7 Henry Farrell - Technocracy and Empire

The Ministry for the Future is a novel, not a manifesto. That complicates things. As Francis Spufford described *Red Plenty* nine years ago in his own CT seminar:

> I was trying to stitch together a sort of story that paid more attention than usual to the economic motives for human behaviour, but even there, I wanted my account of causes to be as broad and open as possible, and not to collapse without residue into any single one of the rival diagrams of economic behaviour. Basically, I wanted to be awkward. I could take advantage of fiction's built-in tolerance of overdetermination, in which multiple possible causes for an outcome can be allowed to exist alongside each other without being resolved, or even given definitive weights. Storytelling lets you bring negative capability into economics.

KSR was in that seminar too, arguing that *Red Plenty* was a novel. And so is TMFTF - it brings negative capability into the politics of climate change, allowing it to capture *both* how we need radical changes, *and* how we can't be sure exactly which radical changes, in which combinations, we need. You can read the book as presenting KSR's best guesses as to how such changes might unfold. But - and this is my argument - that's not the only reading of the book. Because it's a novel, it folds those best guesses together with the uncertainty that they will be right, and with the presupposition that actual history emerges, as the imagined history of the novel does, from disagreement and conflict between people with different guesses, different theories, different ideologies. From this perspective, the novel invites people who disagree with KSR's surmises to advance their own, recreating in real life something like the arguments that drive the book.

If *Red Plenty* addresses the present through a reconstructed past, TMFTF does it

through an imagined future. It asks the reader to think about how we can get from here to there, but not by presenting a Single Great Plan That Will Resolve Everything If Only It Is Implemented Comprehensively. Instead, it depicts its better future as the result of a process of discovery, where none of the characters really understand the consequences of what they are doing at any point, but they still keep trying. Their various imperfect efforts (sometimes working against each other; sometimes reinforcing) plot a possible path out of the mess we are in, into a different and better mess than we could think that they (or we) might reasonably have hoped for. Some characters try to extend and change the international rule of law; others use organized violence; others engage in sporadic individual acts of terror and despair. Which is effective and which is necessary? It isn't clear to us, or to the book's characters (who change their minds as they go along), any more than we really know the paths to effective action are clear in the world we live in.

Thus, on the one hand, TMFTF illustrates an imaginary path through which a better, imaginary future might be discovered. We don't know whether there were better paths or better futures in this fictional microcosm, and never will. Novels are like real history, in that they never clarify the underlying causal forces (if they do, they stop being novels and start being social science). We don't have access to a counterfactual novel in which the sons of Kali decided not to take up violence, any more than we have access to a counterfactual past in which Gandhi decided to take up the armed struggle against British imperialism. But not knowing isn't an excuse for not acting (while TMFTF is not a policy tract, it is certainly a political novel).

On the other, novels differ markedly from real history in that they are the product of the writer picking and choosing (perhaps consciously, perhaps as the result of some scarcely articulable habitus). A novel is a different kind of "imaginary relationship to a real situation," as TMFTF describes the notion of ideology. It can help make sense of the

blooming, buzzing confusion of the world (a phrase that KSR borrows from the pragmatist William James, and quotes at least twice in the book).

A naive reading would suggest that TMFTF tries to represent the Sole True Ideology, even if not the One True Plan. I don't think that is true, even if it likely represents KSR's best guesses, his informed representation of how we might strike on a path out of our dilemmas. A different - and I think better - interpretation is that insofar as the novel has a political purpose, it is to get us to start people arguing about the right things, beginning to taking seriously the notion that we can escape from the political and economic trap we are in and figuring out what to do better, likely disagreeing much of the the time as the characters in the novel disagree, and sometimes working at odds with each other, but still moving half-crabwise towards a success that is cobbled out of failures. In other words, it is an invitation to get thinking, get arguing, get doing and get changing. And since I'm better at the arguing part than the doing or the changing, that's what I'm going to do.

KSR's best guesses, as I read them, stem from a particular understanding of our current capitalist moment, and how it is likely to develop. His imagined world is one that is dominated by markets and technocracy.

In this world, the Ministry For the Future, without ever quite planning it, becomes a kind of Modern Prince, seizing and repurposing technocratic and market means that it can turn to radical purposes. Social media platforms are the most visible expression of how global capitalism weaves itself into the lives of ordinary people - but they can be replaced by a new social network that displaces Facebook and its ilk. Global finance can be reconfigured by convincing the technocrats that run the central banks to change their policies. Blockchain can be weaponized to create new financial instruments that are centered on solving the problem of climate change. All this seems possible, because we live in a world where markets and technocracy have outpaced the global bourgeoisie that first

set them in motion. Everything is decentralized, and the apparent elite is smaller and less powerful than it seems on its face. The chief servants of the order that they have created - the people who run the central banks - defect, because they are pragmatists, and figure out that they need to save the world to do their job. The result, as one character puts it towards the end of the book, is that the world is "saved by fucking bankers." That's not all that's important in the narrative - technology, for example, plays a key role too. But it is a big part of what's important.

The reason I want to argue is that this isn't the world that I see us living in right now (obviously, I could be completely wrong, and I've skin in the game as I and my co-author have written a lot about this, and we are writing more). As I see it, the standard technocracy-meets-Davos-meets-markets-that-no-one-is-in-control-of account of the world that both the left and the right believe is crumbling. Far from being decentralized, that falling world created the machineries of its own downfall - global networks that are being weaponized by states against each other. It is incredibly hard for newcomers to displace existing social media networks because of network externalities - the more people are in them, the stickier they become, because their value is a function of the number of users they connect. Global finance is becoming ever less technocratic, as states begin to take control, turning global financial networks into tools of coercion. Decentralized blockchains are less likely to succeed than central bank backed digital currencies, which have surveillance and state control built into their architectures. All of this centralization may itself be unsustainable - but the future that it will give way to is less likely a new decentralized global architecture that citizens can control for global benefit, than a fragmented world in which national states reassert their domestic power while looking as best they can to impose it on others.

This implies a different analysis of the relationship between empire and technocracy

than KSR's. TMFTF identifies US power as the source and for a long time, the mainstay of the "soft power imperialism and economic dominance" that created the globalized world that we live in. The US was the main author of the IMF, of structural adjustment, and the panoply of purportedly technocratic institutions that helped sustain a world where the US had all the assets. But after US power, the technocrats can escape the logic of empire. They are pragmatists, and can be persuaded that the best way to do their jobs is to save everyone. The world of great power domination described at the beginning of the book, where "the US does what it wants," regardless of international law, gradually turns into one where Ministry officials don't need even to pretend to take the US and other great power wannabes seriously.

The near future that I see, in contrast, is one where US soft power imperialism continues to be strong - and where the most plausible threats to it come from other states aspiring to the throne. We are living in a world in which the old logic of geopolitics is returning, albeit in very complicated ways. Quinn Slobodian's history, The Globalists, depicts neoliberalism as a political project aimed at hemming in imperium (the ability of nation-states to assert authority), via an extension of dominium (international flows of money and of commodities). Now, we are seeing imperium reasserting itself - but in a world that has been remade by dominium, creating new opportunities and new vulnerabilities. Nation states are re-asserting themselves in a world of flows and hidden ties and intimacies. This suggests a different trajectory than TMFTF's.

Put differently, the moment when it was easiest for international organizations, cross-national movements of people, and temporary cross-national alliances of civil society to have influence was the moment where globalization was at its peak, so that different countries' economies commingled, generating both pressures for change, and opportunities for people and organizations to work across different jurisdictions to generate that change.

That peak may be past. If - as seems likely - we are descending into an era of decoupling, and increased national control of the economy, those opportunities will dwindle. International organizations will be weaker. Increased suspicion and dwindling linkages mean that it will be harder for non-state actors to work together across national borders. Global networks will become more contested internationally, and more entrenched (thanks to growing links with the state) in their home jurisdictions.

This is a more pessimistic understanding of world affairs than TMFTF's. But there are still opportunities for change. It isn't only central bankers who can be pragmatic - indeed, they are often more ideological and less pragmatic than TMFTF suggests. Empire has been willing to commingle pragmatism and ruthlessness where necessary, including the US imperium. At one point, TMFTF describes a future Head of the Federal Reserve as refusing to consider the possibility that it might support another currency.

> I don't see how we can get into the business of backing a currency that isn't the US dollar," she said when Mary was done. "The Federal Reserve exists to protect and stabilize the dollar, nothing else. That means stabilizing prices more generally, which means we pay attention to unemployment levels too, and try to help there as we can. So this idea is not really in our purview, and if we tried this new alternative currency and it somehow destabilized or harmed the status of the dollar, we would be worse than derelict in our duty."

But as Adam Tooze's history of the 2008-2009 crisis emphasizes, the Fed is very definitely and self-consciously in the business of backing other currencies when necessary. Back then, it feared that if it didn't provide massive swap lines and repo facilities to other central banks, the world economy would crash. It furthermore knew that precisely because of dollar sovereignty, it was the only actor that could do this at sufficient scale. In contrast, it was the technocrats of the European Union who were unwilling to provide large scale

help to their own member states when their debt became unsustainable, without attaching swingeing conditions that even the IMF quailed at.

I don't want for a moment to provide a general defense of empire, the cruelties of which abound. But if my alternative understanding of the likely near future is right (a big if), the political possibilities of dealing with climate change are going to have to run through empire, whether the US empire of global finance, China's efforts to create an alternative, or the more subtle imperium of the European Union's acquis and regulatory influence. The implication is then that we are mostly only going to see political action against climate change when empire is sufficiently cognizant of its self-interest to solve broader problems, and global cooperation when different empires are willing to set aside their differences to work together. "Mostly" is key here - no political logic explains everything, and there is always a gap between ideology and reality. There will still be tacit interconnections, technologies moving across borders, trade and investment (if truncated to some greater or lesser degree by security fears).

In this world, other possibilities might open up. Under the Biden administration, the US is changing how it thinks about the world in ways that I at least didn't expect. For example - who would have predicted that the US would press for a minimum global tax rate for business, looking to limit its ability to relocate to minimize its tax burden, and threaten countries that taxed it too heavily? That doesn't do much that directly addresses climate change - but it offers a model for how a powerful state can press for global regulatory changes. The US exercises extraordinary power through its control of the global financial system (exercised through its power to regulate the dollar clearing system, and influence SWIFT, the global financial messaging system). Nicholas Mulder has written powerfully about the destructive consequences of sanctions. Yet he also muses about how a left-leaning foreign policy might direct sanctions against tax evasion and

global financial oligarchy, and elsewhere argues that "Green New Dealers should consider recasting the tools of US hegemony, beginning with carbon tariffs and corporate sanctions," as a complement to a Green lend-lease program of international technology transfer. Todd Tucker, who contributes elsewhere to this seminar, argues for a new left internationalist program, where the US would look to reshape international law so that it supported rather than hindered domestic efforts to address climate change. These might be reinforced by, or reinforce European efforts to impose carbon border taxes.

The limits to these possibilities are just as clear. They will only work so long as empires have some self-interested reasons to implement them, and actions which cut against this self interest will not succeed, even if they are necessary. They will be compromised by the internal politics of empire - the gross inequalities that it involves and the desire to maintain them. They will be complicated - at the very best - by the politics of clashes among emerging empires and with aspiring ones. And they will be entirely insufficient. Real action will both have to engage with the realities of the world we live in, and the commitment to something that is radically better. The argument over American empire between Perry Anderson and Adam Tooze (whose response is yet to come out; presumably delayed by the events of the last year) is one manifestation of these tensions. But if we are not living in a world of self-organizing and decentralized global markets, and instead are being propelled along a trajectory to new kinds of imperium, these are the tensions and the contradictions that we are going to have to live with. I don't know what a TMFTF written in this world would look like, but TMFTF has been one of the main spurs to the broader argument of a book that Abraham Newman and I are now writing. And if other better thinkers have been spurred as well, then TMFTF will have done important work.

8 Suresh Naidu - This Is How It Gets Better

It's a real privilege to comment on this book.From the Mars trilogy to my personal recent favorite, *Aurora*, Kim Stanley Robinson has been one of my favorite science fiction authors, staying with me as I went from teenage escapism to middle-aged escapism. There are so many great ideas in The Ministry of the Future (TMFTF), where Stan has clearly combed the academic and activist literature for the boldest ideas to grapple with the climate crisis and used the medium of fiction to communicate them. There are engineering feats, like the propping up of glaciers to slow melting, direct air capture of CO2 at economically feasible scale, alongside political transformations like the mutually-assured-destruction made possible by targeted kinetic pebble smartbombs, a rebirth of Indian democracy, and carbon quantitative easing? Everyone who cares about climate change (and really at this point it should be everyone with some stake beyond the next 10 years) should read it. But beyond being a hardware store full of tools for decarbonization, it also charts a politically possible trajectory to a transformed economy. TMFTF is not just outlining a future sustainable economy, but showing a properly historically contingent path to it.

Stan's book is simultaneously an Edward Bellamy and an Edouard Bernstein for our times: a possible future economic configuration for humanity but also a way to get there that builds on, rather than replaces, the institutions and societies we currently have. The engine of the novel, of course, is the threat of civilizational collapse posing a stark fork in the road of human progress: eco-social democracy or barbarism.

For economists, the book is interesting both as a criticism of the view of climate change embedded in integrated assessment models as well as an expression of hope in the informal empire of central banking authorities. "Carbon quantitative easing" is the primary engine by which our characters move decarbonization at a world scale, harnessing markets to deliver rapid global adjustments and innovations in sequestration. The premise is in-

genious: rather than leading with the (necessary) negatives of a carbon taxes, which have proven to be politically unpopular even when proposed at hopelessly inadequate scales (no matter how many petitions are signed by economists), policy leads with debt-financed de-carbonization subsidies, which create a whole new global economy organized around sequestration. Once it pays to keep and pull carbon out of the sky, the global economy pivots, with the kind of speed and coordination that we absolutely need, ones that would be hard to generate using purely dirigiste tools.

My particular take is going to be to use TMFTF to indict how economists have modeled climate change in the macroeconomy, both theoretically and empirically. But I'm also going to criticize the principal, somewhat reluctant, sidekick for saving the world: the central banks. Still, I think Stan is really onto something: this is how we get to something better and sustainable, not waking up the morning after a mass revolution and writing a new constitution while implementing some algorithmic central planning AI (or for libertarians a laissez-faire utopia), but rather piecemealing together a patchwork of mechanisms, some from above and some from below, and an equally Frankenstein-like quilt of political coalitions that together make the burden of scarce resources both less binding and borne more equitably.

The Economy Is For People

The opening scene of TMFTF is unforgettable, a close up description of a murderous heat wave, with the predictable armed conflict over water and electricity, hitting India. This heat wave kills 20 million people, precipitates an honest reckoning with climate change by both the formal powers, as the Indian government unilaterally throws reflective material into the sky to geoengineer the planet in the interest of its population, as well as informal powers (the Children of Kali terrorist group). The terrorists kill innocent civilians, albeit

somewhat discriminately, injecting cows with cultured mad cow disease, blowing up coal plants, and knocking fossil fuel powered jets out of the sky with pebble bombs, and indeed, anti-carbon direct action does start yielding some progress on climate goods.

Temperature is already a silent killer in rural India. 40% of India's 1.3 billion people live and work in the agricultural sector, and agricultural productivity (for obvious reasons like it is outdoor work and less obvious reasons of crop failure and water shortages) falls with extreme temperatures. Extreme temperatures do not kill yet in massive heat waves with millions dying in a few months, but slowly, as frogs boiling, with raw rural poverty interacting with extreme temperatures to kill infants and the old, thousands of tragedies that, over time and space, already constitute a scorching grim reaper. Burgess et al. (2017), find that rural Indian life expectancy strongly responds to temperature increases, and the magnitudes imply 5.1 years and 10.4 years of life expectancy lost for those born in 2045-2059 and 2075-2099, respectively. These are mostly economic effects, not accounting for the direct effects of temperature on human survival (because they are based on historical variation in weather which have not so frequently been in the lethal range).

Delhi, with a population over 11 million, experienced 3 weeks of 45 degree plus Celsius weather in 2019 that killed 36 people, and this was with the electricity on and the government functioning. In 2015, over 2000 people died during another heatwave in South India. Even small increases in mean temperature imply tail events that are increasingly fatal. Stan does us all a favor by pointing out that our fragile meat-and-water bodies are directly destroyed by high enough temperatures (coupled with humidity that prevents us from sweating), and drawing attention to the salience of tail weather events driven by secular climate change, where wet-bulb temperatures greater than 30 (higher than 50 Celsius) are lethal. In a decade or so, the Indian heat waves will likely hit this level, and the chaos and death vividly etched in TMFTF's opening does not seem implausible.

It's useful to contrast the opening of TMFTF with the bloodless specification of the "damage function" in integrated assessment models (IAMs), which lie behind estimates of the social cost of carbon. The sociology of these IAMs deserves greater study (and for all I know this has already been done). These models have four ingredients: i)a trajectory of carbon emissions based on projections of carbon intensity of production plus future GDP growth, ii) a scientific model mapping carbon emissions into temperatures, iii) a "damage function" mapping temperature into estimates of lower GDP, and iv) some social welfare function that applies a discount rate and a utility function to the resulting path of output. The derivative of the discounted social welfare function with respect to carbon emissions yields the marginal social cost of carbon, which is a number that gets used throughout government cost-benefit analysis (see here for how these numbers are estimated and used).

These models are a wonderful window into so many pathologies of economic policy modeling, from the insistence that the neoclassical growth model is the appropriate benchmark macroeconomic model (which assumes full employment, no role for fiscal or monetary policy), to the preservation of the global distribution of income to taking the U.S. economic parameters as global ones to the assumption that future generations out to be discounted based on the market rate of return.

The premise of a lot of economic modeling of climate change is that it involves an intertemporal choice between emissions today and climate change borne by future generations. There are many philosophical objections to discounting future generations, and much debating about what discount rate to use (e.g. if the market discount rate is set by people who have finite lifespans, is it really the right one to use? Should any discount rate be used?). In my opinion, we are already past this decision point: the costs of climate change are here and being borne by an increasing share of the world's actually already existing population, which is overwhelmingly in poor countries. And the benefits of emis-

sions accrue roughly proportionally to income, so the airplanes, food, and infrastructure of rich people and rich countries can account for the lion's share of both the past stock and current flows of emissions (see evidence by Chancel and Piketty here). Yes China and India are major emitters, but it is also important to flag the enormous inequality in income, and emissions, even within China and India.

Consider an early assessment by Nordhaus (1993) "The DICE model assumes that a 3C warming would lower world output by 1.3 percent". In light of the past decade of heat waves, forest fires, hurricanes, floods, and generally increasingly treacherous natural environment, the ever-increasing evidence of anthropogenic climate change, and the mortality estimates above, this seems maddeningly optimistic, and a future generation may wonders whether the Hague would have been a better destination for the author than Stockholm. I rarely get so upset as when I'm discussing the role economists played in the 1990s and 2000s (and some even to this day) in minimizing the threat of climate change and suggesting that we could and should all live with 3.5 degree increase, as GDP growth and innovation would allow future generations to adjust easily to any costs.

I was going to write a lot more here, but I see Noah Smith beat me to it, in a post I completely endorse. The last decade has seen an explosion of climate economics that finally gets a sense of the threat (to be fair only about a decade behind the natural scientists), but the legacy of economists waving off the warnings of scientists is going to be hard to live down.

The most consequential effects of climate change on human well-being is probably not summarized by a GDP penalty, it is direct biological effects on human bodies, magnified by direct physical impacts on physical infrastructure and food supply chains (which are small shares of GDP but obviously crucial for welfare). Imagine we get heat waves (and hurricanes and forest fires and maybe even epidemics) that raise mortality a little tiny bit:

that human mortality increases by 0.01%, or one over ten thousand, as a result of climate change. That's 700000 people killed directly by climate change a year (modestly greater than U.S. deaths from COVID so far). Now multiply that by roughly 5 million dollar value of a statistical life (ignore the problems with that number!), and you get an estimate of "damages" that's around 3.5 trillion, already 4% of world gdp, without accounting for any of actual economic effects created by destroyed infrastructure and agriculture. Add even a little bit more mortality, and you get costs of climate change that swamp the world economy.

One doesn't even need to go down this particular rabbit hole to get quite high social costs of carbon. Stern and Weitzman argued for damage functions that were steeper than quadratic. Weitzman convincingly argued that the distribution of damages was "fat-tailed", and if you push this logic far enough you can get that the costs of climate change are basically infinite. What use is the language of trade-offs and social optima when faced with singularities in the path of possible economic trajectories?

The point of this is not that there is a "better" damages function, but that there is something deeply wrong in the belief that the environment's effects on human well-being could be summarized by its effects on the economy. Or that there is some entity called "the economy" that somehow exists apart from the humans that live in it. The hubris of economists was that we could trade-off the environment with economic well-being; but such a trade-off implies a concave objective function, where well-being today can be smoothly traded-off for well-being tomorrow. If instead we have these non-linear feedbacks and freakish ecological and political effects of climate change, the language of trade-offs and cost-benefit analysis seems of limited use: we're in do-or-die territory and the preconditions for a social trade-off are gone.

TMFTF inverts the principle of the IAM. Instead of seeing the environment as a input

into the economy, it sees the economy as something that needs to be subordinated to the "throw everything at decarbonization" mandate that follows from managing a runaway nonlinear process that threatens not just the vast mass of biological life, but also the accumulated physical infrastructure and slowly depreciating investment goods of the last few centuries.

The Empire of Central Banking

The trump card in TMFTF is the carbon coin, where the central banks of the world agree to issue a currency to compensate agents who remove carbon from the atmosphere. This can include leaving proven reserves of fossil fuels in the ground, or figuring out new ways of pulling carbon out of the atmosphere. This is a great idea, although the real work is obviously figuring out how to cheaply and accurately monitor pinpoint sequestration efforts. Once we have the enforcement technology and administrative capacity to monitor detailed emissions and emissions reductions (as well as property rights around who should be paid!), we can create a variety of devices to provide decentralized incentives to both abate and sequester carbon. TMFTF goes with the global monetary policy and financial system bank shot, instead of, for example, a much more workaday system of cash payments.

One view is to forget the baroque mechanisms of currency exchange markets setting the relative price of carbon coins and local currency: imagine instead that governments just agree to pay for sequestration. This is simple, and could have been put into the American Jobs Plan: prove to a regulator that you've sequestered X tons of carbon and you get Y dollars in actual USD. Economists enthralled with the carbon tax could be equally enthralled with the sequestration subsidy (of course conditional on the monitoring problem being solved). Anything that alters the relative price of carbon vs non-carbon sectors is basically equivalent when you see everything as a supply-and-demand diagram,

and future generations should gladly accept whatever debt burden (if any) it takes to pay off current emitters, so why not do it with a decarbonization subsidy rather than a carbon tax. The politics of implementing a sequestration and anti-emission subsidy seem far less like science fiction than an adequate carbon tax, at least right now. Buying off the key fossil fuel actors (fossil fuel companies and Gulf states, although I would loved to have seen speculation about Venezuela's position) and creating a financial sector interest in managing climate change seem to be the major political obstacle, which is overcome by subsidizing de-carbonization rather than taxing carbon. These are important, but it's not clear to me there are any actual administrative or economic merits to running decarbonization through the financial sector. Every doomed cap-and-trade policy had to provide some carve-out for incumbent emitters, and indeed the redistributive conflicts over those carve-outs arguably sunk some proposals (e.g Waxman-Markey). TMFTF accepts that on the time-scale we face, we need to buy-off the carbon interest rather than politically conquer it. But this has always been a tension in the eco-socialist program: if climate change is upon us, and is a species-threatening event, shouldn't we put the class war on hold and encourage capitalists to chip in with their eldritch command of innovation, arbitrage, and technology to save us from it? To which a response is: fossil fuel interests can't be bought off, and thus must be politically defeated by a large climate coalition brought together by material and environmental interests, hence the political necessity of a Green New Deal platform. I'd be curious as to Stan's take.

One might wonder (and I did at first) what the advantages of a new financial asset are in delivering this global subsidy that incentivizes sequestration. I think it is primarily political and administrative: a global consortium of the major central banks is the only global economic governance tool we have right now, and climate change requires something both effective and global. Almost every subnational carbon tax has run into political

problems, and one possible reason is that everyone gets the free-rider problem inherent in such piecemeal solutions: why do we have to suffer these taxes while they continue to emit? And given we're not getting a global tax authority anytime soon (although Janet Yellen and the Treasury might be working on it), TMFTF looks to the one global economic power we have that have the scale and reach necessary to implement global decarbonization: the network of coordinated monetary authorities of the large economies, documented for example in Adam Tooze's Crashed. The consortium of central banks swayed by Mary's repeated injunctions that climate change falls under their mandates is an extremely non-democratic entity staffed by eminently reasonable people; the closest humanity has ever gotten to the economist ideal of a social planner.

It is true that coordinated large economy central banks are possibly the only apparatus we have with the ability to shape the whole global economy and it is at the same time revealing of the limits of our political imagination (not Stan's)! One of the legacies of the 2008 financial crisis and the innovations in monetary policy pursued around the world was the increased interest in money and finance, with a lasting consequence being that the monetary system became an intellectually interesting institutional matrix by which we could backdoor implement a variety of policy ideas. It led, in some corners of the left, to a kind of Green Lanternism of the central bank, where Federal Reserve balance sheet innovation is the primary tool we need to fix any economic problem. We were going to fix wealth inequality with Fed deposit accounts, fix unemployment by having the Fed stand ready to finance any deficit spending, and in TMFTF, fix climate change by issuing a new financial instrument.

None of these are obviously wrong ideas, but it's worth wondering why people want to lean on the financial system and central banking to do all the work of economic governance. I suspect some of it is because mastering the details of the financial system is a certain

kind of esoteric expert knowledge, like subgenres of music, mastery of which generates joy among some people. Some of it is also that money has a semi-legal, semi-conventional character, where it is both created by tax liabilities of the state but also private notes of exchange and financial contracts, and because of the numerous tangencies between taxes, law, regulatory authorities and the administration of money the crucial central bank role in financial markets becomes a powerful lever for governments to use in redistributing income and reshaping the economy. Finally, it is a relatively politically autonomous domain, deliberately shielded from party politics. Experts and interests can then offer ideas for interventions within a powerful, politically insulated institution to secure their desired outcomes, be they pecuniary or ideological. So climate activists just have to convince the Fed governors, not voters.

TMFTF is quite open about the non-democratic, somewhat magical nature of central banking. Part of the power of central banks, in TMFTF and in real life, come from their perceived ability to make promises that are insulated from politics, guiding investment decisions of private actors, and institutionalizing this promise-making capacity was essential for central bankers to be able to issue pronouncements that could coordinate the private markets. Central banks that move too far and too fast from the expectations of private financial actors can find their ability to influence the economy undone by either price-setting or currency flight or both. On the flip side, central banks that maintain the power of the spell gain capabilities to guide the economy via forward guidance, where the economy can be steered merely by credibly signaling future policies. At the extreme, you get the argument that a central bank that pledges to wreck the economy should inflation get too high will never face substantial inflation. For some economists, technocrat-plus-banker capture of central banks is the political precondition for central bank efficacy. The influence of the central bank on private financial markets is contingent on it using it in the interest

of the system as a whole, regardless of what elected legislatures demand. But given the crises unleashed by climate change documented in the book, why would states continue to give the banking authorities such long leashes? Why are the bankers able to do this kind of autonomous response to crisis? What stops the central banks from changing their minds later on and reneging on the carbon coin?

One answer is raw political power, either from above or from below. One could imagine a global green version of "Fed Up" showing up at the houses of the bankers with placards and protest songs, and this mobilization being the pressure that keeps the central bankers on their mission. One can also imagine legislatures transforming the governance of the central bank so that "Federal Reserve Governors For the Future" institutionalize a climate interest in central bank governance.

The central banks are just the cavaliers of the winning army in TMFTF. The supporting protagonists of TMFTF, from Mary's team at the Ministry to Jane Yablonski at the Federal Reserve, are all technically competent bureaucrats, democratically unaccountable, loathed by many, bureaucrats, who save the day. Bureaucrats who have discretion, who do not have their every move watched and policed by Congressional committees and oversight reporting (Mary, iirc, never has to fill out paperwork or write a report to the UN!), and who are far outside the iron cage of administrative roles.

Making saviors out of bureaucrats is a worthy rhetorical goal, for we will need public-spirited bureaucrats to save us. I look at all my colleagues and friends who have entered the Biden administration and I'm somewhat envious of their confidence that they can really make a difference in government. But many of them also recognize the historical moment created by COVID-19 and the mobilizations of Black Lives Matter in the past year have created an activist base that can put outside pressure on the clunky apparatus of Federal government that strongly complements insider pressures. But both bureaucratic

politicking and street protests exercise power through minoritarian democratic channels, not majoritarian ones. Surely a democratic system would have ways of aggregating a collective interest in a more direct fashion. When Mary is visited in the night by the traumatized survivor of the Indian climate massacre, it's an admission that democratic, mutual persuasion based means of securing a climate transition is impossible. Strange men living in sheds handing out midnight threats is no basis for a system of government!

TMFTF is a realistic projection of the cramped and depressing politics our time, and so the novel isn't quite utopian. But it is funny that the only systematic force that keeps bureaucrats accountable and responsive to public pressures and climate needs are their own consciences, supplemented by terrorist attacks and midnight visits by traumatized radicals. It seems easier to imagine the end of ecologically-destructive capitalism than it is to imagine actual democratic governance at the scale needed to address the climate crisis.

The Path-Dependent Transition

The final point I'd like to make is that the historical trajectory Stan charts for our future is a winding one. Social and technological innovations happen that were unforeseen, political configurations and interests evolve, and all of these shape and constrain the institutions that emerge. The 10% rational policy, 90% jury-rigged nature of social problem solving (particularly at the global scale) comes alive in the novel. It still winds up working in the end, but it is as much by chance as anything else.

This is usefully constrained with the "Red Monday Blues" fantasy that perhaps still lurks in the lizard brains of many leftists. Basically the working model is that there is a revolution or decisive election, and then we need to get to the business of implementing a socialist economy. And so ideas for whole cloth systems of planning, from parecon to some kind of nationalized Amazon-mondragon hybrid, to sui generis models of market socialism

with various Rube Goldberg devices thrown over markets to discipline them, proliferate. These visions all suffer from the Rawls "ideal theory" problem: they presume some break, some moment that will come that will let us re-engineer political and economic institutions from the ground up.

But TMFTF instead charts a much more historically plausible path forward. Where idiosyncratic legacies of the past exercise enormous and difficult-to-predict effects on the future, so we never get clean breaks, elites are never permanently dislodged, and revolutions are always only partial breaks with the old order. Past actions and structures deal the cards held by the living.

Social democracy, a civilizational achievement by any light, was clearly pulled together like this. It was considered a second-best compromise by electoral socialists who nonetheless pushed for it, but was also made possible by simultaneous innovations in administrative capacity (e.g. automated payroll systems and ever-larger firms) and a couple of global conflicts bracketing big demands for increased social insurance. Nobody would look at the architecture of the welfare states and conclude that they were elegant expressions of abstract, parsimonious principles of social scientific genius. Instead they are muddled-through mixtures of utopian ideas, inspired technocratic hacks, bureaucratic innovations, and political deals made between factions of politicians and fractions of the population. Similarly with neoliberalism, which for all its efforts never really succeeded in reversing Wagner's law (that government is a normal good that increases with share of GDP), and wound up disappointing its most fervent adherents.

Stan's road out of climate crisis has a similar view of path dependent transitions. Instead of replacing the whole economy with something completely different, it builds on the enormous infrastructural and institutional power that modern civilization, including those realized in varieties of capitalist arrangements, harnessing them to deliver something on the

other side of terrible. But the anticarbon economy winds up unleashing a whole slew of new economic mechanisms, gestured at throughout the book, like parecon and mondragon. The vision embraced by Stan's book looks much more like a yin and a yang of central direction and bottom-up initiatives. The central banks provide a sparse guiding light for human economic activity, but the vast bulk of economic activity is still something autonomous and bottom-up, if not purely market driven, that actually executes the decarbonization at the required scale.

What I think TMFTF gets right is the bricolage nature of the economic calculation problem. It is neither a pure Hayekian vision of prices bring privately known tastes and technologies into harmony nor a Lange-ean vision of government calculation of social optima, to be implemented by an optimal tax structure or government price setting, but rather some fractal combination of the two, with levels of centralization nesting decentralized organizations that in turn nest even smaller centralized organizations. Coase drew a binary line between command inside the firm and prices outside of it, but maybe its more useful to think of the economy as nesting multiple scales of bottom-up signaling and communication and top down means of coordination and aggregation.

Indeed, I wonder if modern states already have the tools they need to radically reshape the economy, with limits set by norms and politics. Beyond central banking setting bounds on the price of capital, we have large chunks of the labor market regulated by minimum wages or directly employed by the state, we have public provision of schooling (rationed using mechanisms Soviet planners didn't even dream of), and a detailed and sophisticated tax and transfer system. The idea that we need some radically new tools of government price setting in order to "really" get government control of the economy is basically belied by a quick inventory of the tools of government regulation we already have. But because we already have them, it reveals that the obstacles to democratic planning are not economic

or administrative ones to incentive-compatible, information-constrained planning, but an absence of models of democracy that we trust absolutely enough that we could rely on them to run the economy. The planning problem is not an economic design problem: it is a political one. One that can't be solved in some transcendental way but that requires us to work with the wildly varying ideas and interests and values of the people and groups we have right now.

Suppose we massively change the relative price of carbon while driving down the costs of clean alternatives (which we may well do) in the next decade or two. We will risk many political and economic effects that are difficult to anticipate, and the responses to these effects will likely be improvised and the product of contingent coalitions, interests, and ideologies. Paying an enormous sum for sequestration efforts will transform (as is the point) huge sections of the economy. We should probably admit that our social science isn't good enough to predict the detailed contours of the outcomes if we do this, even as our climate science is good enough to predict the broad calamity if we don't.

9 Kim Stanley Robinson - Response

When I attended the Clarion Science Fiction Writers' Workshop in 1975, our first teacher Samuel R. Delany gave us some advice: don't respond to critics. It never does any good. Don't even write reviews.

It was good advice, and I've followed it ever since. But here I am. Did I make a mistake? Maybe so.

On the other hand, I've published a lot of non-fiction in recent years. What was I saying in those pieces? Couldn't I respond like that?

Maybe so. Quite a bit of my non-fiction consists of appreciations of other writers, like this one of Gene Wolfe. These were expressions of love.

And I've answered lots of interview questions. These were like conversations. There's no harm in love or conversation.

So I'm going to try this: I'll happily express my appreciation for all the generous giving of time and thought that I see in the responses below; and I'll do my best to answer any questions they ask. If there are complaints about my book (and there are), I'll stick to my long-time practice, and hold my tongue.

Oliver Morton — On Solar Geoengineering and Kim Stanley Robinson

I appreciate Oliver Morton's response, and all his books, which I've greatly enjoyed. My favorite is *Eating the Sun*, but the one most relevant to this discussion is *The Planet Remade*, a great meditation on geoengineering, in particular solar radiation modification, SRM.

The Paris Agreement doesn't forbid geoengineering, so I don't know why I wrote that in chapter 4 of *Ministry.* Efforts to establish some kind of treaty regime are sure to be very slow-going. In the meantime, if India suffered a catastrophically fatal heat wave, no one would have any legal or moral standing to complain about them acting in their own

defense.

The dust I had India casting was identified in the text as sulphur dioxide. I've since learned that other kinds of dust are being studied that might serve better, as being less damaging to the ozone layer. Think limestone, or diamond dust. And planes would work to get it up there, or so my sources say.

Many people worry that any act of SRM would inevitably create a "thermal shock" when the casting of dust ended. Andreas Malm mentions this in a defense of his book, *How to Blow Up a Pipeline*, which includes some discussion of my *Ministry*. He explains the logic of this worry: if you were to keep casting dust into the high atmosphere year after year, while also continuing to burn fossil fuels, then any cessation of the casting would cause an especially brutal rise in subsequent global temperatures. Possibly true, but this is just one scenario, the dangers of which have then been generalized to all scenarios. This kind of worry drift happens quite often in any discussion of geoengineering. The worst plans with the worst consequences are taken as the norm.

Maybe the shock of realizing we are undeniably in the Anthropocene, responsible for protecting the biosphere from ourselves, and obliged to save what we can of it for our descendants and all other living creatures, has caused a period of confusion and dismay. It makes sense; it's a heavy burden, and given humanity's sorry track record so far, it seems all too possible we will screw things up again, even when trying to fix them. In this unhappy moment of overwhelmed realization, distinctions seem to get lost. Good plans get dragged down with bad plans in the general flailing.

For me, the really interesting geoengineering in *Ministry* is the Antarctic work of pumping water out from under the quickest-moving glaciers. This has no apparent negative consequences, and it might help to slow down sea level rise, which is an otherwise intractable problem.

An Antarctic glaciologist told about this idea, and I put it in *Ministry* under the impression that it was something new. But recently I ran into this: I was amazed. That the proposal was analyzed and advocated for in *Nature*, in 2018, is great news for the beaches of the world, which are otherwise doomed. The preliminary study looks promising, and I hope this project begins as soon as possible.

Suresh Naidu — This Is How It Gets Better

"A Frankenstein-like quilt of political coalitions": I like this description of the world system in the years to come. There won't be a master plan appearing to save the day, and whatever people try, there will be a lot of resistance to it. Also a lot of infighting among people who should be allies.

I met Suresh Naidu at a conference at Stanford, and in following his work since, I've seen some of what the cutting edge of progressive economics is doing. Because of that, I appreciate his take on *Ministry*'s fictional events, which straddle the border of economics and political economy, the latter always projective and speculative. This isn't a zone that many economists seem comfortable exploring.

He asked if simple cash payments for carbon sequestering would work as well or better than making up a digital carbon coin. I don't know, and would like to hear more discussions of that, by him and others in his community.

I'm curious to know whether two terms he used, *parecon* and *mondragon,* are common usage in economics circles, or if he's just referring to alternative political economies that have appeared in my novels. I'm hoping the former.

Concerning the carbon coin idea, I got the idea from a paper by Delton Chen. Recently I learned of the existence of the Network for Greening the Financial System, an organization of 89 of the world's central banks, including all the major ones. They've put out a paper describing nine ways that central banks can tilt money toward green projects. I wondered

if Chen's carbon coin idea, as described in my novel, serves in effect as a kind of symbol for these nine strategies, or if it would be a tenth strategy. It would be good to see this discussed, perhaps by a group that Suresh Naidu is associated with, called Economists for Inclusive Prosperity.

In general I'd like to see that group get more involved with theorizing a new improved political economy, rather than just analyzing tweaks to the current system. But we need the tweaks too, so to each their own patch of the broad front. I'm grateful for Suresh Naidu's work.

Maria Farrell — What Is Only Ours to Give

In the list of mistakes I've become aware of making in *Ministry*, using the word blockchain is prominent. I should have said "encrypted digital money," or even just "digital encryption." The computing experts I've spoken to, a pretty big group at this point, have often assured me that blockchain as such doesn't require the huge "proof of work" action demanded by the designers of bitcoin. Nor, they told me, is it a particularly great form of encryption; they judge it as code to be (perhaps deliberately) awkward, and very likely to be superseded in years to come.

I share Maria Farrell's disgust at bitcoin, which has spurred a large and completely unnecessary carbon burn on the part of people hoping to make money from nothing. Blockchain exists under a cloud of suspicion and dislike because of its connection to bitcoin, and it will have to be shown to be useful for other purposes or it will die with bitcoin, which I hope will pop like the speculative bubble it is, the sooner the better. Future evolutions in encryption and forms of money will hopefully work better for people and biosphere.

In that hope, calling the computer world "a hard-right haven of male libertarians" strikes me as a bit harsh. When I visit Silicon Valley, the people there seem to me odd, often obsessed, often heavily involved in various gift economies; intellectuals, working in

capitalist enterprises; in short, they remind me of university professors. I hope the ones giving their time to the construction of new open-source digital commons, and platforms devoted to the public good, fare well in their efforts. We'll need them if we're to get to a better place.

Todd Tucker — Ministry for your Future Soul

"Start with the outcome, then work backward through what it would take to get there": yes. Utopian novels often begin this way, maybe all novels.

I appreciate Todd Tucker's description of *Ministry*, in particular the references to Gramsci and 1848. Those locate me me in a discourse space I'm familiar with and understand.

I also appreciate his format of asking questions, for reasons explained in my opening.

So:

How reliant is my theory of change on MMT? I'm not sure. I would say I've based this novel's scenario mainly on a kind of left Keynesianism, in Joan Robinson style; but maybe that's what MMT is too. Like Todd Tucker, I very much approve of MMT's insistence on a Job Guarantee. That guarantee clarifies the stakes involved. Maybe rapid carbon sequestration will require such enormous amounts of human labor that full employment will be achieved. I'd like to read more discussions of this possibility among economists and those doing political economy.

Would MMT be just a first step on the way to more just and sustainable systems? I think so, but we need that first step.

What about leaving black rocks in the ground and thereby making money? Nice work if you can get it, right? I suppose I was thinking of easements. Of course who owns the coal then becomes the question. If it were treated like water is now, under California's new law SGMA—declared a public good, in other words, and regulated under the common ownership of a citizenry, then possibly it would be the people of West Virginia who would

get paid for not burning coal. That would eventually require lots of money, but if it were fixed to a physical quantity of carbon, rather than financialized to infinity as with bank loans and so on, it might not crash trust in money. Amortized over time, it could be a good way to deal with the social costs of keeping coal in the ground.

For the question concerning blockchain, see my reply to Maria Farrell.

For the question concerning the possibility or need for violence in any successful replacement of capitalism, see my response to Belle Waring.

For the questions concerning human population, please see my response to John Quiggin.

As for strikes and their utility, quite a few are described in this novel, but having featured them as the climax of the plots in *New York 2140* and *Red Moon*, I didn't do that this time. On this topic, I've learned much from Erica Chenoweth's *Why Civil Resistance Works*, Peter Dickinson's *A Summer in the Twenties*, and Joshua Clover's *Riot Strike Riot.*

Thank you for asking about Frank. He is damaged and isolated, also self-isolating, and thus relatively ineffective as a political actor. Although by working with refugees on a volunteer basis, he does what he can given his problems.

I take a personal interest in PTSD. Everyone is post-traumatic eventually. You don't have to reflect long to find your own traumas. But not everyone suffers from the stress disorder that often follows the trauma. How do some people cope with their trauma, while others are shattered by it? This is mysterious and individual; maybe it's a question that can't be answered. Mary has reasons for thinking about this as the novel proceeds, but can come to no conclusions. Anyway, I don't find anything risible about Frank, but admire his stubbornness in doing what he can with what he has, even after making huge mistakes. It's a sad story.

John Quiggin — Half the Earth?

To John Quiggin, thanks for bringing up the animals, our horizontal brothers and sisters. Also the Half Earth plan to save them from a mass extinction event.

Right now only about three percent of the living flesh on the planet is wild; the other 97 percent is us and our domesticated food animals. This is the crisis of biodiversity, the slide into an anthropogenic mass extinction event. Were one to happen, Earth's biosphere would not recover for millions of years; its current diversity would be unrecoverable by the people who follow us no matter what their GWP happens to be. So it needs to be attended to, and the Half Earth plan, derived from calculations out of island biogeography, is the best plan we have for dealing with this immediate crisis.

As John Quiggin points out, progress in this area has been made with surprising speed, because it turns out the whole world is somewhat like Australia—there's a lot of land that could be protected for the sake of the animals. A good new book describing the history of this project, and the current work being done on it, is *Rescuing the Planet*, by Tony Hiss. The idea is rapidly being taken up, not just as a utopian wish, but as a necessary part of civilization's survival. I'm surprised and encouraged by the acceleration of progress in this project. 30 by 30 is an exciting plan.

People have made the excellent point that "pure wilderness" with no humans living in it is a peculiar concept historically and in the present, and I trust my book makes it clear that all kinds of protected land under a variety of regulatory and ecological regimes would be best, following a general principle I like of avoiding either/or when you can find a both/and. In this case I recommend looking at the land use categories defined by the International Union for Conservation of Nature, an admirable organization for stimulating thought and action, at `https://www.iucn.org`.

Concerning the size of the human population, I recommend *A Planet of Three Billion* by Christopher Tucker, current head of the American Geographical Society. It takes on the

question asked in the great book by Joel Cohen, *How Many People Can the Earth Support?* with some new findings and methods. What it describes as a project is a world in which the more women are empowered, the lower the birth rate. That's a double good, being both moral and practical. The project Tucker describes is now afoot, to bend the global birth rate below the replacement rate by 2030, almost entirely by empowering women. 1.5 by 30.

Olufemi O. Taiwo - What's In Our Way?

Olufemi Taiwo and I did a Zoom panel together recently, and I've been thinking since about what he said. What I take from that event, and his text here, is that inequality created by the colonialist racist last several centuries still manifests in everything, including how we respond to climate change. Capital is still heavily concentrated in the US and the developed countries, and capital is rarely given away by those who have it. So when push comes to shove, international treaties get ignored, and there is no sheriff to enforce them. So the Paris Agreement could easily turn into something like the League of Nations, a good idea that failed.

That seems undeniable, and is good to remember.

I hope *Ministry* pays attention to that reality. The future it depicts is a chaos in which good and bad are mixed, not so much intertwined as coming in rapid alternation (this is partly a narrative issue of one sentence and scene at a time). There's a lot of violence in it, including the slow violence of capitalism. It sticks with India, which stays important to the world history outlined in the book, even though the novel is mostly set in Zurich. It's true that some big changes in my fictional future happen in India, and are therefore somewhat off-stage for my main characters. But why not? It's a multi-cultural country with a lot of political energy. Of course it could go wrong, but that's true everywhere; and things are happening there that could turn out to be good for everybody. That's the story

this novel tells. I don't want to be put into a lose-lose situation where if I speak of central banks, it's a novel about the elite of the elites saving the world; but if I speak of India, that's putting the hard work of saving the world on far-away people of color. I wanted to describe a process that included both these phenomena, led by India. Both parts have to work for any real success to be achieved.

The Paris Agreement insists on climate equity. Developed nations are to pay more than developing nations to cope with the damage of climate change. Will that actually happen? Achieving it would mean something like what is graphed in this analysis, made by one the crafters of the Paris Agreement:

What this suggests has to happen—a giant pay-out by the US in particular—is sobering indeed. But the calculation has been made, the Paris Agreement was signed by all nations, its promises now exists. Time to make everyone keep these promises, especially the developed nations.

A difficult story to believe in, yes. But it's the world telling it now, not my novel; and it's worth telling. The Paris Agreement is real, so all the nations have already made certain commitments, and the pressure's on to make more.

Thanks to Olufemi Taiwo for holding up this future, and all our stories, to the reality principle of history and our current moment. And I appreciate the reminder not to shoot the messenger on these points.

Jessica Green — Can the World's Bankers Really Save the Climate?

Thanks to Jessica Green for her detailed descriptions of the novel's green quantitative easing plans.

As to her article's title, which asks a question, I can answer it quickly: no. Bankers can't really save the climate. And that's not the story my novel tells.

Regarding mass actions, I refer you back to chapters 35, 39, 41, 55, 60, 65, 69, 73, 75,

82, 85, 101, and 103. There you will find:

> a spontaneous riot, an illegal kidnapping of Davos, citizen solidarity in the face of a drought, a Paris Commune-type month of mass takeover, worker strikes all over the world, a mine takeover as part of Africa for African campaign, a military coup, an animal stampede organized by people, student fiscal strikes in America, mass demonstrations in China, an organized sabotage campaign, the revolutionary establishment of new nations, a list of over a hundred citizen groups already defending the biosphere, a thirty-year off-and-on city strike, a worldwide citizen's religious demonstration/party, and more.

Can mass action take a variety of forms? Yes. How can novels portray such various events? Lots of ways beyond mere dramatization. Alex Woloch's *The One vs. the Many* is very good on how to deploy minor characters in a novel with low protagonicity, as he calls it, in order to portray mass historical actions.

Henry Farrell — Technocracy and Empire

I appreciate Henry Farrell's initial description of my novel, and agree with it, until he begins to categorize what the novel is concerned with, where I become confused. "His imagined world is one that is dominated by markets and technocracy." I balk at this, as the implication is that I'm leaving something out; and I don't like markets, which systemically misprice things. But with some transcoding, maybe I can follow him.

Since the Mars trilogy, I've been describing history as a struggle between science and capitalism. It's very Manichean, but I'll stick with it as a rough cut, enabling all kinds of further work. Using these terms, I can transcode what Henry Farrell says by defining technocracy as the political effectiveness of science, and markets as a manifestation of capitalism. Yes, my imagined world is dominated by capitalism and science. And so is the real world. But markets always misprice things, and are an instrument of capitalist power,

so they must be defeated. So: technocracy defeating markets? Okay, I can accept that as a description of my novel.

Another transcoding: finance and the state. Joseph Vogl's *The Ascendancy of Finance* describes very persuasively the history of the state and finance as two parts of a single power system, of the post-Westphalian nation-state variety—always hand in hand, but arm-wrestling for control. Mauricio Lazzarato's *Governing By Debt* makes a strong case that in the neoliberal era, finance has decisively whipped the state in this struggle for control, the state having been transformed by its debt to finance into an outsourced and semi-privatized instrument of finance's overweening power. Whether the great quantitative easings of 2008-12, and now 2020-to present (and future), would complicate Lazzarato's conclusions in his disturbing book, only he can say. But for me, persuaded by these and many other studies, the state both legitimates and enforces finance's power, and is at the same time a site of contestation, in which people struggle for power. Finance tries to rule the state because ultimately the state has the upper hand (I think), as it represents the people and sets the laws. If the state were to declare finance (meaning capital and markets) to belong to the people, this would represent a seizure of the power of capital from the one percent (really more like ten percent, but you know who I mean) by the representatives of the people. Finance therefore has to try to control the state, because if the state controlled finance, then at any time the promise of the state to represent its people might be made real, and the ninety percent of the precariat could then dispossess the rich ten percent, and spread their power and wealth in a democratic way. Robert Meister writes about this possibility—basically a revolution in the form of a legal coup, which is simply to say new legislation passed—in his new book *Justice Is an Option: A Democratic Theory of Finance for the Twenty-first Century.*

One version of this state seizure of the power of finance is told in *Ministry.* Central

banks, under pressure from people and events (see list in reply to Jessica Green), create new fiat money to pay people for sequestering carbon, that being used as an index for other good biosphere work. This is precisely not a market solution, but rather a disabling of markets as the deciders of where capital should be expended—because markets always direct capital to the highest rate of return, which means more capital accumulation by the rich. This plot recognizes that the invisible hand never picks up the check, and it tells the story of overriding that particular legal system called the market, by way of a government-directed spree of biosphere-helping stimulus spending. Zachary Carter's *The Price of Peace* provides an excellent history of this kind of Keynesian mixed-economy power exerted in the twentieth century, and Meister's book is an attempt to describe what it might look like in the near future. Modern Monetary Theory is another such attempt.

So, I'd like to see Henry Farrell's own alternative evaluation of the major determinants of the next few decades expressed more fully (perhaps in a novel!) so I can understand him better. If he's saying a good future can't possibly happen because of capital, or because of imperial (American) power, I disagree. But all the transcoding I've had to apply here may have confused me. I feel on the outside of a discourse space unfamiliar to me.

For now, I would hope that *Ministry* resists all reductive abstractions, single-angle analysis, and political science. Because the disciplines discipline.

Belle Waring — The Sudden Tempest of Ultimate Summer

I like Belle Waring's response. I appreciate it very much.

It starts poetic, therefore impressionistic and suggestive. Then it's novelistic, in that she imagines herself, as readers do, into a scene; this time one in which an airplane is shot down by climate terrorists, and her comforting her daughters as the plane goes down; this is harrowing, what I call a "needle in the eyeball" moment; it sticks with you. Obviously it should be a scene in the book, and I add it to three or four other scenes suggested to me by

readers since the book came out. It's a somewhat melancholy pleasure, compiling this list: chapter 107, tremendous, 108, stunning; 109, 110, 111—never to be written by me, even though they would make the book better. Belle Waring's scene would make it shockingly better, in that people would be shocked. On the other hand, putting all the attendees at Davos against a wall and shooting them, even with paper bullets of the brain—I don't think so. Just a feeling.

So, living into a novel while reading it. I do that myself. Then her response becomes analytic in the more usual way, providing an X-ray of the book's structure. A surface novel and an under novel: yes. The novel's attitude toward what level of violence might acceptable in resisting the destructive power of capitalism is a crucial thing, but I didn't feel comfortable judging this myself. I tried to get out of the way and let the world speak, because this is a world where we live our daily lives under the rule of law, while at the same time robot machines drop from the sky and kill people elsewhere. The decision to kill is made extra-judicially by people acting in our names, supposedly to defend us, or the system we live in (not at all the same thing). So Americans already live in the double structure of my novel, and it wasn't just me avoiding answering the question of justifiable violence in resistance to this horrid system. We live this question daily, we are in collusion, compliance, subalternity, pick your abstraction—guilt? Shame?

Also, I was playing the game of forms. Even in a novel about such grim stuff, there should be pleasure. For me some of that came from making a game of forms. So the surface novel is Mary's story, about what we could achieve by legal means; then there's Badim's story, obscure enough that the reader has to stay alert for clues as to what's happening there. This is not unusual, all detective novels operate this way; but this time there aren't enough clues. The reader has to shift from being a detective to being a co-novelist, concocting their own version of what Badim might have done or authorized. In that process

readers have to consider what they themselves might sanction, given the world's desperate situation.

That Belle Waring saw this structure indicates that it must be there, and legible, which is good to know. That she responded to it so generously (because it could be seen as merely evasive) is something for which I am very grateful.

What I would have commented on, if asked, is the game of forms, the literary game. Lots of modes in this book, in a bricolage, perhaps to imitate the confusion of history and make readers be historians as well as ethicists. Novels always do this.

The riddles came to me from Anglo-Saxon. About a third of remaining Anglo-Saxon literature consists of riddles, and many are structured so that there can be more than one right answer, as in puns. Scholars still argue about whether the answer to one of them is an angel or a grasshopper; that was surely deliberate, a joke. A surface answer and an under answer.

The "IT narrative" was a fad in eighteenth century England, in which a coin or a violin or an atom would tell its story, proceeding through the world, and usually through someone's digestive tract, with amazement but with little to no agency, which I take it is why the genre died off.

The dialogues between the smooth host and the grumpy guest I got from a book called *Orwell at the BBC*. Included are some transcripts of Orwell hosting a weekly radio show on books, broadcast during the war. A repeat guest on this show was the literary critic William Empson, whose frequent rudeness always bounced right off Orwell. This struck me funny, and I thought it could be put to use.

Meeting notes: having dramatized quite a few bureaucratic meetings in my career, it seemed to me it would be a relief to all to convey these by notes alone.

Essays, encyclopedia articles, political rants, historical summaries, op-ed pieces: these

are all genres with specific norms. They are also forms that fiction can use. Including them in a novel might add to what Barthes called the effect of the real, but even if they don't, they do create variety, and the chance to play with pastiche and parody.

There is a spine of dramatized scenes, mostly focused on Mary and Frank. Very important, still the basic unit of fiction. Then also the opposite of dramatization, summarization; this was a staple of nineteenth century realist novels, and is still very useful—not to be jettisoned, much less despised, no matter how unfashionable some people now find it.

Lastly, and for me the great discovery for *Ministry*, is the eyewitness account. This too is a genre, I think under-recognized and theorized as such. Eyewitness accounts are more summarization than dramatization; they are telling not showing, thus reversing one of the Three Stupid Rules of MFA creative writing programs (see *The Program Era*, by Mark McGurl). Eyewitness accounts are often the result of interviews; the eyewitnesses are usually recalling something that happened many years before, which has since been judged significant. So they make judgments; they tell us what they think the event meant to the world, and what it meant to them in their lives after it happened. They tell their story with urgency and often great propulsive force. Something they saw, and often did, later proved important not just to them, but to the world!

When I understood this genre's potential for my project, I began to collect and read anthologies of eyewitness accounts. *Swansong 1945,* by Walter Kempowski, was a very powerful example. The more I read, the more impressed I became by the potential of this form for fictional purposes. I began to make lists of who might see what; I began speaking in tongues. Despite all, including occasional waves of dread, these chapters lifted and carried me through this book. Are there mistakes, inaccuracies, omissions? Of course. There should be more eyewitnesses, in my book and in the world. But this Frankenstein-like quilt (thank you again Suresh), stitched together from so many disparate parts, in the

end seemed to clomp away from me toward the Arctic, and I was happy. Go little book.

Thanks again to all. yrs, Stan