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Fred Pearce has been writing about climate change for eighteen years, and the more he learns, the worse things look. Where once scientists were concerned about gradual climate change, now more and more of them fear we will soon be dealing with abrupt change resulting from triggering hidden tipping points. Even President Bush's top climate modeler, Jim Hansen, warned in 2005 that "we are on the precipice of climate system tipping points beyond which there is no redemption."

As Pearce began working on this book, normally cautious scientists beat a path to his door to tell him about their fears and their latest findings. *With Speed and Violence* tells the stories of these scientists and their work—from the implications of melting permafrost in Siberia and the huge river systems of meltwater beneath the icecaps of Greenland and Antarctica to the effects of the "ocean conveyor" and a rare molecule that runs virtually the entire cleanup system for the planet.

Above all, the scientists told him what they're now learning about the speed and violence of past natural climate change—and what it portends for our future. *With Speed and Violence* is the most up-to-date and readable book yet about the growing evidence for global warming and the large climatic effects it may unleash.

With Speed and Violence: Why Scientists Fear Tipping Points in Climate Change **Details**

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Rob says

Alright so I am interested in climate change. In part it is because I am a concerned citizen but there is a touch of the apocalypse porn thing going on.

This book falls very much into the science category. The book is written by the eminent science journalist Fred Pierce so it is accessible to the averagely intelligent reader. No science degree is needed but there is no talking down either.

Pierce is not interested in the bland IPCC (Intergovernmental Panel on Climate Change) consensus. That consensus is that climate change will be gradual. This is scary enough since the frog is more easily boiled slowly. His contention is that their findings and official line is consensual and not necessarily true. In fact things are probably a lot worse. In fact the most likely scenario is a sudden change, not geologically sudden but human lifetime sudden, say ten years sudden.

The book explores a number of different theories and research findings about how and why the earth has suddenly switched from warm to cold and back again. The one thing that is certain is the sudden turn arounds are in fact the norm rather than the exception.

There are any number of theories as to what is the driver of these cycles but at this stage it is hard to point to one discreet factor. There is probably a subtle interplay of forces until there is a change and when there is that change it is like an avalanche. This is the positive feedback we hear about. The biggest positive feedback is the methane clathrate fart that is usually stored under the deep sea at high pressure and low temperatures. If that goes that's it there is no going back.

And in case anyone is wondering, Pierce is not quoting cranks, they are all respected scientists, mostly climate scientists but all excellent credentials.

Karl-Friedrich Lenz says

"The last generation" doesn't mean that ours is the last generation to survive. It means ours is the last to see a stable climate.

Pearce does a very good job explaining the science six years ago. His writing is clear and easy to read.

The main point of his book is that there are many unknown feedback effects. While the planet as a whole will get warmer from more CO₂ in the atmosphere, there is no guarantee that will happen in a slow and predictable way. There have been rapid changes in the past.

I agree with that. While some of the skeptics claim that we don't know enough to be sure there is a problem, it is actually the other way round. Exactly because we don't know what kind of feedbacks might kick in at exactly what level of CO₂ emissions, the situation becomes scary.

In my global warming science fiction novel "Great News" I have one of the main characters (who knows

much about this stuff) say that the first 50 degrees of warming will only take a couple of decades. I was assuming that part to be fiction.

I am not so sure about that now.

Stephen says

A good book on climate change, as it covers all of the major issues in a fairly understandable manner. I wish the chapters were a little longer though, as the book tends to take a hit-and-run approach at times. The approach left me a tad confused as it zipped through some rather complex science in 2 or 3 pages.

Eric says

If you have anxiety related to climate change, don't read this book. I enjoyed this book though. The science is fascinating. The earth is so complex and interconnected, it was interesting to learn about some of that.

Some of the unknowns about climate change are insane. If everyone read this book we would all be actively doing something about climate change. Everyone should do some reading on positive feedback loops related to climate change or just read this book!

Stephan Kub says

Good overview concerning tipping point.

Joan says

I can't decide whether to give this 3 stars or 5 stars so I compromised. This book is absolutely terrifying. The writer is a journalist whose beat is environment so he's gotten to know most of the major scientists in the fields that make up climate change. He makes an all too believable case for the fact that climate change is not going to be a gradual process that we can learn to live with but one that will be full of "speed and violence". He covers just about everything you can possibly think of in connection with climate change and talks to scientists who say that the change won't be gradual. There is a lot of detail in this book. I'm posting this the day after James Hansen wrote his op-ed saying that he had been far too optimistic in his studies and that climate change is going to be fast and scary. In other words, he agrees with the thesis of this book, even if he may or may not agree with all the specifics covered here. Here is a link to his article:
<http://www.washingtonpost.com/opinion...>

I strongly suggest you forget my review and go read Dr. Hansen's essay instead. For those who didn't go read the link, bottom line is we need to have a cap and trade on carbon NOW. We need to phase out the use of oil and oil based products NOW. Otherwise we need to all start trying to think what lies we are going to tell our

grandchildren when they want to know what we did to stop the destruction of their world.

I have been reading this books for what seems like forever. I could only read a bit before the sheer horror of what Pearce wrote would make me have to put the book down and do something else. As horrifying as his book is, he does believe that a cap and trade to reduce carbon could still mitigate things a lot. He is still hopeful after all he has written that the country will come to its senses and start an all out fight to keep the scenarios he heard from scientist after scientist from happening. My recommendation is join a local group trying to keep climate change from being more severe than it is now (anyone notice the worst drought in the US since the 1950s? How about the heat that killed thousands in Europe in 2003? How about weird hurricanes and tropical stroms where they have never been before? etc, etc etc!) 350.org seems very good to me. Someone just told me about Citizens Climate Lobby. There is also Climate Reality. Go look, there are organizations in place that will welcome your effort. In the meantime, read this book if you like movies like Jaws. This will scare you a whole lot more than little Jaws did!

Randy says

Fred Pearce, in 37 short chapters, has given us a very readable account of the current issues in the broad subject of global warming. I wish I could say it is a reassuring read, but it is not. From melting glaciers to thawing permafrost, the prognosis is not only not good but also possibly catastrophic.

The primary issue is the sensitivity of global temperatures to continued "outside forcing" brought on by increases in greenhouse gases. Conventional thinking, that of the Intergovernmental Panel on Climate Change (IPCC), predicts that rising emissions of carbon dioxide will produce a steady rise in atmospheric concentrations and an equally steady rise in temperatures. Pearce notes, however, that "the history of our planet's climate shows that it does not do gradual change. Under pressure...it lurches - virtually overnight."

For example, about 8,000 years ago ice-age conditions reversed with such speed that about half the warming took place in only a decade. This means that the world warmed by 9 degrees F - the IPCC's prediction for the next century - within ten years. How did this happen? It seems that the rise and fall of the ice ages coincided with a minor wobble in the earth's orbit. Its effect on the solar radiation reaching the planet was minute, and it happened only gradually. But somehow earth's systems amplified its impact, turning a minor warming into a sudden defrost. Pearce argues that the amplification certainly involved greenhouse gases: "the extraordinary way in which temperatures and carbon dioxide levels have moved in lockstep permits no other interpretation". So a minor change in the planet's heating - much less, indeed, than we are currently inflicting through greenhouse gases - could cause such massive worldwide changes.

As recently as 2001, the IPCC suggested that with a warming beyond about 5 degrees F, Greenland might gradually start to melt, and it would be unstoppable because of positive feedback mechanisms that would spur it along. At the time it was thought that the process would take a thousand years or more. But now, with the discovery of increasing amounts of meltwater pouring into cracks in the ice down to the bedrock at its very base, the potential destabilization of the ice sheets may reduce the timescale down from millenia to

years and decades.

We have already witnessed this kind of event in the catastrophic shattering of the Larsen B ice shelf in Antarctica in 2002. Because it was floating, its destruction did not raise sea levels. But like removing the cork from a bottle, it has opened the way for land-based ice to drain into the sea, and that does raise sea levels. There is the possibility that the West Antarctic ice sheet could collapse and raise sea levels by 6 yards in the next century. The larger East Antarctic ice sheet seems to be much more stable, but certainty is diminishing as more is learned of the mechanisms of destabilization, and we can't say that it is immune. If it went it would raise sea levels by 50 yards or more. And if all the ice melted, at both poles, it would raise sea levels worldwide by 230 feet. Rapid melting has happened in the past. About 14,500 years ago, as the world was undergoing a thaw, suddenly sea levels rose very, very quickly: within 400 years, they rose by 65 feet.

In addition to this, fear is growing about the carbon stored in the thick layers of permafrost in the far north, especially in Siberia. The stores of carbon here are so vast that it could be described as nature's own doomsday device. As the permafrost thaws, it begins to rot, releasing most of its tens of billions of tons of carbon into the atmosphere as carbon dioxide. In those bogs and lakes where there is very little oxygen, most of the carbon will be converted into methane, a greenhouse gas potentially a hundred times more potent than carbon dioxide.

A tipping point seems to be at work here, as the newly melted permafrost, darker than the old frozen surface, absorbs more heat and causes more warming. And as temperatures rise, methane emissions grow exponentially. How much the thawing permafrost will contribute to global warming is unclear. If all the stored carbon were released as carbon dioxide, it would add something like 5 degrees F to average temperatures around the world. But if it was mostly released as methane, depending on how quickly it was released (because it decomposes to carbon dioxide after a decade) it could actually raise temperatures by tens of degrees.

According to Jim Hansen, President George W. Bush's top climate modeler, "we are on the precipice of climate system tipping points beyond which there is no redemption." He gives us just a decade to change our ways. But as we are showing no signs yet of acting on the scale necessary, ours is probably the last generation that will experience a stable global climate. There is still so much we don't know about these so-called tipping points; we can't be sure of them until they happen and it is too late. But we can see what has happened in the past: relatively minor forcings have been amplified by positive feedback systems to produce much greater temperature changes. With greenhouse gas emissions we are engaging in what could be such a forcing.

The extent to which the environment can absorb and neutralize these emissions, and the point at which positive feedback mechanisms will tip to runaway temperature increases, is not clear. There is a growing consensus that we should prevent global average temperatures from rising by more than 3.6 degrees F above

pre-industrial levels, or about 2.5 degrees above current levels. Beyond that I suppose we will know first-hand, and not from computer models, whether climate lurches with speed and violence when tipping points are reached.

Ted says

2017 update

This book is now almost ten years old. As such, it contains some info and views which are now dated, and about which there is now much more clarity.

For example, the chapter on hurricanes is rather tentative about whether larger, more powerful storms will be a result of global warming going forward.

It's become a commonplace for people (including scientists) to say that any given storm, rainfall, drought - whatever- can be said to be "caused" by climate change. This is changing a bit in the last couple years, as scientists have come up with new ways of working probabilistically with weather features as they have changed over recent decades. Basically, the approach is to try to calculate how the chance of a certain type of weather event occurring has been changing as the atmosphere warms. So a certain type of event might have been described decades ago as a one in 50 years event, whereas currently the warmer atmosphere would make it a one in 20 years event.

Which brings up the recent 2017 hurricanes **Harvey and Irma**. Harvey was the first major hurricane to make landfall in the U.S. in ten years, dumping as much as fifty inches of rain on parts of southeast Texas. This has been described as (at least for the U.S.) an unprecedented rain event which had been unimaginable until it happened.

Harvey has been followed only a couple weeks later by hurricane Irma, the most powerful hurricane ever seen in the Atlantic, with winds approaching the theoretical maximum, and an 800 mile size that is almost as large as Texas. As I write Irma is expected to hit the south coast of Florida within a couple days, after virtually destroying a couple islands in the Caribbean already.

I think the book is still worth a look, as an overview of a lot of issues which in 2017 have become less controversial, with a consensus having formed since 2008. I wish I knew of a book which was as comprehensive as Pearce's, but contained more up-to-date information, but I don't.

Original 2012 review.

This is a very good survey of the different scenarios that are worrying various scientists around the world nowadays (actually, almost five years ago now), regarding climate change. There are 37 chapters grouped into eight topics, with most chapters concentrating on a different one of the tipping points that could lead to significant (and quite fast) destabilization of the atmosphere, seas, climate, or all three.

Pearce does not try to give probabilities or time lines for most of these possible occurrences, that would really be beyond the scope of our knowledge - though some of the scientists he mentions do throw out some

guesstimates. But consider: let's say there are only 25 items discussed here, and the average probability that any one could occur in the next 50 years is 2%. Well, that would imply that there would be a 40% chance that *at least one* would occur in that span of time.

What kind of catastrophes are discussed? Three of those that I have heard discussed elsewhere (not just in this book) are massive release of methane from a thawing tundra; the cessation of India's monsoon; and the drying out of the Amazon basin. One that is not even discussed in the book is the loss of the Himalayan glaciers, which feed most of the major rivers in China (and India) and provide the water for much of China's agriculture.

Bottom line - a good survey, but depressing.

Harold Norman says

Fred Pearce explains in a clear and measured way, the risks we run as we continue to ignore the massive buildup of carbon dioxide in Earth's atmosphere. We hear from climate scientists studying different aspects of the environmental changes that are happening now, and we get a good explanation of tipping points that might occur which could accelerate the change. Easy reading, good explanation of the science and should be read by any lay person unsure about climate change.

Xavier Alexandre says

To anyone still having doubts about the reality of man-made climate change, as a few of my friends are, please read this book. From a scientific writer who has been in this field for 30 years, the main conclusions are:

- Climate changes happen much faster than we think, sometimes in a decade. A number of well described examples from past events make this clear.
- The threshold when abrupt changes happen is when the atmosphere contains 850 billion tons carbon dioxide. We are at just 800 now, from 600 before the industrial revolution. At the current rate, we shall cross 850 within just 10 years.
- Exactly what will happen after these 10 years is impossible to predict, as there are too many feedback loop effects at play, but could include much larger hurricanes - sounds familiar -, parts of the world becoming unlivable, large heatwaves, end of the monsoons in India, or the complete disappearance of the Amazon forest.

Fasten your seat belts. We won't be in Kansas anymore.

Fred Dameron says

I held off reviewing "With Speed and Violence" until I had finished "Six Degrees", I believed that both told different sides of the climate issue, and I was correct.

Speed and violence discusses tipping points. Tipping points are events that once started will cause a cascade of other events that are related. Think of a tipping point as a dense fog on a highway. Suddenly you are

immersed in a pea soup and can't see. If you hit your breaks the guy behind you hits your rear so you drive on until you run into some one else rear end. Now you also get rear ended and so on. Tipping points work like that. One climate point starts to cascade or stop and other tipping points kick in leading to an avalanche of climatic change.. These points are many, methane clathrates, the shutting down of the Atlantic Conveyor, El Nino and La Nina events, drought in the Amazon Basin etc. Each tipping point is scary enough but it's affect on other tipping points drives the planet into uncontrollable warming. At this point "Six Degrees" takes over.

Six Degrees talks about what the world looks like at One through six degrees of warming. (A note here, Six Degrees was written in 2007. In 2016 the planet according to the British Metrological Service and The National Snow And Ice Data Center earth has already warmed 1.6 C since 1990. We only have .4 C before we cross the 2 degrees C threshold that Kyoto and Paris have tried to get us to stop at.) Two degrees life is hard but mostly around the world quite livable. AS we go past two degrees the world becomes more and more inhospitable.

Understanding what tipping points we have crossed, bleached coral, stronger El Nino and La Nina, ocean PH dropping by .1 from 8.2 to 8.1 and what tipping points are yet to be crossed is the NUMBER ONE ISSUE WE FACE as Hominids.

To survive as Hominids we need to cut back on our carbon usage. All of us today will most likely see two degrees. It will be hit sometime between 2020 and 2025. (See Met estimates of warming.) Will I see three degrees probably as 2030 to 2040 is when we cross that threshold. Will some remnant of humanity survive a six degree warmer world? Yes. Will it be my Avigale? I don't know. I want to leave her a world that is livable so it's time for every one to wake up. The coffee is already burned.

Trish says

This is an important and informative book about climate change, both from an historical perspective to projections for the future.

What I liked most about this book is that Pearce talks to many different scientists who have different theories about what the central driver of climate change is and what we can expect going forward. He does not just talk to scientists who will move his own agenda forward, but gives equal time and attention to the many theories that are out there. There are few definitive answers in the scientific community, but there is one thing they all agree on, global warming is happening and it is, and will have major effects on weather systems. We are moving from the relatively stable Holocene era, that began 8,200 years ago, into an unstable (to say the least), and perhaps volatile period that could have catastrophic consequences. At the least we can expect more severe and unexpected weather; colder winters and hotter summers, desert like conditions in non-traditional arid regions and vice versa, and more frequent and severe El Niño's.

The question is what can we do to help stem global warming and how much time do we have before we hit points where there is no turning back (or at least not for thousands maybe even millions of years until the planet can renew itself)? Again there are no definitive answers, with the exception that we (meaning the world population) must start cutting our carbon emissions so we are not adding more carbon dioxide than the planet and atmosphere can absorb. If we don't do this, permafrost and glaciers will continue to melt rising sea levels and more importantly, exponentially releasing billions of tons of methane gas and carbon dioxide from fossilized vegetation which has formally been frozen under the tundra causing even more and faster

rates of global warming.

Stylistically this book has some problems; he is all over the map so to speak. Most of the chapters are short (think magazine article) and do not flow together as a cohesive narrative. He jumps from the glaciers to the tropics, to the oceans, back to glaciers, to the atmosphere, back to the tropics etc. It is a bit hard to follow, not to mention the all of the scientific information that needs to be understood and absorbed. These are minor criticisms though, and should not deter from the overall impact of this must read book.

Ray says

Climate change has been depicted as a slow gradual process. Using science and history, this book upsets that paradigm by explaining "tipping points" in climate systems. If you're already concerned by climate change...you don't even know the half of it until you read this book. Good science and a good read!

John says

As I write this Hurricane Sandy is working it's way up the east coast and has the potential to be one of the most destructive storms on record. Every state from South Carolina to Maine has declared an emergency and is preparing the National Guard for disaster relief. Few people deny that global weather has changed in the last decade. Is this normal climatic variation, a blip on the graph? One can hope so. Because if it isn't, given the general lack of interest in both political parties and folks in general, we might be in real trouble. This book argues that overwhelming climate change can happen precipitously. That forces which govern climate are delicately balanced and little understood. Climatology is not a precise science. There are wackos in both camps. No one denies that CO2 levels are growing and the earth is warming. The skeptics tell us not to worry. A little warmer won't hurt and maybe even help, extend the growing season and so on. Most mainstream climate scientists aren't so sure, and some are clearly spooked and shouting "The sky is falling". Who is supposed to sort this out? Not likely the average Joe, forty percent of whom believe the world is less than 10,000 years old. It's not likely to be our lawmakers either. Most are lawyers whose scientific credentials peak at dissecting a frog in the ninth grade. I'm worried for my grandkids.

Chrisl says

6/6/18 - the linked article reminded of Pearce's reporting ... Fly finding at Greenland Ice Sheet.
<https://www.sciencedaily.com/releases...>

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Very informative. In the years since reading it, I have seen an increasing number of scientific articles verifying Pearce's research and predictions.
