

exerted as much legal muscle as she could against Tyler, Carreyrou, and her other perceived enemies while she still clung to the levers of power. As of this writing, full justice for Holmes is still waiting in the wings, as she and Sunny have been indicted by a federal grand jury and the case is currently under trial.

The story of Holmes and Theranos shows how easy it is to cross ethical boundaries in pursuit of success. In a time like ours when everyone is expected to design and use their own moral compass, Holmes is an example of what can happen when genuine talent and tremendous drive are not tempered by an equally strong ethical framework. While Holmes distorted reality for the

outside world, Sunny ran Theranos like a dictator, and the anything-goes environment of Silicon Valley was hospitable to that combination for a while. But when real patients began to get flawed blood-test results from companies such as Walgreens with reputations to uphold, the cards began to fall, and Carreyrou's reports finished the job.

I cannot think of another book in the areas of engineering or business ethics that combines such a wide variety of blatant ethical lapses in the story line with an engaging style that makes it fun to read. But it's fun in a grim way, because the whole enterprise was based on mining the gold that medical care has become in the U.S. It's too late to call for a return to

the time when medicine and healthcare were more of a calling than a profitable career, and there is no space left here to discuss the question of how commercialized healthcare should be. But the fact that one of the most spectacular cases of business fraud in recent memory involved a healthcare company should at least give us pause, and make us think of better ways to provide healthcare while avoiding the traps that Holmes and Sunny fell into — or rather, fashioned for themselves.

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A. David Wunsch

Climate Madhouse

The Madhouse Effect: How Climate Change Denial Is Threatening Our Planet, Destroying Our Politics, and Driving Us Crazy

By Michael E. Mann and Tom Toles. New York, NY: Columbia Univ. Press, 2016, 186 pages.

I don't believe it." These were the words of Donald J. Trump, President of the United States, leader of the free world, as he addressed reporters on Monday, November 26, 2018. He was responding to a report issued by his own administration, released on the previous Friday, which was produced by 13 federal agencies and 300 major earth scientists that warned of the growing catastrophe

due to climate change. Trump said that he had read "part" of the report. It was evidently not necessary for him to read the whole document. He had assured the American people earlier that year "Throughout my life, my two greatest assets have been mental stability and being, like(sic), really smart." Putting aside the grammar, his not believing his administration's report must have come as small comfort to residents of California who in the same year experienced the largest wildfire in the state's history. For years, climate scientists have warned of the growing

ferocity and frequency of forest fires because of the earth's warming.

Reading Mann and Toles's book in 2018 is a very different experience from reading it in 2016, the year of its publication, when Barack Obama was president. Michael Mann is a distinguished climate scientist who directs the Earth's Systems Science Center at Pennsylvania State University and who has been prominent in bringing to the American public knowledge of the risks inherent in global warming. Tom Toles, a Pulitzer Prize winning cartoonist for the *Washington Post*, provides lively

illustrations for this joint venture. My favorite shows a melting sundial. The image is captioned “The Persistence of Procrastination” — and we realize this is a riff on Salvador Dalí’s famous painting “The Persistence of Memory” which features three watches melting in the sun. Mann’s name may be familiar to readers, especially if they live in Virginia. Before moving to Penn State University, he was a professor at the University of Virginia.

In 2010 the Attorney General of Virginia, Ken Cuccinelli, a “Tea Party Republican,” filed a suit under the Virginia Fraud Against Taxpayers Act claiming that Mann likely violated state laws in five research grants he had received while at the school. He suggested that the professor could have manipulated data and demanded to see University records of his work. The case was seen by Mann and fellow scientists as “blatantly political” and he withheld the documents. In its final form Cuccinelli’s suit reached the Virginia Supreme Court where Mann and the University (which had defended him) were victorious. In 2013, Cuccinelli ran as the Republican nominee for the governor of Virginia and was defeated.

Mann’s name has also been associated with a climate change graph showing the mean earth temperature over the past 1000 years. This has become known as the “hockey stick graph”; if you imagine a horizontal hockey stick with the bent end facing upward, it roughly describes the curve, with a steep rise beginning at circa 1900 and continuing linearly upward to the end of the data, which go nearly to the year 2000. Although the graph stirred up controversy at the time of its publication in 1998, where Mann was just one of the authors, it has steadily gained adherents — if not in every detail — in the climate community.

Mann would probably fault me for suggesting that climate change caused the summer of 2018 California wild fire. He is careful in his language, asserting, “We of course can’t say that climate change ‘caused’ a particular heat wave, flood or storm. There is always the chance that the heat wave, flood or storm would have happened anyway. But climate change is almost certainly making these events more frequent. There is an increased occurrence of these events because of climate change, just as there is an increased incidence of lung cancer among smokers...”

Mann and Toles crystallize for us climate change denialism, principally in the United States, over the last generation. The core of this denial results from the confluence of several trends deeply embedded in the American culture: anti-intellectualism which makes a significant portion of the American public contemptuous of any expert whose knowledge and education exceeds their own, the propaganda of businesses whose profits depends on consumption of carbon based fuels, and a small but visible minority of scientists who are in the pay of these companies. Denialism comes quickly to those who seek it: seeing a legitimate earth scientist debating a company shill on a television show they falsely assume that the scientific community is almost evenly divided on this issue — but it isn’t.

A quick sampling of denialist propaganda can be found in the website of the Heartland Institute a conservative organization with a blatant history of anti-science arguments. Perhaps the reader should take a break and go to their homepage where you will find, for example, this piece on evolution:

“God did not simply create the universe in one act, but having brought the universe into existence, intervened several times to bring about changes. The “missing link,” then, does not refer to the past, but to the present. There is nothing like us on the planet. While there are variations among



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us, we are truly awesome. We are wonderfully made. The Bible tells us, you can’t love God if you don’t love people. How does somebody who denies the creation confirm to us that he believes we have rights that the government must respect?”

In 2007 Heartland was denying the harmful effects of cigarette smoke, e.g., in an article entitled “Smoke, Lies and the Nanny State.” And in 2008 we find “The Emperor Has No Clothes: The Truth about Second-hand Smoke” by one Jerome Arnett, MD, who insists that the connection between cigarette smoke and lung disease is bad science. Of late, the Institute, sensing their battle here is lost, has been quiet on this issue. But the Institute has moved into high gear in condemning U.S. government reports on the connection between CO₂ emissions and climate change. From their web site they damn “... the false narrative that human carbon dioxide emissions are causing an increase in extreme weather such

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as hurricanes, droughts, tornadoes, and floods. It is all politics, no science.” Their evolution denial is harmless. Research workers in the health or biological sciences aren’t guided by the biblical account of creation. But Heartland’s introducing doubt about mainstream climate science is criminal.

What motivates Heartland? As Mann and Toles so effectively explain, the Institute has historically been propped up by tobacco money and more recently the fossil fuel industry, especially in the form of donations from billionaires Charles and David Koch whose fortune derives from the petroleum and chemical industries. If you want to see where most science denial comes from in the United States, you need only follow the money.

Among their most salient exhibits is the painful story of Frederick Seitz, once a renowned solid-state physicist and sometime president of the prestigious National Academy of Sciences, which can boast of the membership of most of America’s best scientists. Mann describes him as a “founding figure in modern-day science denialism.” Joined by two other distinguished physicists, in the early 1990s Seitz went on a publicity campaign to debunk the science behind global warming, acid rain, and ozone depletion. What was in it for Seitz? The money of course. Prostitution is not limited to those with “love for sale.” After leaving academia in the early 1970s he got over half a million dollars from tobacco giant R.J. Reynolds for questioning the connection between cigarette smoking and cancer.

There is a sadness in reading this book, published in 2016, in the fall of 2018. Mann and Toles were writing in the final year of the Obama administration. Despite their rogue’s

gallery of climate change denialists, they saw reasons for hope. They point out that solar power doubled in the U.S. between 2013 and 2014 and wind energy increased by nearly 10 percent. In November of 2015 the two biggest carbon polluters, China and the United States, agreed to make substantial cuts in their CO₂ emissions over the following 20 years. This action sent an important message to the United Nations Global Climate Change Conference taking place in Paris in December 2015: the U.S and China took global warming seriously. At the time of their writing, Mann and Toles remark on a “huge spike” in the sales of electric vehicles and hybrids. They assert, “in the wake of the Climate Change Conference in Paris there was a collective feeling of euphoria that maybe, just maybe, we are now ready to turn the corner in confronting the climate challenge.”

Those words come out of an era that looks like half a lifetime ago. In June of 2017, Trump, half a year into his term, announced the U.S withdrawal from the Paris climate accords, claiming it, “an agreement that disadvantages the United States to the exclusive benefit of other countries.” The U.S. is the only country to have withdrawn. I suppose this shouldn’t have been a surprise: in his campaign he maintained that global warming was a hoax being perpetrated by the Chinese to disadvantage the U.S. economy. The signing nations had agreed to try to hold the earth’s temperature to 2 °C above pre-industrial levels. At the announcement of withdrawal, Trump was accompanied by Scott Pruitt, then the Environmental Protection Administrator who, until he was forced from his job, managed to delay or rescind numerous clean air and water regulations. This looks

like a dismal time for environmentalists but there has been a strong pushback from a number of states, e.g., California, which has aggressively pursued its own vehicle emission standards.

I would encourage Mann and Toles to update their book and explain whether the situation is as bleak as it seems. Another matter needing scrutiny is nuclear power. In November of 2018 a liberal leaning organization of scientists and engineers, the Union of Concerned Scientists (full disclosure: I belong) issued a report expressing support for nuclear power. They pointed out that with cheap coal and natural gas available in the United States a significant number of existing nuclear power plants are destined to close because they cannot compete financially. These plants, once they are constructed, have essentially zero carbon footprint and are supplying 20% of the nation’s electricity. The president of the organization stated, “These sobering realities dictate that we keep an open mind about all of the tools in the emissions reduction toolbox — even ones that are not our personal favorites.”

The organization’s shift in its advice and position on nuclear power deserves scrutiny and I hope Mann and Toles will give us their voice. A writer for the *Boston Globe* compared the Union’s about face to the militant anti-Communist Richard Nixon opening the doors to China.

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