

Presumptions, Prophecies and Predictions

Written for the Sphex Club, October 17, 2013

For a long time, I've been fascinated by decisions and predictions made by knowledgeable people that turned out very differently from what they thought. I think this interest began at a very early age as I began to read about the history of baseball and learned that the Boston Red Sox had sold Babe Ruth for \$100k. I couldn't begin to understand why—even though the trade preceded his home run hitting career.

So over the years, I've kept a file of strange decisions and erroneous predictions. Some of them are humorous in retrospect, but many have had dire consequences.

In 1899, the Commissioner of the US Patent Office, Charles H. Duell, claimed that "Everything that can be invented has been invented."

Marshall Ferdinand Foch, in his role as Professor of Strategy, Ecole Superieure de Guerre, speaking prior to WWI, said that "Airplanes are interesting toys but of no military value."

In his role as Assistant Secretary of the Navy, Franklin D. Roosevelt wrote in 1922 that "The day of the battleship has not passed, and it is highly unlikely that an airplane, or fleet of them, could ever successfully sink a fleet of Navy vessels under battle conditions." This opinion was held despite the efforts of Army General Billy Mitchell, who had successfully demonstrated the ability of aircraft to sink navy ships a couple of years earlier. Fortunately, Roosevelt had learned otherwise by 1940.

As late as 1939, Rear-Admiral Clark Woodward was quoted as saying "...As far as sinking a ship with a bomb is concerned, you just can't do it."

A 1921 New York Times editorial commenting on Robert Goddard's rocket research noted that "Professor Goddard with his 'chair' in Clark College and the countenancing of the Smithsonian Institution does not know the relation of action to reaction, and of the need to have something better than a vacuum against which to react—to say that would be absurd. Of course, he only seems to lack the knowledge ladled out daily in high schools." The remark was retracted in the July 17, 1969 issue of the Times.

Writing in 1929, Yale Professor of Economics Irving Fisher famously noted that "Stocks have reached what looks like a permanently high plateau."

The Pittsburgh Gazette in 1934 quoted Albert Einstein who said that "There is not the slightest indication that nuclear energy will ever be obtainable. It would mean that the atom would have to be shattered at will." Enrico Fermi had just announced the experimental splitting of the atom.

According to President Harry Truman's autobiography, Admiral William Leahy, a member of the leadership team of the Manhattan Project told Truman in 1945 that "That is the biggest fool thing we have ever done...The bomb will never go off, and I speak as an expert in explosives." This was the same William Leahy who, as an aide to then Secretary of the Navy Roosevelt, argued strenuously in support of Roosevelt's position that ridiculed the future use of air power against naval vessels.

1876 was an interesting year for predictions on the emerging technology of the telephone.

In 1876, Western Union held a monopoly on the telegraph and, consequently, was one of America's wealthiest companies. Gardiner Greene Hubbard, a wealthy Bostonian, offered to sell the patent for a new invention that he had partially funded to Western Union for \$100,000. Western Union CEO William Orton thought Hubbard was joking. A Western Union internal memo at the time noted that "This 'telephone' has too many shortcomings to be seriously considered as a means of communication. The device is inherently of no value to us." Orton disregarded the offer and wrote directly to the inventor. "Mr. Bell, after careful consideration of your invention, while it is a very interesting novelty, we have come to the conclusion that it has no commercial possibilities... What use could this company make of an electrical toy?" All Western Union would have needed to do was to hook the telephone to its existing lines, since Bell had already shown that the telephone worked quite well on telegraph wires. Within 25 years, AT&T, Bell's subsequently formed company, had become the largest company in the US—and Western Union had spent millions fruitlessly challenging Bell's patents, which they could have owned.

No less of a person than Sir William Preece, chief engineer of the British Post Office said in 1876. "The Americans have need of the telephone, but we do not. We have plenty of messenger boys."

Perhaps the automobile industry was more prescient. Henry Ford noted in his autobiography that "...my gas-engine experiments were no more popular with the president of the company than my first mechanical leanings were with my father. It was not that my employer objected to experiments—only to experiments with gas engines. I can still hear him say: 'Electricity yes, that's the coming thing. But gas—no.'" "The Edison Company offered me the general

superintendency of the company but only on condition that I would give up my gas engine and devote myself to something really useful."

In 1903 Ford asked that membership in the Association of Licensed Automobile Manufacturers be granted to the Ford Motor Company. Frederic L. Smith, President of A.L.A.M. at that time, later recalled giving this reply: "I remember solemnly telling Henry Ford that his outfit was really nothing but an 'assemblage plant' -- poison to the A.L.A.M. -- and that when they had their own plant and became a factor in the industry they would be welcome..."

Shortly after World War II, a group of British and American automobile industry leaders were asked to evaluate the possibility of taking over a German automobile factory as a contribution to war reparations. The only product made at the factory was the so-called "People's Car" designed before the war by Ferdinand Porsche as an inexpensive means of transportation for German workers. Ernest Breech, president of Ford Motor Co. and leader of the American team pronounced "The car is not worth a damn." Sir William Rootes, leader of the British team, declared that "The Volkswagen does not meet the fundamental technical requirements of a motorcar." Prior to its conversion to military production, the Rootes Motor Group had controlled the manufacture and distribution of such well-known British cars as Talbot, Humber, Sunbeam and Hillman. By 1952, it was not unusual to see a Beetle on American streets and highways and, once the innovative "Think Small" marketing campaign of the 1960s took hold, the lowly Beetle seemed to be everywhere.

In the interim, what did Ford Motor Company do? They designed a car "perfectly geared to American taste." They used the newly emerging science of market research to guarantee the success of the project and in 1958 the Edsel made its appearance in Ford showrooms. Two years and 15 days after its debut, production ceased and Ford Motors had lost more than \$350 million on the project. By the 1960s the Rootes Motor Group was seeking financial support from America and was acquired by Chrysler Corporation.

About the time of the Edsel's demise, General Motors introduced the Chevrolet Nova, intended primarily for the Mexican market. They were appalled by the sales numbers and finally someone realized that Nova means no go in Spanish.

The editors of Business Week proclaimed in August of 1968 that "With over 50 foreign cars already on sale here, the Japanese auto industry isn't likely to carve out a big slice of the U.S. market." It appears that American automobile manufacturers severely misread the American public on the matter of fuel efficient cars, even as the price of oil skyrocketed in the early 1970s.

Maybe the computer industry was more prescient.

Thomas Watson, chairman of IBM claimed in 1943 that "I think there is a world market for maybe five computers."

In 1949, the editors of Popular Mechanics wrote that "Where a calculator on the ENIAC is equipped with 18,000 vacuum tubes and weighs 30 tons, computers in the future may have only 1,000 vacuum tubes and weigh only 1.5 tons."

Ken Olson, president, chairman and founder of Digital Equipment Corp observed in 1977 that "There is no reason anyone would want a computer in their home." His failure to recognize the future offered by the emergence of Apple and by IBM's PC doomed DEC to eventual bankruptcy.

In his autobiography, Steve Jobs wrote "So we went to Atari and said, 'Hey, we've got this amazing thing, even built with some of your parts, and what do you think about funding us? Or we'll give it to you. We just want to do it. Pay our salary, we'll come work for you.' And they said, 'No.' So then we went to Hewlett-Packard, and they said, 'Hey, we don't need you. You haven't got through college yet.'" I was consulting for Atari in the late seventies and heard that story from Jobs' partner, Steve Wosniack. Interestingly, Atari, who invented the computer game, hired a CEO from American Standard Company. He decided that computer games were a passing fancy and changed Atari into a computer company—whose product was going to compete head to head with the newly emerging Apple Computer Corporation. We know how that turned out.

And finally, Bill Gates is purported to have said that "640K ought to be enough for anybody."

Well, perhaps the arts and entertainment industry has fared better.

When David Sarnoff was trying to solicit investment in the radio in the 1920s, one of his associates replied "The wireless music box has no imaginable commercial value. Who would pay for a message sent to nobody in particular?"

In a book entitled *History of Radio*, Leonard Archer describes the 1913 trial of Lee deForest, inventor of the audion tube, a device that makes radio broadcasting possible. DeForest was charged with fraudulently using the U.S. mails to sell the public stock in the Radio Telephone Company, deemed a worthless enterprise. The District Attorney charged that "De Forest has

said in many newspapers and over his signature that it would be possible to transmit human voice across the Atlantic before many years. Based on these absurd and deliberately misleading statements, the misguided public...has been persuaded to purchase stock in his company..."

De Forest was acquitted, but the judge advised him "to get a common garden variety of job and stick to it."

Even deForest was not immune, however, writing that "While theoretically and technically television may be feasible, commercially and financially it is an impossibility." Daryl F. Zanuck later proclaimed that "Television won't be able to hold onto any market it captures after the first six months. People will soon get tired of staring at a plywood box every night."

And, from the movies, Harry Morris Warner, the president of Warner Brothers, said in 1927. "Who the hell wants to hear actors talk?"

Many actors have made curious choices in turning down roles. Gary Cooper, explaining his decision not to take the leading role in *Gone with the Wind*, said that "I'm just glad it'll be Clark Gable who's falling on his face and not Gary Cooper."

Sean Connery turned down the role of Gandalf in the *Lord of the Rings* because he didn't understand the script. Connery was reportedly offered a percentage of the gross, which would have amounted to nearly \$450 million. Connery also turned down the role of the Architect in *Matrix Reloaded* because he didn't understand the script. He was not alone. Will Smith was offered the role of Neo in *The Matrix*. He turned it down because he thought the plot was too complicated and it would not sell at the box office..

The publishing world is rampant with curious publishing decisions. In 1900, Beatrix Potter, a London painter of watercolors, wrote and illustrated a children's book that she called *Peter Rabbit*. She sent handmade copies of text and illustrations to multiple publishers, all of whom promptly rejected the book. So she decided to publish it herself to give to family and friends. One of the publishers who turned her down saw one of these copies and offered to publish it, but only if Ms. Potter would bear the financial risk—and thus any potential financial gain. Three years later, the book had sold more than 75000 copies.

J. K. Rowling sent hand-typed copies of the first Harry Potter novel to twelve publishers, each of whom tossed it without reading it. Finally, one publisher decided to give it to his eight-year old daughter to read and it was only when she came to him asking for the rest of the story that he realized that he might have something worth publishing.

And there are many others. *Lorna Doone* was denied by 18 publishers; *Silent spring* was turned down by five publishers; *The Peter Principle* bounced around 15 publishing houses; *M*A*S*H* was denied by 21 publishers.

Speaking of *M*A*S*H*, no one expected much when the TV series debuted in 1972. Producers just wanted to use the *M*A*S*H* movie set again to make a cheap series—so they were pleasantly surprised when it became Fox's only hit show. Three years later, the company was hard up for cash. When the *M*A*S*H* ratings started to slip after two of its stars left, the production company decided to raise cash by selling the syndication rights to the first seven seasons of *M*A*S*H* on a futures basis: local TV stations could pay in 1975 for shows they couldn't broadcast until October 1979—some four years later. Fox of course could not guarantee that the show would remain popular, or even in production. The cost of \$13,000 per episodes was non-refundable. But enough local stations took the deal so that Fox made \$25 million. *M*A*S*H* of course became one of the most successful syndicated TV shows ever. Each of the original 168 episodes grossed over \$1 million for local TV stations; Fox got nothing.

In 1970 a former BBC news writer sent a manuscript of a spy thriller to a British publisher who returned it saying that it "had no reader interest." Four more publishers passed, although one of them subsequently had second thoughts and decided to publish *The Day of the Jackal*.

Jack Canfield and Mark Victor Hansen shopped copies of their manuscript to more than 140 publishers and not a single one of them expressed interest. Canfield said that "They all said it was a stupid title, that nobody bought collections of short stories, that there was no edge -- no sex, no violence. Why would anyone read it?" His co-author actually collected 20,000 preorders—from people saying that they would buy the books. He could guarantee sales of 20,000 copies and publishers still said no. Eventually, a small company specializing in books on subjects like alcoholism and drug addiction was sufficiently desperate that they agreed to publish the manuscript—but for an advance of zero dollars. In 2008, *Chicken Soup for the Soul* became the best-selling trade paperback series in the history of publishing and, to date, its total retail sales are in excess of \$2 billion

On December 13, 1961, a representative of Decca Records traveled to Liverpool to watch a local band perform. He decided they had talent, and invited them to audition on New Year's Day 1962. The group travelled to London and spent two hours playing 15 different songs at the Decca studios. Then they went home and waited for an answer. They waited for weeks. Finally, Decca records executive Dick Rowe told the band's manager that the label wasn't interested because they sounded too much like a popular group called The Shadows. In one of the most famous of all rejection lines, he said: "Not to mince words, Mr. Epstein, but we don't like your

boys' sound. Groups are out; four-piece groups with guitars particularly are finished." The group was The Beatles, who eventually signed with EMI Records and ultimately became the most popular band of all time.

Even at the Nobel Prize level, strange decisions have been made. The first Nobel Prize for literature was awarded in 1901. Among the nominees were Henry James, Emile Zola, Joseph Conrad, and Hendrik Ibsen, all of whom were still living. The prize was awarded to Rene Sully Prudhomme, a French novelist. In 1910, Leo Tolstoy died, having been repeatedly nominated for *War and Peace* and *Anna Karina*. The 1910 award was to Paul von Heyse, a German poet.

In the middle of the sixteenth century, Duke Lorenzo de Medici decided that he did not like the murals on the walls of the Piazza Vecchio in Florence. They were old fashioned and politically incorrect, having been painted, as it were under an earlier political regime. So he commissioned Giorgio Vasari, a now little known purveyor of gossip and mediocre painter to obliterate one of Leonardo da Vinci's great works and replace it with his own composition. Millions of dollars have been spent in trying to restore the original.

Writing about the first exhibition of impressionist painting by Manet, Monet, Pissarro and Renoir, Emile Cardon, for the French newspaper *La Presse*, commented as follows: "In examining the works exhibited . . . one wonders whether one is seeing the fruit either of a process of mystification which is highly unsuitable for the public, or the result of mental derangement which one could not but regret. . ."

In 1974 the owner and publisher of the *San Francisco Chronicle* turned down the syndication rights to a series of articles the *Washington Post* was running about a break-in at the headquarters of the Democratic Party in Washington, DC. In declining the offer, the owner noted that "There will be no West Coast interest in the story." The rival paper, the *Examiner*, bought the rights for a few hundred dollars.

In 1972, George Lucas, then a relatively unknown director, pitched a project for a film he was calling *American Grafitti* to United Artists, who decided to back the low-cost (\$700k) project. But then they decided to back out. American International Pictures refused to pick up the project, deeming it "commercially unacceptable." Universal Studios did the same, but for some unknown reason, reversed course and *American Grafitti* became one of the most lucrative films in history. Lucas then began work on a science fiction movie that he tentatively entitled *Star Wars*. No one was interested. Eventually 20th Century Fox gambled a small amount of development money—but Lucas was forced to raise most of the production money himself. By the time the film hit the theatres, Lucas was broke—but he owned the picture and the rights to

all sequels. In its first year, the movie grossed more than \$300 million. And you know the rest of that story.

And there are various and sundry proclamations from other venues.

A Yale management professor wrote in response to Fred Smith's class paper proposing creation of a reliable overnight delivery service "The concept is interesting and well-formed, but in order to earn better than a 'C', the idea must be feasible." Mr. Smith went on to found FedEx.

In 1974, Margaret Thatcher proclaimed that "It will be years -- not in my time -- before a woman will become Prime Minister."

So what about political predictions? Well, that's just too easy. All of us can cite examples of erroneous political prognostications, ranging from the 1948 presidential election to the last presidential election. Perhaps the most interesting predictions in the general social science arena are predictions that were not made. I cite two. First, to my knowledge, no one predicted the actual collapse of the Soviet Union and few realized the possibility of the 2008 economic collapse.

In a 2011 paper entitled "Are Talking Heads Blowing Hot Air? An Analysis of the Accuracy of Forecasts in the Political Media," a political science professor and five students from Hamilton College analyzed the accuracy of 472 predictions made by a group of political commentators during the 16-month period between September of 2007 and December of 2008. They concluded that most were no more accurate than one would be by flipping a coin. The 26 journalists and politicians wrote columns in major print media and appeared on the three major Sunday news shows—Face the Nation, Meet the Press, and This Week. The authors divided their results into three categories which they called The "Good," The "Bad," and The "Ugly."

The students determined that only nine of the writers had predicted more accurately than a coin flip. Two were significantly less accurate, and the remaining 14 were not statistically any better or worse than a coin flip. Those whose predictions were correct more than 50 percent of the time, led by New York Times columnist Paul Krugman, were labeled "Good," while those whose predictions were more or less comparable to a coin flip were "Bad." Those who scored less than zero (which was possible because points were taken away for inaccurate predictions) were put into "The Ugly" category. Syndicated columnist Cal Thomas scored the lowest of the 26.

Just so you know, in addition to Paul Krugman, the most accurate writers were Maureen Dowd

of The New York Times, former Pennsylvania Governor Ed Rendell, Senator Chuck Schumer (D-NY), and former House Speaker Nancy Pelosi—all Democrats and/or liberals. Conservative columnists Kathleen Parker and David Brooks, along with former Treasury Secretary Hank Paulson and columnist Eugene Robinson of The Washington Post also made the “good” list. Since many of the events predicted were political events, you might think that political bias was part of the predictive process. The students eliminated political predictions and looked only at predictions for the economy and social issues and they found that liberals still did better than conservatives at prediction. Those whose scores were negative included Cal Thomas; Senator Lindsey Graham (R-SC); Senator Carl Levin (D-MI); Senator Joe Lieberman, and Sam Donaldson of ABC.

Landing between the two extremes – “The Bad” – were Howard Wolfson, Governor Mike Huckabee, Newt Gingrich, Sen. John Kerry, columnist Bob Herbert of The New York Times; Andrea Mitchell of NBC; New York Times columnist Tom Friedman; the late Washington Post columnist David Broder, Clarence Page; Nicholas Kristof; Hillary Clinton; and George Will.

All of us make predictions. Some are almost unconscious—to the level of being assumptions about the way things will evolve. A prediction is simply a statement about the way things will happen in the future. It may or may not have anything to do with our experience or our knowledge. While prediction and forecast are often used interchangeably, predictions usually connote an expected outcome, while forecasts often involve a variety of possible outcomes.

Obviously, prediction often implies little more than an “educated” guess. I might predict a certain response on the part of a colleague, based on a long history with that colleague and others like him. Such predictions can be valid if the person making the prediction thinks clearly, has sufficient data and knows the field. That’s often the case with poker players. Consultants often offer this form of prediction to businesses and organizations to help them develop realistic expectations for the future.

More often today, predictions are based on the mathematical field of statistics, which is applied to create statistical inferences. I had originally intended for this paper to be about statistics, but I didn’t have the heart to do that to such a distinguished group. We live in a world dominated by numbers and data, even though we may try to hide from them. Statistics allows us to infer information about a population from knowing something about a sample of the population. In elementary school, you learned about the average, or mean, as a single number that can be used to represent a population. Typically, the first use of average is in computing grades. Later on, you learned about other measures, including the median and the mode. When you study introductory statistics, you learn about standard deviations and about ideal distributions such

as the normal distribution. Eventually you might have learned about predictive inference—i.e., how to use knowledge of a sample to make predictions about the population.

Many, if not most, mathematicians regard statistics as an almost trivial application of a subset of the larger mathematical realm of probability theory and thus they are not terribly interested in the subject. However, they might encourage their students who are looking for jobs to consider statistics—especially as the subject might apply to the specialized field of analysis known as actuarial science. If you were fortunate, or unfortunate as the case may be, to have studied statistics, then you may remember, with varying degrees of fondness, terms such as regression analysis, least squares curve fitting, time series analysis, and some others.

In its simplest guise, statistical predictions require that one collect data on the variable that one is interested in predicting, and on other variables that might influence this so-called dependent variable. The statistician assumes a mathematical relationship between the dependent variable and the independent variables. The simplest and most often used relationship is a linear relationship. This relationship, which is often called a model, is in many ways the most critical part of the predictive process. The result of a statistical technique, no matter how sophisticated, can be no better than the mathematical model upon which it is based. The independent variables are used to optimize how the assumed model fits the data at hand. This is the estimation step. To make predictions, one then manipulates the independent variables to generate predictions for the independent variable.

I have recently been reading *The Signal and the Noise*, by Nate Silver. Silver is known for his “FiveThreeEight” blog and for his accurate forecasting of the 2012 presidential election results. The book is about the application of statistics to predicting. Silver argues that for the most part, we don’t do it very well. He discusses his own experiences with predicting elections, baseball performance, and poker. And he also talks about the history of prediction in all sorts of other areas—the weather, especially hurricanes, earthquakes, computer chess, the stock market, the economy, sports betting, climate change, terrorist attacks, and more.

Silver provides many examples of failed predictions, including the economic collapse in the United States prior to the 2008 general elections. As you know, much of this was due to the collapse of the real estate market and falling house/property values. Real estate was badly overvalued, and financial firms made packages of investments whose soundness was based on many mortgages NOT defaulting at the same time; analysts had determined that the risk of that happening was astronomically small. That was wrong of course; one reason is that the risk of such an event is NOT described by the “normal” (bell shaped) distribution but rather by one that allows for failure with a higher degree of probability.

Silver basically concludes that there is no universal recipe for making good predictions. Good prediction involves a lot of good judgment, by which he means deciding how to weigh various general considerations in any particular case. A few things are always helpful, such as good mechanistic knowledge (which we have for weather, hurricanes, and poker), a large historical database of cases similar to the ones we're trying to predict (which we have for baseball), and acknowledging all sources of uncertainty and error. And a few things are always unhelpful, most importantly our tendency to see "patterns" where there aren't any and so overfit the data and make overconfident predictions.

But in between, there are lots of things that are helpful in some circumstances but unhelpful in others. For instance, having more computing power has helped weather forecasters, who have long had exactly the right mechanistic model of the atmosphere but lacked the ability to simulate it at sufficiently fine spatial resolutions. Now they do—for the most part. A year ago, our youngest son Jeff was facing his first hurricane in New Orleans as hurricane Irene approached, trying to decide to stay or evacuate. Jeff is an atmospheric scientist and he had an incredible amount of data at his disposal. If you look, you can find on the Internet detailed maps of atmospheric pressure, wind speeds, temperature profiles, atmospheric moisture, sea surface temperatures, the results of at least six comprehensive computer models that forecast the movement of weather systems and more. Although the forecasts were very accurate in terms of the storm's path and its intensity, they failed to predict the fact that it would pause over New Orleans for more than 24 hours, dumping incredible amounts of rain in the process.

More computational power hasn't helped in earthquake prediction, because we lack the ability to even write down the correct cause and effect model, much less identify all of the relevant parameters. You might have read recently about the trial of several Italian earthquake scientists who were sentenced to six years in prison for failing to warn citizens about an impending earthquake and potential damage—despite the fact that it's currently impossible to do so.

In general, the more complex the system, the more difficult predictions become. Physical science, including meteorology, for the most part treats simple systems—systems that can be described by mathematical relations that reflect cause and effect. Thus one would expect those systems to lead to the most accurate predictions and they do. As we move to the realm of biology, which adds "life" to the complexity of chemistry, systems become more difficult to predict. If we add the concept of "mind" to the mix, as does psychology, the system becomes infinitely more complex and predictions are even less accurate. When collections of minds are considered, as in the social sciences, it seems miraculous that any predictions can be and not at all unreasonable that those predictions should include ranges of uncertainty.

In the end, how we actually make predictions and decisions is a complex psychological process, one that is poorly understood and for which I found dozens of equally confusing theories. So I won't delve into the psychological realm. However, I will point out that Yale law school professor Dan Kahn conducted a clever experiment about the impact of political passion on people's ability to think clearly. He asked a group of subjects to interpret a table of numbers about whether a skin cream reduced rashes, while asking others to interpret a different table -- containing the same numbers -- about whether a law banning private citizens from carrying concealed handguns reduced crime. He found that when the numbers in the table conflicted with people's positions on gun control, they couldn't do the math right, though they could when the subject was skin cream. The more advanced that people's quantitative skills were, the *more* likely it was that their political views, whether liberal or conservative, made them *less* able to solve the math problem. He concluded that political partisanship can cloud basic reasoning skills. Subjects who were otherwise good at math may totally flunk a problem that they would otherwise probably be able to solve, simply because giving the right answer goes against their political beliefs.

Well, that hardly seems surprising, especially in light of recent national politics. More importantly, what does it imply about the place of reason in the political arena? You can easily see how it impacts contentious issues such as gun control and climate change. As an educator, I'm still optimistic that disputes over facts can be resolved by evidence, but you have to admit that things aren't looking so good for reason. This and other studies of how our minds work suggest that the political judgments we've already made are impervious to facts that contradict us.

So what about our basic belief that education, a free press, scientific evidence, or reason can provide the tools and information that people need in order to make good decisions? The real problem, at least in the public realm, is not a lack of information. Rather, it's how our minds work, no matter how smart we think we are. We want to believe we're rational, but reason often turns out to be the *ex post facto* way we rationalize what our emotions already want to believe. When there's a conflict between partisan beliefs and plain evidence, it's often the beliefs that win. As Kahn concluded, "The power of emotion over reason isn't a bug in our human operating systems; it seems to be a feature." The question remains, what do we do about it? And that is possibly the subject of another talk.