

Insurance and the Long View

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Richard C.J. Sommerville, *The Forging Air: Understanding Environmental Change* (Berkeley: University of California Press, 1996), 195 pages, \$21.95

John M. Barry, *Rising Tide: The Great Mississippi Flood of 1927 and How It Changed America* (New York: Simon & Schuster, 1997) 524 pages, \$27.50

Large companies, including insurance companies, should concern themselves with the long view in three senses. First, senior executives, who should all have some affinity for long-range planning, must wonder how things have been—not just yesterday and the day before, but over the long haul. The future does not replicate the past, but it often resembles it. Second, responsible executives wonder about the diversity of ways that exist in the present for handling (roughly) the same problems. Third, corporate planners wonder how things will go in the future. Projecting probable futures is a humbling activity, but necessary. This is especially true for liability insurers (which face long-tail claims), life insurers (which are on a single risk for many years), health insurers (which may be dealing with the same group of people for decades), and some property insurers (which may keep their customers year in and year out).

Senior risk managers should have the same set of horizons. Thus, not all management is operations. Not all management is done by wandering around. Some of it is done through imagination, foresight, and leadership for the long range. That part of management, of course, requires stimulation more than structure. Needed inputs are not going to come from ignorant men and women meeting with each other and talking about their untutored fantasies. Nor will they come from TV studies of current events: *60 Minutes*, *Prime Time*, or anything of that

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sort. They can come from getting lectures and seminars from the right sort of people. And they can come from good, old-fashioned reading.

The books under review here are about taking the long view. *The Forgiving Air*, by Richard C.J. Sommerville, is about the long-range problems of air pollution and has implications that imaginative insurance executives and thoughtful corporate risk planners may wish to ponder. Professor Sommerville is in the Department of Meteorology at the University of California, San Diego, and he is the Director of the Climate Research Division at Scripps Institution of Oceanography at that university. *Rising Tide*, by John M. Barry, is brilliant, journalistic social history. It tells the story and explores both the origins and the implications of the catastrophic flood that occurred along the Mississippi River in 1927. That event had enormous human, social, and political implications. For example, Barry argues that it virtually elected Herbert Hoover. At the same time, massive flooding is not a thing of the past. Indeed, on April 28, 1997, *Business Insurance* carried a front-page story on the 1997 spring floods in North Dakota, Minnesota, and southern Canada.

Injuries and the Long Haul: Looking to the Future

The Forgiving Air is mainly about air pollution, atmospheric sciences, and figuring out what the environment is going to be like in half a century. Sommerville concentrates on four topics: the ozone hole, the greenhouse effect, air pollution, and acid rain. His book is mainly about the science of these topics. At the same time, the prose is sprightly and the tone is conversational. (Unlike many conversations, the book is articulate at all points. Like many conversations, it is somewhat redundant.) Its thesis is simple enough. According to Sommerville, "We've already harmed the Earth, and especially the atmosphere, by using it as an all-purpose dump." The question is, how much further can we go? Sommerville's view is that we will go too far unless there is an informed populace, and citizens cannot be informed unless they are "scientifically literate."

Ozone Hole. There is something miles up called the ozone layer. In it is the maximum concentration of ozone to be found in the atmosphere. Even there, it is only a few parts per million. "If you brought all the ozone in the atmosphere down to the surface, it could be contained in a layer about 3 millimeters thick."

Even though we're not talking about a thick layer, ten or so molecules of ozone per million serve a vital function in the atmosphere. They absorb almost all of the especially dangerous wavelengths of ultraviolet radiation. If larger doses came through, there would be more skin cancer, premature aging, and damage to the eyes, possibly

in the form of cataracts and damage to the retina. Ultraviolet radiation can also injure the human immune system as well as other animals and plants. Obviously, these conditions are of virtually primal significance to many types of insurers.

In 1928, Thomas Midgley, a scientist-engineer for General Motors, invented a chlorofluorocarbon (CFC) that made refrigeration possible. There are lots of these CFCs now. CFC-11 not only was a refrigerant, but also was used as a propellant in aerosol spray cans. It is responsible for nearly half of the observed ozone depletion. The other CFCs are also problematic. The trouble with them all is that when they break down, they produce chlorine. When a chlorine atom encounters an ozone molecule, the ozone breaks up and forms a molecule of chlorine monoxide. That molecule is relatively unstable, so it breaks up fairly quickly, which frees the chlorine atom to interact with another ozone molecule. "A typical chlorine atom can go through this destructive catalytic cycle some 1,000 to 10,000 times before something else happens to it."

The problem is particularly acute over Antarctica, because of some complicated facts about climate, which Sommerville explains at length. It took a while for scientists to recognize what was happening. A NASA satellite recorded a radical decline in ozone (from 1 part per million to 1 part per 2 million), but the NASA computer threw out the data as being too weird to be reliable. Only later did scientists realize that NASA's data were correct.

CFCs will increase for several decades to come. It will take a half century to really reduce them significantly.

Thus, we now appear to be inextricably committed to substantial increases in ultraviolet radiation for decades to come, with ensuing health and ecological effects. The consequences of producing CFCs for over half a century cannot be evaded by agreeing not to produce any more. The atmosphere remembers our past behavior. There are limits to the compassion of the forgiving air.

This is an example of how yesterday and today reach a long way into tomorrow. Obviously, insurance planners today need to attend to such long-range trends. It is also important to recognize that the trends producing the ozone hole are broad in the sense that they are global, although they are not broad in the sense that they do not involve many different kinds of activities.¹

Enhanced Greenhouse Effect. The so-called greenhouse effect is broad even in this last sense. The problem is that there are gases—such

as water vapor, carbon dioxide, methane, nitrous oxide, ozone, and CFCs—that contain infrared radiation (i.e., heat that the Earth emits as the result of its processing sunlight). “The overall effect of these gases is to trap some of the heat, and thus, like a blanket, they make the Earth warmer than it would otherwise be.” What is worrisome about the greenhouse effect is not that it exists. Were it not for the greenhouse effect, the surface of the Earth would be below freezing. The problem is that we are adding to the greenhouse effect, and that means we are likely increasing the Earth’s average temperature.

Sommerville is very tentative about the enhanced greenhouse effect. He takes the existence of the ozone hole to be proven fact. With the enhanced greenhouse effect, there is no “smoking gun”-type evidence. Nevertheless, he suggests that there is a scientific consensus: “the greenhouse effect during our lifetime—perhaps during this decade, perhaps during the next—will increase enough that *everyone* will notice the results.” Carbon dioxide is one of the main problems. A graph, called the “Keeling curve,” in honor of the scientist Charles David Keeling at Scripps, apparently demonstrates that the amount of CO₂ in the atmosphere has risen 10 percent since 1958. On the basis of examining ice cores, the conclusion is warranted that the amount of CO₂ in the atmosphere is up 25 percent since pre-industrial times, and it was apparently lower still longer ago.

The main source of CO₂ in the atmosphere is burning coal, oil, gasoline, and natural gas. Deforestation makes some contribution, but it is secondary. Moreover, carbon dioxide is only half of the man-made problem. The other half of the enhanced greenhouse effect results from methane, nitrous oxide, ozone, and CFCs. The volume of those gases is growing at a faster rate than CO₂.

Perhaps the most interesting part of Sommerville’s discussion of the greenhouse effect is his discussion of experiments his colleagues at Scripps have undertaken to determine whether the average temperature of the ocean is rising. This is done partly by dispatching sound waves from the South Pacific in several directions and monitoring them. Another extremely interesting form of scientific inquiry into the enhanced greenhouse effect has to do with clouds and their impact on the Earth’s temperature. It turns out that—within limits—scientists disagree about ways that changes in cloud formation might affect climate. There is broad agreement, however, that the enhanced greenhouse effect will change cloud configurations to some degree, that this will change the reflectivity of the Earth with respect to sunlight, and that these changes will have enormous impact on such things as polar ice, soil moisture in

a variety of places, rainfall, wind behavior, cloud formations, and so forth.

The effect of change in cloud formation is controversial. There is some agreement, however, and Sommerville summarizes the scientific consensus as follows:

The effect of the cloud changes in th[e] models [proposed by various scientists] in a double-CO₂ world is threefold, and all three effects tend to increase the warming [of the Earth]. There's a positive feedback from the reduction in cloud amount. There's a positive feedback in the fact that the average cloud altitude goes up, driving the average cloud temperature down. There's also a positive feedback from the reduced cloud albedo, thus lowered reflectivity of the clouds.

According to Sommerville, there is no question at all about these facts. The serious question has to do with how much the temperature will increase. Sommerville's hypothesis is this: "Since we're introducing a big change in the atmosphere's chemical composition, we have every reason to suspect that we might be having a significant impact on our climate." If the air warms up much, the sea level may rise by a meter or so over the next century. (Some countries—like the Netherlands—are already planning on this. Some governments—like those charged with the welfare of Florida—are not.) Sommerville also conjectures that hurricanes may increase in intensity, that the winds caused by El Niño may become more significant, and that droughts may become longer and drier. Obviously, all of these matters should be of substantial concern to imaginative and future-oriented property insurers and risk managers.

Given the gigantic increases in population, it is not clear what should be done. Reforestation is a good idea, although secondary. Changes in fossil-fuel consumption are important, but countries like China have a virtually inexhaustible supply of coal, and China means to complete industrialization. Cutting down on emissions is a good idea, but there is no central control authority that can supervise. All of these sound like sensible ideas. Some proposals, however, sound a little mad. One of them, called "iron fertilization," calls for putting iron in the ocean in a form which small plants called phytoplankton can consume. If these plants could only get enough iron, they would grow stronger and consume more CO₂. Unlike the situation with ozone, no consensus has emerged, and no international agreements have been reached.

Air Pollution. The third major topic Sommerville covers is the meteorology and chemistry of air pollution. He devotes less space to

it, but provides the reader with an especially lucid discussion of smog and the temperature inversions that made Los Angeles what it is today. Air pollution is easily visible in many of the great cities of the world: Mexico City, Bombay, Calcutta, Los Angeles, New York, Chicago, and so forth. Controversies over so-called environmental injustice—which means: pollution is a form of invidious discrimination or, at least, oppression—are coming up everywhere.

Acid Rain. Sommerville also provides a comprehensible discussion of acid rain. He contrasts the science of acid rain with that of the greenhouse effect. We do not understand the latter very well, he says, but we understand acid rain quite well indeed. The main problems are SO₂ (sulfur dioxide) and NO_x (nitric oxide and nitrogen dioxide, considered collectively), which create acid precipitation from the atmosphere. The implications of this problem for property insurance should be obvious. Finding solutions is much more difficult. (1) We could burn only low-sulfur coal. Unfortunately, high-sulfur coal is far cheaper. (2) We could treat high-sulfur coal chemically before burning it. However, the technology for this is not so good. (3) We could treat the emissions after we burn it. We have developed an enormous technology, scrubbers, to do just this. (4) We can disperse the emissions with, for example, taller smokestacks. (5) We could search for alternative sources for fuel. (6) We could place power plants in different locations, so as to avoid inversions. (7) We could buffer parts of nature (e.g., lakes), although it is not clear how you could buffer a forest. And so forth.

The science involved in all these solutions is not that complicated, nor is there considerable disagreement about it. The fights over acid rain are “not so much scientific in nature as they are political and economic.” Cleaning up a lake and keeping it clean costs a lot of money. How clean do you want your lake? Insurance executives will be asking an additional question: “What has all this got to do with insurance claims?” It is clear that substantial acid rain creates property damage and some health problems. In the aggregate, acid rain may shorten at least some lives. Should not the clear-sighted insurer and the foresighted insured care about such matters? Don’t they go to the long-range bottom line?

According to Sommerville, all of the environmental problems he is worried about can be traced to a tripod of common causes: population, affluence, and technology. He states:

These environmental effects are all happening at the same time, in our lifetime, on a global scale, and not by chance, but rather because

they have a common cause—namely, the number of people on earth, the way we live, the amount of energy we use, and the way we generate the energy.

Sommerville offers no definitive solutions. He suggests, however, that capitalism can provide an answer by making environmentalism profitable. In effect, he offers a new twist on the old joke: "Where there's smoke, there's money." In addition, he presses a plea for tolerance with respect to science. Most scientific ideas go no place. There must be a population of many ideas, however, out of which a few, ultimately correct ones emerge. Thus, scientific failure is not really failure. Producing mistaken ideas is not itself a mistake.² Scientific progress results from a sort of intellectual Darwinism.

Environmental Disaster, Social History, and Learning from the Past

Rising Tide is a page-turner. Barry writes with gusto and simplicity. His prose sweeps the reader along. His is not a book to start on an evening when you have to retire early.

Obviously, flooding is an issue of single importance to property insurers. Flooding along the Mississippi River ranks up there with hurricanes as an historic source of property damage. The worst of its floods was in 1927, although there have been many others. Interestingly, that flood was in part man-made, and it had long-lasting human significance. The social significance of environmental disasters is not something that usually occupies the attention of insurance executives, but perhaps it should.

The first third of *Rising Tide* concerns U.S. social history from approximately 1850 to 1927. During that period, there was a vigorous and public controversy over the best way to control floods. Some thought that outlets (or spillways) should be used to lower the level of the river. Others thought that levees should be used to contain the river and increase its speed, thereby scouring the channel. Others thought that the river should be straightened by means of cutways through meanders, so that high water would spend less time getting to the sea. Yet others thought the combination of these three was the way to go. In the end, the Army Corps of Engineers and the Mississippi River Commission selected the levee-only approach to flood control. This was a catastrophic decision, which resulted from engineering errors, lethargy, bureaucratic rigidity, personality clashes, and the politics of the times.

The 1927 flood was several orders of magnitude bigger than any other in memory. It is impossible, argues Barry, to understand that

flood without understanding the social and political history of the period between the Civil War and the Great Depression. The financial history of the times, the struggles between the Bourbons and Klan in the Mississippi Delta region and throughout Louisiana, and the history of the interaction between railroads and plantations are of particular importance. The first third of the book also contains an unsystematic history of flooding in the Mississippi River Drainage Basin since 1850, and a chapter on the hydrology of flooding. One would not expect the purely technical chapters on engineering to be compelling, but they are.

Race relations, immigration policy, and the profound impact of Social Darwinism are all part of the story. Southern planters could not find enough domestic labor, so they attempted to import it from Italy. They treated the immigrants miserably, and so the Justice Department investigated. For this purpose, it used the first female Assistant U.S. Attorney. Political old-boyism prevented any indictments, but through the good offices of the State Department, the Italian and Austrian governments ended emigrations to southern plantations. Also, during the flood of 1912, at a levee near Greenville, Mississippi, the crew ran out of sandbags. The engineer in charge ordered several hundred African-American convicts to lie down on the top of the levee, as close together as possible. The spray from the river frequently dashed over them, and the water came up to them. The presence of their bodies prevented an overflow which might have developed into a crevasse. The men lay there for an hour and a half, until more sandbags arrived. *The New York Times* described this idea as brilliant, although the leader of the southern Bourbons in the region condemned it as inhuman.

The middle third of the book describes the flood itself and its immediate politics. The arguments over levees which had raged on for years came to a head with vengeance. Many believed that some levees needed to be dynamited in order to save some of the more valuable social assets, such as the city of New Orleans. Others observed that dynamiting the levees would endanger many lives, quite deliberately, and unfairly distribute the destruction of private property. The great financial institutions of New Orleans promised full reparation to those who suffered.

The final third of the book deals with the aftermath of the flood. President Coolidge appointed Herbert Hoover director of relief efforts. On the surface, Hoover did an impressive job leading the relief project. His activities guaranteed his nomination and election for presidency and contributed to giving him the appellation "The Great Humanitarian."

Relief efforts suffered from the maladies of the times, however. Whites refused to help do cleanup work. They classified it as beneath them. Whites received assistance which blacks did not. Refugee camps for blacks were closed sooner than those for whites. Pellagra was common among blacks and much less so among whites. New Orleans had promised reparations to those in nearby parishes who suffered when the levees were dynamited. Nobody received what he should have gotten, but blacks were treated worst of all. Obviously, Hoover alone could not have fully remedied this problem, but it is not clear that he did all he could.

The problems were overwhelming. Hundreds of thousands of acres were under water for considerable periods of times. Many structures and much personal property were destroyed. People—especially blacks—were turned out of refugee camps and sent home to work the land while there was still inches of water on it. Hundreds of people perished. Thousands upon thousands of animals died. The amount of uncompensated property damage was incredible. And after the flooding was over, droughts, insect infestations, worms, and other difficulties ruined crops.

Whole cities were battered by social and economic forces, as well as by water. New Orleans was one of the wealthiest cities in the nation before the flooding. Afterward, its banks began to fail—some of them immediately and some of them over time. The city went into decline and thereafter was smashed by the Depression.

Black voters did not immediately begin to leave the Republican Party for the Democratic Party. Indeed, the majority of blacks still voted for Hoover in 1932. However, that state of affairs did not last long, and Barry implies that Hoover's handling of the 1927 flood had something to do with it.

In response to that flood, there was a constitutional watershed, which is not taught in law school or elsewhere. After the flood, Congress enacted comprehensive flood control for the Mississippi River. Such legislation was unprecedented in two ways. First, it was the most expensive legislation of its type in history. Second, it involved unheard-of intervention by the federal government in local affairs. Nevertheless, there is no great Supreme Court decision on the matter. Apparently, the country simply recognized what had to be done.

Rising Tide is an absolutely marvelous book. The insurance industry figures in it in odd ways. For example, one of the preeminent engineers of the 19th century put together a salvage company on the Mississippi River, funded mostly by marine insurance companies. At the same time, insurance money played almost no role, apparently, in

responding to the 1927 flood. Obviously, such a thing would be inconceivable today. At the same time, the last chapter of the book briefly discusses imperfections in contemporary flood control and obviation arrangements. Improvements would be appropriate. I know of no insurance industry initiative, however, which might be relevant.

This point resurrects the general theme of this review. Insurance companies and risk managers alike would be well advised to take the long view. This imperative requires them to consider history, technology, comparative issues of governance, and the shape of the future. This is not something which should be done on a catch-as-catch-can basis.

Notes

1. Sommerville spends very little time discussing the international politics of ozone management. See R.E. Benedick, *Ozone Diplomacy* (1991).

2. There has been a good deal of interest in recent years that the interface between science and the law is a result of the upsurge of the use of expert witnesses in litigation. The legal system has seen the most intense controversies, in recent years, in the area of toxic torts. Nevertheless, the use of medical doctors as expert witnesses has a long and controversial history. See T.L. Haskell, *The Authority of Experts: Studies and History in Theory* (1984); H.B. Zobel and S.N. Rous, *Doctors and the Law: Defendants and Expert Witnesses* (1993) (written by a judge and a physician); N. Vidmar, *Medical Malpractice and the American Jury* (1995); and J.C. Mohr, *Doctors and the Law: Medical Jurisprudence in 19th-Century America* (1993). See also T.R. Forbes, *Surgeons at the Bailey: English Forensic Medicine to 1878* (1985). The use of psychological experts is similarly a matter of considerable attention. J.P. Eigen, *Witnessing Insanity: Madness and Mad-Doctors in the English Court* (1995). The interface between science and the law, of course, is much broader than the controversy over how the law should utilize expertise. See S. Jasanoff, *Science at the Bar: Law, Science, and Technology in America* (1995), and S. Goldberg, *Culture Clash: Law and Science in America* (1994).

