This collection of essays should not be mistaken for dispassionate academic inquiry. The authors pursue three aims: first, to discredit the motives of anti-biotechnology activists; second, to make a case that the use of genetically modified organisms (GMO) in agriculture is a safe and effective tool for the amelioration of hunger and economic deprivation; third, to consider what strategies might result in more GMO-friendly policies across Europe, the United States, and developing nations. Unfortunately, the earnest criticisms levied against GMO opponents apply equally well to various authors within this book, undercutting their appeals to the authority of independent science. Let Them Eat Precaution is best read as a window into the competitive effort of interested parties to outframe their opponents.

Editor Jon Entine opens the book with a scathing indictment of anti-GMO activists, "determined protesters" who use "incendiary pejoratives" and "blanket insinuation" as a "disingenuous ploy" in an "often politicized process," seeking "to apply public relations and, by proxy, financial pressures to influence the debate and public policy." This theme is picked up by Jay Byrne, who writes of "opportunistic feeders" in a "disciplined Orwellian campaign" employing "a new kind of professional activist, one who combines money and marketing with the growing influence of the Internet to sway public opinion and public acceptance ... backed by a reservoir of funding from special-interest foundations." Byrne exposes GMO activists as tools of public relations firms, hopelessly ensnared in connections to the organic food industry. But if this renders activists' arguments invalid, then woe for the authors, nearly all of whom have their own financial ties to large biotechnology corporations. Some of these ties are openly acknowledged in the book: Jay Byrne is a public relations professional who has been employed by Monsanto. Other ties are not acknowledged: Tony Gilland's Institute of Ideas organized a 2003 "Genes and Society Festival" financially supported by Pfizer and CropLife International, a federation organized by GMO corporations BASF, Bayer CropScience, Dow Agrosciences, DuPont, FMC, Monsanto, Sumitomo, and Syngenta (Institute of Ideas, 2003; CropLife International, 2006).

By itself, this is an absurd way to evaluate the merits of claims by either GMO proponents or opponents. The most that either the authors or this reviewer can reasonably conclude is that such connections of financial interest are suspicious and merit further scrutiny. Some misreading of the scientific literature is evident: for example, Entine refers to a 2004 National Academy of Sciences report that he says "concluded without equivocation that
genetically engineered crops do not pose any health risks that are not also present in conventionally produced crops.” Yet a prominently featured figure in that report displays the committee’s conclusion that the relative likelihood of unintended genetic alteration is higher for genetically engineered crops than for nonmutated conventional crops and identifies “sizeable gaps in our ability to identify compositional changes that result from genetic modification; . . . to determine the biological relevance of such changes to human health; and to devise appropriate scientific methods to predict and assess unintended adverse effects on human health” (National Research Council, 2004, pp. 4, 15). Equivocation, indeed. It is difficult to accept the authors’ review of the scientific literature at face value when pieces of that literature are misread in a direction sympathetic to the corporate interests who have funded many of the authors. That is a shame, because an impartial scientific review is crucial to policy progress.

It is in its third task that Let Them Eat Precaution shines. Robert Paarlberg, Carol Tucker Foreman, and Thomas Jefferson Hoban begin by noting the existence of highly active public relations campaigns on both sides of the GMO fray, each laying claim to “sound science.” Paarlberg and Tucker trace the current standoff in GMO policy to a decision in the 1980s that reduced government involvement in GMO research, leaving research and development to a deregulated private sector that released information in small, industry-friendly portions. Because biotech firms stand to profit from the use of GMOs, efforts to deploy such technology have united antibiotech and anticorporate interests, making opposition much more effective. The authors suggest that the most effective path to acceptance of GMO agriculture is the development of nonprofit, freely available GMO crops. When corporate profit is decoupled from agricultural progress, the hope is that anticorporate forces will drop their ideological opposition. The separation of publications on the subject from financially interested parties would, I suspect, have a similar positive effect.

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COMMITTEE ON IDENTIFYING AND ASSESSING UNINTENDED EFFECTS OF GENETICALLY ENGINEERED FOODS ON HUMAN HEALTH, NATIONAL RESEARCH COUNCIL, 2004. Safety of genetically engineered foods: Approaches to assessing unintended health effects. National Academies Press, Washington, DC.
This book begins with the premise that the process of evolution by natural selection applies to both biology and human culture. Wallace asserts: "Once we understand that evolution changes both our anatomy and our culture by the same process, we open the door to a unification of the social sciences with the biological sciences" (p. xix). Further, "Fitness, meanwhile, determines both individual and cultural survival" (p. xviii). How is a culture's fitness determined? He suggests that cultures compete in an environment with other cultures. The fittest culture is the one that "fits" the current technological environment better than other cultures.

Moreover, he suggests that just as evolution in biology is punctuated, so too is the evolution of culture. As technology changes, it triggers "circuit overload" in human culture, and problems arise. After a lag, eventually culture adjusts to fit the new technology. "In short, we invent technology, and then embrace it. We begin to adjust our way of life to the technology by creating the social software that allows us to engage effectively with the new hardware" (p. xx). He summarizes this process as a five-step process he calls FROCA—"Frontier, Release, Overexploited Opportunity, Crash, then Adaptation." In other words the new technology opens the frontier, problems ensue, and eventually cultural adaptation takes place.

After presenting his FROCA theory in part I, Wallace then fits all of human history into its framework. Part II covers from early farming to despotic civilization, part III covers from the dark ages to enlightenment, and part IV covers opening the American frontiers. Obviously, this is too much material for one book, and compressing it all can lead to oversimplification to an almost humorous extent (see Sellar and Yeatman's 1930 classic *1066 and all that*). In part V of the book, Wallace suggests that the current problems in the world, and the Middle East particularly, are a result of the clash between traditionalist cultures of the Islamic world and the new technology of the West. Wallace suggests the solution to such clashes can be either world government, which is not so good, or a "high-tech, free market capitalism" without a central authority, which is better.

This book is very well written, and at its best condenses a huge amount of world history into readable form. The FROCA process, as applied to business cycles, is useful. In business, there is often a technological breakthrough or new idea that creates new markets, then subsequent overexploitation of those market opportunities and a resulting business crash. Wallace gives a very interesting account of the history of the airline industry, and why its periods of growth in the twentieth century did not always correspond to periods of growth in the economy as a whole. Applied to other industries, such a perceptive analysis would bear many fruit. Yet applied to all of human history?
Wallace presents his FROCA process as a theory of history, but others have been there before. Marx theorized human society as shaped primarily by its mode of production or subsistence technology, with associated relations of production (or class relations). Based on this mode of production is a "superstructure" of culture and ideas. Technological change drives changes in the mode of production, which create strains in the relations of production. These strains eventually erupt in conflict between the primary classes. Finally, the class associated with the new mode of production overthrows the old ruling class, and a new epoch of history begins.

Wallace’s FROCA process is highly reminiscent of Marx’s dialectical materialism. Applied to history, it shares the same problems. First, there is the functionalist assumption of an adaptive “fit” between the mode of production and the superstructure (culture). In an organism, an adaptation helps the organism survive and reproduce in a given environment. Yet a society is not an organism. People are organisms, and each individual’s ability to learn a culture is a powerful human adaptation. But it is a mistake to think that society, therefore, is like a superperson with a culture that is adaptive. For one thing, as thinkers since John Locke (including Garrett Hardin and Mancur Olson) have taught us, what is good for the society or group as a whole is not necessarily good for the individual, and there is often a clash between the well-being of the whole and the well-being of the individuals that make up the whole. So a culture that helps the whole society function and therefore is adaptive for that society may or may not be in each individual’s interests to adopt. Thus cultural innovations (e.g., writing, literacy, mathematics) that are helpful to the group as a whole can die out and disappear in that group. Nor do societies compete as organisms do. Indeed, for much of human history and in many parts of the world, societies did not compete at all and often never encountered each other. When societies do compete, this competition is not the same as a competition between organisms. A society does not die, nor do societies go extinct as organisms do. Some individuals in a conquered society die, but most don’t. Usually, these individuals (with their cultures) are simply incorporated into the new society.

Certainly, you can describe cultural change as cultural evolution, but the process is just analogous; it is not the same as biological evolution. The functionalist analogy is obviously a seductive one—it seduced Marx and continues to seduce others to this day besides Wallace (e.g., Mesoudi, Whiten, and Laland 2004). But it is just an analogy, no more, and one of limited usefulness.

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