Letters

We welcome letters from readers, particularly commentaries that reflect upon or take issue with material we have published. The writer's name, affiliation, address, and telephone number should be included. Because of space limitations, letters are subject to abridgment.

Stuck in the Legal Quagmire

TO THE EDITOR:

Joshua Stein's "Building a Better Bureaucrat" (*Regulation*, 1995 No. 3) purports to critique my book *The Death of Common Sense* and Justice Stephen Breyer's *Breaking the Vicious Circle*. But it strikes me mainly as a platform for the writer to display ideological zeal, in Joshua Stein's case, the opportunity to conclude that "the answer probably lies in a smaller government taking on fewer and more fundamental tasks." That point, I think, has already occurred to some people.

The Death of Common Sense approaches the problems of government from a different perspective. It focuses on *how* government works, and tries to explain why the basic techniques invented in the 1960s—detailed rules, nearly endless procedures and well-meaning "rights"—practically guarantee a bad result. I deliberately avoided the ideological slugfest over what government should do, although my disdain for certain regulation is not exactly disguised.

The reason I took this approach—and I know it's bad news to some conservatives—is that most areas of regulation, say, environmental protection, or airplane safety—are here to stay. The important issue, in my view, is how to make the regulation more sensible. The point I make—which both the Right and the Left seem to have embraced, I am pleased to report—is that humans must have the opportunity to take responsibility to make sense of the situation at hand. Law can't be an instruction manual. The legal labyrinth always leads us to the wrong place, where teachers lose authority over classrooms, and factories are ordered to catch the pollution at the wrong place.

The choice that confronts us is plain. Either we continue with a system that bans individual responsibility or go to one that allows (and suffers) the vicissitudes of human judgment. I choose the latter.

This human system does not require me to trust bureaucrats any more than I must trust a chemical company to be nice and never pollute. The point is to create a system with tensions pulling at both sides, where no one has absolute power (reserving that to Congress and the courts) and where both regulator and regulated can be held accountable for reasonable implementation of public goals.

Stein quotes Ludwig von Mises for the idea that detailed rules "are essential to controlling bureaucrats." And left-wingers feel exactly the same way about the need for detailed rules to clamp down on business.

Indeed, it was this mutual mistrust that led both sides to demand a system of legal micromanagement that functions more or less like central planning. Like Mises, Stein condemns government to the rigidities of the socialist state and then complains that it works so badly. Stein, I'm afraid, lets his ideology take him back into the legal quagmire.

Philip K. Howard

A Respectful Disagreement

STEIN replies:

I respectfully disagree with Philip Howard. He disagrees with me, perhaps not as respectfully. He says I merely "purport" to critique his book, as a veil for "ideological zeal." I call it rational debate over important issues on which there is room for more than one opinion.

Howard believes that the modern regulatory state is desirable, inevitable, and immortal. I do not, even if in Howard's opinion the modern regulatory state could somehow become wiser and more flexible and thus produce better results. In my opinion, it generally cannot. Intentionally or not, Howard's book tends to support my position.

Joshua Stein

The Prevalence of Path Dependence

TO THE EDITOR:

Let me start by saying that I have some sympathy for Liebowitz and Margolis ("Policy and Path Dependence: From QWERTY to Windows 95," *Regulation*, 1995 No. 3). We have all seen the way that a good story that happens not to be true can take on a life of its own, and I realize that they are frustrated with the way that an overstated version of the QWERTY story has spread despite their efforts to stop it. That frustration does not, however, justify the hectoring and unprofessional tone of their piece or the way it misrepresents what those of us who take path dependence seriously have said.

Consider the following four propositions:

1. Small events can have large impacts on the subsequent shape of the economy (e.g., on the choice of technology or the location of production).
2. The path the economy takes as a result of early accidents sometimes turns out to be the "wrong" one, in the sense that in retrospect we wish it had gone down another road.
3. The government can usefully try to direct the economy down the "right" paths.
4. Even once the economy has gone some ways down the wrong path, the government can usefully intervene to get everyone to move to a better equilibrium.

What Liebowitz and Margolis seem to do in their article is to say that

you must either accept proposition 4—and indeed claim that it is a common situation—or reject the whole idea of path dependence. That's a false dichotomy, and a silly one.

I will make the argument here mainly in terms of the kind of path dependence I know best, which involves the location of industries rather than the choice of technologies. (And why did Liebowitz and Margolis completely ignore location? Is it because the case for path dependence is too compelling when we talk about cities rather than technologies?) Consider first proposition 1, that small events can have large consequences. There are many industries that are or have been highly concentrated in particular locations: costume jewelry in Providence, carpets in Dalton, autos in Detroit, semiconductors in Silicon Valley.

Why? In each case there is a simple, known, historical contingency that seems to have been crucial at an early stage: for example, an 18th-century Providence craftsman invented "filled" gold. Such contingencies can have persistent effects if and only if increasing returns are important. If you want to deny the importance of increasing returns, you must insist that there are hidden reasons why, despite the apparent arbitrariness of the industry's location, it had to be precisely there—in fact, that if you were to start fresh, you would put it there right now. (And you must argue that the same factors that made Providence precisely the right place to make costume jewelry in 1800 still prevail today.) In other words, you must reject a straightforward, simple story that fits the facts in favor of pure and implausible speculation. If you don't want to do that, if you think that New York is a great city in part because of the head start it was given by the Erie Canal, then you have already accepted a weak form of path dependence.

Now ask whether the economy sometimes takes the wrong path. Well, once you accept that there is some arbitrariness about where cities or industries end up, it is hard not to believe that there were sometimes other possibilities that would have turned out somewhat better. In the early stages of Chicago's growth, its position as a likely terminus for canal traffic played a large role in promoting investment; but as it turned out, canal traffic never became important; meanwhile, the site had important liabilities (marshy soil, a lake harbor that kept silting up). Are the authors sure that another site on the Great Lakes might not have turned out better for all concerned? Maybe the potential gains were small, but this is a matter of judgment rather than principle.

What is certainly true is that wrong paths are much easier to identify in hindsight. There is a big difference between believing that path dependence is pervasive in determining the location of cities and industries, and sometimes matters for technologies—a position I would defend strongly—and believing that the government should routinely try to dictate those locations and choices—a position most of the people who write about path dependence have never advocated. In other words, one can believe that path dependence is very important but also believe that intervention should be undertaken only sparingly, if at all. (I suggest that the authors reread what I actually said about policy in *Peddling Prosperity*.)

Finally, there is a also a big difference between saying that an alternative path would have been better than the one we followed and saying that we would be better off retracing our steps. Boston is probably not an ideal location for such a large concentration of universities, but it might not be worth trying to get Harvard and MIT to move to North Carolina at this point. I believe that there are cases of pure lock-in, where everyone would be better off if everyone moved, but nobody does because nobody does. (A good example of the evidence I have in mind is the way that new urban subcenters, once established, often experience explosive growth, suggesting that there was a pent-up demand.) But such cases are not crucial to the broader issue of path dependence.

One concluding point: the authors seem to think that because the economy often manages to make use of technologies that seem to be subject to network effects, those effects can never frustrate potentially valuable technologies: "We have cars and we have faxes. We found ways out of these traps." But does that mean that we have found ways out of all traps? Perhaps more important, does it mean that we found our way out of those traps as quickly as we should have? Think of Apple's defiant slogan, "Windows 95 is Macintosh '89". Should we congratulate ourselves on finally having moved to a graphical interface, or should we wonder why it took so long, in an industry where six years is the equivalent of several generations anywhere else?

Paul Krugman
Professor of Economics
Stanford University

Academic Scribblers Leave Paper Trails

LIEBOWITZ and MARGOLIS reply:

Let us start by saying that we have some sympathy for Professor Krugman's impulse to fight false, silly dichotomies. The dichotomy he is fighting this time, however, is entirely his own creation.

It has never been our position that the possibility of government remediation of old errors is necessary for the very existence of path dependence. Quite to the contrary, our *Journal of Law, Economics and Organization* article (cited in our *Regulation* piece) carefully distinguishes among different kinds of path dependence. As we point out in that piece, in its weak forms, path dependence is often manifest in choices of technology or locations that may later turn out to be inappropriate. Krugman's examples of industrial location are of this weak form. Our key point about these kinds of path dependence is that they are not examples of market failure, but at worst, the simple consequences of imperfect knowledge. As we emphasize in our *Regulation* article, "Certainly one thing does lead to another, sometimes in ways that are surprising or intriguing. Discovering that interconnectedness is much of what science is about."

Of greatest interest to us in our *Regulation* piece are instances of a third type of path dependence in which a superior choice is not taken even though it is worthwhile switching paths to get there, and even though individuals know that

it would be worthwhile. This is the only type of path dependence that raises the specter of market failure. And this is also the form of path dependence that is the focus of Brian Arthur, Paul David, and other leading authors in this literature, as can be seen in their examples. The usual (incorrect) telling of the QWERTY story argues that it would be worthwhile switching keyboards now, as it was in the 1930s. These are not just ex post regrets, but current errors. Also, the lesson that Arthur draws from his table, as reproduced in our *Regulation* article, is that a market chooses the wrong path even though the mistake would be evident at the time decisions are being made. The usual allegation in the Beta-VHS story is not that we discovered 10 years too late that Beta was better, but rather that Beta was known to be better even when VHS was displacing it. The claim in the Macintosh-IBM story reprised by Krugman is not that we discovered too late that Macintosh was better, but rather that we always knew (or should have) that it was better. (Actually, this story neglects the fact that the comparatively primitive computer hardware of the 1980s was better suited to the primitive but nondemanding nongraphical interface than it was to the more demanding graphical interfaces. By the time the hardware had sufficient power, Windows was good enough to make the switch to Macintosh unnecessary.)

Krugman claims that the current, serious peddlers of path dependence "have never advocated" that the government get involved even in cases of this last type of path dependence. Fortunately, academic scribblers leave trails. Contrary to his claim, serious economists have not been shy about drawing policy conclusions or alleging market failure within the "economics of QWERTY." The most visible instance is the White Paper on Microsoft, which bears the names of Brian Arthur and Garth Saloner, two of the leaders in the field, and both colleagues of Krugman at Stanford. Calls for government intervention abound, even in strictly academic writing. For example, listen to Brian Arthur: "But where competing technologies show increasing returns to adoption, the 'fittest' of the technologies may not survive. The government may then need to step in, to encourage and protect infant technologies that, if sufficiently adopted and developed, may pay off handsomely." *(Options)*.

And here's Paul David: "While it does, therefore, require some rather exacting circumstances for an inefficient technological system, or a technically inferior standard to become historically 'locked-in,' this analytical conclusion cannot warrant taking comfort in a belief that those conditions obtain only rarely in the experience of real industries . . . . Public agencies may have to intervene to *mitigate the tendency of market competition relentlessly to lock the system into 'wrong' standards*" (italics in original) ("New Standards for the Economics of Standardization").

Indeed, here's Krugman himself: "What conservatives believe in, above all, is the effectiveness of free markets as ways to organize economic activity. . . . But what if the collective result of those free choices is to lock in a bad result? What if we end up stuck with an inferior technology, or with an industry in the middle of a congested metropolis when it might function better in a new location? And what if another country manages, with a little timely government intervention, to "lock in" an advantage in some major industry—and thereby lock us out? No, the story of the QWERTY keyboard is not just a cute piece of trivia . . . it is a parable that opens our eyes to a whole different way of thinking about economics . . . . It asserts that the outcome of market competition often depends crucially on historical accident. . . . And this conclusion is fraught with political implications, because a sophisticated government may try to make sure that the accidents of history run the way it wants" (*Peddling Prosperity*). In fairness to Krugman, he does criticize "strategic traders." But his criticism is only that government tools are not yet sophisticated enough to fix the problems of path dependence. He doesn't doubt that there are path dependence problems to be fixed.

Krugman's position is that there are many QWERTY market failures, but we should be careful about trying to fix them. Our position, which is quite different, is that there are no known instances of QWERTY market failures, so there is not anything to fix.

As to our professionalism, the reader is our judge. But if Krugman considers our "tone" to be unprofessional, what must he think of researchers who continue to use a story that they know to be false so as to prop up a theory that apparently cannot stand on its own?

Stan Liebowitz
Professor of Economics
University of Texas, Dallas

Stephen E. Margolis
Professor of Economics
North Carolina State University

Clearing the Air

TO THE EDITOR:

In "Secondhand Smoke: Facts and Fantasy" (*Regulation*, 1995 No. 3), W. Kip Viscusi would have us believe that restricting public smoking is regulation for regulation's sake. Nothing could be further from the truth. Tobacco harms others in addition to those who smoke it. There are only 16 pollutants the Environmental Protection Agency (EPA) classifies as Group A carcinogens, and environmental tobacco smoke (ETS)—more commonly called secondhand smoke—is there among radon, benzene, and asbestos. As a single cause of death, deaths of nonsmokers from exposure to ETS is the third leading cause of preventable deaths in the nation, behind only smoking itself and alcohol use.

If critics think regulations shouldn't help reduce such a major, known health hazard, they are little better than ideological anarchists. Who should the public trust more to protect its health—tobacco firms or elected government?

Specifically, I'd like to address three areas of Viscusi's argument: his criticism of the scientific studies, his reliance on an economic model, and the broader question of how to make responsible public policy.

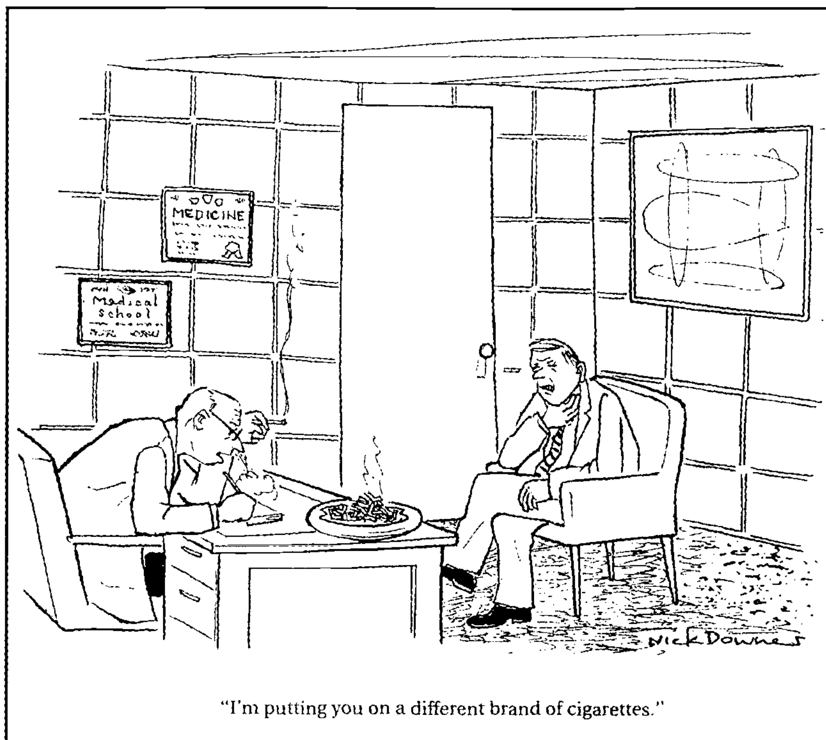
First, Viscusi's attempt to debunk the scientific studies is like John McEnroe sitting in the broadcast booth calling the World Series. Viscusi is an economist, not an epidemiologist, and yet he has taken on virtually the entire U.S. scientific and public health establishment.

Like him, I am neither a scientist nor an epidemiologist, and so I leave it to those whose training and independence qualify them to judge whether the evidence is strong enough to establish a causal link between secondhand smoke and lung cancer. And according to the scientists and epidemiologists at the EPA—and a committee of independent reviewers—the connection was strong enough in 1992 to classify ETS as a known human carcinogen.

Viscusi takes issue with the studies on which that determination was based, but in the years since, several additional major U.S. studies that take into account many of his concerns have confirmed and strengthened the conclusion. In particular, a 1994 study of women in two California and three southern cities is the largest case-control study ever conducted and is considered by the EPA to be the best-designed study yet completed on secondhand smoke and lung cancer. It found that the risk of lung cancer significantly increased with exposure to ETS, and the findings were important because women were exposed not only to smoking in their homes but also in their workplaces and social situations. Furthermore, this study controlled for diet and other factors that could have increased the incidence of lung cancer, concluding: "These observations indicate that the strong association in this study between adult secondhand smoke exposure and lung cancer risk cannot be attributed to any likely confounder [other specific influencing factor]."

Second, by placing his discussion within a purely economic framework, Viscusi misses the entire point of restricting smoking: people become ill, existing illness worsens, and some people even die from breathing the pollutants smokers and burning cigarettes spew into the air. In all, as many as 50,000 Americans die each year because of *other* people's unhealthy habit.

Viscusi acknowledges this and seems to agree that some restrictions may be necessary, but he would like to see any proposed restrictions pass a cost-benefit test. Sounds good in theory: if the costs outweigh the benefits, then the regulation must not be implemented.



"I'm putting you on a different brand of cigarettes."

But who does the counting? Since corporations control cost data and no one has good benefit data, cost-benefit analysis can be about as objective as literacy tests in the Old South.

Sorry to throw a wrench into the works, but social policy doesn't fit comfortably into a mathematical model. To start with, it's impossible to assign a dollar value to an intangible benefit like saving lives. But it's also difficult to precisely pinpoint costs. Viscusi inadvertently proves this point with his labored attempt to place an $11 billion value on the enjoyment smokers lose when smoking is restricted. But these aren't real dollars that anyone pulls out of their pocket. So where's the cost? And even if, for mathematical modeling's sake, one wanted to accept a construction like this, half the equation is missing. Where is the calculation of the enjoyment nonsmokers lose when they are subjected to smoke-polluted air? And shouldn't their lost welfare be multiplied by a factor that gives value to the fact that their lost enjoyment is involuntary?

Public officials have a responsibility to protect those who persist to smoke even in the face of overwhelming evidence that they endanger not only themselves but those around them. As the public advocate for New York City and the former consumer affairs commissioner, I am proud to have supported one of the strongest indoor air laws in the country restricting public smoking.

Mark Green
Public Advocate
City of New York

The True Task of a Public Advocate

VISCUSI replies:

Mark Green begins with a claim with which we both agree: cigarette smoking poses a truly substantial risk. Where we part company is with respect to the magnitude of the risk from ETS. In his view, 50,000 people per year are killed by ETS, which is more than the annual death toll from automobile accidents. If this mass carnage were in fact true, we would have very little difficulty in demonstrating this risk. However, for 10 of the 11 studies cited by OSHA to justify the regulation, the risks were not statistically significant. Moreover, statistical significance only suggests

that the risks are not zero—not that they are large. The fact that cigarette smoke is a carcinogen does not mean that any regulation, however costly, is justified. We do not, for example, take action against the natural carcinogens in basil, potatoes, or yogurt. Yet Green would have us abandon all tradeoffs in our quest to eliminate ETS.

Somewhat surprisingly, Green suggests that I should not even comment upon the science. However, science has been inextricably linked to all of my pursuits, ranging from my current membership on two U.S. EPA science advisory boards and being a consultant/reviewer for the EPA on a recent ETS study. Many of the controversies surrounding the ETS studies involve statistical issues for which epidemiologists do not have unique or, in many cases, particularly sophisticated expertise. To attempt to exclude from participation in a public debate people who are not certified members of some professional priesthood is an odd position for an avowed public advocate to take. I, for example, welcome Green's attempt to comment on the economics of the proposed rule, even though he is not a card-carrying economist.

Unfortunately, Green's economics does not earn a passing grade. He resists cost-benefit analysis of ETS because "corporations control cost data." However, the main cost that was omitted by OSHA is not a cost to corporations, but a cost to smokers. I calculated this cost figure—$11 billion—in my article. Moreover, the other key cost—the cost to every workplace in the country that will be required to either ban smoking or install a smoking lounge—is not cost information held in secrecy by tobacco companies. This kind of cost can be readily calculated. Indeed, I have done so as a consultant for past analyses that served as the foundation for OSHA's regulatory impact analyses. Quite simply, cost assessments are routine. However, OSHA ignored these costs as well, including zero cost as a possible cost figure.

Green's complaint that "no one has good benefit data" seems particularly odd and inconsistent with his view that ETS kills 50,000 people annually. I agree with his ultimate conclusion that these data are not good, but I do not think that casting doubt on the ETS risk data was his intent.

The only remaining obstacle to cost-benefit analysis is that in his view "it's impossible to assign a dollar value to an intangible benefit like saving lives." However, I have spent the better part of my academic career developing these value-of-life estimates, which are now used throughout the federal government. The basic idea is that what matters is society's willingness to pay to reduce the risk, which is a magnitude we can deduce from observed risk tradeoffs that people make, such as those involving risky jobs.

Green concludes that his obligations as a public advocate have led him to support smoking bans. However, the public includes smokers as well as nonsmokers. Green would seek to disenfranchise smokers who constitute more than one-fourth of the adult population. The true task of a public advocate is to reflect the interests of all citizens and to balance the competing concerns. Green denies that there are any tradeoffs in his single-minded zeal to advance his own conception of the public interest.

W. Kip Viscusi
Professor of Economics
Duke University

Commercialized Nicotine Addiction

TO THE EDITOR:

The opinions expressed by W. Kip Viscusi in his article entitled "Secondhand Smoke: Facts and Fantasy" (*Regulation*, 1995 No. 3) show ignorance of the scientific data that underlie the clear fact that environmental tobacco smoke (ETS) causes disease and, in particular, is a cause of human lung cancer. His article also misrepresents the process by which public health risks are assessed and managed. Not only does he cynically emphasize the purported economic benefits of shortened life, but he naively assumes that free-market forces can resolve what is a massive public health issue in which premature loss of life is perpetuated through commercialized nicotine addiction.

After long and careful deliberation, the Environmental Protection Agency (EPA) in 1993 concluded that ETS was a Class A, confirmed human carcinogen. That was old news to the scientific community. Some eight years earlier, at a time when research results were much less extensive, the U.S. Surgeon General, the National Academy of Sciences, and the World Health Organization's International Agency for Research against Cancer reached the same conclusion. The EPA pronouncement was based on 33 studies of lung-cancer frequency in the nonsmoking spouses of cigarette smokers, 27 showing increased risk, nine being sufficiently large to achieve statistical significance. All 21 studies in which levels of spousal smoking were recorded showed increasing risk with increasing exposure, 10 at statistically significant levels.

This degree of epidemiologic consistency is most persuasive, especially given the great diversity in study designs, methods, and geographic locations; the relative crudeness of ETS exposure measures; and the anticipated low power of individual studies. The conclusion of carcinogenicity, however, is made all the stronger by the knowledge that both mainstream and sidestream tobacco smoke contain at least 42 known carcinogens and that the chemicals contained in ETS are clearly absorbed by exposed nonsmokers. The observed increase in risk of lung cancer (about 20 percent) corresponds closely to what is predicted by the experience of active smokers after adjustment is made for smoke dilution.

The cardiovascular effects of ETS exposure are more difficult to estimate, as one would expect from the fact that in active smokers the increase in cardiovascular risk is substantially lower than the increase in lung-cancer risk. However, consistency in epidemiologic findings, again coupled with toxicologic data and with the analogy of risks in active smokers, makes it likely that such effects are real. Health risks from ETS exposure are also highly evident in the form of acute and chronic respiratory illnesses in children.

The scientific basis for regulating ETS exposure is therefore well established. That such regulation,

in Viscusi's words, will "reduce the welfare of smokers" by restricting their freedom to smoke is an unfortunate assertion. Most adult smokers are heavily addicted to nicotine—it being addiction, not choice, that keeps them smoking—and hence their welfare is reduced. From that addiction comes the public health tragedy: that one of every two smokers who is unable to quit smoking will die prematurely from the habit; that mortality from such continued nicotine addiction dwarfs most other health hazards in developed countries; that exposure to cigarette smoke at present kills more Americans each year than AIDS, alcohol, motor vehicle injuries, homicide, suicide, and all illicit drugs combined.

The origin of the addiction that eventually has this appalling effect on the "welfare" of smokers lies in the social forces that cause children and adolescents to begin smoking in the first place. Any restrictions imposed by society on active smoking, including regulation of ETS exposure, send a clear public message to young people that smoking is socially undesirable, let alone unhealthy. It is no wonder that public health progress towards such social change is vigorously opposed by tobacco companies, ostensibly in the name of smokers' rights and "welfare," but ultimately in defense of a lucrative, addiction-based market.

Economic arguments, such as Viscusi advances, in favor of a continued free market for tobacco commerce, greatly distort the process of risk-benefit analysis by ignoring the health consequences of nicotine addiction. The cancer risks posed by ETS exposure cannot be compared with those associated with chlorination of drinking water without recognizing the far-reaching benefits that chlorination brings for the prevention of epidemic infections. No such benefits attend tobacco use and ETS exposure, and certainly not the illusory concept of smokers' "welfare." The disease consequences of tobacco use, ultimately measured in the loss of productive human life, make up the entire risk-benefit picture, unbalanced by concrete benefits. To say then that the money saved by premature tobacco mortality (retirement pensions not paid, elderly medical care avoided, etc.) is beneficial is to deny the very value of human life. Our society deserves a far better recognition of real costs and benefits.

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Bootleggers and Baptists

TO THE EDITOR:

Reviewing *The Causes and Consequences of Antitrust: The Public-Choice Perspective*, edited by Fred McChesney and William Shughart ("Self-Interest or Surfboarding?" *Regulation*, 1995 No. 3), Donald Baker objects to the argument that antitrust regulation is motivated by rent-seeking interest groups. The opinion of a respected former antitrust enforcer such as Baker should be taken seriously. However, in this case, Baker's objections to the public-choice explanation of antitrust are unpersuasive.

Baker has derived his conclusion that antitrust is largely intended to serve public-interest goals from his personal experience. But Baker draws his conclusion too quickly. Rent seekers aren't sinister-looking comic-book creatures with $$$$$ dripping from their pockets as they haunt bureaucratic corridors demanding anti-social favors. Rent-seekers and rent-seeking are often difficult to spot if you don't know what you're looking for. The rent-seeker who warns in somber tones that a proposed merger will devastate consumers, workers, suppliers, mom, apple pie, and the very ability of America to feed its people in the 21st century has a public-relations advantage over rent-seekers who simply but honestly say, "Protect me from competition so that I can get richer." And particularly in a complex area such as antitrust—where reasonable people often sincerely disagree about the competitive significance of this or that activity—it is easy to find (or concoct) public-interest rationales for almost any policy proposal.

Complicating matters is the phenomenon my colleague Bruce Yandle calls "bootleggers and Baptists" ("Bootleggers and Baptists—The Education of a Regulatory Economist," *Regulation*, May/June 1983). Writing about his own experience as an antitrust enforcer at the Federal Trade Commission, Yandle points out that rent-seekers are to well-meaning social engineers what bootleggers are to Baptists. Bootleggers profit from alcohol prohibition; but bootleggers as such don't lobby for prohibition. Instead, bootleggers remain silent as the sincere Baptists make the ethical and political case for prohibition. Once the Baptists win the day politically, bootleggers work behind the scenes milking the prohibition law for all the rents it is worth.

Antitrust's analogue to bootleggers are firms that use antitrust to stifle competition (say, by suing to prevent an efficiency-enhancing merger among rivals). Antitrust's analogue to Baptists are sincere scholars, journalists, and citizens who mistakenly believe that large size and marketplace success are species of monopolization. Antitrust researchers tuned in exclusively to the rhetoric used to defend antitrust will hear only the antitrust "Baptists."

This rhetoric is singularly uninformative about both the causes and consequences of antitrust. Baker's claim that antitrust statutes enjoyed sufficient public support to be enacted is true by definition. But Baker wrongly suggests that this support (such as it was) spontaneously coalesced. Much of the evidence presented in the McChesney-Shughart volume shows that the forces pressing for antitrust legislation originated with producers who were annoyed with the new methods of vigorous competition that emerged during the half-century following the Civil War. And even more evidence is presented showing that the manner in which antitrust statutes are enforced promotes producer interests rather than the public interest. Quite frankly, the evidence contradicts Baker's "surfboarding" theory, in which "big political waves create opportunities for those who are willing to plan and lead, because the big waves tend to

override the normal constituency-service tradition that protects competitors from competition." The first century of antitrust was overwhelmingly dominated by so-called constituency service. Sadly, there is every reason to expect that antitrust's second century will likewise be dominated by such "service."

Fred McChesney and Bill Shughart have compiled a book with systematic theory and evidence showing that antitrust is a creature of interest-group politics. Baker's skepticism to the contrary, the intellectual burden is now on those who cling to the fiction that antitrust laws are meant to promote the public welfare.

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Clemson University
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Competitive Enterprise Institute

Self-Interest Drives Antitrust

TO THE EDITOR:

The main theme of Donald Baker's review of *The Causes and Consequences of Antitrust*, edited by Fred McChesney and Bill Shughart, is the old canard that social scientists cannot credibly comment on activities they have not directly participated in. Specifically, he faults the editors—academic economists with experience at the FTC and as private antitrust consultants—for not having spent more time on *his* career track as an antitrust "enforcer." He tends to base his criticisms of some very sophisticated research on the simplistic notion that he "was there" and didn't really notice all that much self-interest in the government, so it must not have occurred.

Well, one does not have to have known Thomas Jefferson personally to understand that he was a great man, or suffer from cancer to know that it is a terrible disease. Indeed, one of the virtues of the methods of social science is that they enable researchers to see more than the kind of myopic view that Baker apparently had while serving as an antitrust "enforcer" in the Antitrust Division of the Justice Department.

Without offering any evidence or citing any research, Baker dismisses the essays in the book by the antitrust "abolitionists," including myself, as based on a "simplistic" view of history. But these essays contain original historical research on what actually occurred at the time the major antitrust laws were being enacted. In contrast, Baker's views are based on not a shred of evidence or a single citation of an academic study, but on a recitation of the old fairy tale that antitrust regulation was a selfless, public-spirited response to market failure. That's what I would call simplistic and simple minded.

If Baker had actually read these essays, he would not have made the statement that there "has never been a specific political constituency in favor of general antitrust laws." Yes there has: Congress. As Baker himself recounts, the explosion of antitrust regulation that occurred in the 1970s was a response to the rising rates of inflation (caused, of course, by the government's own monetary policy). Congress—the narrowest and most effective special interest of all—used stricter enforcement of antitrust laws as a means of trying to divert the public's attention away from the real culprit—the federal government itself.

This has always been the case with antitrust. In an article of mine that was not included in the McChesney-Shughart volume ("The Origins of Antitrust," *International Review of Law and Economics*, December 1984), I explained how the 1890 Sherman Act was essentially a "fig leaf" for the McKinley Tariff, which was passed just four months after the Sherman Act and was sponsored by none other than Senator Sherman himself. The idea was to blame the "trusts" for the "monopoly problem," while pandering to protectionist business interests, thereby creating a genuine monopoly problem. As I showed in the article, the trusts were singled out by Senator Sherman and his associates for cutting their prices more sharply and expanding output more rapidly than the rest of the economy during the decade prior to the Sherman Act. In other words, the Sherman Act targeted the most competitive industries in America for regulatory harassment. This fraud was exposed by the *New York Times*, which labeled the tariff bill the "campaign contributors' tariff bill." The special-interest beneficiaries of the whole scheme were Congress itself and the "favored manufacturers," as the *Times* called them, who actually wrote the tariff bill for Senator Sherman.

Baker's example of the AT&T case as evidence of enlightened antitrust enforcement is disingenuous. It was government regulation that created the telephone monopoly in the first place during a time when there was vigorous competition, as described by Adam Thierer in the Fall 1995 issue of the *Cato Journal*. Is this really the best defense Baker can make for antitrust—undoing the damage that other government bodies have done? If so, then government is even more of a Rube Goldberg machine than I ever imagined.

Baker's concluding statement that the Antitrust Division does not negatively affect entry or output is simply ridiculous. What in the world would he call the recent decision to prohibit Microsoft from purchasing a financial software company that even with the help of Microsoft's resources would still have had only a tiny share of that market? I call the decision what it is: a barrier to entry contrived by special interests (i.e., Microsoft's competitors) and enforced by the Antitrust Division. Indeed, the entire episode of antitrust harassment of Microsoft—including the charade of six *anonymous* plaintiffs—is a case study of how antitrust regulation is *inherently* guided by self-interested politics.

Thomas J. DiLorenzo
Professor of Economics
Loyola University
Adjunct Scholar
Cato Institute

Benefits of Antitrust

BAKER replies:

I will confine myself—but with difficulty—to only two points in responding to the rhetoric of these two contributors to the McChesney-Shughart collection. I simply read history very differently than they do.

As to Boudreaux, I am struck by his bold assertion that "the intellectual burden is now on those who cling to the fiction that antitrust laws are meant to promote the public welfare." If Boudreaux were to compare consumer purchasing power in the United States with other leading industrial countries, he would find that the U.S. consumer is better off than all his foreign counterparts. He would also find that the United States has historically had the strongest antitrust laws, the highest level of public expenditure on antitrust enforcement, and the most active private enforcement program anywhere in the world. The "intellectual burden," it seems to me, is on those who cling to the fiction that antitrust law and enforcement has nothing to do with these favorable consumer results.

As to DiLorenzo, I am stunned by his reference to "Congress—the narrowest and most effective special interest of all." What is his definition of a "special interest"? Somebody who votes for a policy that he doesn't like? Somebody who votes for a policy because it will be generally popular back in his district? DiLorenzo's approach has a wonderful Humpty Dumpty quality about it and amounts to a broad-brush rejection of representative democracy as the Founding Fathers contemplated it. For me, "special interest" has to mean some individual or group that is getting a specific benefit at the expense of the broader public. A "special interest" is classically illustrated by those who seek and often get statutory antitrust exemptions to take care of their own arrangements—such as for insurance company agreements, football telecasting agreements, newspaper cartels, or for doctors' alliances (as provided in the current budget reconciliation act).

The idea that the Congress—which enacted the Sherman Act almost unanimously (with but one dissenting vote in the Senate)—was the "narrowest and most effective special interest of all" will not survive even a casual reading of the chorus of newspaper editorials of the day. Boudreaux and DiLorenzo suggest (in their essay in the McChesney-Shughart volume) that the enactment of the Sherman Act reflected the concern of Missouri's farmers and butchers about the rise of the big Chicago meat-packing companies. They add that it also "might have been a political smoke screen to pave the way for the McKinley tariff." The McKinley Tariff was not a unanimous issue, and one doubts that congressmen from importing areas would have all cheerfully voted for a "smoke screen" to help their protectionist brethren. More importantly, the McKinley Tariff is long gone—while the Sherman Act is still here, and, as a result of the 1974 felony amendments, is a lot stronger than whatever "smoke screen" Congress passed in 1890.

Donald I. Baker
Baker and Miller PLLC

Bitter Harvest for Environment

TO THE EDITOR:

James Bovard's article, "The 1995 Farm Bill Follies" (*Regulation*, 1995 No. 3) does a nice job detailing the fiscal contradictions embodied in many of the agricultural price-support programs. In the area of reforming federal agriculture programs, environmentalists, conservatives, and libertarians are finding more in common than ever before.

Many farm programs are imposing significant costs by degrading the environment. Bovard actually underestimates the costs of the agricultural subsidies in his analysis. In addition to the ongoing costs of the programs, they are burdening future citizens with the costs of repairing the damage. The federal sugar program is a good example. As Bovard points out, this "sweet deal" hurts consumers by providing a system of restrictions on sugar imports and price supports that artificially doubles the price of domestic raw sugar. The program has also spurred fertilizer-intensive sugar cane cultivation, basically subsidizing pollution.

The sugar program has caused serious disruptions to ecosystems like the Florida Everglades. In fact, current estimates by the state reveal that it will cost roughly $360 million to clean up the polluted runoff from sugar-cane plantations. In the meantime, the Everglades National Park has lost 90 percent of its nesting bird population.

The peanut program is another illustration of bureaucracy buttering up big business and bludgeoning the environment. Price supports (almost double the world price) coupled with a poundage-quota system encourage farmers to employ agricultural practices that are not environmentally sound. Peanuts now use more fungicides on a pound-per-acre basis than any other crop. Since the peanut program was enacted, application of fungicides has risen 42 percent, fostering increased hazards to human health, wildlife, and water quality.

Generally speaking, agricultural support programs pad the wallets of large corporate agribusinesses, rather than helping small, cooperative businesses and family farms based on organic or alternative agriculture. As a conservative conservationist, I am troubled by the subsidization of financially secure, large corporations that use intense energy and chemical inputs along with other environmentally harmful practices. The current system forces taxpayers to pay twice—once to underwrite the crops and once again to address and clean up the environmental damage. Kudos to Bovard for his endorsement of cutting wasteful and environmentally harmful federal spending. Now if only our politicians had the courage to make it happen.

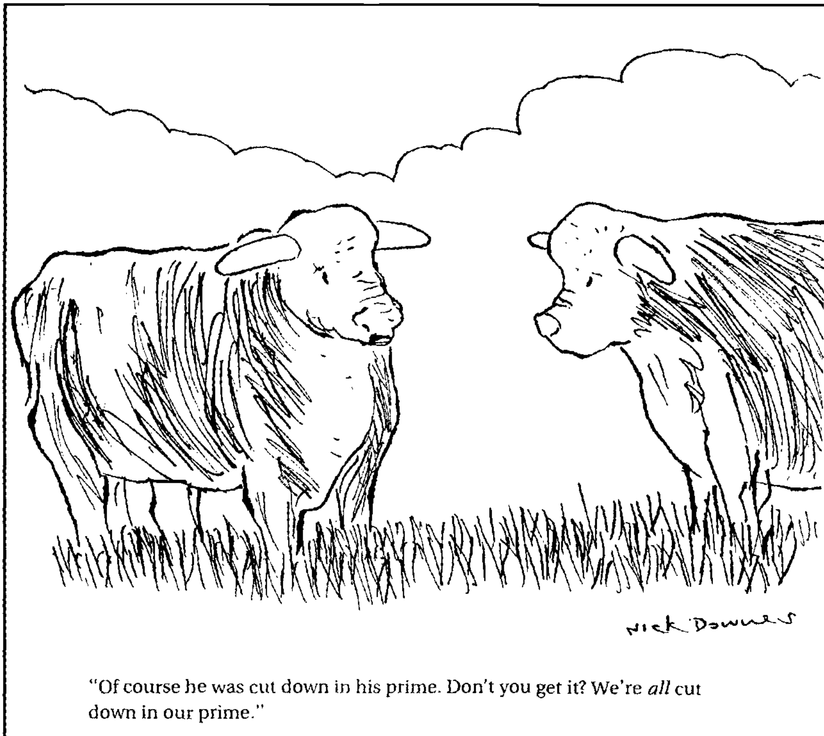
Courtney Cuff
Appropriations and Tax Policy Associate
Friends of the Earth

Garbage in, Garbage out

TO THE EDITOR:

James Bovard's outrageous comments on U.S. sugar policy in "The 1995 Farm Bill Follies" (*Regulation*, 1995 No. 3) are an absolute injustice to the truth. His numerous assumptions are often wrong, and the data he cites are dated and frequently flawed. Garbage in—garbage out.

Let's review of one of the farm programs he maligns—the sugar policy that operates at no cost to the federal government, helps



"Of course he was cut down in his prime. Don't you get it? We're *all* cut down in our prime."

reduce the federal budget deficit, benefits American consumers, responds to unfair foreign subsidies, provides 420,000 direct and indirect jobs, and generates $26.4 billion a year in positive economic activity for the country.

Sugar is an essential ingredient in the food supply of over 250 million Americans, and the United States is one of the largest users of nutritive sweeteners in the world (19 million tons a year). We are not self-sufficient in sugar and sweetener production, so we import at least 14 percent of our sugar needs from foreign suppliers. U.S. consumers enjoy a reliable supply at stable and fair prices. In fact, they pay 28 percent less on average for sugar than consumers in other developed countries.

Bovard dipped back farther than even the much-maligned 1993 General Accounting Office (GAO) study to come up with what he says are "consumer costs" of U.S. sugar policy. The 1993 GAO study, which was criticized by Department of Agriculture under-secretary Gene Moos as being "flawed," as well as the earlier study assume that all of the sweetener used in the United States could be purchased on the highly volatile world market without the price going up even a penny. That's absurd. The studies also contend that the mythical "savings" from buying on the world market would be passed back to the consumers by the large food and candy conglomerates that buy 80 percent of all the sweeteners. That, too is absurd. The truth of the matter is this: the whole "consumer" debate over sugar policy is an attempt by the big sweetener users to take money from our family farmers to add to their already healthy profits and send our jobs overseas.

Most economists, policymakers, and editorial writers believe that the most efficient farmers in the world are the ones who should produce for the marketplace; so does the American Sugar Alliance. American sugar farmers are among the most efficient in the world. Half of the sugar produced in the world is produced at a higher cost than in the United States. That's right—even with our higher health, safety, social, and environmental regulations, our sugar farmers produce at a lower cost than the world average. In an ideal world of no government intervention in the sugar industries worldwide, and farmers competing against farmers, we would do just fine without a sugar program. But that is not the world we live in. Our efficient farmers have to compete against the policies and treasuries of foreign countries. Virtually every foreign government intervenes in the sugar market to provide a reliable supply for the country's consumers and price stability for its producers. Many less-efficient foreign producers are subsidized, and any surplus sugar production is dumped on the world market for whatever price it can command.

Our farmers should not be expected to compete with such unfair trade practices. When President Reagan proposed in 1986 that all trade-distorting agricultural subsidies be eliminated, the U.S. sugar industry endorsed that proposal wholeheartedly. We still do, and have asked that such a proposal be written into the language of the new farm bill—as other countries reduce or do away with their sugar subsidies and trade barriers, we will phase out our sugar program. To surrender our comparative advantage and unilaterally disarm our own farmers before others take positive steps is to eliminate the very tool we can use to bring about fair trade.

The United States imports at least 14 percent of its sugar needs each year from 41 countries. Those countries are paid the same price for their sugar as American farmers receive. Contrary to what Bovard alleges, U.S. sugar policy has the wholehearted support of Caribbean Basin Initiative countries, such as the Philippines, the African countries, and others.

Since 1985, U.S. sugar policy has been legally mandated to operate at no cost to the federal government. The industry was well ahead of its time in its efforts to maintain a program at no cost to the taxpayers. In fact, since 1991, sugar farmers have paid a special marketing tax to the U.S. Treasury on every pound of sugar sold—for the sole purpose of helping to reduce the federal deficit. Both the Senate and the House propose substantial increases (25 percent and 36.4 percent, respectively) in the marketing tax, which is expected to bring in between $295 million (Senate) to $322 million (House) over the next seven years. This money is taken from farmers to pay for other government programs. The sugar program gets an A+ for being fiscally responsible.

Journalists frequently refer to "sugar subsidies" when referring to U.S. sugar policy. But the fact is, there are no—repeat, no—subsidies involved in U.S. sugar policy. What is involved is a simple loan program. Processors may be eligible for Commodity Credit Corporation loans so that they can pay farmers for their crops—sugar cane or sugar beets—after harvest. The processors can borrow, with interest, loans based on 18¢ a pound raw value for sugar cane, and a proportionate amount for sugar beets. The processors must then repay the loans with interest within nine months.

Under provisions being considered as farm bill legislation, these loans to processors would break with tradition and be "recourse" loans when imports are kept at the GATT-required minimum level. With a recourse loan, the borrower can no longer simply forfeit the commodity used as collateral in order to pay off the loan. If the price of sugar drops below the loan level, the processor cannot "turn in" the sugar used as collateral and have the loan paid off. That means, effectively, that there would no longer be any safety net or floor under the price of sugar, as long as imports are at a specified level. That puts farmers at even more increased risk.

Sugar policy provisions in both the Senate and the House propose additional reforms—such as total elimination of domestic marketing controls. That would mean that there would be no limit on domestic production or marketing of sugar. That would substantially increase the risk for producers and push domestic sugar prices down to market-clearing levels regardless of the loan rate.

Knowing the facts about farm programs is the only way to judge them.

Luther Markwart
Chairman
American Sugar Alliance

Long on Adjectives, Short on Facts

BOVARD replies:

Luther Markwart's response to my article is long on adjectives and short on facts. Markwart claims that American consumers "pay 28 percent less on average for sugar than consumers in other developed countries." Many other industrial nations also protect their sweetener industries. Does the fact that the European Community allows European sugar farmers to plunder European consumers prove that U.S. sugar producers are entitled to abuse American consumers?

Markwart refers to the "much-maligned GAO study of 1993." The main groups that have maligned that study are the sugar and sweetener industries and their lackeys in the Agriculture Department and on Capitol Hill. Markwart is correct that Gene Moos called the study "flawed," but did not mention that Moos—proving himself a hero to the sugar lobby—asserted that the program could actually save consumers money. This is USDA logic at its best—claiming that the agency serves the public by driving food prices to double the world market prices. I would wager heavily that USDA employees in their own personal shopping do not seek out grocery stores that charge double other stores' prices, simply to make themselves feel rich.

The sugar program skews law enforcement priorities. Federal import restrictions make sugar smuggling immensely profitable. The Justice Department caught 30 companies in a major sting operation named Operation Bittersweet. Federal prosecutors were proud that the crackdown netted $16 million in fines for the government—less than one-tenth of 1 percent of what the sugar program cost American consumers in recent years. The Justice Department was more worried about businessmen bringing in cheap foreign sugar than about the sugar lobby bribing congressmen to extort billions of dollars from consumers.

Markwart states that "half of the sugar produced in the world is produced at a higher cost than in the United States." The only thing that this proves is that some other governments have sugar policies as foolish or more foolish than does the United States.

Markwart claims that "in an ideal world of no government intervention . . . we would do just fine without a program." The sugar lobby, by clamoring for handouts or high tariff protection for the last 180 years, has made sure that no such "ideal world" exists.

Markwart claims that "there are no—repeat, no—subsidies involved in U.S. sugar policy." Then perhaps it is mere coincidence that the price of sugar in the United States is double the world sugar price, and has been as high as five times the world sugar price in the past decade. The U.S. government, in a 1989 GATT negotiating paper, declared: "A subsidy is any government action or combination of government actions which confers a benefit on the recipient firm(s)." The import quota on sugar creates an artificial scarcity which, combined with federal sugar price supports, allows sugar growers to charge far higher prices. If there are no subsidies, then why does the sugar lobby bother deluging congressmen with money?

Markwart says the U.S. must not "unilaterally disarm our own farmers." This phrase sounds good, but is misleading. Accurately, Markwart's plea is like a gang leader saying that the police must not intervene to stop his gang members from mugging people until gangs in other cities can somehow be forced to stop mugging people in those cities.

Markwart states that the sugar program operates "at no cost to the federal government." The same is true of the Mafia, but that is not a good excuse. The sugar program deftly launders money directly from consumers to sugar growers without running the money directly through the Treasury coffers. This is a virtue?

James Bovard
Associate Policy Analyst
Cato Institute

Ocean Farming: An Emerging Agribusiness?

TO THE EDITOR:

Ocean farming has the potential to become the most productive means of raising animals for food. We can tap this potential by applying technologies such as direct fertilization of the ocean, as Michael Markels Jr. suggested in his article "Fishing for Markets: Regulation and Ocean Farming" (*Regulation*, 1995 No. 3).

We can also use more traditional production systems, such as confining fish in feed lots or net-pens, technologies that have proven themselves very efficient for raising tuna, salmon, and many other species in both warm and cold climates.

It is worth emphasizing that the United States controls by ownership (Proclamation No. 5030, March 10, 1983) 10 percent of the ocean's "Exclusive Economic Zone" (EEZ), which is more of the EEZ than is controlled by any other nation. In fact, the U.S. EEZ is huge, representing an area twice the onshore area of the United States, and making America potentially the home of the largest and most productive ocean farming industry in the world. The immense scale of this emerging industry can best be estimated by noting that the Norwegian salmon farming industry, covering an area of approximately 500 surface acres of net-pens, this year will supply as much salmon to the world market as Alaska's record wild harvest. Statistics such as these indicate the potential to fundamentally change the world food supply and improve the American diet.

Most of the net-pen technologies were developed at universities or federal laboratories in the United States; much of the pioneering work on aquaculture was done at the University of Washington under the leadership of Dr. Lauren Donaldson, whose students later established successful industries in Norway, Chile, China, and other nations. Unfortunately, America has failed to commercialize these technologies to build successful industries such as those found in Norway, Chile, and Canada.

Markels identified the most important reason for the failure of American entrepreneurs and investors to start a large aquaculture industry in American waters: "the lack of private property rights in the seas." Of equal importance is the inability of American fish farmers to hold clear title to their products, because aquatic species are defined under American law as wildlife, not as livestock or crops. The most fundamental obstacle to the development of an enormous American ocean farming industry is not technological or economic, but an artifact of the laws and regulations that define what constitutes agriculture or animal husbandry, and those definitions, in turn, are a result of historical views of farming that have not changed with the development of new technologies and new domesticated species.

To position the United States as a competitive player in this international business, two kinds of property rights are needed. First, farmers must have the ability to secure the full and undisputed ownership of their product. There are many routes to this objective, from marking individual fish to establishing a registry for broodstocks—on the model of the bovine, seine, and poultry industries—to legislation that will recognize the status of new domesticated species on a par with the traditional domesticated species that have been part of the human experience since the bronze age.

Second, as Markels points out, for farming of this type to occur on any scale in the open sea, there must be a legislative structure that will permit farmers to establish rights consonant with their investment in offshore facilities and the areas of the ocean where those facilities are located. Recent attempts to obtain licenses for ocean farming locations have met with federal rejection because of a lack of clear jurisdiction among agencies. As an alternative to the Atlantic and Pacific Ocean fishing authorities proposed by Markels, many in the ocean farming industry would prefer a model based on the historic Homestead Act. Under such a model, sites would be granted to farmers who made sufficient and sustained investment in development of an ocean farming site. As the legal and regulatory environment stands, ocean farming as an emerging agribusiness is not ready to benefit from its productive potential because of a lack of property rights.

Per O. Heggelund
President
AquaSeed Corporation

Thomas Trzyna
Dean
Arts and Sciences
Seattle Pacific University

Scientific Questions

TO THE EDITOR:

As a marine biologist concerned with the state of the world's fisheries. I was intrigued by Michael Markels's ocean-farming proposal ("Fishing for Markets: Regulation and Ocean Farming," *Regulation*, 1995 No. 3). For years, scientists have pondered and investigated the possibilities of increasing ocean productivity while fishery managers have struggled both to sustain fish stocks and maximize economic gain.

I am pleased that Markels addressed both issues in his proposal. However, as a fishery specialist, I feel it necessary to comment on some aspects of his article that deserve more attention—particularly the oceanographic side. While it is clear that a great deal of research on ecological theory was conducted to arrive at convincing ratios for biological transfer of energy through food chains, the author pays little attention to the oceanographic complexities of the Gulf Stream.

Throughout the article, the author presents the upwelling system off the coast of Peru as an example of a nutrient-rich area supporting large populations of commercially important fish. He argues that this type of system can be created by fertilizing the East Coast via dumping nutrients into the Gulf Stream. This concept ignores the oceanographic features off the Peruvian coast that allow such a system to persist. There are factors in this upwelling ecosystem other than the abundance of nutrients that create such productivity—factors such as water temperature, ocean circulation, meteorological patterns, and fish biology. Perhaps the most important feature of upwelling systems is the continual upward flow of water that suspends large phytoplankton (called diatoms). It is the large size and high food quality of these suspended diatoms that makes the system productive. This is almost completely different from the Gulf Stream system, which is influenced continually by variable currents and weather patterns.

While I recognize that *Regulation* is not a scientific journal, readers should be given an explanation as to how the Gulf Stream ecosystem differs from the upwelling systems. The suggestion of similarity between the two systems begs the question of why Gulf Stream fertil-

ization does not occur naturally, and since it does not, why didn't we think of this years ago? The author does a wonderful job of convincing us of the economic potential of an ocean-farming program but gives no information justifying why the Gulf Stream ecosystem would respond as he predicts.

A second issue the author does not address is that not all ocean ecosystems react positively to the addition of nutrients. The Midwest floods of 1993 and 1994 flushed tremendous amounts of nitrate into the Gulf of Mexico. This nutrient flux has caused hypoxia (low-oxygen conditions) in the Louisiana-Texas shelf waters, now known as the "dead zone." Because of the resulting phytoplankton bloom, little more than bacteria can survive in this Massachusetts-sized area. Furthermore, the addition of the wrong types of nutrients may result in blooms (commonly known as "red tides") of toxic dinoflagellates that can cause massive fish kills.

Markels's proposal needs to address these complications. I have seen no scientific evidence that suggests the Gulf Stream ecosystem along the East Coast is ideal for ocean farming. Moreover, I disagree with his statement that "we are dealing with a system that is already broken. We can help to fix it by creating conditions that nature already provides elsewhere." The system is not broken. It is complex, and fishery production in it is not well understood. "Fixing" it may do more harm than good.

Markels's article betrays a terribly naive view of how oceanic systems work. He presents a catchy idea in a convincing fashion to lure the support of potential investors. However, as it stands now, the proposal is based on bad science. Before jumping on this bandwagon, I encourage readers to demand a more scientifically sound proposal.

On a final note, I agree with the some of author's perspective on fishery management. It has become painfully apparent in the last decade that established fishery management schemes are not working and the consequences of overfishing are being realized. Local economies that once thrived with a management system based on politics rather than science and sustainability are now suffocating from the effects of crashed fish stocks and emergency fishing moratoriums. Every fishery has unique technical, economic, and social aspects. Private, rights-based management may not be appropriate for all of them, but as long as fishery resources are viewed as common property, without proper management the sea will continue to be raped and economies will suffer.

Fernando Leyva
Sea Grant Fellow
National Oceanic and Atmospheric Administration

Making the Oceans Bloom

MARKELS replies:

The Gulf Stream was selected as an example of a coastal area amenable to fertilization because it is familiar, has gyre that recycle organisms that are most productive, and is long enough that useful fertilization could be accomplished and still stay within the 200-mile EEZ. It is a complex system of currents, and weather could make it less desirable as a platform than other coastal areas such as Oregon, California, and many foreign coasts. It is too early to make that judgment now.

Leyva correctly points out that in shallow waters like bays, estuaries, and coastal shelves, too much phytoplankton production will lead to anoxia in the shallow water. For exactly this reason we plan to restrict fertilization to deep ocean water where this will not be a problem. We also plan to seed the fertilized area with phytoplankton that will lead to the bloom of the most desirable plant life to support the fish catch that we want.

Leyva is correct that scientific evidence is required to demonstrate the efficacy of the technology proposed. This the three-phase program that is now underway in Gulf Stream water, culminating with the production of fish from ocean fertilization. The fertilization of the ocean has never been done before, and we will learn a great deal from it even if it does not prove to be economically viable in the Gulf Stream. If it is as economically bountiful for other coasts as the current estimates indicate, we will have achieved a very large success indeed.

Leyva's skepticism is shared by many in the oceanographic community. After all, we are asking them to change the way they look at the oceans from passive observation to active intervention. The senior oceanographers on my advisory board had similar difficulties until they delved into the concept more thoroughly. They now accept the idea that if the viability of the technology can be demonstrated, there will be many areas of the ocean where it can be applied with great benefit to mankind.

Michael Markels
Chairman and CEO
Versar Inc.