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No Middle Way on the Environment

The authors, environmental scientists, warn that in the debate between "cornucopians" and informed prophets of the dangers posed by overconsumption, splitting the difference won't work -- and that the cornucopians are wrong

by Paul R. Ehrlich, Gretchen C. Daily, Scott C. Daily, Norman Myers, and James Salzman

LAYPEOPLE frequently assume that in a political dispute the truth must lie somewhere in the middle, and they are often right. In a scientific dispute, though, such an assumption is usually wrong. Copernicus, in *De Revolutionibus Orbium Coelestium* (1543), showed (to the distress of the

establishment) that the earth both rotated on its axis and, along with the other planets, revolved around the sun. The controversy about what revolved where was not resolved by a compromise that had the earth stationary on its axis but circling the sun. Pasteur put an end to the debate over whether some organisms could be produced by "spontaneous generation" by showing that bacteria descended from other bacteria. The answer wasn't a compromise in which mice couldn't be spontaneously generated whereas flies and microbes could.

Discuss this article in the Global Views forum of Post & Riposte.

From the archives:

- **"Do We Consume Too Much?" by Mark Sagoff (June, 1997)**

"Discussions of the future of the planet are dominated by those who believe that an expanding world economy will use up natural resources and those who see no reasons, environmental or

There has long been a dispute between "cornucopians" and scientists over whether too much consumption in rich countries poses a serious threat to the global environment. In his recent article regarding the state of our planet, "Do We Consume Too Much?" (June *Atlantic*), Mark Sagoff fell headlong into the truth-in-the-middle trap by asserting that "neither side has it right." He has done a disservice to the public by promoting once again the dangerous idea that technological fixes will solve the human predicament.

But the debate goes well beyond Sagoff. In challenging his views, we are also challenging a whole current of opinion based on a sophistic application of a political model (in which split-the-difference outcomes are the rule) to the environment.

Sagoff argues that concern over the depletion of natural resources and the

otherwise, to limit economic growth. Neither side has it right."

- **"An Explosion of Green," by Bill McKibben (April, 1995)**
"The reforestation of the eastern United States -- thanks partly to conservationists and mostly to accident -- can show the developing world how to make room for people, farming, industry, and endangered species of plants and animals, which have been returning. We can give the rest of the world a better example if we address the problems that even this fortunate region still faces."

- **"Can Selfishness Save the Environment?,"**

impact of their current levels of use is misplaced, and that technological innovation will remedy any problems that do arise. This view certainly is not shared by the scientific community. For example, the 1992 "World Scientists' Warning to Humanity" (signed by more than 1,500 leading scientists, including more than half of all living Nobel laureates in the sciences) stated that "human beings and the natural world are on a collision course" and that people in developed nations "must greatly reduce their overconsumption, if we are to reduce pressures on resources and the global environment."

A 1993 statement on world population issued by fifty-eight scientific academies dealt with consumption in a similar vein. The academies, which include the U.S. National Academy, the British Royal Society, the French, German, Swedish, Russian, and Indian Academies, and the Third World Academy, represent the global scientific community. They concluded,

> If all people of the world consumed fossil fuels and other natural resources at the rate now characteristic of developed countries (and with current technologies), this would greatly intensify our already unsustainable demands on the biosphere.... As scientists cognizant of the history of scientific progress and aware of the potential of science for

by Matt Ridley and Bobbi S. Low (September, 1993)
"Conventional wisdom has it that the way to avert global ecological disaster is to persuade people to change their selfish habits for the common good. A more sensible approach would be to tap a boundless and renewable resource: the human propensity for thinking mainly of short term self-interest. "

> contributing to human welfare, it is our collective judgment that continuing population growth poses a great risk to humanity. Furthermore, it is not prudent to rely on science and technology alone to solve problems created by rapid population growth, wasteful resource consumption, and poverty.

Thus the very people who would produce the technological fixes in which Sagoff places such faith do not share his complacency.

Sagoff's thesis rests on a series of basic misconceptions.

Misconception No. 1:
Overconsumption is only a moral issue

IT is simply wrong to believe that nature sets physical limits to economic growth." Or, as Sagoff put it at another point, "The idea that increasing consumption will inevitably lead to depletion and scarcity, as plausible as it may seem, is mistaken both in principle and in fact."

This statement, Sagoff's core message, misses the point. Since natural resources are finite, increasing consumption obviously *must* "inevitably lead to depletion and scarcity." Currently there are very large

supplies of many mineral resources, including iron and coal. But when they become "depleted" or "scarce" will depend not simply on how much is in the ground but also on the rate at which they can be produced and the amount societies can afford to pay, in standard economic or environmental terms, for their extraction and use.

For most resources, economic and environmental constraints will limit consumption while substantial quantities remain. Long before coal disappears, coal production will probably be limited by the lack of atmospheric capacity to absorb safely more carbon dioxide, the greenhouse gas of which coal burning is an especially prolific source. For others, however, global "depletion" -- that is, decline to a point where worldwide demand can no longer be met economically -- is already on the horizon. Petroleum is a textbook example of such a resource. Ironically, Sagoff cites it as a resource that is increasing in abundance, asserting,

> Raw materials -- including energy resources -- are generally more abundant and less expensive today than they were twenty years ago. [In the 1970s] economically recoverable world reserves of petroleum stood at 640 billion barrels. Since that time reserves have *increased* by more than 50 percent, reaching more than 1,000

billion barrels in 1989.

These impressive figures are, unfortunately, figments of the bureaucratic imagination. In an unpublished report Amos Nur, an earth scientist at Stanford University, wrote,

> In 1987 ... there was a sudden boost of reported crude-oil reserves. It turns out that all of this came from Middle Eastern governments: Iraq, Iran, and a few other countries increased their proven reserves by 250 percent overnight! It was not improved technology or new discoveries that led to this; the governments of those countries simply recalculated the volume of recoverable oil in the fields. So 'proven reserves' are completely unreliable.

From the archives:

"Mideast Oil Forever?" by Joseph J. Romm and Charles B. Curtis. (April, 1996)
"Congressional budget-cutters threaten to end America's leadership in new energy technologies that

What *is* reliable in this business is actual production -- and in that regard the United States is well over the peak, and the world as a whole is at the peak right now.

Steps can and should be taken to stretch oil supplies; conservation and improved secondary recovery (extracting oil that remains after standard pumping operations) are the most promising. But conservation is often politically difficult to sell (especially when prices are kept low), and secondary recovery is expensive and can require large amounts of water, another resource in short supply. In China water is already being

could generate hundreds of thousands of high-wage jobs, reduce damage to the environment, and limit our costly, dangerous dependency on oil from the unstable Persian Gulf region."

forcibly withheld from farmers along the Yellow River in order to flush residual oil from the wells of the Shingle Oil Field Company. But, as Nur emphasizes, even though the last drops of petroleum will never be extracted from the earth, "the supply of oil is truly finite."

That finitude may actually be a good thing, because -- as Sagoff observes, quoting our colleague John Holdren, a professor of environmental policy at Harvard University -- the overall problem with energy is not mobilizing enough of it but containing the environmental consequences of its use. Sagoff is right that solar and other technologies hold great promise as replacements for the fossil fuels that may (or, if we're lucky, may not) be pushing the world toward catastrophically rapid climatic change. But he seems oblivious of the timetable for the large-scale replacement of energy technologies. Even if a widespread deployment of new technologies began today, society's dangerous dependence on fossil fuels could not be significantly reduced for many decades; and there is no sign of such deployment. Furthermore, no

way of mobilizing energy is free of environmentally damaging side effects, and the uses to which energy from any source is put usually have negative environmental side effects as well. Bulldozers that ran on hydrogen generated by solar power could still destroy wetlands and old-growth forests.

Misconception No. 2:
"In defending old-growth forests, wetlands, or species we make our best arguments when we think of nature chiefly in aesthetic and moral terms"

FEW environmental scientists would dispute the importance of aesthetic and moral arguments in defense of biodiversity -- the plants, animals, and microorganisms with which we share the earth. But few indeed would assert that these are the "best" arguments, in light of the materialistic, growth-oriented philosophy that now dominates the planet.

The idea that technology can fully substitute for natural life-support systems recently underwent a damning test in the first Biosphere 2 "mission." Eight people moved into a 3.15-acre closed ecosystem, intending to stay for two years. The $200-million-plus habitat featured agricultural land, "wetlands," "rain forest," "desert," "savanna," and even a mini-ocean with coral reefs. A sample of biodiversity thought adequate to keep the system

functioning was included, and the system was designed to supply the "biospherians" with all basic material needs and more. But comfort was short-lived, and the experiment ended early in failure: atmospheric oxygen concentration had dropped to 14 percent (a level typical of elevations of 17,500 feet); carbon dioxide spiked erratically; nitrous-oxide concentrations rose to levels that can impair brain function; nineteen of twenty-five vertebrate species went extinct; all pollinators went extinct, thereby dooming to eventual extinction most of the plant species; aggressive vines and algal mats overgrew other vegetation and polluted the water; crazy ants, cockroaches, and katydids ran rampant. Not even heroic efforts on the part of the system's desperate inhabitants could suffice to make the system viable.

What went wrong? Evidently more was involved than aesthetic or moral arguments for having the right components of nature in the closed system of Biosphere 2. This is also true in the closed system of the earth as a whole. The biospherians learned a basic lesson the hard way: humanity derives a wide array of crucial economic and life-support benefits from biodiversity and the natural ecosystems in which it exists. Many of these benefits are captured in the term "ecosystem services," which refers to the wide range of conditions and processes through which natural ecosystems, and the species that are a part of them, sustain and fulfill human life. These services yield ecosystem goods, such as seafood, wild

game, forage, timber, biomass fuels, and natural fibers. They also underpin agricultural productivity, the pharmaceutical industry (nine of the top ten pharmaceuticals in the United States are derived from natural sources), and many other aspects of industrial production.

Natural ecosystems perform critical life-support services that make consumption possible and upon which the prosperity of all societies depends. These include the purification of air and water; the mitigation of droughts and floods; the generation and preservation of soils and renewal of their fertility; the detoxification and decomposition of wastes; the pollination of crops and natural vegetation; control of the vast majority of potential agricultural pests; and partial control of climate. This array of services is generated by a complex interplay of natural cycles powered by solar energy and operating across a wide range of space and time scales.

These services operate on such a grand scale, and in such intricate and little-explored ways, that most of them could not be replaced by technology -- even if no expense were spared, as Biosphere 2 showed. Ecosystem services are worth trillions of dollars annually, but since they are not traded in economic markets, they do not carry prices. If they did, changes in those prices might serve to alert society to reductions in their supply or to deterioration of the underlying ecological systems that

generate them. Moreover, humanity came into being after the underlying systems had been in operation for hundreds of millions to billions of years. Thus it is easy to take ecosystem services for granted and hard to imagine their disruption beyond repair. No one knows precisely which, or approximately how many, species are required to sustain human life; but to say, as Sagoff does, that "there is no credible argument ... that ... all or even most of the species we are concerned to protect are essential to the functioning of the ecological systems on which we depend" is dangerously absurd. Until science can say *which* species are essential in the long term, we exterminate *any* at our peril.

Today human activities are driving species extinction at a rate of several species per hour -- thousands of times as fast as the rate of evolution of new species. This is akin to popping the rivets out of the airplane your children must fly in. We are entering the first episode of mass extinction in 65 million years -- the first ever since human beings came into existence. The consequences for the ecosystem services on which humanity depends could be severe. Recovery from previous mass extinctions -- caused by, for example, giant asteroid impacts -- took tens of millions of years. Today's mass extinction is driven primarily by the overconsumption of natural habitat and resources, and the toxic by-products of this consumption. The earth could not avoid the path of an asteroid. We can change our consumption patterns.

From the archives:

- **"Empowering Species," by Charles C. Mann and Mark L. Plummer (February, 1995)**
"The best way to save endangered species may be to help them pay their own way."

- **"The Butterfly Problem," by Charles C. Mann and**

Mark L. Plummer (January, 1992)
"Because the government doesn't have the means to preserve endangered species, let alone a coherent plan its decisions are haphazard -- and private landowners often find themselves paying for the preservation of species they've never heard of."

- **"Our Real China Problem," by Mark Hertsgaard (November, 1997)**
"The price of China's surging economy is a vast degradation of the environment, with planetary implications."

Misconception No. 3:
Price signals will give warning of disasters

PART of Sagoff's complacency stems from his implicit assumption that price is the same thing as cost, and that price signals will therefore warn of any impending problems. This is a confusion that some ecologists, including Paul Ehrlich, shared a quarter century ago, and one that increasing interactions between ecologists and leading economists have long since dispelled. The price of raw materials often declines as, for example, giant corporations push external costs off onto consumers or indigenous peoples who have little choice but to accept them. The tropical hardwood used in an expensive home does not include in its price the loss of biodiversity in a tropical forest or the carbon dioxide added to the atmosphere as waste wood decayed or was burned and as fossil fuels were used to cut, transport, and process the wood. Also absent from the price are the costs incurred by tropical-forest peoples when their environments and ways of life are destroyed.

External costs are a major reason that price signals are unreliable. A good example is the price of gasoline, which carries a social cost of *at least* $4.00 a gallon but is sold to Americans for $1.20. Another source of unreliable price signals is perverse government subsidies. In Mexico City the

real cost of water may be as high as a dollar per cubic meter, but the government charges only a tenth of that -- simultaneously creating an annual deficit for water services of about $1 billion and hiding the catastrophic state of the city's water supplies. Three separate analyses have estimated that such subsidies cost the global economy some $500-$600 billion annually -- as much as the Rio Earth Summit's proposed budget for sustainable development. In other words, if subsidies were eliminated, saving the earth would not need to cost the earth.

Misconception No. 4:
Simple extrapolation of past trends provides a clear view of the future

TODAY'S situation is wholly unprecedented. Whereas it took our species hundreds of thousands of years to reach a population of 10 million, we are now adding (net) 10 million people to the planet every six weeks. Whereas in the past human impacts on the environment were local, reversible, and escapable through migration, they are now typically global, irreversible, and inescapable.

• Human-induced land degradation inflicted since the end of the Second World War affects about 40 percent of the planet's vegetated land surface, and the rate of degradation is accelerating nearly everywhere, reducing crop yields and

posing a serious threat to agriculture.

- Humanity is overpumping (at rates higher than recharge) groundwater stored during the last glacial period by some trillions of gallons a year. Another ice age will be required to refill some depleted aquifers.

- Humanity is using about 50 percent of accessible freshwater runoff globally. New dam construction could increase this accessible runoff by about 10 percent over the next thirty years, but it won't do so fast enough to keep up with population growth. The number of people is projected to increase by more than 30 percent during that period.

- The burning of fossil fuels, deforestation, paddy rice production, nitrogen-based fertilization, and other routine human activities have possibly changed the composition of the atmosphere enough to induce a devastating pace and magnitude of climate change.

Our generation is supporting itself on a one-time depletion of natural capital. In his optimistic assessment of future food-production possibilities, Sagoff conveniently ignores the depletion of these critical capital inputs into agriculture: biodiversity, ecosystem services, productive land, irrigation water, and favorable weather.

Misconception No. 5:

What's biologically, physically, economically, or politically possible at one place or scale is probable at other places and scales

From the archives:

- **"Forgotten Benefactor of Humanity," by Gregg Easterbrook (January, 1997)** "Norman Borlaug is responsible for the fact that throughout the postwar era, except in sub-Saharan Africa, global food production has expanded faster than the human population, averting the mass starvations that were widely predicted."

SAGOFF holds out a few technological advances from around the globe, such as genetically engineered fish, as environmental silver bullets. Although advances in biotechnology are important, proposed dietary or technological fixes for the *world* food problem have proved to be chimeras. We are not feeding the world on plankton, algae farmed on sewage ponds, single-cell proteins from microorganisms grown on petroleum, or meat from whales raised in atolls. The world as a whole has not approached the agricultural productivity of Iowa -- nor will it, because the necessary soil quality, climate, and expertise, among -- other prerequisites, are not universally available.

Technological fixes for environmental problems have a mixed record, just as do fixes for food problems. They often work locally or temporarily but prove unworkable

on regional or global scales or over the long term. Dumping pollutants in the Mississippi River can solve the disposal problems of those people who are living upstream while creating an impossible mess for the residents of New Orleans. Air-pollution "control" devices have also often turned out to be a means of shifting pollution to some other place or population. Tall smokestacks tend to convert local air pollution into regional acid rain. Smokestack scrubbers produce cleaner air in exchange for toxic sludge. Can technology reduce the environmental impacts of modern society? Absolutely -- but to regard it as the answer to the threats detailed above ignores the record to date. Remember that the target is moving. If the level of consumption in the developing world should rise to that of North America -- which is the trend -- under current technologies we would require two additional earths to meet everyone's food and timber needs.

Above all, one must recognize that what is technically and economically feasible is often sociopolitically impossible. People consider many technological "solutions" (the widespread use of nuclear power, for example) to be unacceptable, often because they do not trust the political entities that propose to manage the technologies safely for the benefit of all. Many ordinary citizens have come to the same conclusion that the distinguished demographer Nathan Keyfitz claimed as a finding of the social sciences: "If we have

one piece of empirically backed knowledge, it is that bad policies are widespread and persistent."

Misconception No. 6:
The North doesn't exploit the South and economic growth saves the environment

THERE is much more to exploitation than is subsumed under trade in natural resources. Exploitation is a complex subject, but in a world in which huge international disparities in wealth and power persist, the rich-poor gap is increasing. In 1960 the ratio of the income of the richest 20 percent of humanity to that of the poorest 20 percent was 30:1; according to the *United Nations Human Development Report 1997,* it was nearly 80:1 in 1994. And the rich show pathetically little interest in closing that gap. Since 1950 the richest fifth of humankind has doubled its per capita consumption of energy, meat, timber, steel, and copper, and quadrupled its car ownership, greatly increasing global emissions of CFCs and greenhouse gases, accelerating tropical deforestation, and intensifying other environmental impacts. The poorest fifth of humankind has increased its per capita consumption hardly at all. Indeed, those in the poorest fifth average a cash income of less than a dollar a day, and those in the next fifth average only three dollars a day. This means that 40 percent of humankind accounts for a mere 6.5 percent of the world's income.

With only 4.5 percent of the world's population, the United States uses about 25 percent of the earth's resources and contributes more than 20 percent of global emissions of carbon dioxide -- the atmospheric pollutant that accounts for about half of global warming. In 1996 the United States contributed one fifth more carbon to everybody's atmosphere than did China, which is 4.5 times as populous. The poor will be affected by global warming whether they are major or minor sources of carbon dioxide. The winds carry no passports.

Promoting intensive cash-crop industrial farming techniques, in which the overuse of fertilizers and the broadcast use of pesticides replace more ecologically sound food-crop agriculture, is another form of exploitation -- and one of the chief generators of the displaced peasants that Sagoff cites as a major cause of deforestation. But in Indonesia and Malaysia, the two most forested countries of Southeast Asia, where forests are disappearing fastest, logging by large corporations and clearing to create oil-palm plantations are the prime causes of deforestation. The logging is pursued in no small part to meet rich-world demand for specialty hardwoods at prices that are very far from reflecting the costs entailed. Recently the independent London-based Environmental Investigation Agency asserted that the $100 billion timber

industry is "out of control," threatening "the extermination of most of the world's species and massive social and economic disturbance." Similarly, fish farming, which Sagoff sees as the solution to the decline of oceanic fisheries, is fine for supplying salmon or shrimp to the rich. But those salmon and shrimp, at $7-$15 a pound, are far out of reach for poor people making less than $2,000 a year, who once depended on indigenous fisheries for the protein in their diets.

The claim that economic growth and prosperity are a cure for environmental degradation is arguable. It is based largely on the "Kuznets curves" observed in some forms of pollution. When the amount of pollution is plotted against per capita GNP, an inverted U curve is produced. As economic activity grows, pollution first increases. Then, presumably because an increased concern for environmental amenities appears when basic needs are satisfied, pollution control is implemented and pollution decreases. Prosperity thus saves the environment. Unfortunately, such Kuznets curves are of limited application. Economic growth has helped to mitigate some kinds of air and water pollution, but production of many of the most important pollutants, among them carbon dioxide, keeps right on rising with prosperity.

Why Worry About the Muddled Middle?

MIDDLE ground" pronouncements on the debate between cornucopians and the environmental scientists who understand the deteriorating state of our life-support systems are counterproductive in solving the human predicament. They obviously encourage those who wish to continue humanity's current trajectory, for whatever motives. For our part, until a systematic analysis shows the Nobel laureate economist James Meade to be wrong, we'll continue to agree with his assessment:

> Pollution and the exhaustion of natural resources depend and will depend in the future on the absolute level of total economic activity. This means that it is necessary to restrain both the rate of growth of population and, at least in the developed countries, the rate of growth of consumption per head.

Restraining the growth of consumption does not mean going back to living in caves and cooking over buffalo-chip fires. For decades in the rich nations increased consumption has not been correlated with increased satisfaction, and perpetuating Third World poverty is a luxury that the prosperous can no longer afford. Greatly enhanced efficiency, reduced consumption among today's superconsumers, more-sensible choices of energy technologies, and a halt to population growth followed by a gradual

decline might, as John Holdren and others have clearly shown, lead to a closing of the rich-poor gap without an ecological collapse. Over the next century, with careful planning, mutual trust, and cooperation, humanity could create a sustainable global society with a higher quality of life for everyone.

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