and that if every animal group tested has succumbed to it then man will succumb as well.

Nitrosamines are also prime suspects in the quest for what one scientist calls "the defining factor in urban cancers." William Lijinsky, a well-known nitrosamine researcher at Oak Ridge National Laboratory, along with Epstein, pointed a finger at this possibility in a 1970 article in *Nature*. "In our view, any group of chemical carcinogens significantly implicated in human cancer must be both widespread and multipotent. Such chemicals are the nitrosamines. . . ."

Hickey, in a 1970 study cross-checking disease rates in 38 U.S. urban areas with a host of environmental chemicals, found that $NO_2$ cross-correlated with seven out of eight categories of cancer and with heart disease. (Sulfur dioxide, sulfates, and heavy metals also correlated with several cancers.) In his paper, published by the Regional Science Research Institute in Philadelphia, Hickey speculated that this might be due to nitrous acid's role as a mutagen, which could make the population more susceptible to disease. However, now that nitrosamines have been found in the urban atmospheres, Hickey agrees that they could form part of the explanation.

However, French, the EPA epidemiologist, doubts that nitrosamines by themselves—or any single compound—will prove the missing link in explaining the urban cancer rate. She suggests that urban air may contain other substances, such as benzo(*a*)pyrene, that may act along with nitrosamines in a harmful manner. "If you eliminated nitrosamines entirely, you'd still have cancer. They are only one of the possible causes."

It is too early to predict what kind of action the government might take on the issue of environmentally occurring nitrosamines. Clearly, since USDA has concluded that certain amounts in food are unacceptable, it would be hard for the EPA not to take action. Epstein, who has often prodded federal agencies over environmental and occupational health issues, complains: "It's absurd for the government to have entirely different policies for the same compound, based on the fact that it happens to occur at several different places in the ecosystem."

Nader and Epstein, in their summer letter to Train, argued that the key factor in nitrosamine occurrence in the atmosphere could turn out to be nitrogen oxides and argued strongly that therefore EPA should not go through with a proposed relaxing of emission standards of these oxides for automobiles. Clarence Ditlow, of the Nader group, goes further and charges that the EPA has tried to downplay the nitrosamine issue because EPA is already politically committed to relaxing these standards.

However, other people who have examined the potential regulatory problems posed by environmental nitrosamines argue that standards limiting the amines—which come by and large from industrial sources—may be the easier method of control.

Clearly, much more research and study will have to be done before anyone knows for certain what levels of nitrosamines are in the environment, how they behave there, and where they come from. But however complicated this knowledge turns out to be, it may help to cut the Gordian knot faced by research scientists who are trying to figure out the probable causes of urban cancers.—DEBORAH SHAPLEY

# Edward Goldsmith: Blueprint for a De-industrialized Society

The *Ecologist*, despite its title, is not a scientific journal. Its editor, who frequently has harsh things to say about science and scientists, refers to it affectionately as a "propaganda paper." Published from the rural depths of Cornwall, England, the *Ecologist* is in essence a political magazine devoted to environmental issues. Its positions are usually uncompromising. It advocates the dismantling of industrial economies and the return to a rural society embodying small-scale technology and rustic virtues. It styles itself the "Journal of the Post Industrial Age."

Such a program is akin to redressing the 18th-century ideal of the Noble Savage in modern clothes. It is clearly of limited persuasiveness to anyone who thinks that the present style of civilization can and should be preserved. Nevertheless, the *Ecologist*'s plans for the world are worth considering whether one agrees with them or not. The idea of a past Golden Age, simpler, purer, and somehow recapturable, is deeply rooted in Western and other cultures. The *Ecologist* wields more influence than might be expected for the advocate of so extreme a stance. Its circulation of 10,000 copies is small but respectable (*Nature*, for example, *Science*'s English counterpart, has a circulation of about 20,000). The *Ecologist* sells about 1000 copies in the United States, and has three heads of state (those of Tanzania, Zambia, and Papua New Guinea) among its personal subscribers. Its dramatic credo, the *Blueprint for Survival*, has sold some 500,000 copies in 3 years and has been adopted as an election platform by political parties in England, New Zealand, and Tasmania. In national elections held 2 months ago the Values Party of New Zealand polled 5 percent of the vote, which observers regard as an impressive showing for a new party.

The editor of the *Ecologist*, and coauthor of the *Blueprint for Survival*, is Edward Goldsmith. Teddy, as he is known to his friends, wants to de-industrialize the world; his brother Jimmy is a self-made millionaire who is one of England's most successful entrepreneurs.

Goldsmith is a man of refreshing individuality. He stood as a candidate for parliament in the last election, touring his would-be constituency on camelback for the purpose of emphasizing that other forms of transport would no longer be available in 20 years time. The principal plank in his campaign was soil erosion. The issue, he persuasively contends, is "far more important than the price of beer, equal pay for women, or the other fatuities they debate in parliament." If that makes him sound like a male chauvinist, well, he appeared at a recent conference in Houston wearing a tie emblazoned with boar heads and the monogram MCP.

An engaging and impulsive talker, Goldsmith has the uninhibited delight in knowledge of the self-taught, which to some extent he is. After taking his bachelor's degree at Oxford in 1950, he became, he says, a permanent student. His military service on the allied staff in Berlin did not prevent him from spending 4 hours a day in the library, and he continued his studies when he moved to Paris to manage a small electronics factory.

Ten years ago Goldsmith came into a small private income which has made it possible for him to follow his own interests. Through several vacations spent in Africa he became concerned about the

threat of demographic expansion to wild animals. He also joined an organization called the Primitive Peoples Fund (now Survival International). With a member of the fund, Robert Allen, he founded the *Ecologist* in 1969.

"Right from the first issue it was devoted to attacking economic growth," Goldsmith said in an interview given during a recent visit to Washington, D.C. "From the very beginning we never believed that there was a technological solution to pollution. Both the basic thesis of the *Ecologist* and my own message is that the problems we are facing have been interpreted by us so as to make them appear amenable to the only solutions our industrial society is capable of providing."

Goldsmith's solution lies essentially in reversing the principal features of the Industrial Revolution. He believes that urban populations must slowly be redeployed in small village settlements which are largely self-governing and which exploit small-scale technology in small-scale economic enterprises. Such changes are not only desirable on social grounds (only through small communities can the social bonds necessary to man's psychic well-being be restored); they are also inevitable consequences, he believes, of the approaching collapse of industrial civilization through material shortages and ecological degradation.

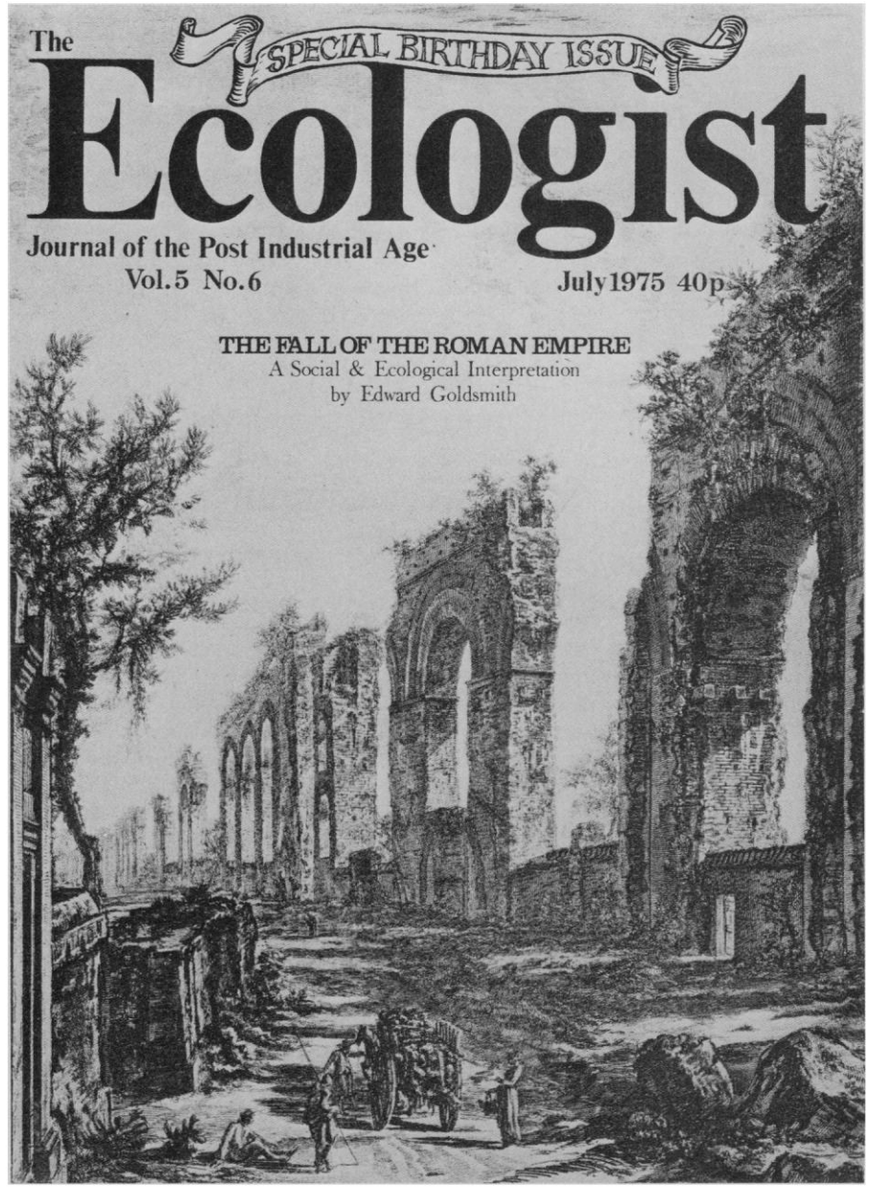
The *Blueprint for Survival*, which Goldsmith and coauthor Allen issued in 1972, warns that "the breakdown of society and the irreversible disruption of the life-support systems on this planet" are inevitable, if present trends continue, "possibly by the end of the century, certainly within the lifetimes of our children." The list of suggested preventives includes withdrawal from use of chemical pesticides and fertilizers; a switch from monocultural to diversified farming; minimized use of raw materials so as to conserve resources and reduce pollution; an end to population growth; and the creation of a new social system based on small, decentralized communities that allow all individuals to participate in decision-making and which exist in harmony with their environment.

The *Blueprint* was signed by several distinguished English scientists (such as Frank Fraser Darling, Julian Huxley, David Lack, and C. H. Waddington) who said that, while not endorsing every detail, they fully supported the basic principles it embodied.

The significance of the *Blueprint* is that it is as much a political as a scientific statement. Its enormous sales indicate that it has struck a chord somewhere. The Ecology Party, which adopted the *Blueprint* as a political manifesto, was unsuccessful in the most recent elections in Britain, but the Values Party of New Zealand, founded in response to the *Blueprint* and the Club of Rome's *Limits to Growth*, performed well enough to indicate that the *Blueprint*'s themes possess a measurable attraction to voters. The Values Party was formed just before the 1972 elections, at which it polled 2 percent of the vote. In the most recent elections it put up candidates in all electoral districts and, though it failed to win a seat, garnered 5 percent of the national vote. Technology can lighten man's work burden, says the party's 1975 manifesto, but often it "has made work meaningless, has replaced the tasks from which people derive satisfaction. Technology, instead of making human hands and brains redundant, should help them become more productive."

Meanwhile the *Ecologist** continues to propound the themes laid down in the *Blueprint*. The magazine may lack the profundity of more orthodox journals, but has an edge in terms of variety and spontaneity. "It presents a complete picture, an integrated approach. Basically we regard it as a forum for a group of people who see things the same way," says Goldsmith. Apart from occasional outside contributions from people such as Garrett Hardin, the *Ecologist* is chiefly written by Goldsmith and his friends, several of whom live in the same Cornish valley. A recent issue, for example, includes a disquisition by Goldsmith on the fall of the Roman Empire. Michael Allaby, a former pilot and actor, explains how Britain could become self-sufficient in food, provided that the urbanization since the Industrial Revolution is reversed. Jimoh Omo-Fadaka, who used

*Available from *The Ecologist*, 73 Molesworth Street, Wadebridge, Cornwall PL27 7DS, England; U.S. annual subscription for 12 issues, $14.

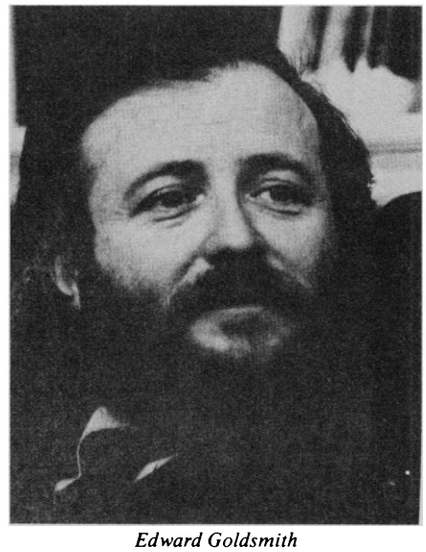


to be a director of television in Nigeria, reports on a visit to Papua New Guinea, and a tour d'horizon of organic farming is given by farmer Peter Bunyard. The journalism follows the English tradition of not striving too hard to divorce fact from comment, but the result is a colorful mixture of distinct points of view.

Like others before him, Goldsmith finds a greater receptivity to his ideas in the United States and Canada. During a recent visit he gave a lecture course at the University of Michigan and wrote a report for the Canadian ministry of the environment. "People here are much more open-minded than in England. In Canada people fall over themselves trying to talk to me. In England I can't even get to see officials in the ministry of the environment."

"As our society breaks down," Goldsmith told *Science* in one of his high-speed extempore lectures, "the solutions offered prove increasingly counterproductive. We assume *Homo oeconomicus*, we assume we can control nature. These are the values of industrialism. We believe in a paradise that will be created by science and technology and industry, a sort of Herman Kahn paradise in which people have all the material goods they require, and in which all our problems of pollution, war, and disease will be solved by science and technology.

"Of all the paradises proposed by man, this is the most naive. To achieve it would involve violating the basic laws of thermodynamics and ecology. Yet science has accepted the values of this paradise. The whole edifice of knowledge will lose all credibility as its solutions fail. As people grope around for a new set of values, it is difficult to see what will replace it. Marxism is largely discredited, old-fashioned rubbish, besides which the proletariat has already become the establishment in most industrialized countries. What other possibility is there? The Gandhian one seems to me to be the only course. It offers the perfect social philosophy for a decentralized society which lives in harmony with the environment. I can see no other social philosophy that meets the requirements."



*Edward Goldsmith*

Goldsmith is now planning to set up a World Gandhian Institute. He recently spent 2 months in India as a guest of the Gandhian Peace Foundation, and ran a special issue of the *Ecologist* that was written entirely by Indians ("People are sick to death of being told what to do by Europeans"). He claims to have founded the OAD (Organization for African Disunity) to foster a return to tribalism—a solution, be it said, that he advocates for everyone. He believes in democracy, but "of the kind you can only have in a small society; mass society is incompatible with democracy—a lot of deadbeats who care only about the price of beer and working less."

It is easy to argue that Goldsmith's remedies are extreme, impractical, and utopian. Yet all utopias are by definition impractical extremes, but that has not deprived them of influence on the course of events. In an age excessively dominated by specialists, Goldsmith and his colleagues are trying to be generalists. Their beliefs as to what a stable society should look like in its economic, technical, and social characteristics are at the least of theoretical interest and, given a few large-scale calamities, might even one day be pertinent.

—NICHOLAS WADE

# Diabetes Commission: Problem Severe, Therapy Inadequate

Diabetes, commonly considered to be the seventh leading cause of death by disease in the United States, is actually the third leading cause, according to a report by the National Commission on Diabetes. Even though only 35,000 deaths per year are directly attributable to diabetes, the commission found, there is "strong evidence" that diabetes and its complications are responsible for more than 300,000 deaths per year—ranking it behind only heart disease and cancer. The commission also found that the prevalence of diabetes in this country increased by more than 50 percent between 1965 and 1973. Diabetes now affects 5 percent of the population and, at the current rate of increase, the number of diabetics will double every 15 years. The average American born today, the report says, has a better than one-in-five chance of developing diabetes.

The report was the culmination of a 10-month study of diabetes by the commission, which was established by the National Diabetes Mellitus Research and Education Act of 1974. Like similar studies of diseases, it recommends an increase in funding for diabetes research. But the report also has some unusual facets.

One of the major conclusions reached by the commission, according to its chairman, Oscar B. Crofford of Vanderbilt University, is that there is widespread resignation about the inadequacy of the present therapy. Even with the best of medical care, he says, the complications of diabetes still develop. (These complications include impairment of vision, kidney function, and peripheral blood flow; loss of peripheral nerve sensation; and increased periodontal disease.) There was thus no great pressure on the commission from diabetes organizations and laymen to set up a health care delivery system, as had been the case in similar studies of heart disease and cancer. Consequently, the report recommends that the comprehensive diabetes research and training centers authorized by the 1974 act provide no health care other than that which is specifically linked to research.

It was also the conclusion of the commission, Crofford says, that there are not enough qualified investigators in the many areas of diabetes research to justify a massive infusion of funds. The report thus recommends what Crofford terms a modest increase in funding: from $43 million in fiscal 1975 to $142 million in fiscal 1980. (In comparison, funding for cancer and heart disease in fiscal 1975 totaled $691 million and $208 million, respectively.) And to stimulate the development of additional manpower, the commission recommends the establishment of "Distinguished Scientist Awards" in the National Institutes of Health. These awards would provide an