

## THE CRISIS IN ENVIRONMENTAL QUALITY

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To begin to talk about the crisis in environmental quality I would like to begin by attempting to define that sometimes elusive term "quality of the environment". In the definition I have used, I consider it as the sum of four components: environmental health, environmental productivity, environmental diversity, and environmental space. A high quality environment can be considered therefore as one that is healthy, productive, diversified, and provides adequate space for the creatures that live in it (Dasmann 1968). At the present time all of these components are threatened. Consequently there is indeed a growing crisis and one to which our attention has been, thus far, inadequate.

The growing crisis was emphasized in a conference sponsored by The Conservation Foundation and held in December 1968, in Airlie House, Virginia. The conference was concerned with the ecological aspects of international development, and featured a series of case histories on the environmental effects of various international development projects intended to enhance the economic well-being of underdeveloped nations. It was intended for and attended by representatives of the major development agencies: the World Bank, United Nations, Agency for International Development, etc. We hope that it moved us a step toward the goal of building ecological direction into the international development process.

In one of the papers presented to this conference, L. D. Newsom traced the consequences of 20 years' use of synthetic organic pesticides in attempts to control insect pests of cotton in Louisiana. Beginning with DDT and going on through BHC, aldrin, endrin, dieldrin, and heptachlor, through parathion and other organophosphates, the cotton growers and chemical industries combined their efforts to produce the following results: (1) All of the important insect pests of cotton now have populations that are resistant to one or more of the chlorinated hydrocarbons, the organophosphates, and the carbamate insecticides; (2) It has become obvious that cotton pests

are becoming resistant faster than chemists can develop satisfactory alternative insecticides; and (3) Populations of such cotton pests as the tobacco budworm and the spider mite have been created that cannot be controlled by any available insecticide. Newsom concluded, therefore, that a critical stage had been reached (Newsom, 1968).

Meanwhile, evidence is accumulating that residual insecticides are contributing to the decline of wild bird populations through interference with calcium metabolism in egg shell formation (Risebrough, et al., 1968).. The decline in populations of our raptorial birds has been attributed to this cause. We know also that these residual insecticides are now distributed over the world from the Arctic to the Antarctic in birds, mammals, fish and invertebrates. Their full effects have yet to be felt.

I regard these and related developments as evidence of an impending crisis in environmental health, productivity and diversity. If we had no problem other than the pesticide problem we should still talk of a crisis. The crisis exists for the same reasons that other problems exist -- in part because those who gain short-term benefits from pesticides do not have to pay for long-term damage -- in part because through technological specialization we have lost the capacity to look at the total environmental picture and see only a narrow range of costs and benefits.

In the field of human health, we encounter similar problems. Thus we use antibiotics as supplements to livestock feed because they appear to enhance rapid growth in young animals. In so doing, however, we produce strains of bacteria, some of them pathogenic to man, that can no longer be controlled by available antibiotics. Resistance to one antibiotic often brings resistance to a whole family of antibiotics. Resistance to antibiotics is transferable from one bacteria to another and one generation to another. We are developing populations of bacteria that are beyond our capability to control. We have yet to feel the full consequences of this misuse of modern technology (Harold, 1968)..

Ecologists can take some grim satisfaction in having foreseen and predicted these events. They must also share the guilt of having failed to forestall them.

In Sweden, the practice of using mercury salts as a fungicide to control rot on logs being held for use in pulp mills, and also as an agricultural seed dressing, has had consequences that could have been predicted, but were not. As I have heard the story (Borgstrom, Lundholm, personal communication), the first awareness of the problem came during the Japan Olympic Games when Japanese scientists analyzed hair collected from the various national Olympic teams. The hair from the Swedish athletes contained an unusually high mercury content. When this news reached Sweden, a survey of the extent

of mercury accumulation in body tissues was carried out. When the results were in the people of Sweden were shocked into action. Since mercury salts moved primarily from the pulp mills through aquatic food chains, the Swedes stopped buying fresh-water fish. The fresh-water fishing industry closed down and has virtually ceased to exist. Pulp mills were shut down temporarily while a search for a non-toxic fungicide was carried out. Faced with a crisis the Swedes became aware of their environment almost overnight. I have been told that when students and other new left types demonstrate on the streets of Stockholm they have two major slogans: "Americans get out of Vietnam" and "Stop pollution". Soon they may be left with only the latter slogan.

The concern over mercury poisoning in Sweden has led to a concern over pollution in general. Sweden has joined with other Scandinavian countries in an international effort to control air pollution. Sweden has taken the lead in the General Assembly of the United Nations in calling for a world conference on the human environment to be held in 1972.

One wonders what it will take to engender a similar concern over pollution in the United States. We all continue to accumulate our daily dose of lead, thanks to the automotive and petroleum industries. We have a legal suit against the automobile industries for failure to move ahead in developing effective pollution-control devices, but we know that even with the best control devices installed on all forthcoming new cars we will continue to be exposed to increasing effects from air pollution. We also know that efforts to control water pollution are far from adequate. The current Santa Barbara Channel oil crisis is perhaps illustrative.

Perhaps in the long run more important than the twin menaces of pesticides and pollution is the loss of environmental diversity. This too is a cumulative process. Like the increase in lead or DDT in our body tissues we do not feel the change. It takes place in cities and in the countryside. In Washington, D. C., I have watched over the past three years as the architectural diversity of the central city vanishes before the march of look-alike ten-story blocks of glass, concrete and steel. Efforts to save historic buildings or some of the more attractive older structures have usually failed. Here in California the spread of look-alike suburban tracts over the countryside has been going on for so long that it has become a sick joke, but it continues. Many of us continue to live in them since economically we have no choice.

We could be building new and diversified towns and cities, fitted to their respective environments, offering a wide variety of ecological niches to the varied wants and needs of a diversified population. But the public doesn't realize that there could be such a thing as a real choice in the type of community they live in; governments have generally failed to provide

the necessary leadership; and our private developers fear to take risks.

Outside the urban areas we see a similar trend away from environmental diversity as we pursue the goal of increasing short-range productivity to satisfy immediate needs or to enhance short-term profits. The ecological evidence developed by Charles Elton, Robert MacArthur and others shows strongly that in the long run environmental stability, resistance to disturbance, and productivity are enhanced by diversity. Simplified communities, and in particular monocultures, are necessarily unstable. Yet, rather than learn the difficult art of managing environmental complexity, we take the way out with the short-run payoff, concentrating on those species that are obviously immediately productive. Thus we endanger the future prospects for our environment.

None of these things would in themselves constitute a crisis were it not that they are linked to the fourth component of environmental quality -- the decrease in environmental space resulting from the increase in human populations. It can hardly be questioned that the number one environmental problem today is the human population problem.

Loss of diversity, long-range declines in productivity, the wearing away of environmental health through accumulation of pesticides and other pollutants, would all be problems of less concern and more imminent solution were they not tied to ever-growing numbers of people and the knowledge that tomorrow there will be less and less space for more and more of us. When I first started publicly lecturing about the human population problem, sixteen years ago, it was regarded as a joke by the mass media and completely ignored by government. Now it is recognized on a global scale for what it is -- a first concern of mankind. Nevertheless, here within the United States most people still regard it as a problem for underdeveloped countries. It is not just for these countries, but is a major problem within our own national boundaries.

I see little hope for improving the American environment until each community -- each town, city, country and state in this country -- faces up to its own local problem and asks itself some searching questions: how big do we want to be? how high a population density do we want to support? what kind of an environment do we want to live in? how do we want to look? These are the questions that should concern our city and regional planners. These should be a first interest to each city council and county commission. All other questions of growth and planning should only be answered within the framework provided by the answers to these fundamental questions.

I have attempted to sketch out some boundaries of our environmental crisis. Tied up within it are all of the various social and political problems

that dominate the front-pages of our newspapers. Many of these problems are amenable to solution only through federal action. Most, however, are not. I am afraid that our environmental crisis will be resolved only when those who are aware of its existence begin to take an active interest in the often dull and unspectacular concerns of local government.

During the last session of Congress some of us favored a bill calling for a federal council of ecological advisers, equivalent to the existing council of economic advisers, to function at the highest level as advisers to the President. There is little doubt that some such agency would be valuable. But it would be equally, if not more, important to have a similar council or office at every level of government, and in each agency, down to the city, county and town level, since it is at these levels that major environmental decisions are made. Some of the New England states with their town conservation commissions have taken a step in this direction. But all communities need some such control.

Personally I believe that the wildlife profession has a special responsibility in these affairs. It could be said that we represent a special interest, but our interest is also the public interest in environmental quality. Furthermore wildlife experts have been trained to think in ecological terms, to look at the broad environmental scene. Such abilities are badly needed, particularly at the local level. However, apart from political responsibilities, the wildlife profession has a clear responsibility and that is learning how to manage for environmental complexity -- to move away from specialization on one or a few species and tackle the task of managing for a diverse and complex environment, fit for maintaining a diverse and complex variety of human beings. It is in this direction that hope for the future of the human environment must lie.

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