

## Science as a Way of Knowing—Human Ecology Opening Remarks<sup>1</sup>

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We now begin the second annual session of *Science as a Way of Knowing*, a project of the Education Committee of the American Society of Zoologists and eleven other organizations.

The goal of *Science as a Way of Knowing* is to offer suggestions for making the teaching of biology at the college and university levels more effective. Each year the project considers an important subfield of biology. Last year it was Evolutionary Biology and this year it is Human Ecology. Next year at the Baltimore meeting it will be Genetics and at the Nashville meeting in 1986 we will focus on Developmental Biology.

Our package consists of four parts. Each year there will be: first, a symposium where outstanding scientists develop various aspects of the year's topic; second, a film program; third, a published essay with an extensive bibliography; and fourth, the publication of the entire proceedings in the *American Zoologist* followed by the wide distribution of reprints throughout the world.

These activities are made possible by a grant from the Carnegie Corporation of New York. The Corporation is not responsible for what we say but its generosity makes it possible for us to say it. We could not have a more understanding patron.

The three main themes of the *Science as a Way of Knowing* project are

1. to emphasize the procedures that enable us to understand the natural world,
2. to show how these understandings can be united in conceptual schemes that carry understanding to a higher intellectual level, and
3. to explore how the data and proce-

dures of science can serve as powerful adjuncts to achieving human goals that rest on humane decisions.

There is no branch of science that is more human oriented and more relevant than Human Ecology. All human history is but a reflection of the workings of ecological principles. What we are and what we will become depends, absolutely, on our interactions with the living and non-living environments. Nevertheless, Human Ecology tends to be given short shrift in many university courses in biology. I ask you now to consider whether or not this can be justified.

We like to assume that higher education is effective in preparing the maturing generation for life in that real world where disciplined and informed minds must deal with the difficult problems of the day—many of which are life threatening. Is that the usual outcome of higher education? Surely to some extent, but I cannot escape the feeling that for most of the pressing problems of the day we are not producing an effective cohort with those informed and disciplined minds. We must reach this conclusion since there are overwhelming data to indicate that in many parts of the world human activities are rendering the natural world ever less able to provide the resources and conditions required for human life. Students may learn a very great deal but does this include the information, the perspectives, and the philosophical stance to deal with such matters?

Consider the following. Front line news across the nation today is the terrible famine in much of Africa, especially Ethiopia. You can conduct an interesting and sobering experiment by asking students and peers what should be the proper course of action for the United States and other nations in a position to help. The usual analysis that I find is that "Hungry people

<sup>1</sup> From the Symposium on *Science as a Way of Knowing—Human Ecology* presented at the Annual Meeting of the American Society of Zoologists, 27-30 December 1984, at Denver, Colorado.

need food and so the thing to do is feed them." It hardly takes a university education to achieve that level of sophistication. I have yet to hear a person say, "The real problem is how can we prevent such happenings."

Possibly the first question should be reworded to ask, "What would be the most humane action in the long run?" In my small sample no one seems to have considered this aspect of the tragedy. The decisions that are being made nearly always deal with the problems of today—not of long term solutions. It is far from simple to reach a decision on what *is* the most humane solution to endemic famine or to the many other seemingly intractable problems of Human Ecology, yet decisions must be made.

Many years ago I found myself in a plane sitting next to Marston Bates, the distinguished naturalist, author, and malaria specialist. He had been recalled by the Rockefeller Foundation from his laboratory in Villavicencio (Colombia) to return to headquarters and *think*. The Foundation had become increasingly uneasy about its worldwide programs in public health. Not that the programs were failing—they were often a spectacular success. But could it be that these programs were keeping people free from disease only that they would die later of starvation? That was what Marston was to think about and he had come to believe that more food was of greater importance than more health. The Foundation soon changed its projects and some of them gave us the "Green Revolution." I asked Marston about the obvious risk of saving people from starving now with the probable consequence that more would starve later. His answer was, "The next generation will have to deal with that one."

We are that generation. Unless we have the courage to make some of the most heart-breaking decisions ever faced by human beings, we will be compromising the future of humanity. There is little evidence that our leaders have the knowledge, courage, or deep humanity to make such decisions. Science alone cannot decide what is "right"—that is a human decision. Yet the data and concepts of Human Ecology are fundamental in guiding us toward humane decisions. I cannot escape the feeling that, to the extent that we fail to prepare students to deal with these problems, we fail as individuals and as a profession. Biologists must play their essential role as interpreters of the present and as guides to the future—if there is to be an acceptable future.

The unifying characteristic of the individuals who are speaking at this symposium is that they are scientists who have been preeminent in their use of science for the betterment of humanity. To varying degrees they have left the relative ease and security of the laboratory bench to deal with ignorance, intolerance, greed, apathy, selfishness, and undisciplined emotion. They have emphasized that the overriding goal of humanity can no longer be the conquest of nature because, to the degree we conquer nature, we defeat ourselves. Unless we join them by working effectively in our classrooms, the human future is bleak indeed. That future may or may not see a Nuclear Winter but, if we continue to flaunt the laws of nature, surely there will be an Ecological Winter.

But never forget for one moment that we have the knowledge and power to prevent that future. Our profession must transmit that fact and hope.