

What none of us envisioned and what many of us are still in the process of realizing is that, in the space of a few decades, science and technology, quite literally, have made a new world and, at present rates of change, will remake the world at intervals of a decade or two.

As one writer has put it:

"Progress no longer trudges as it did in more sedate eras—mankind had about 1,000,000 years to accept the wheel before the first model-T came along but less than half a century between the air-hopping of the Wright brothers' pepped-up kite and the 600-mile-an-hour jet."¹

In order to walk the tight-rope of technological change and human ecology, we must learn to look beyond the conventional statements of this, that, or the other environmental problem in an attempt to survey systematically the sum of individual actions and interactions.

To return to the report on *Environmental Pollution* issued by the Subcommittee last year, the first recommendation was:

"1. To improve our knowledge of what we are about, scientific activity in ecology and related fields should be immediately expanded to provide:

"(a) Baseline measurements in plant and animal communities and the environment—an ecological survey.

"(b) Continued monitoring of changes in the biosphere.

"(c) Abilities to predict the consequences of man-made changes.

"(d) Early detection of such consequences.

"(e) Knowledge of the environmental determinants of disease."

The ecological sciences, on which the International Biological Program concentrates, require greater world-wide efforts.

The United States, the countries of Europe, and the Latin American countries can all be said to be underdeveloped in this area of research. Man's activities are changing the world's biotic communities and have altered much of the earth's surface. Basic information is sorely needed.

It is urgent that studies be undertaken to define existing conditions, to understand the mechanisms that control the components of so-called ecosystems, and to comprehend interactions among ecosystems. The International Biological Program places a long-overdue and most welcome emphasis on primary productivity and its meaning for man, on trophic structure, energy-flow pathways (food chains), limiting factors, interactions of species, bio-geochemical cycling, species diversity, and other attributes that interact to regulate and control the structure and function of communities.

Encouragement to biologists in this hemisphere is already apparent. Argentina, Brazil, Chile, and Mexico are shaping programs through national committees.

In many respects, the International Biological Program resembles the International Geophysical Year during which, physical scientists worked cooperatively to advance knowledge by giant steps. The cooperation established then continues and additional related international programs have evolved, including the International Year of the Quiet Sun and the International Hydrological Decade.

The International Biological Program offers the U.S. an opportunity to participate in urgently needed studies which require collaboration across political boundaries, to help developing countries in their efforts to avoid starvation, to advance the common purposes of the world's biological scientists, to foster efficient use of resources, and to contribute to world-wide coordination of ecological research.

The research carried out under Phase II of the International Biological Program will add immensely to the knowledge base for future planning in the U.S. and in other countries.

There seems to be a general belief that the way to acquire original ideas or to solve difficult problems is to sit and think intensively, preferably in some quiet place. While this procedure may be extremely helpful in reaching a difficult decision or reviewing existing knowledge, I doubt that it fosters creative thoughts.

Dr. Theobald Smith, the great biologist, once wrote:

"Sharp prolonged thinking is necessary that we may keep on the chosen road, but does not necessarily lead to discovery."

Because we are *now*, and *will be* in the future faced with choosing new roads, the insights and alternatives which the knowledge acquired during the International Biological Program will afford can play a major role in our future courses of action.

¹ News Front, January 1967, p. 87.