Similar studies of all faunas and floras on land and in the sea involve the intensive development of physiological and behavioral ecology throughout the world. Not only will the number of such ecologists be greatly increased, but the subject matter will become a comprehensive survey of species characteristics that will lift a minor subject to a position of major status.

A second contribution to ecology results from a program to assess the capabilities of this planet as a life-support system. By mapping and characterizing all of the environments, both terrestrial and marine, and by making suitable measures of present and potential production, the I.B.P. hopes to obtain some practical measure of the earth's capacity to support mankind.

The contributions to ecology will be, first, the gathering of such information on a comparative basis, and, second, the development and standardization of techniques for making such measurements.

The latter is the larger task. In biology, comparability of data involves more than the problems of scale of measure. Respiration, for example, can be measured as the rate of oxygen consumption, or the rate of carbon dioxide production, or the rate of heat production, or the rate of loss of weight. It can be measured per unit wet weight, per unit dry weight, or per unit calorie on combustion. In order to compare such measures, conversion scales must be worked out for every organism in every set of environmental conditions. Obviously, in the I.B.P. some one method of measuring respiration will have to be chosen. Whether or not the units of measure are metric is a trivial problem.

The I.B.P. is contributing already in the several international handbooks being prepared for us by all participating countries. These establish standards techniques for the estimate of thousands of parameters. Some of these handbooks will be available this year.

As these standards become used, the comparative ecology of the earth becomes a realistic goal. The wide range of ecological systems that will result, complete with estimates of present and potential production, will emphasize the vast array of environments on this planet.

In cooperation with the human adaptability section of the I.B.P., the biological aspects of human ecology can be incorporated into this analysis. A variety of patterns of human behavior and physiology, each in harmony with particular sets of ecosystems, may emerge.

A third major contribution to ecology lies in the programs of several subcommittees, in several countries, designed to study whole ecosystems. Terrestrial, freshwater, and marine areas are included. The management of whole systems has already started, and it behooves us to supply alternatives to the trial-and-error approach as soon as possible.

The quality of the environment is a national issue in all of the industrialized countries. Most of the problems relate to the deterioration of the environment caused by erosion, pollution, and urban sprawl. These causes of environmental decay involve whole systems of human activity as well as whole systems of ecological activity. Systems analysis is already being used in some of the engineering solutions to pollution problems. The development of ecosystem analysis to the level at which it can be incorporated into such solutions will improve greatly the chances of success in such programs.

Although programs of ecosystem analysis will be organized primarily by the advanced countries, the only nations able to afford them, the results may prove applicable with little additional effort elsewhere. These methods may prove invaluable in countries where inefficiency and error may be disastrous.

As a contribution to ecology, the development of ecosystem analysis will provide an exciting stimulus as well as producing a much needed set of concepts and principles. For the last twenty years many ecologists have been frustrated in their attempts to understand ecosystems, or even to understand single populations in ecosystems. The older methods required a simplification that produced designs known to be naive or unrealistic. We are now eager to explore this new approach, which does not impose such limitations, and we hope to see a whole new level of ecology emerge. It is evident already that, in the piecemeal approach to ecosystems we have been using, we have missed some vital components that must be operating, since a synthesis of what we think we know does not produce systems like those we find.

At present, the "game" of systems analysis differs in ecology from its form in other applications. Ordinarily, a known system is simulated, and the effects of various alterations is explored, the goal being an improved profit margin or an