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Limits to Growth

The public and its leaders are now aware of and rightly concerned about the unpleasant potential consequences of overexuberant growth. Small wonder, then, that a 1-day symposium on the "Limits to Growth" held at the Woodrow Wilson Center in Washington on 2 March should draw an attentive audience that included senators, ambassadors, and a cabinet officer, as well as numerous representatives of the press, radio, and television.

The principal speaker was Dennis Meadows, who has headed a study group at Massachusetts Institute of Technology. This group has used high-speed computers in an attempt to examine the interacting consequences of continued exponential growth of population, food production, industrialization, pollution, and consumption of nonrenewable natural resources. Meadows' major conclusion is the perhaps obvious one that, if mankind continues to indulge at current rates in various forms of exponential growth, calamities will occur in about 50 years.

As a pioneering effort to evaluate a complex web of interactions the study, and a popular book* based on it, is likely to have considerable impact. The book is to be translated into half a dozen languages and distributed broadly. The approach, though, has defects.

Responding to the allure of tackling a truly big problem, the study group has attempted to treat the entire Earth as a single system. In order to limit the number of variables, they chose to aggregate variables on a global basis. Thus the population growth of all the world is taken as a single variable, although the growth rates in various countries and regions differ by a factor of 6 or greater. An even less defensible aggregation of variables is subsumed under pollution. Here an attempt is made to lump together the many components of solid, liquid, and gaseous pollution, even though each differs in nuisance or toxic characteristics.

Enthusiasts can easily lose sight of the limitations of computers. In this study, data from the past are used as a basis for predicting the future, but such data are far more relevant to the past than to the future. The computer is unaware of changing human behavior. Concern about the population explosion and such matters as pollution has already had profound effects. Recently released figures show that the rate of growth of population in this country has been slowing. The rate of increase of important polluting chemicals has been slowed, stopped, or is even decreasing. Important segments of the middle and upper-middle classes are talking of a future "no growth" society.

The study also does not adequately take into account ingenuity with respect to natural resources. Current technology is based on the availability of certain raw materials, such as copper and natural gas. As these resources become scarce, technology will change and, for example, aluminum will be used as a conductor, while methane will be obtained from coal.

The concept of Earth as a closed system is an appealing one, and in some respects it is valid. We all share the oxygen of the atmosphere and must be concerned with changes in its carbon dioxide content. However, much of pollution is local or regional in its effects. The same is true with respect to population. Growth of population exacerbated by concentration in urban centers is a bad enough problem in the United States. It is a far more serious and potentially catastrophic phenomenon in the so-called lesser developed countries.

A member of the audience at the recent symposium privately reminded us that, although Meadows predicts hell in 50 years, hell is already present on Earth in places such as Calcutta.—PHILIP H. ABELSON

* D. H. Meadows, D. L. Meadows, J. Randers, W. W. Behrens III, *The Limits to Growth*, a report for the Club of Rome's Project on the Predicament of Mankind (Potomac Associates–Universe Books, New York, 1972).