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Renewable and Nonrenewable Resources

The current issue of *Science*, devoted to materials, is the third in a series of special issues that have provided extensive discussion of topics of enduring consequence. The first two subjects treated were energy* and food*. How the various peoples deal with these three matters in the future will go far to shape their living patterns and their destinies. *Science* has also published a large number of individual articles on topics related to population. Many of these have been gathered together and republished in a compendium entitled *Population: Dynamics, Ethics, and Policy**.

In these publications the perspective is future-oriented, and one is given the benefit of the visions provided by about one hundred of America's leading scholars. Most readers, of course, will see or have seen in the articles reinforcement for already held beliefs, but few can peruse the total without encountering new ideas. In addition to covering scientific and technological aspects, the articles treat economic and political factors, including some international issues.

If we focus on the United States, the future picture at first sight looks favorable. The country has much in the way of potential energy sources, it is the major granary of the world, and it is well fixed with some, though not all, materials resources. It could fill reasonable future needs for energy, food, and materials while safeguarding the environment. Population increase goes on, but at not so dangerous a rate as in many other countries. If one concentrates on scientific and technological aspects, one can be quite optimistic. Until recently we have been quite wasteful with respect to energy and materials. It is now evident that many functions could be performed using half or less of the previous standard amounts of these items. In addition, as Chynoweth points out in this issue, we have not begun to exhaust the potentialities of electronics in conserving energy and materials.

But when one examines economic, political, and sociological aspects in relation to energy, food, materials, and population, the picture is not so bright. For example, science, medicine, and technology have provided a variety of contraceptive devices and methods. These can and will be improved and supplemented. But to what extent will they be used? Behavior of the government in handling energy matters has been disquieting. Can politicians, necessarily governed by a short-term vision, be depended on to make good long-term decisions in highly complex technological matters? The recent indication is that the answer is No! If we are to have anything approaching energy independence, huge investments must be made either by government or by industry. Congress is deathly afraid of passing legislation that might enable industry to make a profit from developing new energy sources, such as by liquefaction of coal, but at the same time Congress is reluctant to set up a government corporation to do the job.

In the materials field much new legislation has been enacted that has severely restricted the mining and processing of minerals. Our forests constitute one of the great potentials for materials for the future, but government has, if anything, impeded rather than facilitated constructive developments.

As for the other countries, their peoples face differing constraints and opportunities. To a considerable degree the world's knowledge is accessible to them. They differ, of course, in available resources, but there are few countries in which performance comes close to matching technological opportunities. This is true with respect to energy, food, and materials. It is especially true with respect to population control. Countries continue to experience a 3 percent annual population growth that guarantees future miseries. Some of these countries have been making increasingly strident demands on the developed countries, whose response to their requests has been diminishing. Many people would like to be helpful and constructive, but despair of a situation in which nations do little to help themselves. Science and technology hold great potentials for humanity, but they are not effective in the absence of appropriate institutional arrangements.—PHILIP H. ABELSON

*For further information see page 612.