ture of one facet of the critical formative years of a divided Germany and a divided Berlin.

The subtitle of the book is "Memoirs of a Social Inventor." Social innovation, clearly, has been an important concern throughout the author's life. It has yielded many and significant fruits, some of which are described in this volume. During Conant's presidency of Harvard University, the Society of Fellows and the Niemann Fellowships were established, the device of the ad hoc committee was made more effective, and the School of Education was revitalized and the Master of Arts in Teaching degree inaugurated. These innovations, for most of which the author was indeed the inventor and with all of which he was deeply concerned, receive extensive treatment. So, on the national stage, do some of the "inventions" which have helped to form our social history, or which constitute contemporary institutions of importance: the National Defense Research Committee, which Conant headed during World War II and which, with its parent body, the Office of Scientific Research and Development, served as the organizational prototype for many later developments relating science to government; the citizens' Committee on the Present Danger, of which Conant was a founder and which played so important a role during the Korean war; the Educational Testing Service, of great contemporary significance, to whose founding the author contributed critically, though he disclaims its actual invention; and the attempt to control the use of atomic energy, on the early stages of which Conant's lively description sheds added light.

This is but a sampling of the illuminating detail in this autobiography. There are parts which are wholly personal, and not of much wider significance: chapter 17, for example, an account of the author's mountain-climbing expeditions, or the chapters on his early life—although these opening chapters provide vignettes of Boston in the last decade of the 19th century and the first of the 20th that are fascinating.

In its detail and its diversity, the careful reader of the book will surely recognize the mine of important historical information it constitutes. Not the least remarkable feature of the book is the author's use, for documentation, of letters he has written at various times—a feature which adds much and which he says is due particularly to his wife.

The book can hardly be better summarized than in the judgment of Vannevar Bush given on its jacket: "This book will have many audiences, many publics, for it is the record of one of the most versatile men of our times. Its range is wide, from pedagogy and science to weapons development to statecraft to diplomacy, and no matter where his service was called for, the author's action was highly effective, and the record is good reading indeed."

It will be a record of enduring value.

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The Food-Supply Question

The Hungry Future. RENÉ DUMONT and BERNARD ROSIER. Translated from the French by Rosamund Linell and R. B. Sutcliffe. Praeger, New York, 1969. 272 pp., illus. $6.95.

Seeds of Change. The Green Revolution and Development in the 1970's. LESTER R. BROWN. Published for the Overseas Development Council by Praeger, New York, 1970. xvi + 208 pp., illus. Cloth, $6.95; paper, $2.50.

The World Food Problem. A Guardedly Optimistic View. WILLARD W. COCHRANE. Crowell, New York, 1969. xvi + 334 pp. $7.95.

Both population growth and agricultural development have been and remain highly dynamic and critical elements in the total development process. During the 1960's the less-developed countries of the tropics experienced rates of growth in both population and agricultural production that were exceptionally high, in comparison to either the historical or the contemporary experience of the developed countries. The decade of the 1960's was also characterized both by a world food crisis and by a revolution in the technology of food-grain production.

The book by Dumont and Rosier is heavily inspired, both in its analysis and in its rhetoric, by the food crises of the mid-1960's. The book by Brown reflects the insights and enthusiasms of the "green revolution." Cochrane relies on the concepts and methodology of modern economics to examine the dimensions of the world food crisis and the potentials of the new biological technology. All three books give detailed consideration to the policies that will be necessary, in both the developed and the less-developed countries, to avoid a "hungry future."

The three books differ in other respects. Dumont and Rosier's is the most comprehensive; it contains an excellent treatment of the recent agricultural development experience of the socialist countries as well as of the Western developed countries and of the less-developed countries of the Third World. Cochrane's book conveys a sophistication and a hard realism with respect to agricultural and development policy, reflecting both his earlier academic research and his role as an agricultural administrator and as a consultant. The book by Brown is more brilliant and imaginative and more erratic than the others. Both Cochrane's and Brown's books reflect substantial modifications of earlier views: Cochrane is now more willing to concede the significance of the role of prices in guiding the use of resources in the development process and to accept the limitations of food aid as a tool of development, and Brown has turned 180 degrees from his earlier Malthusian perspective, which he shared with Dumont.

A common "model" of the agricultural development process is implicit in the three books. The model can be characterized as follows: Agriculture is no longer a resource-based industry. It is a technology-based industry. The modern biological, chemical, and mechanical technology which is the source of agricultural growth is primarily the product of public-sector agricultural

experiment stations and private-sector industrial research. The new knowledge produced by research is embodied in biological, chemical, and mechanical inputs produced by the industrial sector and by specialized agricultural enterprises (as in seed multiplication). Agricultural development is thus an integral part of the total process of development. Progress in agriculture is intimately linked to progress in the rest of the economy through product, input, and labor-market linkages.

The agricultural revolution that is currently under way in grain production is firmly based on this model. This technical revolution, which Brown dramatically catalogs, is a necessary but not a sufficient condition for economic development. Will the potential commodity surpluses resulting from this new biological and chemical technology be used to generate viable economic growth in the total economy or will they be absorbed by even faster population growth? The choice that faces most developing economies is between the historical examples provided by Java and Japan—between involution and development. The indications of a rise in the rate of population growth in the Indian Punjab, where the new wheat varieties and the new irrigation technology have combined to produce a dramatic increase in output, are a disturbing reminder that the Malthusian link between food production and population growth has not yet been ruptured in most areas of the world.

If the Malthusian link is to be broken, the breaking will depend on the implementation of policies that are drawn on a more general model of the relation between population growth and economic development than is implied by Dumont and Rosier. Clearly the technical and economic capacity exists, or can be created by investment in agricultural experiment-station capacity and in the industrial capacity to produce the essential chemical and mechanical inputs, to meet world food requirements for the foreseeable future. The significant question raised by continued escalation of population growth rates during the rest of this century is not whether it will be possible to meet food requirements. Food requirements will be met. The significance of rapid population growth lies in the competition between (i) the use of resources to meet food and other subsistence requirements and (ii) the use of resources to improve the quality of human life, to permit the great bulk of families in this world to achieve progressive increases in the level of consumption both of commodities and of social services and amenities.

There are points on which each book can be faulted. Dumont and Rosier are entirely too pessimistic regarding the potential for increased food production in the developing countries. They completely ignore the fact that the most rapid growth in agricultural output since World War II has occurred in less-developed countries, such as Mexico and Taiwan. In spite of Dumont's training in the agricultural sciences and his experience in the less-developed world, they underestimate both the potential for productivity growth in the densely populated areas of the tropics and the responsiveness of peasant producers to economic incentives. The most significant economic incentive that can be made available to peasant producers is advances in technology which sharply reduce the costs of production per unit of product.

Brown's enthusiasm regarding the contribution of the multinational corporation to the economic development of the poor countries is not yet fully matched by performance. Clearly, much of the new crop-production technology must be made available to the agricultural producers of the poor countries embodied in the form of biological, chemical, and mechanical inputs produced by the industrial sector or by specialized agricultural firms. It is not correct to credit Esso with great success in its Philippine fertilizer operations. The Esso fertilizer investment in the Philippines embodied a technology that was obsolete before the plant was constructed. The much-publicized BIMAS program in Indonesia, under the management of multinational corporations such as CIBA (Swiss), Hoechst (Germany), and COOPA (Lichtenstein), has been something close to a disaster both for the Indonesian government and for many of the farmers who have been forced into participation in the program. One does not have to enumerate the more spectacular failures, such as the Calabrian venture in grain marketing in Thailand and the Lytton venture in Greece and Crete, to demonstrate that the limitations inherent in the current state of cooperation between the multinational corporation and the developing economies have not yet been fully overcome. Both the multinational corporation and the bureaucracies of the developing countries clearly have much to learn in working out a viable, nonexploitative partnership that is productive in terms of economic development for the host countries and a profitable return on investment for the multinational corporation.

The faults of the Cochrane book are less spectacular. The main limitations are described by its subtitle, "A Guardedly Optimistic View." It is a solid but unexciting book, typical of the texts used in most undergraduate classes—admirably designed to "turn off" any but the most diligent reader.

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The Case for Population Growth

General Theory of Population. ALFRED SAUVY. Translated from the French edition (Paris, 1966) by Christophe Campos. Basic Books, New York, 1969. xii + 556 pp., illus. $12.50.

In a period when associations are formed in the United States for the purpose of promoting a zero population growth and idealistic young women pledge to have no children, the translation of Sauvy's magnum opus (first published in French in 1952 but extensively rewritten in 1966) is timely. Sauvy has expressed more cogently than anybody else the case for a positive, albeit moderate, rate of growth. However, if I interpret correctly the foreword by E. A. Wrigley, the British historical demographer, the translation was prompted less by a concern for timeliness than by the interest of historians and other social scientists in the influence of population on the functioning of societies of the past, on which the book's theoretical models throw a great deal of light. This is but one indication of the scope of this major work, full of wisdom and wit, by one of the elder statesmen of demography. It exceeds the reach of most texts on population, touching not only on such classical