resolution) in domestic matters, says:

"Under these conditions, France does not see how she can adopt any other attitude toward the United, or Disunited, Nations than that of greatest reserve. In any case, she does not wish to contribute her men or her money to any present or eventual undertaking of this organization—disorganization. Of course we hope that the day will come when common sense will again prevail and when reasonable nations, noting the results of experience, will wish to resume this great world undertaking on a new basis" (p. 145). He considers the organization of Europe the first step toward this improvement.

Much of the criticism expressed in these articles was prompted by some specific U.N. action, or inaction, which the writer disliked—for example, the incidents in Hungary, Goa, and Angola and at Suez; the fighting in Katanga; the troika debate; the bond issue; and the Assembly resolutions dealing with colonialism and South Africa (p. 18). The criticism, however, tended to be generalized and to lead to the following specific suggestions, which are summarized by the editor: (i) the finances of the U.N. should be put in order, (ii) the authority of the Secretary General should be maintained, (iii) the Afro-Asian nations should abandon the dual standard; (iv) weighted votes should be introduced into the General Assembly, (v) it should be recognized that the U.N. depends on the climate of diplomacy, (vi) cohension in the community of free nations should be increased, and (vii) member nations, especially the great powers, should assume responsibility for national decisions that involve their vital interest.

"The United Nations then must not be 'the cornerstone' of the foreign policies of the Great Powers, especially the United States, but a valuable and indispensable supplement to their traditional diplomacy, alliances and regional organization" (p. 21).

While the last two of these suggestions manifest a nationalistic attitude, the first two would be supported by most internationalists. In regard to the remaining suggestions, it may be noted that the tendency of Afro-Asian nations to subordinate peaceful settlement of disputes to the elimination of colonialism and racialism is to be expected in view of their experience with these phenomena; that this tendency is given some support by the Charter provisions concerning the "self-determination of peoples" (Art. 1, par. 2; 55) and the emancipation of "non-self-governing territories" (Arts. 73 and 76); and that the tendency is not likely to last long in view of the rapid progress of the colonial revolution. It should also be noted that, apart from the colonial issue, these nations have, in general, supported measures to maintain the purposes and principles of the U.N., and to strengthen the organization. The fact that neither side in the Cold War wants to alienate them, or to facilitate unilateral intervention by the other side, tends to induce abstention rather than veto in the Security Council—for example, in most of the votes on the Congo situation—and to assure a two-thirds vote for resolutions that maintain the purpose and principles of the U.N. in the General Assembly (p. 10). Consequently, the influence of these states has tended to strengthen the organization and to reduce the capacity of the great powers to use it as an instrument of national policy. This is probably one reason why nationalistic statesmen of these powers have been increasingly critical.

While internationalists often approve weighted voting, in principle, they generally recognize that it will not be practical politics for a long time and that, if population were made a major criterion of voting power, its major effect would be to rectify the present gross under-representation of the communist bloc; although these nations have more than a third of the world's population, if we count China, they have only 11 out of 111 votes in the General Assembly and 2 out of 11 in the Security Council. The Western group with 47 votes and the nonaligned group with 53 are, in proportion to population, about equally overrepresented in the General Assembly, but neither group ever votes as a bloc (see 15th Report, Commission to Study the Organization of Peace, 1962, pp. 35 ff.). The western group is, in proportion to its population, greatly overrepresented in the Security Council.

All scholars recognize that the U.N. depends on the climate of diplomacy, but most believe that the outstanding unfavorable aspect of this climate is the Cold War and the high tensions and rival alliances which it engenders. The last two recommendations would tend to augment this situation.

The editor notes that the contributions do not mention the positive achievements of the U.N. in keeping the peace, in nonpolitical cooperation, in facilitating international contacts, and in enlightening public opinion (p. 21).

The book is significant in that it presents less extreme nationalistic criticisms of the U.N., but it can hardly be said to constitute a just appraisal of that institution or of its appropriate relation to national policies of the U.S. in the atomic age. The three presidents of the U.S. since the U.N. was established have accorded it a more important role than have these critics.

QUINCY WRIGHT
Columbia University

Archeology and Anthropology

Digging Up Bones. The excavation, treatment, and study of human skeletal remains. Don R. Brothwell. British Museum (Natural History), London, 1963. xiv + 194 pp. Illus. Plates. 19s. 6d.

Human biology looks for experimental data largely to the records of disease, demography, growth, race mixture, and evolution held in the skeletons of past populations as they are related to their environments and history. Brothwell tells archeologists and others practicing anthropology (sometimes they "practice" anthropology without quite realizing it) how to get, record, and use these data. He takes up each problem the excavator and student must face, from the proper preservation of bone to the details of determining age, sex, body build, and kind of disease or trauma suffered during life. He outlines useful measurements and observations, some of which probably have a simple genetic background (for example, the presence of a metopic suture), and shows how statistical comparison may measure the closeness of the relationship between populations. He discusses sampling bias (social selection) in cemeteries and describes such ancient surgical techniques as trephining. Finally, he devotes almost 40 pages and most of the plates to the fascinating subject of ancient disease, covering the range from arthritis and poliomyelitis to leprosy, syphilis, and the blood dyscrasias. This is the high point, most valuable to physicians and historians as well as to anthropologists.

My only criticism is that the list of measurements is inconsistently complex for use by a nonspecialist; this would

not matter if all archeologists and historians had anthropological or biological backgrounds—a fault that will be healed by the closer association of science and the humanities in the world's universities. For this coalescence, Brothwell's book is a nicely engineered bridge, concise in structure, economical, and sparse in language.

J. LAWRENCE ANGEL
Division of Physical Anthropology, U.S. National Museum, Smithsonian Institution

Man-Machine Relationships

Biotechnology: Concepts and Applications. Lawrence J. Fogel. Prentice-Hall, Englewood Cliffs, N.J., 1963. xviii + 826 pp. Illus. $22.

The rate at which knowledge is acquired and the rate of technological advance is so rapid that most of those who are engaged in research and development find it difficult to keep abreast of progress, even in narrowly circumscribed or highly specialized fields. This problem is greatly magnified by the rapid growth of interdisciplinary fields. Thus, in recent times, the application of quantitative methods to biology and medicine have led to the emergence of biophysics, bioengineering, and biomathematics, interdisciplinary areas that cannot be precisely or uniquely defined. In this remarkable book, *Biotechnology: Concepts and Aplications*, the author's stated purpose is to clarify man-machine relationships by the use of quantitative description. A precise definition of biotechnology is not immediately apparent and may remain obscure until the reader turns to chapter 20 in which the author provides both a graphic and an operational definition of the field. In summary, biotechnology is shown as an approach to human engineering for the man-machine system, an approach that utilizes applications of mathematics (that is, systems analysis), biology (including appropriately selected information from physiology, anatomy, biochemistry, pharmacology, and biophysics), and psychology in the study of the reactions of human beings to their environment. Many readers will profit by turning directly to chapter 20 for preliminary orientation.

The volume is a remarkable synthesis of pertinent and interesting material, gathered from diverse sources and woven into a text with continuity and purpose. The total body of information from which the book was synthesized is so huge that one reviewer should not be expected to judge the authority and accuracy of all aspects of the book. The presentations in the first section contain a most interesting and challenging consideration of mathematical models as they are related to the scientific method. Section B contains concise descriptions of the mechanisms by which human organs receive information (vision, audition, position sense, cutaneous sensations, taste, smell, and some interrelations between them). The functions of these sensory mechanisms are clearly described and supplemented by much information of particular interest to engineers (that is, intensity ranges and intensity discrimination, frequency discrimination, and the like). The material was well selected, and it is authoritative.

A section on decision making with respect to control-systems analysis should be particularly interesting to engineers, but it is an area in which my own competence is insignificant. Chapter 11, on human decision making, can be appreciated without a strong quantitative background. In controlling man-machine systems, incoming information leads to decisions which are converted into a response in terms of adjustments of movable controls or of verbal responses. These are considered in terms of the characteristics of the intended human-output information. In addition, information about the performance of the human being can be extracted by recording the electrical resistance of the skin or the electrical potentials that emanate from the heart, brain, or skeletal muscles. The fact that these techniques are traditional, pedestrian, and unimaginative emphasizes the immature state of the art from the point of view of biology. I found this to be the weakest section of the book.

Section E is devoted to an extensive discussion of machine and system design. A very large number of human engineering problems are presented, with emphasis on matching the properties of man to machine. This chapter should be of great interest to engineers who deal with problems of developing personal equipment, artificial environments, controls, and displays. The final section presents a brief overview of biotechnology.

In summary, this book contains a remarkable quantity of factual and conceptual material of interest to biologists, psychologists, and engineers who are concerned with problems related to the performance characteristics of human beings as an essential component of a man-machine system. It provides concepts and material for interesting reading and reflection by men with broad interests in any of these fields.

ROBERT F. RUSHMER
Department of Physiology and Biophysics, School of Medicine, University of Washington

Tamiya Volume

Studies on Microalgae and Photosynthetic Bacteria. A collection of papers. Edited by the Japanese Society of Plant Physiologists. University of Tokyo Press, Tokyo, Japan, 1963. xxiv + 636 pp. Illus.

Hiroshi Tamiya, the distinguished Japanese plant physiologist, was 60 years of age on 5 January 1963. His accomplishments include the founding of the Japanese Society of Plant Physiology and the initiation of its journal, *Plant and Cell Physiology*. It is particularly fitting, therefore, that the Society, with help from private industry and government sources, has edited and published, as a special issue of its journal, this commemorative birthday volume. The editing and the manufacturing of the book are well done.

The 54 reports on original research have, as their leitmotiv, the organisms —unicellular photosynthetic algae and bacteria—that have entered so prominently into Tamiya's own research. Scholars in laboratories throughout the world were invited to submit the papers, which were received by the editors during the early fall of 1962. Eight of the papers are in German, one in French, and the rest in English. A number of papers that arrived too late for inclusion in the volume will be published in future issues of *Plant and Cell Physiology*.

The volume is divided into six parts: taxonomy and cytology (8 papers); the physiology of growth and ecology (11); photometry and photochemical processes (14); photosynthetic pigments and apparatus (6); enzymic reactions and carbon metabolism (8); and phosphorus and sulfur metabolism (7). As one