Microbiology: Global Aspects

At any conference with a title as ambitious as "The Global Impacts of Applied Microbiology," and a subtitle, "A projection of the microbiological research of today to the needs of tomorrow," one would expect that papers delivered at the plenary sessions and technical papers presented at the panel sessions would differ widely with respect to subject matter, point of view, and pertinence. Such was the case at the conference on microbiology in Stockholm, 29 July–3 August, in which about 350 representatives from 30 countries participated.

The papers given at the plenary sessions fell roughly into two groups: technical reviews, and speculative discussions on factors that influence the rate and direction of growth of science and technology, the need for helping the underdeveloped countries and developing countries, and the problems encountered by such countries in adopting a science and technology based on presuppositions and value systems different from their own.

The reports at the panel discussions dealt (i) with the role of microorganisms in food spoilage and preservation, soil fertility, plant protection, and the production of essential amino acids, (ii) with microorganisms as food, and (iii) with related problems such as bioengineering, documentation, and information retrieval. Although applied aspects were emphasized, many of the papers dealt with basic problems of microbial physiology and genetics.

Despite the diversity and levels of discourse, the dominant concern was with problems of the so-called developing countries, particularly with the widening gap between the global rates of increase of population and the food supply and with the possibility of increasing the quantity and quality of food by the application of the principles of microbiology.

Some sense of unity was provided by the unquestioned assumption that microorganisms are a very important natural resource potentially available to all nations and that methods now exist and are continually being improved for controlling microbiological processes so that they can be exploited to meet human requirements and to help buy the time needed for attaining a balance between population increase and food supply.

The initiative for arranging the conference came from a group of microbiologists who feel that it is essential that super-projects such as the U.N. Conference on Science and Technology (Geneva, February 1963) be followed by meetings of biological scientists and other individuals who have the knowledge and imagination to be able to contribute to the evaluation of the biological problems facing mankind. It was felt that participation of social scientists and high-level science administrators was also essential.

The wisdom of this approach was adequately supplied by Abba Eban, Deputy Prime Minister of Israel, who opened the conference with a lecture on science and politics, and by Gunnar Myrdal (University of Stockholm) who discussed population and other problems of the underdeveloped countries. Eban said: "The total result in social terms of scientific progress in this age has been to bring about a simultaneous increase in salvation and disaster." He noted that although high-energy physics seems to open new vistas of abundance, its main result so far has been to sharpen the perils inherent in international tension, and that, because of medical science, which has been one of the factors responsible for the increase in the world's population, "we now face a dangerous tension because the growth of population is so much more rapid than the growth of resources." He also pointed out that the processes of scientific inquiry and most of its fruits are largely the inheritance of a minority of states with an established scientific tradition and technological dynamism, and that science and technology are making rich nations richer without having a corresponding impact on the underdeveloped states.

The responsibility for the danger of nuclear war, for the prospect of world famine, or for the gap between the advanced and the less advanced countries—the three cosmic dangers of the modern age—lies not with sciences but in our failure to determine the social direction of scientific progress. (This point is recognized in the report of the resolutions committee which recommends "that the biologists should assume a responsibility for preparing society for the application of modern genetics and physiology to constructive rather than destructive ends.")

Eban said further: "There are now, therefore, new preoccupations for statecraft of which previous generations never dreamed. Today, when the political leader deals with arms regulation, with agricultural development, with industrial progress, with automation, with the advancement of new states, with the claims and challenges of mass education, he finds himself confronted by problems which are created or at least transformed by science. There is, therefore, no room today either for a scientist without social conscience or for a politician without a basic understanding of the impact of science upon the life of nations and of the world community. Politicians can no longer afford scientific illiteracy."

Myrdal discussed the urgent need for scientific breakthrough if the underdeveloped countries are to avoid conditions of misery and destitution. He pointed out that the gap between the underdeveloped and the developed countries is widening at an accelerating rate. When colonialism ends, conflicts between ethnic groups break out and the adoption of research and technology is impeded because conditions are different from those which previously existed. He also noted that the problem of population increase is becoming more acute. The ethics of civilization demands control of disease even though it does intensify the population problem. Birth control must follow and in the advanced countries it has come as a private effort and not as a matter of government policy. There is a dire need for effective methods applicable and acceptable to the underdeveloped countries. Myrdal said that, from the standpoint of world trade, the position of the underdeveloped countries was worse than in the past and was getting even worse because, to cite one example, the advanced countries, through the application of science and technology, were developing synthetic substitutes for many of the natural products produced by the underdeveloped countries.

E. C. Stakman pointed out in his

keynote speech, entitled "Applied Microbiology in the Future of Mankind," that even in his most brilliant periods man has been relatively blind and therefore ignorant. He has been unable or unwilling to see and to meet the challenge of the times, and the consequences of his blindness have been disaster.

The conference was arranged by the Section for Economic and Applied Microbiology of the International Association of Microbiological Societies and the Royal Swedish Academy of Engineering. It was cosponsored by the World Academy of Art and Science and supported by the Swedish Government, UNESCO, CIOMS, IUBS, and private contributions. The papers given at the plenary sessions and the reports of the panel session will be published during the autumn of 1963. Officers of the conference were C. G. Hedén, chairman and M. Tveit, general secretary.

JORGEN M. BIRKELAND
Department of Microbiology,
Ohio State University, Columbus 10

Cardiovascular Disease

"Psychophysiologic Aspects of Cardiovascular Disease" was the subject of an interdisciplinary conference at Timberline Lodge, Oregon, 26–28 June. The conference stemmed from discussions between E. C. Andrus, chairman of the National Advisory Heart Council of the National Heart Institute, and various other officials of the National Heart Institute who felt that a systematic appraisal of this area, including prospects for future investigations, was desirable for two reasons. The first reason follows from two recent presidential addresses to the American Psychosomatic Society (by Erich Wittkower in 1960 and by Morton Reiser in 1961); the former expressed disappointment in the results of the past 20 years of psychosomatic research in this field, and the latter suggested that at the level of psychophysiological correlations within a given individual we may have to undertake such novel and difficult approaches as experimental manipulations of the individual's level of conscious awareness. The second reason is that the magnitude, complexity, duration, and cost of current and forthcoming investigations in the field pose unusual scientific and social problems that can be best solved through person-to-person investigations of the relevant issues.

The general questions posed at the symposium included: (i) What do we know about the relation of symbolic experiences to cardiovascular mechanisms and to cardiovascular disease? (ii) Who is working in this area and what kind of work is being done? (iii) What are the currents and directions in this area? (iv) What are the needs—methodological, conceptual, financial? (v) Where do we go from here?

The conference was arranged so that morning sessions dealt with research needs and goals suggested by clinical observations, while afternoon sessions dealt with methodological implementation of these needs. A final session attempted to digest and anabolize the transactions of the previous sessions. On the whole the symposium provided maximum opportunity for discussion and presentation of new and provocative data. The formal presentations included: "Psychological aspects of heart disease," Louis Katz; "A critique of aspects of methodological approaches to the role of the central nervous system in cardiovascular disease," George Burch; "Psychophysiologic aspects of blood pressure regulation: the clinician's view," Caroline Thomas; and "Psychophysiologic aspects of blood pressure regulation: methodological issues," Alvin Shapiro. A summary, "Synthesis and perspectives," was provided by Adrian M. Ostfeld and Stewart Wolf.

The disciplines represented included: neurophysiology (Birger Lofving, Sweden), statistics (Mindel Sheps), biochemistry (Theodore Sourkes), preventive medicine (Lester Breslow), mathematics (Murray Eden), Pavlovian psychology (W. H. Gantt), operant conditioning psychology (Orville Smith), pediatrics (Earle Lipton), psychoanalysis (Leon Moses), cardiovascular physiology (J. W. McCubbin), clinical hemodynamics (Jan Brod), pathology (Ralph Strebel), clinical cardiology (Bernard Lown), and psychiatry (David Hamburg). Among the 51 participants were a representative of the World Health Organization (Z. Fejfar) and of the National Heart Institute (Malvina Schweizer).

There was general agreement that verbal and other symbolic stimuli could affect cardiovascular functions as much as physical and chemical stimuli do. But there was general dissatisfaction with our present knowledge of the detailed steps between the symbolic stimuli and the final cardiovascular responses and with our ability to relate clearly to one another the autonomic, higher nervous system, and humoral components of these intermediate steps. Despite the plausibility of the proposition that discrete cardiovascular responses to intermittent symbolic stimuli become (with repetition over time) sustained cardiovascular disease, the solid evidence for this proposition remains feeble.

Investigators in different fields discovered that they could make important contributions to each other's work. Thus, a subject as limited as a segment of human superficial vein (Burch) could, if an investigator of personality traits wished, help make more explicit and precise the terms used by the student of personality traits. He had only to relate his language of personality description to the precise descriptions that can be made of the behavior of the segment of vein in the same person at the same time.

Personality theory need not always come from personality theorists. Lacey's careful studies of the autonomic system led him to a view of the relationship between baroreceptor activity and certain aspects of personality functioning (preoccupation with external environment or with internal events) which constitutes an alternative view of the hypertensive personality to that shared by most students of that subject. His view is a more general one, though it arose from a more circumscribed field of study.

New and ingenious methods are always appearing in problem areas thought inaccessible. Reproducible experimental study of the communication of subtle affective states in a monkey (and associated effects upon the cardiovascular functions of the receiver monkey) are achieved by conditioning and closed circuit television techniques (Miller).

Even though the explanation of the intermediate steps between intermittent symbolic stimuli and sustained cardiovascular disease may be far off (in the sense of clarifying the intermediate steps in the metabolism of glucose), it may be feasible by epidemiological studies on a large, expensive scale over a 6- to 10-year period. Such findings would establish that the sequence does, in fact, exist and that some presently suspected etiological factors are relevant to the disease outcome while others are not.

The conference may be judged successful in making known the work which is being carried out in this field and defining the state of our knowl-