

are now fully engaged in this programme; in another nineteen, planning has reached an advanced stage, and, in seventeen other areas—mainly in Africa—the Organization is assisting with preliminary work. Some idea of the complexity and scope of these campaigns is conveyed by the variety of the Organization's work on malaria as reflected in this report—a wide range of research, assistance with training, planning and organizing campaigns and, as the programmes advance, with evaluating and assessing their efficacy and results.

The World Health Organization's assistance to Governments for the control of yaws, smallpox and tuberculosis, leprosy and various diseases increased significantly during the year. Medical research was intensified on practically all communicable diseases, the main co-ordinated effort being centred on virus diseases and on bilharziasis.

The year 1960 was the first year of full implementation of the intensified programme of medical research. Although the programme is concerned mostly with communicable diseases, work has begun on cancer, cardiovascular diseases, radiation medicine and human genetics. It is made clear in the report that the Organization's role is primarily to provide services to research and to co-ordinate the work being done in national centres. "It is, I believe", writes the Director-General in his introduction, "a gratifying fact that much of the medical research supported by WHO has grown out of the Organization's current field programme and is being carried out by national institutes and national staffs".

For the World Health Organization, as for the United Nations, the emergence of new independent States brought a marked increase in membership. In planning for the future, account has been taken of the particular needs of these newer countries, so as to

ensure the most effective use of their often limited resources in the progressive development of balanced health programmes.

In most countries essential health work is being handicapped by shortage of trained professional and auxiliary personnel, and much of the Organization's work is concerned with education and training in one form or another. Under the Organization's fellowships programme, more than 1,000 fellowships were provided in the period covered by the report. In addition to details of the fellowships awarded for both group training and individual studies, the report gives information on the other aspects of the World Health Organization's work to further the training of professional and auxiliary health workers: courses, study tours, seminars and a variety of other meetings were organized, and experts were provided to serve as visiting teachers or as members of demonstrations and training teams. For example, in the first nine months of 1960, the Organization sent more than 160 nurses to help with nursing and midwifery training in forty-five countries.

In the field of environmental sanitation, emphasis was laid on the training of sanitary engineers and sanitarians, and on providing safe water-supply and waste disposal. In certain regions—Europe, for example—work was concentrated on river, lake and sea pollution and other problems resulting from the rapid growth of cities, such as air pollution. The growing use of atomic energy in power production, and of ionizing radiation in industry and medicine has given rise to several problems, and many Governments are becoming increasingly aware of their responsibilities in radiation health. The Organization's programme is orientated mainly towards assisting health authorities to strengthen their competence in radiation questions in order to meet these responsibilities.

## MEASURING INDIGESTION

**I**NVESTIGATORS in the food research group and analytical chemistry laboratories of the Stanford Research Institute have developed a method to measure the degree of digestibility of any food for a particular individual. Basically, one reason for the discomfort caused by certain foods is related to the bacteria flora that inhabit the intestines of all mammals. When a person eats a food he can digest only partially it is attacked, when it reaches the lower part of the small intestine, by organisms which digest the remaining material. These bacteria form hydrogen gas as a by-product in the process, and resulting discomfort depends on the amount of gas; this, in turn, depends on the constitution of the flora of that individual and the quantity of undigested food.

The project team reasoned that if gas pressure is present, the hydrogen should pass through the semi-permeable intestine wall into the blood stream. Because hydrogen is inert and therefore unchanged by body chemistry, the gas should eventually pass into the lungs and be expelled in the breath. They modified a gas chromatograph so that, if a bag is blown up by the subject, the hydrogen in the breath can be measured. By making the test after feedings of separate foods, they could determine what foods and how much are causing indigestion.

Some aspects of the investigation were sponsored by the U.S. Department of Agriculture and the Idaho Bean Commission. A unique application of the method was utilized by the latter organization and is outlined in a recent issue of *Research* (13, No. 1; January-February 1961). Beans in many individuals produce hydrogen and methane, which also are detectable by chromatography. A chemical and leaching process was developed by the food research group to make beans more generally digestible and greatly reduce gas formation, while not altering their taste. The breath-analysis technique was a useful tool in proving the bean treatment.

The individual digestive idiosyncrasies of animals, which cannot announce the fact that they have 'heartburn', may be detected by the chromatograph method. Various medical applications have also been suggested. For example, because intestinal bacteria populations increase rapidly by feeding on foods undigested in the stomach, the chances for future digestion problems are increased. With individual analysis, it may become possible to control the number of undesirable bacteria through selection of easily digested foods which will 'starve them out'.