

NUTRITION IN BRITISH COLONIAL TERRITORIES

NUTRITION in British Colonial territories was discussed at a conference arranged by the Nutrition Society and held at the London School of Hygiene and Tropical Medicine on March 2. The chairman, Colonel Walter Elliot, in opening the Conference, commented on the magnitude of the problem and the diversity of conditions in the various territories.

In his paper on "The Problem and the Principles Underlying its Solution", Dr. B. S. Platt gave population figures for the Colonial territories and cited examples of the variety of conditions under which these peoples live. Recent estimates of the total population of the British Colonial Empire state that it exceeds 66 million. Hong Kong, with about $1\frac{1}{2}$ million people in its small area, was contrasted with Nyasaland, where a population of similar size covers an area of 48,000 square miles; these territories also illustrate the striking differences encountered, in that the former is almost entirely dependent on imported foods and the latter on subsistence agriculture.

The existence of a nutrition problem can be determined in two main ways: (1) from clinical and related data; and (2) from a knowledge of the food supplies available. The prevalence of gross mal- or under-nutrition had been recorded for different territories before the War in Part 2 of the Report on Nutrition in the Colonial Empire¹, and there is no reason to think that the picture differs markedly now. The numbers of recorded cases of frank deficiency disease may not be large, but may well indicate the existence of widespread nutritional ill-health, single signs of which have been found to affect as much as two-thirds of some of the population samples surveyed clinically. Apathy is common and may often be associated with, if not a direct consequence of, poor feeding. Infant mortality in some territories is very high; for example, in Hong Kong, the rate is 327 per 1,000 births, and in Malta, 230 per 1,000. These rates, together with total mortality-rates and the prevalence of certain signs of inadequate nutrition, were shown in Ceylon to fall with an improvement in feeding during the period 1930-42, and after 1942 to rise again coincidentally with a deterioration in the nutritive value of the dietary. In an analysis of autopsies on 500 infants in Lagos², it was found that only about 3 per cent of deaths were directly attributable to nutritional disease compared with two-thirds due to respiratory infection; it was, however, recognized that there is a relationship between malnutrition and zymotic disease.

Turning to the question of food supplies, Dr. Platt pointed out that adequate production data are lacking except for the more highly developed territories, and that so far he had obtained satisfactory data only for Malaya (pre-war) and for several West Indian territories. The problems of collecting and interpreting food consumption data relating to Colonial territories were discussed.

He then went on to show how, when the existence and nature of the problem have been determined with the help of clinical surveys and data on food consumption, it is possible to make simple, precise recommendations which, if implemented, would undoubtedly lead to improvement in the state of nutrition of the population. Recommendations of this kind have been made for the West Indian territories³.

The methods by which a territory's dietary can be improved were discussed, emphasizing the importance of taking into consideration available and potential food supplies, whether from home production or importation. Factors involved in the improvement of food production include soil conservation and the use of fertilizers and crop residues; water for irrigation and fish culture; careful choice of crops to ensure balance and the cultivation of the most suitable varieties; efficient labour properly equipped; livestock in the right proportions to secure a balanced system of agriculture; pest control; storage, processing, transport and distribution. An outstandingly important factor in the maintenance of soil fertility is the return of crop residues to the soil. There is a strong case for limiting exports from tropical countries to products consisting entirely of carbon, hydrogen and oxygen. Dr. Platt also emphasized a difficulty which will have to be overcome in many places before progress can be made, namely, the pre-occupation of the women with time-consuming domestic tasks. It was found, for example, in one of the Nyasaland villages surveyed, that the women spent on an average seven hours a day on routine occupations, excluding special seasonal tasks and their agricultural work. It is obvious that until this burden is reduced, they will have little time to learn how they can improve their lot, let alone to put new ideas into practice. Suggestions of a simple character, involving some degree of specialization in village life, were made to show how this time expenditure might be reduced. Other equally important factors which received attention were conditions of land tenure, incentives, control of size of population, and the improvement of educational work and propaganda. Everywhere there is a need for more basic facts on which to found the food policies of the territories.

The key to the solution of all these problems is suitably trained personnel. A summary was given of the various agencies involved and the steps which are being taken at the present time to assist Colonial territories in framing policies for the improvement of nutrition.

The film "To-day and To-morrow"⁴ was then shown, illustrating the magnitude and seriousness of such problems as soil erosion, locust control, the proper use of water (for example, for irrigation), re-afforestation and the need for fertilizers. The film also demonstrated how problems of maintaining food supplies can be successfully tackled if sufficiently strong incentives are created.

Dr. H. S. Stannus, in a paper on "Malnutrition in Colonial Territories", Dr. N. C. Wright speaking on the "Relation of Animal Husbandry to Human Nutritional Needs" and Dr. Audrey Richards, in her paper on "Sociological Factors", expanded some aspects of the main theme.

Dr. Stannus illustrated the difficulties of interpreting clinical observations and stressed the need for a standardized nomenclature.

Dr. Wright gave figures which showed a ratio of livestock to human population greater for the Colonial territories as a whole than for the United Kingdom, for all livestock except pigs. He pointed out, however, that the distribution is very uneven, the livestock population being of high density in the predominantly pastoral areas, as contrasted with more settled agricultural areas. He put forward convincing evidence of the potentialities of native stock, the chief cause of its present inferiority being inadequate feeding. He argued that the improvement of human

nutrition depends on the improvement of supplies of feeding stuffs for livestock.

The importance of relating food habits, attitudes and other matters concerning the production, distribution and consumption of food to the social structure was discussed by Dr. Richards, who successfully presented the case for the inclusion of sociologists in collecting data on nutrition as a basis for development work. In this she was supported by Prof. R. Firth, who opened the discussion.

Mr. A. J. Wakefield admitted the preoccupation of Colonial departments of agriculture a few years ago with crops for export only. He stated that, from his own experience as inspector general of agriculture in the West Indies, he could endorse the importance of reorientating agricultural policies to include the nutritional needs of man.

In the general discussion, contributions were made by returned Service personnel; medical men returned from prisoner-of-war camps directed attention to the mass of material which has become available on almost every known sign of malnutrition and many new manifestations, together with data on the food intake. It was also pointed out that a great deal of information has been obtained in large-scale experiments on troops and other personnel during the War. Examples were given of the administration of vitamin supplements in the treatment of ill-health. The need to utilize all this material in shaping nutrition policies was stressed.

Further contributions emphasized the need for closer co-operation and co-ordination between the bodies concerned with nutrition and welfare in Colonial territories.

In summing up, Dr. Platt said he felt that the question of improving the feeding of animals could not be solved at the expense of supplies for human needs.

In closing the discussion, the chairman pointed out the need in peace, as in war, for the nations to co-operate in attacking the problems discussed at the Conference. In particular he stressed the vital importance of the use of power in various forms, which in fact amounted to a measure of industrialization.

¹ Nutrition in the Colonial Empire, First Report, Part II. Cmd. 6051. (London: H.M. Stationery Office, 1939.)

² Smith, E. C., *Trans. Roy. Soc. Trop. Med. and Hyg.*, **38**, No. 5 (March 1943).

³ Platt, B. S., "Nutrition in the British West Indies" (in the press).

⁴ Ministry of Information Film on the Middle East Supply Council.

PLANT PHYSIOLOGY IN THE U.S.S.R.

By PROF. ERIC ASHBY
University of Sydney

IN the Soviet Union research in plant physiology is being carried on vigorously. There is provision for it, not only in the Academy of Sciences and the universities, but also in some of the research institutes attached to commissariats. The following very brief account is incomplete, and should not be regarded as critical; but it will give some idea of the variety of work going on and the whereabouts of the principal workers. Where possible, references are given to papers in English or with English summaries; but much of the work reported here is unpublished, and I am indebted to many Soviet workers who have discussed their research with me and given me written notes about it.

Institute of Plant Physiology of the Academy of Sciences

The most important centre for research is the Timiriazeff Institute of Plant Physiology of the Academy of Sciences. This must not be confused with the Timiriazeff Academy, which is an agricultural college under the Peoples' Commissariat for Agriculture. The Institute was founded in 1890 in St. Petersburg. In 1934 it was transferred to Moscow, and it occupies part of the biological block on Bolshaya Kaluzskaya 33. During the War, the Institute was evacuated to middle Asia, and it has only recently returned. The director of the Institute is the veteran Academician Bach; but he is now nearly ninety years old, and the Institute is in fact managed by the acting director, N. A. Maximov, who is a corresponding member of the Academy.

Maximov has organised the Institute into ten laboratories, each with a leader and four or five assistants. The laboratories are as follows:

(a) *Photosynthesis* (L. A. Ivanov, corresponding member of the Academy). Work has been directed to the influence of internal factors on photosynthesis and on chlorophyll formation; and the increase of crop yield through carbon dioxide manuring. Katunsky, who is missing on active service, showed that photosynthesis depends on both phenotypic and genotypic characters. This dependence is generally masked by the controlling influence of external factors, and on that account some workers have wrongly assumed that photosynthesis is independent of type of plant and of climate. Katunsky has followed the photosynthesis of successive leaves during ontogeny, and he finds a temporary fall in photosynthesis at the time of flowering. Parallel with these studies, investigations have been made on changes in chlorophyll content during ontogeny. On the subject of manuring by carbon dioxide, Katunsky demonstrated that there can be increases in yield up to 0.3 per cent of carbon dioxide, and that the optimum time to add extra carbon dioxide is from the beginning of flowering to the end of the vegetative season. A summary of Ivanov's recent work will shortly be published in book form; his latest investigations have been on photosynthesis and yield¹. Since the return from evacuation, the laboratory has been working on the chlorophyll-protein-lipoid complex in chloroplasts.

(b) *Water Relations and Growth* (N. A. Maximov, corresponding member of the Academy). The two main lines of work in this laboratory are the study of drought resistance and the physiology of irrigation, and the study of age-cycles. Maximov has continued his work on the physiological basis of drought resistance. In an important recent paper (Maximov and Soykina²), he shows that the causes of drought resistance should no longer be sought in cell-size, as Iljin formerly proposed; and that suggestive results have been obtained by studying the effect of wilting on the permeability and the viscosity of the protoplasm. Wilting is followed by an increase in permeability, and Maximov considers that this increase is an important cause of damage from wilting. According to this view, drought affects plants primarily through its effect on protoplasmic structure. Stability of the permeability of protoplasm, under conditions of water shortage, would be an important index of drought resistance. It is of interest to note that Maximov is now writing the eighth edition of his text-book, and the second edition of his "Plant in Relation to Water".