NATURE

SATURDAY, AUGUST 9, 1930.

CONTENTS.

Editorial and Publishing Offices:

MACMILLAN & CO., LTD.,

ST. MARTIN'S STREET, LONDON, W.C.2.

Editorial communications should be addressed to the Editor.

Advertisements and business letters to the Publishers.

Telephone Number: GERRARD 8830.

Telegraphic Address: PHUSIS, WESTRAND, LONDON.

Science and Food Supply.

IN a celebrated address to the British Association in 1898, Sir William Crookes, discussing what he called the "Wheat Problem", predicted a world shortage of 17 million bushels of wheat in 1931, and went on to assert: "it is the chemist who must come to the rescue of the threatened communities. It is through the laboratory that starvation may ultimately be turned into plenty." The warning was dramatic, and created something of a sensation at the time. The anxiety, it is true, was not shared by such agricultural authorities as Sir John Bennett Lawes and Sir J. Henry Gilbert, but they would have been the first to endorse all that Sir William Crookes said about the importance of the scientific worker in securing the maximum return in agriculture.

This historic address was mentioned by Dr. Levinstein in his recent presidential address to the Society of Chemical Industry. Dr. Levinstein pointed out that if a shortage of wheat is unlikely in 1931 it will be due, not to better fertilising and increased yields per acre, but to a larger acreage under cultivation. The enormous production of nitrogenous fertilisers during the last thirty years has had little effect upon the wheat supplies, and has gone instead to produce sugar, potatoes, rice, and other commodities. The difficulty has been met by extending the zone within which wheat can be profitably cultivated. This has been done partly by the development of new varieties of wheat better adapted to difficult conditions than those previously known, partly by the better utilisation of moisture reaching the soil, and partly also by improved agricultural implements. Thus not only the chemist but also the biologist and botanist, the soil-physicist and the agricultural engineer, have played their part in averting the food shortage which Sir William Crookes believed to be impending.

In this period agricultural chemists have produced no spectacular successes like those obtained with artificial fertilisers in the middle of the nineteenth century. The new methods of crop production have been made possible by an immense amount of scientific research, the practical importance of which was often not apparent at the time. For this reason, although agricultural science stands in higher repute with farmers than ever before, the contribution which science has made towards the improvement of agriculture is far from being appreciated by the community. Lord Melchett was undoubtedly right when he asserted recently that the importance of the chemist as a prime contributor to the progress of civilisation is not yet realised, and this is notably true in the matter of food supply.

Even those who are aware of the part the chemist has played in developing the supply of artificial fertilisers by the fixation of atmospheric nitrogen, for example, or of his work as an analyst in detecting and preventing adulteration and in securing the purity of all kinds of foodstuffs, are unaware of the contribution of the biochemist and the important results of his study of the soil bacteria. In recent years the contribution of the chemist in the sphere of insecticides and fungicides has become as important as in the provision of fertilisers. At the last Imperial Agricultural Research Conference the need for a greatly extended chemical investigation of possible insecticides and fungicides for the control of diseases and pests was realised, and a resolution of the Conference recommended that an investigation of the whole chemical field should be undertaken by chemists working in collaboration with entomologists and plant pathologists. With the growth of intensive cultivation the control of plant pests assumes great importance, and the continuance of civilisation's power to feed the growing population of the world is largely dependent on the ability of the chemist and his fellow workers to protect our crops from such pests.

In a country such as Great Britain the adequacy of a food supply involves not only questions of production and protection of foodstuffs, but also their storage and transport, often for considerable periods. For the past ten years the Department of Scientific and Industrial Research has directed a number of investigations into the changes which occur in foodstuffs during cold storage. These investigations have already been of practical value in improving conditions of transport and storage of fruit and in checking wastage during long voyages from overseas. Success in the storage of fruit is now known to depend upon a close knowledge of chemical changes which follow severance from the tree and the effect upon them of temperature, humidity, age when gathered, soil, climate, etc. A relationship has been established between the chemical composition of an apple and its susceptibility to disease, and the first step has thereby been taken towards enabling the grower to control soil conditions so that the fruit possesses both better storage properties and greater resistance to disease.

Similarly, investigations at the Low Temperature Research Station at Cambridge have upset the accepted view that chemical reaction in tissues is almost completely inhibited in freezing and indicated the existence of a definite temperature zone within which the living muscle may be frozen and revert to its original condition on thawing. Other work on the conditioning of meat has indicated that the prejudice against frozen beef may be due to the use of inferior beef rather than to the effects of freezing, and researches carried out at sea in special trawlers have demonstrated the possibility of so improving the handling and transport of white fish that a higher proportion of the total catch can be handled in a 'fresh' and marketable condition after 10-11 days storage than was possible after 6-7 days by the old methods.

In such investigations not only the chemist but also other scientific workers have played their part. The majority of important advances in applied science under modern industry are the result of team work in which all kinds of scientific workers have co-operated, and equally with the chemist other classes of scientific workers are overlooked by the community. Thus scientific workers have already quietly averted a world shortage of foodstuffs which appeared to threaten us a generation ago. Until, however, the importance of their contributions are fully realised, the business or government of a country is unlikely to take the long range or scientific views of agricultural policy which Dr. Levinstein outlined.

For this position scientific workers are themselves at least in part to blame. With a wealth of material at their disposal—to take the report of the Empire Marketing Board as one example—they have done little to educate the community as to the contribution that science makes to the food supplies of the world, or to remove some of the pressing problems of food production out of the arena of political prejudices and debate into an atmosphere of impartial and scientific examination. Scientific workers must assume to a much greater extent the responsibility of leadership which their knowledge thrusts upon them, if mistakes of policy are to be avoided which prejudice the well-being of future generations. While there may be different opinions as to the precise manner in which science should exert a full and right influence on public affairs, there is little doubt that the recently revived Parliamentary Science Committee offers a valuable line of advance. Support of that Committee may not only provide a form for the expression of scientific opinion upon public affairs, but may also promote the participation of men of science in public life and their representation in Parliament, and even lead to the creation of the Ministry of Science which we have often advocated.