

JEALOTT'S HILL RESEARCH STATION.*

THE future of agriculture is bound up with the development of the fertiliser industry. Farming without manures, the exploitation of the natural resources of the soil, is characterised by large areas and declining yields; it is only rendered possible by cheap and abundant labour on one hand or a high degree of mechanisation on the other. The first step towards more permanent conditions and a higher level of production is usually the fixation of atmospheric nitrogen by the agency of leguminous crops, aided when necessary by the addition of phosphate and of lime. The use of animal manures follows. Then in the search for nitrogen, farmyard manure is enriched by the feeding of purchased feeding stuffs. At this stage the need for further phosphate becomes insistent, and we reach the level of the best British farming of the 'seventies.

In recent years in the older countries this system has been pushed one stage further by the scarcity of land, the introduction of crops which make a great demand on the soil, and the necessity of securing a high production per acre. On the lighter soils, particularly, the need for more potash makes itself felt, and for certain crops in the rotation further nitrogen is still necessary. For a time, by-product sulphate of ammonia and Chile nitrate of soda could provide the necessary nitrogen. In the War period and the years which followed, various processes of fixing atmospheric nitrogen were greatly developed, thus laying the foundation of an abundant supply of cheap nitrogenous fertilisers in all industrialised countries.

In the meantime, numerous field experiments in Great Britain and abroad showed that an increased amount of nitrogenous fertilisers could be consumed by farmers with advantage, particularly if supported by appropriate additions of phosphoric acid and potash. It was further shown that grass-land in intensively farmed countries, which hitherto had received phosphates, if it was manured at all, could also benefit from nitrogenous fertilisers under certain systems of management. The supplying of a range of nitrogenous manures suited to the varied conditions of Great Britain and the Empire and the working out of their economical and effective use in practice, is the task which the Imperial Chemical Industries, Ltd., has taken up. As the source of supply there is the huge synthetic nitrogen plant at Billingham-on-Tees, turning out as its main products sulphate of ammonia and nitro-chalk, the former being our leading source of nitrogen as regards tonnage and range of application, with almost a century of experience and experiments behind it; the latter, a new product consisting of ammonium nitrate and chalk, which combines the advantages of nitric and ammonia nitrogen. There is, however, the staff and equipment at Billingham to manufacture further products as the need for them may arise; and one may expect to see in due course the production of ammonium sulphate, and by inclusion of the natural potash salts, a range of high grade mixed fertilisers similar to those which are becoming a feature of the continental market.

To develop the old and to investigate the new an expert agricultural service is a necessary complement to the producing organisation. Imperial Chemical Industries' Research Station at Jealott's Hill, near Maidenhead, which was opened on June 28, is designed to meet this need. It consists of a farm of some 440 acres, and a well-equipped laboratory containing the usual departments for the study of the many-sided problems of plant and

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animal nutrition. The arable portion of the farm is devoted to experiments of modern design to test the effects of fertilisers on farm crops, with special reference to the use of I.C.I. products. In addition to the fertilisers mentioned above, ammonium chloride, urea, nitrate of lime, ammonium phosphate, and the German compound fertiliser 'nitrophoska', are being used. Experiments are also in view on the manuring of horticultural crops, a line of inquiry which has been somewhat neglected in the past but will assume greater importance in future. The grass-land is largely used for investigations and demonstrations of intensive systems of pasture management in which the use of generous applications of nitrogenous fertilisers is an essential feature.

This conversion of cheap inorganic nitrogen into the protein of young grass, and its further conversion into a saleable form by the agency of live stock, raises a series of practical and scientific problems which are being attacked energetically on the farm and in the laboratories at Jealott's Hill. The effects of the manurial treatment on the pasture itself from its botanical and chemical aspects is being worked out; the measurement of the digestibility of the resulting grass to various classes of stock is under investigation; while the question of how best to utilise the surplus which may arise in favourable seasons is being examined. At certain times of the year, hay-making is uncertain and troublesome. Two alternative methods are being tested: the making of grass silage, and the artificial drying of short young grass, which opens up the possibility of the production of home-grown concentrates or grass cakes. The latter process, the outcome of the work of the Cambridge School, is being followed out in detail, using experimental drying plants of various designs.

On the practical side, there are the agricultural problems which arise when any considerable change in management is made. These are being studied on the farm, and as they are successfully met they are demonstrated to visiting parties of farmers. Thus there are demonstrations of the utilisation of intensively treated grass by young cattle (baby beef) and by dairy cows. In each case a food relatively rich in protein is required. The economic side of these trials and the demonstrations is kept uppermost, and there is a special staff to work out and present this essential information.

With Jealott's Hill as a centre for direction, advice and examination of results, there extends a range of experimental centres and demonstration areas in Great Britain, the Empire, and in foreign countries where fertiliser tests are being made on practically the whole range of economic crops. In most cases the work is done in close co-operation with the existing official agricultural institutions both at home and abroad, and it is the policy of I.C.I. to make these contacts as real as possible.

Nearly seven hundred guests representing every branch of agriculture and its related industries were present on June 28 for the official opening of the Research Station by the Right Hon. J. H. Thomas, Lord Privy Seal. The weather conditions were ideal, and the arrangements for the comfort of the visitors were admirably carried out. The importance of agricultural research in Great Britain and in the Empire, and the part which the new research station is to play in this sphere, were set out by the Chairman, the Right Hon. Lord Melchett, and by other directors of the Imperial Chemical Industries, Ltd.

The Jealott's Hill Station will take up its work with the good wishes of the other institutions already established in the field of agricultural research.