

WHEAT RESEARCH INSTITUTE.

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GREENHOUSE.

The greenhouse at Lincoln was completed. It is lighted and heated by ordinary incandescent lamps, one 200-watt lamp to every square yard. The lights are adjustable so that they can be kept a foot or so above the plants they illuminate. During winter the lights are automatically switched on at 9 p.m. and off at 3 a.m., this timing being suited to the needs of the plants and to the times when current is cheapest.

Owing to building delays the first wheat seed could not be sown in the glasshouse until the middle of May. Important information on growing wheat in winter under glass has been obtained from Canada and the United States of America, but many details as to soil, humidity, temperature, and light had to be worked out for local conditions, and it is satisfactory that reasonable growth was obtained. In late August and early September heads were ready for crossing and 1,230 crossed grains were obtained. These filled and were ripe in October, and were immediately sown in the open; most of the resultant plants ripened in March. Thus two crops have been raised in the year, although the start was late.

The acceleration of the breeding process by the use of the greenhouse, especially when compound crosses are being made, is such that two years are saved out of the first three in the production of a new wheat.

The chief hindrance to the desired rate of progress in the greenhouse was the failure of the plants to tiller freely. More seeds will therefore have to be sown in the coming season, and to provide room for these a third section of the glasshouse, as originally designed, is now almost complete.

PLANT-BREEDING LABORATORY.

The genetics laboratory hitherto used at Lincoln is a converted building kindly made available by Lincoln College. A new and commodious laboratory of six main rooms has now been erected specially for the Institute's use. A fire-proof and vermin-proof room is provided for the storing of records and of the most valuable seed material.

WHEATGROWING PRACTICE.

The use of the header harvester is steadily growing, and now a stook-threshed crop on flat land in Canterbury is subject for remark. The last two seasons have been very suitable for the operation of the header. The advent of this method of harvesting has resulted in some changes in the distribution of varieties, those which are not suitable for heading tending to disappear from certain districts. For instance, Amuri County in 1936 sowed 33 per cent. of its wheat area in Hunters; in 1940 the proportion of Hunters was down to 2 per cent. The non-heading wheats are now tending to be restricted to two special areas: (1) Down country where irregular ripening makes heading unsuitable; (2) dairy country where threshed wheat straw has a special value.

Heading reduces harvesting-costs by 40 per cent. to 50 per cent. The Institute had much to do with the rapid spread of this method of harvesting: firstly, by showing that Canterbury's climate was as suitable to heading as that of many American States where heading was well established; secondly, by showing that wheat headed in good condition gave as good a flour as wheat harvested by older methods; thirdly, by providing a moisture-testing service which enabled farmers to judge accurately when their wheat was ready to head; and fourthly, by demonstrating methods by which wheat headed somewhat too early could be cheaply and conveniently padlock dried.

The Fields Division of the Department of Agriculture was good enough to arrange for the irrigation of parts of seven fields of wheat in the Levels irrigation area on plans agreed to after discussion with the Institute. Five of these were harvested, and the average increase in yield due to watering was about 8 bushels per acre. These fields were watered only once, and it is thought that if there had been two waterings, one earlier and one later than the one that was given, the increase would have been greater. More experience is needed to find out the best watering practice.

It was hoped that the increased yield of wheat might pay for the levelling and border dyking of fields ploughed out of old grass and about to be laid down in better grasses. This hope appears to be supported by the trial already made. The cost of applying the water and of harvesting the extra yield would amount to about 8s. or 9s. per acre, while the increased yield in this trial was worth 46s. The balance of 35s. is more than ample to pay for the levelling and border dyking. Farmers may thus find it pays to take a crop of wheat while the land is broken up in preparation for levelling.

WHEAT-BREEDING.

The new laboratory at Lincoln will facilitate early estimation of quality of wheats in the breeding lines.

On the field plots good yields were obtained over most of the area; this is due almost entirely to the drainage work last autumn. However, some plots were drowned out. The most valuable material lost was the F_3 of a cross Jumbuck by Cross 7, and it will take a couple of years to replace this promising cross. A large number of compound crosses and of crosses among high-yielding parents are now coming into yield trials.