

WHEAT RESEARCH INSTITUTE.

Advisory Committee : Professor H. G. Denham (Chairman), Mr. G. H. Hewlett, Mr. James Carr, Mr. W. W. Mulholland, Mr. C. J. Talbot, Mr. R. K. Ireland, Mr. W. S. Pratt, Mr. R. J. Lyon, Mr. C. E. Boon, Mr. F. H. Hawker, Mr. Burton, Mr. A. G. Cannons, Mr. A. Jones. Director of Research Dr. F. W. Hilgendorf.

The Institute, having now been just over two years at work, has reached the full development contemplated under its present organization. Its staff is complete, and all of its members are fully employed in those activities decided upon by the committee.

A comprehensive annual report of its work was published during the year, and gives detailed results of the varied schemes of experimentation embarked upon. Five thousand copies of a summary of the report were printed for general issue to farmers and others interested.

(1) *Wheat-breeding*.—This work is progressing satisfactorily at Lincoln College. The college supplies the land, horse-work, implements, and machinery, much of the labour, and most of the buildings, and undertakes many of the larger trials. The more exact work of crossing and making preliminary trials in hand-sown plots is undertaken by the Institute.

Last year there were some five thousand plots, including about twelve hundred varieties of wheat. Included among these was one which gives some promise of success for New Zealand conditions. It is from a cross Solid-straw Tuscan, the most widely used New Zealand variety, by White Fife, one of the highest-quality Canadian wheats. The cross was made in 1923, and the resultant lines have been reduced to fifteen, of which there is now enough seed for preliminary yield trials. All of these lines are of great evenness : they have short straw, solid straw, tight chaff, and rapid growth, and in all of these respects are equal, or perhaps superior, to Tuscan. In the yield trial only four replicates were possible ; so exact results are not obtainable, but the indications are that several of the lines are equal in yield to Tuscan. In milling extraction nearly all of the lines give considerably more flour than Tuscan grown in the same field, and in baking trials nearly all again give a considerably better loaf than Tuscan grown, milled, and baked under the same conditions. There is a fair prospect that one out of the fifteen selections may prove to be equal to Tuscan in both yield and growth qualities, and superior in milling and baking qualities. To find such a wheat was one of the main objectives of the Institute.

Preparations are now under way for the sowing of about ten thousand plots this year.

(2) *Milling*.—During the year 418 samples of wheat were milled on the experimental mill. These were samples of different varieties grown in special localities, of the same variety grown in different localities, or with different manures, &c., while many were millers' blends sent in for test. All of the flours from these millings were baked, and the loaves compared, so as to find out what are the best wheats, or the best conditions of growing them, in the endeavour to improve wheats to such an extent as to make New Zealand independent of foreign supplies.

(3) *Baking Tests*.—All the wheats mentioned in the preceding paragraph were baked, and, in addition to this, practically every flour-mill in New Zealand sends in to the Institute a monthly sample of its average flour. These samples are baked against a standard ; and the different millers are given the results, so that they may know if they are keeping up a uniform product. Some mills go beyond this, and send daily samples for baking ; and many mills send samples at odd times when there is any doubt as to the quality of their product.

Bakers also send special flours with which difficulties are being experienced ; and the bakers' organizations ask for the solution of special problems in procedure.

The use in bread of preserved milks has been extensively investigated, and loaves were baked with all kinds of milk. The result has been to define the conditions of preserving milk that give the best results for bakers' use ; and New Zealand is now preparing a dried skim-milk for bakers' use that is equal if not superior to the best milks prepared in other parts of the world.

The suitability of special wheats for the baking of brown bread and wholemeal bread also was investigated, and conclusions reached as to means of judging the value of different wheats for this purpose.

Altogether 3,460 loaves were baked under test conditions, and were judged and reported upon.

Chemical work : A total of 1,024 wheats were tested for moisture and protein : forty stock-feeds were completely analysed, and the mineral constituents of twenty-five wheats were determined.

(4) *Economic problems*.—The use of the header harvester in Canterbury is being closely watched by a committee of the Institute, costs ascertained, and the best methods of storing wheat after harvesting being investigated. Samples representing 200,000 bushels of wheat were tested by the Institute during the past harvest, and much advice given as to the proper state of the wheat for harvesting or forwarding to purchasers.

NOXIOUS-WEEDS-CONTROL RESEARCH.

Advisory Committee : Professor H. B. Kirk (Chairman), Mr. Q. Donald, Dr. F. W. Hilgendorf, Mr. A. H. Cockayne. Director of Research : Dr. David Miller.

From March to October, 1930, Dr. Miller was absent abroad, when he gave detailed attention to noxious-weeds-control research matters. A special report on this subject was prepared and presented on his return.

INVESTIGATIONS.

Blackberry.—Researches on the influence of *Coraebus rubi* upon blackberry were continued throughout the year, but little progress was made with the insect ; however, by a modification of the methods of handling the insect and weed more satisfactory results are expected. With *Coraebus* an