Two other lines of new wheats have approached the conclusion of their trials, and will be grown on a field scale by Canterbury Agricultural College this year.

A number of later crosses hold promise of raising both yield and quality, but they are not far enough advanced for field trials. The extent of the breeding-work is indicated by the fact that over sixteen thousand cross-bred grains were made in December, 1938, and that the number of different plots for the harvest of 1939 was over twenty-seven thousand.

Laboratory Work.

The quality of the wheat from the 1938 harvest was exceptionally good, and the flour throughout the year was of higher quality than for some years past. This might have been expected to lead to decreased demand for testing services, but, on the contrary, those demands increased, owing to the better appreciation of the service the Institute is able to render. The technique of testing flour has been improved owing to Mr. Hullett's visit overseas, and the method of reporting tests to millers has improved as the result of experience.

The rate of harvesting has increased greatly during the past ten years, this being due to many causes. A general shortage of wheat and new methods of marketing have played some part in this change, and the wide use of the " tin " mill, and especially the use of the header harvester, have worked in the same direction. There is therefore a tendency for farmers to deliver wheat out of condition to the stores, and the result is that the wheat is either rejected by the merchant or goes mouldy in the store. To combat this, action along three lines has been taken by the Institute.

The first is to test the moisture content of the wheat before it is harvested and advise the farmer when it should be harvested. Over three thousand samples were thus tested last year and, beside the work done in Christchurch, a branch testing station was opened at Ashburton and carried on for four or five weeks.

The second is to advise the farmer how to dry his wheat after harvest and before delivery. For this purpose observations were taken on the change in moisture content of wheat in sacks stored in various types of stacks in the field or under cover, and sketches of the best form of stack and grain drying shed were distributed to farmers.

The third was to devise a method of drying wheat which had been delivered to stores out of condition. This required investigation on a considerable scale. The method could be suitable only if it required little capital expenditure, because there are very few years in which drying is necessary, and if an expensive device were adopted a large amount of capital would be lying idle for most of the time. High running-costs would be much preferable to high capital cost.

With this in mind, Mr. Hullett, when on the Continent of Europe, investigated all systems of drying wheat in store, but paid special attention to those that involved only cheap modifications of plant that is normally present in a flourmill store. In the light of these investigations he devised a modification of an ordinary miller's bin, filled it with wheat, and blew air through the mass of wheat on all suitable days. A careful study of the moisture content and temperature of both air and wheat was necessary to secure the best results. In summer no heating or drying of the air is necessary in our climate, though both might be necessary if this method of wheat drying were to be used in winter.

As opportunity offers, new devices for testing the chemical, and especially the physical, characters of wheats are being elaborated. One of the chief of these is a kind of extensimeter, which is being constructed piece by piece as experience with its various parts shows that each is performing the service required of it.

Travelling Baker Expert.

In collaboration with the Wheat Committee, the Institute maintains a travelling baker expert, who visits periodically all the bakehouses in the country and gives advice as the general procedure in making the best use of New Zealand flours, and especially when cases of difficulty arise. An extension of this work is the School of Bakery, which is held in the Institute's laboratory for two months in the year. Each course lasts a month, and the students bake different flours under different experimental conditions, as well as listening to lectures, watching demonstrations, visiting flourmills, &c. Indications of the success of the school are afforded by the facts that there is a waiting list of sixty prospective students, and that so far most of the students have been of the grade of foreman or master baker.

Co-operation with other Bodies.

While the Wheat Research Institute has as its chief interests the best utilization of the wheats already in New Zealand and the breeding of new wheats of superior quality, it is inevitably interested in all aspects of the wheat industry except marketing. It is constantly referred to by growers and merchants on all sorts of problems regarding wheat, and it is advisable that it should have all the information needed or know where it is to be obtained.

For this reason the Institute some years ago set up a specialist committee, consisting of all the scientific workers on wheat from all Government Departments and from Canterbury Agricultural College, and this committee discusses all aspects of wheatgrowing. The Department of Agriculture gives assistance in three directions—(*a*) making of field trials of yield in great numbers and in many localities; (*b*) discussing and reporting on the progress of its seed-certification scheme as far as wheat is concerned; (*c*) providing monthly reports on the wheatgrowing conditions from all its field officers located in the districts concerned.