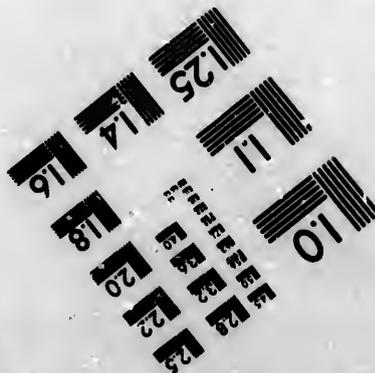
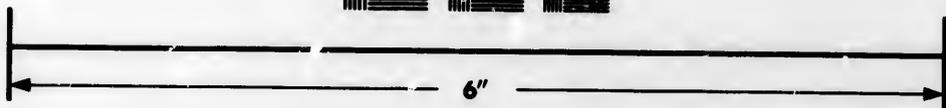
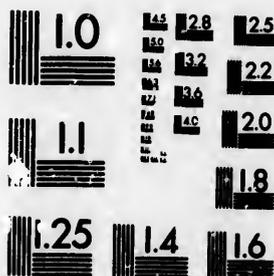


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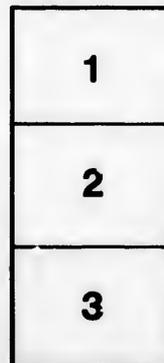
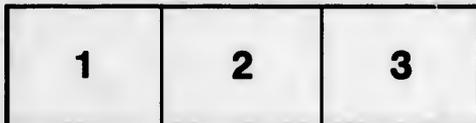
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VII.—*Observations on Early-Ripening Cereals.*

By WM. SAUNDERS, Ottawa.

(Read May 25, 1888.)

In July, 1885, there appeared in *Nature* a brief review of a paper published by W. Kowalewski, in the Memoirs of the St. Petersburg Society of Naturalists (XV. 1), in which were given the results of a careful series of observations on the periods of growth of various cereals in different parts of Russia, from the far north of Arkangelsk to the southern province of Kherson: from which it appears that in the higher latitudes the grain ripens in a shorter period than in the more southern districts, the difference in favour of the north, with spring wheat and oats, varying from twelve to thirty-five days. The intermediate regions show intermediate differences. While the author attributes these variations in the period of ripening partly to the influence of light during the long summer days in the high latitudes, he believes that the cereals in the north have undergone changes which have accommodated them to the conditions in which they are placed, or in other words, that the short seasons of quick growth have gradually induced an early-ripening habit.

Seeing that the present and prospective exports of wheat and flour are among the most important items connected with agriculture in Canada, the subject of cereals was one of the first to claim attention on the establishment of experimental farms in this country. It has been demonstrated beyond a doubt that the immense plains in the Northwest of Canada are capable of producing wheat of a very superior quality, and the area of land available for this purpose is so great that there is practically no limit to the quantity which may be grown, provided that the country be sufficiently populated and the period of growth in all parts long enough to permit of the maturing of the grain.

The early autumn frosts which have prevailed on several occasions in some parts of Manitoba and the Northwest Territories have proved very disastrous, and during the seasons of 1884 and 1885, early autumn frosts were so general and severe that the greater part of the wheat crop of the country was injured and much of it unsaleable, excepting at very low prices. Since 1885, the injury from frost has not at any time been so universal; nevertheless some loss occurs every season from this cause, especially in the more northern settlements. The effect of this oft-repeated experience has been discouraging, and farmers everywhere are anxious to obtain early-ripening sorts which are likely to mature in time to escape this threatened danger. Knowing that the introduction of an early-maturing wheat of good quality would be a great boon to the settlers in the Canadian Northwest, correspondence, under instructions of the Minister of Agriculture, was opened without delay with parties in Northern Russia with the object of obtaining for test in this country some of the acclimatized cereals referred to by Mr. Kowalewski, which had by long

cultivation accommodated themselves to the conditions in which they were placed and acquired this early-ripening habit.

From a seed dealer in Riga, who has made a special study of the cereals grown in Northern Russia, I succeeded in obtaining in the spring of 1887 one hundred bushels of a very promising variety of spring wheat known under the name of "Ladoga" which had been grown in lat. 60° near Lake Ladoga, north of St. Petersburg. This locality is 840 miles further north than the city of Ottawa, and north of the northern boundary of Lake Athabasca, in the Peace River country. The wheat arrived late in the spring of 1887, and although promptly distributed, it did not reach the farmers in Manitoba and the Northwest Territories until from two to three weeks after the bulk of their crop had been sown. 667 sample bags of this variety, weighing three pounds each, were sent to different parts of the Dominion, a large proportion going to the Northwest. The reports received from the parties to whom it was sent for test, place the period of ripening of the Ladoga wheat from ten to fifteen days earlier than the other varieties in general cultivation. Judging from past experience, this difference of time, if maintained, would probably place this variety of wheat beyond reach of danger from early autumn frost.

The earliness of the Ladoga wheat being in some degree established, its fertility may be considered, and in this respect it makes a fair showing, as will be seen from the figures in the following table of statistics :—

RETURNS RECEIVED.	NO. OF RETURNS.	YIELDS FROM 3lbs. SOWN.			TIME FROM SOWING TO HARVESTING. days.
		LARGEST. lbs.	SMALLEST. lbs.	AVERAGE. lbs.	
Manitoba.....	83	165	30	76½	102
N. W. Territories.....	68	236	21	85	105
British Columbia.....	3	112	64	85	93
Ontario.....	67	60	10	27	90
Quebec.....	15	40	6	19	85
Nova Scotia.....	15	89	20	53	102
New Brunswick.....	24	60	8	30	97
TOTAL AVERAGES.....				57	96

The season, both in Ontario and Quebec, was exceptionally hot and dry, hence the crops of all cereals were light and their ripening premature. On the Central Experimental Farm at Ottawa, a field of 14½ acres of this wheat, sown on May 7th, was harvested in 76 days from the date of sowing, but the grain was small and shrivelled, and weighed only 57½ pounds to the bushel; the yield was 11½ bushels to the acre. Under the excep-

tional conditions named, all the varieties sown ripened prematurely. Red Fyfe and White Russian in 84 days, and White Fyfe in 83 days."

The quality of the Ladoga wheat is another very important consideration. The very high character of the Red Fyfe wheat grown in the Northwest, and the excellent quality of the flour prepared from it, has created a demand for this wheat at the highest market prices, and it is of the utmost importance to the whole country that this good reputation be maintained. The Northwest of Canada, the Northwestern United States and the Northern provinces of Russia, appear to be the only countries in the world producing those high grades of hard wheat required by the best millers everywhere to mix with the softer grain from other countries; and the introduction of any wheat of a manifestly inferior quality, which would tend to lower the standard of Canadian wheat, would be highly impolitic. The object in view in introducing the Russian wheat referred to, has been to combine, as far as possible, good quality with earliness of ripening. The original importation of Ladoga is a hard wheat with an admixture of a few softer grains. It has been submitted for opinion to a number of experts, the majority of whom place it in a grade known as "No. 1 Northern", one grade lower than "No. 1 Hard;" and estimate its value as about four or five cents per bushel less than the best Red Fyfe, but some of the samples grown from this seed have improved so much in quality and weight as to entitle them to grade with grain of the highest quality.

The influence of climate is no doubt an important factor in the production of these high grades of wheat, and the excellence of quality is believed to depend on the presence of an increased proportion of gluten, but the relative quantity of this can only be determined satisfactorily by chemical analysis. For some months past, the chemist attached to the staff of the experimental farm, Mr. F. T. Shutt, has been engaged in making such analyses and a full report of the results he has obtained will shortly be published. The work is sufficiently far advanced to enable me to say that, although the relative proportion of gluten does not in all cases correspond with the grading of the different samples by experts, the results are very interesting and show that the Ladoga wheat, in this respect, compares favorably with the best varieties. Mr. Shutt's work shows that variations occur in the proportion of gluten, in the same wheat grown in the same climate, to an extent which would lead one to infer that soil also is an important agent in bringing about these modifications. The Ladoga wheat is not so bright in colour as the Red Fyfe, but whether this will be regarded as an objection by millers can only be determined by submitting a sufficient quantity of the grain to be ground into flour.

The following samples are submitted for inspection:—

- (1.) The original importation of Ladoga wheat, which weighs $61\frac{1}{2}$ lbs. to the bushel, and is graded as about equal to "No. 1 Northern."
- (2.) Sample of the same grown at Binscarth by Mr. G. L. Smellie, weighing 65 lbs. to the bushel, and graded by Mr. W. Ogilvie, of Montreal, as "Extra No. 1 Hard."
- (3.) Sample of the same grown on Poor Man's Reserve, Touchwood Hills, N. W. T., by Mr. H. Keith, weighing $64\frac{1}{2}$ lbs. to the bushel, and graded by the same expert, as "No. 1 Hard."
- (4.) Sample grown at Wolseley, by Mr. Wm. Gibson, who raised the largest crop of any person in the Dominion, 236 lbs. from three pounds of seed. Mr. Ogilvie regards this

as the best result of last year's growth, and it is placed by him in the class known as "Extra Hard." This weighs 63 lbs. to the bushel.

(5.) Sample grown at Edmonton, Alberta, by Mr. Donald Ross, which weighs 61½ lbs. to the bushel, appears to be touched with frost, but is graded as "No. 1 Hard."

(6.) Sample grown at Mowbray, Manitoba, by Mr. A. Johnston, weighs 64½ lbs. to the bushel, and has been graded as "Extra No. 1 Hard."

(7.) Sample grown at Guysboro, Nova Scotia, weighing 61½ lbs. to the bushel, and also graded as "No. 1 Hard."

These are the best samples which have been received. Among the others are some of inferior quality, one especially, the poorest sample from Manitoba, was grown at Plum Creek, Souris, Man, which Mr. Ogilvie grades as "No. 1 Spring," the fourth grade of wheat. This weighs 60½ lbs. to the bushel. Whether in this case there has been some mistake in the sample of seed sent, or whether the deterioration has been brought about by some peculiarity of soil, is at present undetermined. The samples received from Ontario and Quebec, owing to the unfavorable season, were imperfectly developed and shrunken, and on this account were not submitted with the better matured specimens for test or grading.

A second importation of Ladoga wheat has been made during the present season and 1,405 sample bags distributed. As this has been sent out in good time for seeding, the results of the tests for 1888 will be looked forward to with much interest.

Among the importations of this year, the following are specially worthy of mention. Onega wheat and Onega oats from lat. 62° in Northern Russia, Petschora barley from lat. 66°, and Polar barley and Polar winter rye from lat. 67° within the Arctic circle. These are believed to be the extreme northern limits at which cereals are grown in Europe in a continental climate. All of these varieties are from the interior of Russia. In addition to a limited distribution in the present settled portions of the Northwest, 150 samples of these cereals from high latitudes have been sent for test to different points in the great Mackenzie Basin.

Early-ripening cereals are also being sought from other countries in Northern Europe, from high altitudes in the Himalayas and elsewhere, and it is hoped that by persevering efforts in this direction, varieties will eventually be obtained which will ripen sufficiently early to relieve the settler in the more frosty districts from the discouragements experienced in the past, and result in the indefinite extension of the limits of the successful cultivation of cereals in Canada, and that thus the experimental farms may become an important aid in the settlement of these distant parts of the Dominion.

