

Quality of the Lower Grades of Wheat

Wheat of No. 4 Grade, and Sometimes of No. 5, gives a good and sometimes a better quality of flour than No. 1 Hard or No. 1 Northern.

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From year to year there is some discussion regarding the quality of the flour from the lower grades of wheat. Many of the larger milling firms have long ago recognized the fact that frequently the lower grades of wheat can be profitably milled and that they may even be used to strengthen the flour made from the higher grades. These have been the mill chemists, a part of whose duty it is to select the wheat of best quality and to select the stream of wheat going to the rollers so that the best results can be got from the wheat available. The operation in the smaller mill, however, is not done at all and very frequently continues its operations to the rolling of the higher grades of wheat. We have studied for many years the quality of the flour from all the grades and have found almost every season that No. 4 wheat and sometimes No. 5, gives as good and sometimes a better quality of flour than No. 1 Hard or No. 1 Northern. Sometimes the color is not quite so good, and, naturally, the yield of flour is lower. But even on this point there may not be a very wide difference as much will depend upon what caused the wheat to be graded down.

A No. 4 wheat will probably always contain some frosted wheat and if this wheat has been frosted when quite green, it is of low value or even worthless, but if the wheat was fairly well matured when frosted the injury is not so serious. Sometimes, however, the wheat is graded down for other reasons, as for instance, some years ago there was a lot of wheat with a wrinkled skin which was otherwise a good plump kernel. This wheat would probably not yield as much flour, but the quality of the flour made from it was not influenced by the wetting which was said to have caused the crinkly appearance of the outer part of the kernel.

Although we have some data on this point back as far as 1904 possibly it will be sufficient to quote from our records of the past six years. To reduce the amount of data, only the results of the baking tests of No. 1 Northern and No. 4 Commercial grade of each year are given below and only the essential factors are included. The baking tests were all made in the same way and an equal weight of flour was used in each of the tests. The difference in the quality of the bread made from the two grades is represented by giving 100 points each for the color, texture and appearance of the bread made from the No. 1 Northern and assigning a higher or lower figure according to the quality of the bread made from the No. 4 wheat. In every case the flour was made with our little experimental mill.

	Wet Gluten of loaf	Wt. of loaf	Vol. of loaf	Quality of Bread	Tex- ture	Ap- pearance
	grams.	grams.	c.c.	Color	ture	ance
1911 Crop.						
No. 1 N...	37.5	505	2580	100	100	100
No. 4 C. G.	38.3	518	2920	104	104	104
1912 Crop.						
No. 1 N...	41.2	523	2850	100	100	100
No. 4 C. G.	41.5	519	3030	98	101	105
1913 Crop.						
No. 1 N...	38.3	522	2620	100	100	100
No. 4 C. G.	37.3	528	2520	98	105	96
1914 Crop.						
No. 1 N...	39.9	500	2900	100	100	100
No. 4 C. G.	40.2	522	2740	95	90	95
1915 Crop.						
No. 1 N...	40.5	436	2370	100	100	100
No. 4 C. G.	37.1	496	2600	97	102	103
1916 Crop.						
No. 1 N...	39.9	509	2670	100	100	100
No. 4 C. G.	35.9	494	2800	97	102	104

All these tests were made with wheat that came to us through the elevators and thus represent the thoroughly mixed wheats as they come to the miller in the East. It will be noticed that the flour from the wheat of the crops of 1911, 1912, 1915 and 1916 gave a large loaf, thus showing greater expansive power. In every year but one the color of the bread from the higher grade of wheat was the better, but the opposite is true regarding the texture of the crumb of the bread, for in all but one year the texture of the bread made from flour milled from the

lower grade the texture was decidedly better. Frequently even No. 5 gave a very good flour.

It is, however, very doubtful if, one year with another, a miller would be justified in blindly buying the lower grades assuming that they would always give the desired results, for as stated previously, the reason for grading down may vary somewhat from year to year and the nature of the frosted wheat present may vary in the wheat of the same season. Usually the kernels of the lower grades are thinner and, consequently, more glutinous and thus yield a strong flour, although the yield of the flour will just as naturally be lower. It has been claimed by some that the value of the wheat is just in proportion as it will yield flour and there is a great deal to be said in favor of this contention, for the difference in the quality of the flour is not very wide. Yet, in some seasons and in some lots of wheat it does seem as though the lower grades furnish a sufficiently stronger flour to raise the value above the standard just given. An experienced miller may be able to pick out such a wheat, but the selection of such wheat is one instance of where a chemist is a help to his employer.

This year there are some peculiarities in the crop. The drought particularly in the earlier ripening sections of the Western Provinces caused a too rapid ripening of the wheat, with the result that there was a great deal of sound shrunken wheat. How small and light this wheat was is clearly indicated by the weight per bushel fixed by the Grain Standard Board for the special grades which it very wisely introduced this year. Namely 54 pounds per bushel for No. 1 special, 51 for the No. 5 special and 49 for No. 6 special. If mixed with the normal grades a very large percentage of this wheat would have been lost in the cleaning. When kept by itself it could be cleaned satisfactorily and it produced a good quality of flour. Some millers will not purchase frosted wheat at any price, but would and did purchase this sound shrunken wheat and thus a market was got for wheat which would otherwise have been largely lost. Furthermore, the normal grades were not disturbed. The following results of baking tests show the quality of flour made from these special grades. In these tests each special grade is compared with the corresponding normal grade.

	Wet Gluten of loaf	Wt. of loaf	Vol. of loaf	Quality of Bread	Tex- ture	Ap- pearance
	grams.	grams.	c.c.	Color	ture	ance
No. 4 ...	35.0	498	2800	100	100	100
No. 4 Special...	35.4	495	2700	97	98	97
No. 5 ...	37.3	505	2300	100	100	100
No. 5 Special...	40.2	505	2550	99	102	110
No. 6 ...	40.7	507	2450	100	100	100
No. 6 Special...	40.5	506	2460	98	105	105

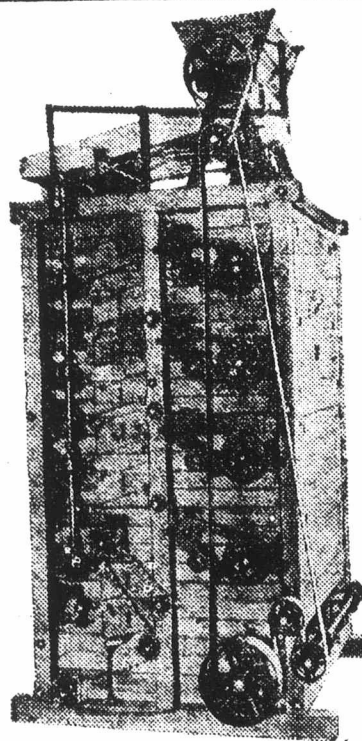
A further quality regarding these wheats is that the flour produced a bread that in color, texture and appearance was in some instances from 10 to 20 per cent superior to that made from the higher grades of wheat. If it were needed, the results secured from the shrunken wheat of these special grades confirms the statement that the thin grains of the normal low grades tend to strengthen the flour.

Recent developments confirm the wisdom of the Grain Standard Board in introducing the special grades this year. The first wheat marketed naturally came from the earlier sections of the country where the drought was most severe. From these districts there was naturally a great deal of this shrunken wheat. If this wheat had been mixed with the regular grades much confusion would have resulted. As the season advanced and the wheat from the more northern districts was marketed more frosted wheat and much less of the normal shrunken wheat has been inspected. If these had been mixed throughout, there would have been a continued change in the quality of the grades and a very large percentage of the sound shrunken wheat would have been lost. Or the grades would have been made the same by cleaning out this light wheat and nearly all of it would have been dockage and been used up as cattle feed. This year when the world's crop of wheat is so small it appears as though the Grain Standard Board had acted wisely in providing grades under which this uncommonly large amount of shrunken wheat could be marketed.

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