

to millers. Regarding the value of the results stated in Table I the following remarks may be made.

In no case of the purchased samples does the ash exceed 0.85 per cent, and the highest ash of the Montreal standard samples is 0.82 per cent. This demonstrates that there is no such thing practiced in Canada as the addition of inorganic substances to wheaten flour, and disproves most effectually the absurd rumour occasionally heard that very white and very finely ground gypsum is sometimes used for adulterating flour.

No indication has been found of the admixture in these samples of flour from any other or lower priced grain. Such an addition would in the case of maize flour be economically possible, but would result in lowering the quantity of gluten yielded by the sample. All those samples in which the percentage of dry gluten was less than 10 or in which the ratio of dry gluten to proteids was less than 1.2 to 1 have however been examined under the microscope without the discovery of any foreign starch. The number of samples so examined amounts to 37 and it was thought quite unnecessary to examine the others. It is therefore safe to conclude that no suspicion of adulteration by foreign grain attaches to any sample of Canadian flour.

The fineness of the various samples is indicated in columns 6, 7 and 8, which show the results of the bolting test. The quantity remaining on bolting cloths Nos. 10 and 12 indicates the coarser particles present which no doubt, when the flour is made into dough, require a somewhat longer time to take up the necessary quantity of water. It may here be mentioned that no attempt has been made to determine the degree of whiteness of the various samples. The differences are so extremely slight that Lovibonds Tintometer was found useless for the purpose. The finest product in bolting is usually a shade lighter in colour than that collected between No. 10 and 12 bolting cloths, but it was not considered of sufficient importance to attempt to record this in the case of each sample.

It is generally supposed that the value of wheaten flour for breadmaking purposes depends on the quantity and elasticity of the gluten which it contains. As regards quantity it would appear that flours are on sale in Canada which give widely different percentages on being subjected to the gluten test. The columns 3, 4 and 5 give the results yielded by this process, which consists in making up 25 grammes of flour with as much water as is necessary to make a ball of stiff dough. This is then allowed to rest half an hour in order that the flour particles may be completely permeated by the water. The ball is then kneaded by the fingers over a fine hair sieve and under a stream of tepid water, until all the starch is removed and the water passes off perfectly clear, when the crude or wet gluten remains, brown coloured, soft and more or less elastic. The latter quality should be noted, although there is no precise means of expressing the degree of elasticity. After all excess of water has been squeezed out of the crude gluten it is made to assume the form of a thin round cake, and weighed in the moist condition. It is afterwards dried in the water bath at 98°C, and the loss of water calculated on the wet or crude gluten. The three results for each sample were thus obtained, which are recorded in Table I. With reference to the percentage of water in the crude gluten, it has been said that it is highest in the flours best adapted for breadmaking, and that the water in gluteins from first class flours amounts to 70 p.c., while the medium grades yield gluteins containing only 62 to 65 p.c.* These statements are not supported by the numbers given under columns 3, 4 and 5, because none of the crude gluteins from the standard samples contain more than 64.6 p.c. water and none of the collected samples yield a gluten with more than 69.8 p.c. The percentages of dry gluten yielded by the Montreal standard samples range from 15.64 to 8.08 per cent. Among the collected samples are some whose dry gluten is beyond these limits. Although consisting essentially of the proteids of the flour, the quantity of dry gluten does not correspond to that of the proteids calculated from the nitrogen percentage given in column 2 of Table I., but is usually much higher. It contains, besides proteids, small quantities of fat, fibre and other substances.

As regards the quality of the various samples a wide variation is also fundamentally exhibited in the percentages of nitrogen given in column 1, which range from 2.23

* Observations on flours. Balland; Journal of the Society of Chemical Industry, 1895, p. 379.