The wheat which offers the chief exception in this consideration is No. 5 Frosted, in which, it is to be observed, that although the ratio between the weight of kernel and weight per bushel is maintained, the yield of 'straight' flour is less than from several wheats of heavier character. The yield of *straight* flour is determined on a colour basis and has in this instance been reduced by the discolouring action of the frost. Examination of the *total* yield of flour for this sample shows that the amount of flour obtainable is directly proportional to the weight of kernel and weight per bushel—and hence, from this standpoint, this wheat falls into line with the rest of the series.

It may be remarked that if these wheats were judged simply by the weight of kernel even the higher grades would be found below rather than above the average as ascertained in our laboratories for first class Red Fife.

COMPOSITION OF THE FLOURS.

The flours submitted to chemical examination in this investigation were obtained in the experimental roller mill and are those designated in Part I of this bulletin as *straight* flours, a definition of which is given on page 6. In addition to the determination of the moisture, protein, fat, fibre, and ash, as in the case of the wheats, the direct estimation of the gluten was made, the proportion of protein in the form of gliadin ascertained and the relative acidity taken.

Moisture.—The percentages of moisture in these flours are considerably less than those in the usual brands of flour upon the market. This is accounted for chiefly by the fact that after milling and before analysis these flours were exposed for some weeks (in small quantities, in bags) when the atmosphere was comparatively speaking, dry. (See note on page 14). This was done for the purpose of equalizing the moisture-content throughout the series and undoubtedly had the effect of drying the flours. The low moisture-content should indicate, other things being equal, high absorptive capacity and a concomitant large bread yield—and this was found to be the case. As the differences, however, between the flours in the percentages of moisture they contain are very small, it would be undesirable to draw any conclusions as to the relative values of the flours in this respect.

Protein or Albuminoids.—As stated in the accompanying table of analyses, the percentage of protein is found by multiplying the percentage of nitrogen in the flour by the factor 5·7. This number has been adopted of recent years as giving more accurately than 6·25 the composition of gluten, of which the protein of flour practically consists.

A study of these data at once shows that it would be practically impossible on this score to discriminate between these flours, the differences in protein-content being so small. It is interesting to note, however, that in this regard No. 1 Hard does not surpass the other grades, indeed it does not stand at the head of the list. As is well known, and as stated in the consideration of the wheats, the protein (gluten) is the most important constituent in determining the bread-making power of a flour. It has been generally held that flours of good quality should contain between 11 and 12 per cent (N x 5·7), but it has been shown by recent analyses in the Farm Laboratories that good bread-making flours may contain considerably less than this amount.

Gliadin.—The water insoluble protein of wheat flour, more commonly known as gluten, has been shown to consist essentially of two albuminoids or proteids, alike as regards their nitrogen-content, but differing in their physical characteristics. They have been named gliadin and glutenin. Gliadin is a glue-like, sticky body and serves to bind and hold together the non-adhesive, non-plastic glutenin (as well as the starch) when the flour is moistened and kneaded and allows the resultant dough to 'rise' under the fermentative action of yeast. It is stated by Osborne and Voorhees, Snyder, Fleurent