times been found convenient to start it at night and allow it to continue till morning unattended, which can be done without danger. Two tubes are extracted together each containing 2½ grammes, and, by drying and weighing these, the loss sustained by the flour is ascertained. The extract from these 5 grammes is deprived of its alcohol, and then divided into equal parts, one of which is used for determining the nitrogen by the Kjeldahl method, and the other for the estimation of the sugars. The sum of these determinations subtracted from the loss sustained by the flour gives the amount of non-nitrogenous substances extracted by the alcohol. The gliadin in the alcohol extract is ascertained on multiplying its nitrogen by 5·7. On deducting the gliadin from the total proteids the quantity present is ascertained of glutenin and other proteids insoluble in alcohol. From the relative quantities of total proteids and gliadin the figures given in the last column are obtained. How far this percentage of gliadin in the total proteids has any practical value cannot at present be decided. Among some of the collected flours it is as low as 28 per cent, but it has to be remembered that some of these were selected for closer examination because of their abnormal characters in other respects.

It may be stated that the average sample of dried gluten referred to above was subjected to the same examination as the samples in Table II and gave the following results :—

	Per-centage.
Total nitrogen	
" proteids (N + 5·7)	12·40
Moisture	70·68
Fat	3·68
Alcohol extract, containing—	0·36
Reducing sugar stated as dextrose	0·43
Sugar after inversion stated as sucrose	0·41
Gliadin (N of alcohol extract x 5·7)	5·52
Non-nitrogenous substances	7·92
Water extract	2·72
Glutenin and other proteids insoluble in alcohol	65·15
Total ash	2·72
Starch and fibre (by difference)	11·09
	100·00

These results were confirmed by an experiment made on crude or wet gluten. From this it appears that dry gluten contains on the average only 70·68 p.c. of proteids and that of these only 5·52 parts are soluble in alcohol. Since the proteids in wheat flour contain from 32 to 58 p.c. of gliadin or alcohol soluble proteid, it would appear that in the gluten test a considerable percentage must be carried away by the water. If the proteids in the dry gluten operated on had contained say 45 p.c. of gliadin then 31·95 p.c. of the gluten should have been extracted by alcohol ; whereas the total alcohol extract is only 14·28 and of this only 5·52 is gliadin. It may, however, be the case, as has been maintained by other observers, that gluten as such does not preexist in flour, or that its constituents enter into a state of more intimate combination under the influence of water when the flour comes to be made into dough.

The present report is to be regarded as the first contribution from this laboratory on the analysis of flour. Unfortunately I am at present unable to say with certainty in what respects all the results now submitted coincide with or illustrate points in the miller's practical experience. I hope, however, that this report, if published, may attract the attention of practical men, and that I may hereafter have an opportunity of consulting with them and possibly of reaching more definite conclusions.

I have the honour to be, Sir, your obedient servant,

THOMAS MACFARLANE,
Chief Analyst.