therefore, seem reasonable to conclude that the higher the proportion of dry gluten to the wheat proteids or true gluten, the greater is the "strength" of the flour, the firmer the gluten and the less its liability to lose proteids in the washing.

Of late years some authorities have come to the conclusion that a determination of the gliadin in flour is one of much importance. As long ago as 1898, Dr. Emile Fleurent* wrote thus on the subject:—'The gluten of wheaten flour consists of a mixture of two principal products, the one glutenin, a pulverulent matter; the other gliadin, a viscous sticky flowing substance. It is according to the relative proportions in which these two substances enter into the constitution of different glutens that the latter owe their greater or lesser degree of elasticity and the irregular manner in which they behave during the process of fermentation and baking. A gluten very rich in glutenin is dry and short, it does not rise easily and gives after baking a compact mass; a gluten too rich in gliadin behaves well during fermentation because it is soft and yielding, but, in baking the gliadin dissolves before coagulating, the gaseous products escape, the dough spreads itself and collapses forming a scarcely porous mass and giving the appearance of badly raised bread.' Allen* states that "so far as known, wheat is the only seed the flour of which yields a tough elastic gluten-mass on treatment with water. It is the gliadin which imparts to wheat-flour the property of forming a stiff, elastic dough, capable of retaining vesicles of gas, and thus producing a light and porous loaf.' Not only from a scientific point of view has a determination of the gliadin in wheaten flour been thought desirable but practical millers in the United States have deemed the matter to be worthy of attention and have endeavoured to ascertain the percentage of this proteid in the wheat they purchase and the flours they manufacture. Reference has already been made to Prof. Snyder's process for this purpose. On the other hand doubts have been expressed as to the utility of such a determination, and, in a very recent article on flour†, Hans Stein, a millowner in Silesia remarks that Fleurents method of separating gluten into its constituents had led to no comprehensible results. Nevertheless from the point of view of the ordinary miller and consumer it seems desirable to attempt the estimation of gliadin and to make closer analyses of wheaten flour for the purpose of ascertaining the essential differences in the qualities of the various flours found on the market, and the value of the names attached to the samples which are each year put forward as standards by the representatives of the grain trade.

It was found impossible to subject all the samples collected to this closer examination but a selection was made from among the samples described in Table I, and the results of their analysis are given in Table II, most of the work connected with which was done by Miss S. E. Wright. The headings in this table explain themselves for the most part, but it seems necessary to describe briefly the manner of operating, and explain how the results tabled under Alcohol Extract were obtained. In order thoroughly to expose the particles of flour to the action of the various solvents, it was distributed through crysotile fibre (Canadian asbestos) placed in so-called Macfarlane tubes which had previously been furnished with a filtering bed. The tube used has a total depth of 75 mm. of which 15 mm. are occupied by the tubulature at the bottom. The body of the tube is 60 mm. long with an outside diameter of 40 mm. A small piece of fine wire gauze is placed over the tubulature and upon this a small quantity of crysolite fibre. Over this a fine filtering bed is laid by pouring into the tube, placed over the water pump, a small quantity of pulp made of hornblendic asbestos, similar to that used for the Gooch crucible. The rest of the tube is filled up with crysotile fibre, through which the flour submitted to analysis is distributed. After drying and extracting with petrolic ether, the tubes are treated in the extraction apparatus with alcohol of 60 per cent by volume. In this as in the fat extraction, the solvent is boiled on a plate heated electrically, and thus all danger from the breaking of a flask and the inflammability of the solvents avoided. On boiling the 60 per cent alcohol in the lower flask it returns from the condenser of a strength varying from 80 to 85 per cent by volume and percolates the tubes. The extraction is completed in seven hours, but it has some-

* Manuel d'Analyse Chimique, p 310.

* Organic Analysis IV, p 75. † Zeitschrift für Untersuchung der Nahrungs und genussmittel, 1904, p 730.