SOME ANALYSES OF OATMEAL.

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VERY meagre information is given in easily accessible English books of reference on the subject of oatmeal. In Thorpe's "Dictionary of Applied Chemistry" the average is given of nine analyses by König (chiefly), and also the average of six analyses of American oatmeal by Johnson, from the Report of the Connecticut Agricultural Station for 1888. In the two averages the proportions of albuminoids (nitrogenous substances) are given respectively as 15.0 per cent. and 14.7 per cent., and the proportions of fat as 6.6 per cent. and 7.1 per cent. In Wynter Blyth's "Manual of Foods" the mean composition of oatmeal is given, showing 11.73 per cent. of albuminoids (nitrogenous matter) and 6.04 per cent. of fat. In Church's manual, "Food," an analysis of Scotch oatmeal is given, showing 16.1 per cent. of albuminoids and 10.1 per cent. of fat, and one of Irish oatmeal showing 14.8 per cent. of albuminoids and 8.8 per cent. of fat.

A short time since I happened to have a number of samples of oatmeal submitted to me for analysis as to genuineness under the Sale of Food and Drugs Act, and I took the opportunity of making a proximate analysis of each, thinking that the results might possibly be useful to myself or to others for subsequent purposes of reference, and in pursuance of this idea I have brought the results together in the following table.

I may mention that the figures given in the column headed "Albuminoids" are obtained by multiplying the percentages of total nitrogen by 6.25, and do not express true albuminoids as distinguished from other nitrogenous bodies.

The indigestible fibre is obtained in the way ordinarily employed in the analysis of feeding stuffs, and the figures in the column headed "Starch and other Digestible Carbohydrates" are obtained merely by "difference."

Thirteen of the samples were what would in common language be described as "fine oatmeal," six were of various grades that would ordinarily be described as "coarse oatmeal," while eight samples represented proprietary preparations in common use, consisting of crushed or flattened oats rather than of what is ordinarily described as oatmeal.

It will be seen that the albuminoids, calculated by multiplying the percentage of nitrogen by 6.25, varied from about 13 to over 18 per cent. In ten cases the proportion of albuminoids did not exceed 14 per cent.; in ten cases it was from 14 to 15 per cent.; in five cases from 15 to 16 per cent.; and in two cases over 18 per cent. In the two cases in which the albuminoids reached 18 per cent., the proportions both of ash and indigestible fibre will be seen to be large, as though the proportion of farinaceous substance to integument was smaller in these cases.

As regards oil or fat, it will be seen that in no case did the proportion fall as low as 7 per cent. In five cases it was between 7 and 8 per cent.; in eight cases between 8 and 9 per cent.; in ten cases from 9 to 10 per cent.; in two cases between 10 and 11 per cent.; and in two cases a little over 12 per cent.

	Moisture.	Oil.	Albu- minoids.	Starch and other Diges- tible Car- bohydrates.	Indiges- tible Fibre.	Total Ash.	Ash in- soluble in Dilute Hydro- chloric Acid.	Nitro- gen.
Fine oatmeal ...	9.07	9.53	16.00	60.86	2.07	2.47	.17	2.56
" "	9.10	8.95	14.81	63.71	1.50	1.93	.07	2.37
" "	9.53	8.63	13.06	65.65	1.30	1.83	.07	2.09
" "	9.17	9.17	13.62	64.94	1.20	1.90	.17	2.18
" "	9.00	9.23	12.94	65.76	1.10	1.97	.10	2.07
" "	8.83	12.23	18.19	54.65	2.20	3.90	.10	2.91
" "	9.00	8.60	14.00	65.46	1.17	1.77	.10	2.24
" "	8.27	10.63	14.44	62.79	1.70	2.17	.13	2.31
" "	9.10	9.97	13.94	63.16	1.70	2.13	.13	2.23
" "	8.60	12.33	18.44	54.40	2.20	4.03	.27	2.95
" "	8.83	8.67	13.12	66.31	1.20	1.87	—	2.10
" "	8.20	9.70	15.31	62.09	1.80	2.90	.17	2.45
" "	8.33	9.37	14.93	63.81	1.43	2.13	.03	2.39
Coarse oatmeal	7.97	8.77	15.18	65.15	1.03	1.90	.07	2.43
" "	9.00	10.23	13.06	65.07	.87	1.77	.10	2.09
" "	8.33	9.07	14.31	65.25	1.07	1.97	.07	2.29
" "	8.43	8.73	15.46	64.51	1.07	1.80	.07	2.49
" "	7.93	9.00	14.93	65.04	1.13	1.97	.10	2.39
" "	9.17	9.37	13.69	64.84	1.13	1.80	.07	2.19
Crushed or flat- tened oats ...	8.70	7.57	14.93	66.13	.97	1.70	.10	2.39
" "	8.17	7.80	14.44	66.82	.87	1.90	.10	2.31
" "	8.57	7.87	13.94	67.02	.87	1.73	.07	2.23
" "	8.93	8.43	14.44	65.50	.87	1.83	.07	2.31
" "	9.03	7.63	14.56	66.21	.80	1.77	.07	2.33
" "	9.27	9.30	12.68	66.21	.87	1.67	.07	2.03
" "	8.77	8.17	15.18	65.24	.87	1.77	.07	2.43
" "	8.60	7.53	14.81	66.12	1.17	1.77	.07	2.37

The "fibre" showed variations from 0.80 to 2.20 per cent., and the ash from 1.67 to 4.03 per cent.

DISCUSSION.

Mr. LING inquired whether any determinations had been made of the furfural-yielding carbohydrates.

Mr. CHAPMAN (Hon. Sec.), in the absence of the author, said that the carbohydrates appeared to be represented by the two items "indigestible fibre" and "digestible carbohydrates" (the latter of which was obtained by difference), no further differentiation of the carbohydrates having been made.

Mr. DIBDIN inquired whether all of the samples were genuine. So high a proportion of albuminoids as 18 per cent. seemed to point to some abnormality.

Mr. CHAPMAN said he was informed that all the samples were genuine.

Mr. HEHNER said that, in examining a specimen of one of the largely advertised preparations of crushed oats, he had found, rather to his surprise, that while the fat of oats and of fine or coarse oatmeal was largely composed of free fatty acid (as in the case of finely crushed seeds containing fat), the fat in this particular kind of oats contained practically no free fatty acid. The material had evidently undergone some process of treatment to neutralize the free fatty acid, somewhat in the same way in which cocoa was treated with ammonia to render it soluble; and this might possibly account for the high nitrogen contents of one or two of the samples referred to in the paper.

The PRESIDENT (Dr. VOELCKER) said it was certainly of great advantage that figures of this kind should be collected, so that there would not be the necessity of referring always to foreign authorities. At the same time, he had often felt that the mere collection of analytical results of food materials, without definite information as to the source from which the materials came, or of the circumstances under which they were produced, was likely to lead to a great deal of misapprehension. It was most valuable to have extended investigation into samples that had been produced in particular ways and under known conditions. If, for instance, in the present case information were available as to whether the terms "fine oatmeal," "coarse oatmeal," and "crushed or flattened oats," were simply names that happened to be put upon the samples in the course of collection, or whether they represented intrinsic differences between the different materials, it would enable some conclusion to be drawn as to how the average composition altered according to the more or less thorough removal of different portions of the grain. It was well known that in wheat, barley, or other cereals the removal of the different layers which covered the inner part of the grain made an enormous difference in the percentage of fat, and also in the nitrogenous constituents of the grain. The question of whether grain was highly nitrogenous or highly starchy depended upon two main conditions. The first was what was known as "maturation," or, in other words, the condition of things at the time of ripening—whether the grain had ripened rapidly, or whether the development and laying up of starch had been a gradual process. The second factor—a factor which, he thought, exercised more influence than it had yet been credited with—was the kind of soil upon which the particular grain had been grown. From the experience that he had acquired within the last two or three years in the growing of grain under different conditions, he was convinced that in the case, for instance, of wheat grown on the same soil and from the same variety of seed, hard wheat or soft wheat might be obtained according as the season was a rapid ripening one or one of mild and steady growth. If the weather were very hot just at the time of ripening, the plant was highly nitrogenous, and a "steely" grain was the result; whereas if the ripening were gradual, a more starchy and less nitrogenous grain would be obtained. Then, again, in growing the same seed—wheat, for instance—on two different soils, it might almost be said that it was possible to transform a soft wheat into a hard one, and *vice versa*. Such factors as these, therefore, must influence very much the value of tables of analytical figures, and render desirable more definite information as to what the particular products are, how they have been produced, and what is the influence of the surrounding conditions in altering their composition.