

SOMERSET HOUSE ANALYSES.

BY O. HEHNER, F.C.S., F.I.C.

Read before the Society of Public Analysts on the 16th November, 1881.

On September 12th a sample of milk, taken on the same day by the Inspector of the Town Council of Derby, was submitted to and analysed by me with the following results:—

Specific Gravity	..	..	..	..	..	..	1027·4
Solids not fat	..	..	..	..	..	..	8·37 per cent. by weight.
Fat	..	..	..	..	..	..	3·49
Total solids	..	..	..	..	..	..	11·86
Ash	..	..	..	..	..	..	0·65

The duplicate analysis gave total solids 11·97, and ash 0·66 per cent.

On the ground of these figures—the specific gravity, solids not fat, and ash—all being low, I certified the milk to be adulterated with 10 per cent. of water.

The results of the analysis were indirectly corroborated by the inspector, who informed me afterwards that his attention had been directed to the fact that the person who sold the milk to the vendor had, on a previous day, been seen to add water to the milk, and that in consequence he purchased the sample.

The vendor asserting, as was doubtless correct, that not a drop of water had been added by her to the milk, the sample was sent to Somerset House, 26 days after my analysis was made.

Before giving their certificate, the Excise chemists requested the magistrate's clerk to give them information as to a number of points, “as the case presented some peculiarities.” They specially wished to know whether the milk was the produce of a single cow or of a number of animals, and upon what kind of food they were fed, and were informed that the milk was from a well-fed herd of 30 cows, grass with a few grains forming the food.

On October 19th the following certificate was received:—

“The sample of milk referred to in the annexed letters, and marked No. 7, was received here on the 8th inst. The sample was securely sealed.

“We hereby certify that we have analysed the milk and declare the results of our analysis to be as follows:—

Solids not fat	..	..	..	..	..	..	..	7·89 per cent.
Fat	..	..	..	..	..	..	..	3·38
Water	..	..	..	..	..	..	..	88·43
								100·00
Ash	..	..	..	..	..	..	..	0·74

"After making the addition for natural loss arising from the decomposition of the milk through keeping, the amount of solids not fat is not lower than is found in genuine milk.

"The percentages of fat and ash are each equal to that found in genuine milk of good quality.

"From a consideration of these results, and of the particulars supplied, we are not prepared to affirm that water has been added to the milk.

"As witness our hands, this eighteenth day of October, 1881.

"(Signed)

J. BELL.

G. LEWIN."

It will be seen that the fat is slightly higher than in my analysis, whilst the total solids have diminished but little. Fermentative damages cannot have taken place to any great extent, doubtless owing to the cold weather prevailing during the period the sample was kept.

The certificate is remarkable in several respects. "After making *the* addition for natural loss." Does any chemist believe that there can be made a fixed addition for loss by decomposition? Fermentation is influenced by many circumstances, and it is not only impossible to make any real correction sufficiently accurate to corroborate or contradict the analysis made upon a sample when fresh, but it is much less possible to make a *fixed* addition or correction. Surely chemists who venture to speak of such corrections in such a manner must have considerable confidence in themselves or their powers.

"From the particulars supplied!" The particulars supplied, if they gave any help in coming to a conclusion at all, testified against the genuineness of the sample, and not in its favour.

The solids not fat being very low the percentages of fat and ash can have furnished the only guidance. Now, the amount of fat goes absolutely for nothing, milk much richer in fat having been found watered. Besides, it is well known that the fat rises as milk becomes old, nitrogenous matter furnishing fatty substances. The ash alone remains as safe measure of the quality of the milk.

Having made my analysis very carefully, and obtained results agreeing well, I felt confident that the amount of ash found by the Somerset House Chemists could not be correct. I did not allow the heat requisite for incineration to rise to redness, and notable loss by volatilisation was out of the question. I, however, repeated the ash determinations, and found in two very carefully performed experiments—Ash, 0.67 (1) and 0.67 (2). The fat had further risen to 3.89 per cent., the solids not fat fallen to 4.22, when the sample was analysed a few days ago (October 4th). The loss of substance by fermentation explains the very slight and insignificant rise in ash.

I am, therefore, in a position strongly to affirm the accuracy of my ash determination, four successive results agreeing as well as they can be expected to agree; and I do not hesitate to declare the only figure, upon which our Court of Appeal could scientifically have relied, to be erroneous and misleading.

Every indication in my analysis pointed in the same direction: the specific gravity, solids not fat, and the ash. On the other hand, we have only the ash, apparently contradicting any results. Public Analysts can form their own inferences from these facts.

MR. J. FALCONER KING, F.C.S., Analyst to the City of Edinburgh, has been appointed Public Analyst to the Burgh of Galashiels.