

campholytic acids. This furnishes quite conclusive proof that the formula for camphor proposed by Armstrong* is not correct.

The preparation of the acid, $C_6H_8O_3$ $\left\{ \begin{array}{l} CH_3 \quad 1. \\ CO_2 \quad H \quad 2. \\ CH_3 \quad 3.7 \end{array} \right.$ has been undertaken and

by a study of its derivatives it is hoped to secure proof of the truth or falsity of Collie's† formula for camphoric acid.

NOTE ON MILK INSPECTION. BY GEO. W. BENTON.

The milk supply of cities is becoming a matter of scientific interest. Formerly milk sophistication consisted of skimming or watering or both. More recently various well authenticated rumors of the employment of chemists in the preparation of adulterants, and the marketing of preparations which enables the creamery to substitute foreign fats for milk fats have caused increased attention and greater care in their examination. The inspector, devoid of scientific skill, relies upon the lactoscope, the lactometer, the hydrometer and the Babcock machine, instruments sufficiently accurate and reliable for the cases of skimming and watering for which they were made, but entirely unreliable when taken alone in the detection of the preparations made by chemists for the express purpose of deceiving those using the instruments.

In my two years' experience in the work of milk analysis, abundant evidence of the untrustworthiness of ordinary inspection came to my notice. Besides the watered and skimmed milk, samples of pure cream, common herd and Jersey milk, were passed upon and pronounced suspicious by the ordinary methods in the hands of the inspector. And, finally, it became necessary, in view of the fabrications employed, to do away with such tests, and subject everything to a more searching examination, as the only sure way to get at the truth.

A case in point came under my observation in December, 1892, as follows:

An inspector brought in a sample of milk which, by his testing instruments, gave evidence of being rich, but the appearance, on close examination, was not in strict conformity with the other indications, and he submitted it for analysis. Results attained were as follows, the data taken from my notes made at the time:

A careful physical examination showed the milk to be abnormally thick for milk, but not for cream. A portion, on standing several hours, failed to show a

* Ber. d. Chem. Ges. (16, 2260.)

† Ibid. 25, 1116.

cream separation, although there was evidence of an oil separation, lacking only the true color of cream. No artificial color had been used.

The further analysis was as follows:

	Per cent.
Sp. G. at 60° C.....	1.024
Water, by evaporation.....	80.30
Solids, by evaporation.....	19.70
Solids, by the Lactometer (N. Y.).....	13.50
Fats, by Feser's Lactoscope.....	5.00
Fats, by extraction.....	4.95
Solids, not fat.....	14.75

By some oversight the ash, if taken, was not recorded. Absence of a record in this instance would indicate that the ash was not abnormal, as it was my invariable custom to take it. No effort was made to determine the nature of the solids not fat, as the purpose of the analysis was not to determine the kind, but the extent of the sophistication, and, at the time, a press of work prevented my taking up the matter from scientific interests.

The microscope confirmed the indications already observed. The familiar milk-fat corpuscles were almost wholly absent, and in their stead was a mass of irregular fatty bodies, twenty-five to fifty times the size of milk-fat corpuscles, whose appearance suggested some vegetable oil admixture, possibly cotton-seed.

Consideration of the results shows that the addition of a little coloring matter would have placed the milk beyond the reach of ordinary inspection methods, while the determination of solids and the microscope proved conclusively a skillful adulteration. It will be noted that the lactometer failed to detect the abnormal solids, as it depends for its data upon Sp. G., while the lactoscope and extraction processes showed about five per cent. of fat, which the microscope proved to be almost wholly foreign to milk.

My own experiments, confirmed by many others, show that milk solids are among the least variable factors in milk analysis, as the average milk containing 3.5 per cent. of milk fat is nearly always found to contain about 12.5 per cent. of solids, while Jersey milk with 4.5 to 5.0 per cent. of fats never exceeds 14.5 per cent. of solids. It will be observed, that the milk referred to gave 19.7 per cent. of solids and nearly 5.0 per cent. of a substituted oil.

As long as milk inspection is confined to the use of instruments in the hands of unskilled inspectors, the dishonest creamery, backed up by professional chemical skill, will continue to furnish a cheap, fabricated article, which savors less and less of its reputed origin and character.

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