BUTTER: ITS ANALYSIS AND ADULTERATIONS, SPECIALLY TREATING ON THE DETECTION AND DETERMINATION OF FOREIGN FATS

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Butter: Its Analysis and Adulterations, Specially Treating on the Detection and Determination of Foreign Fats by Otto Hehner & Arthur Angell

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DETECTION AND DETERMINATION OF FOREIGN FATS

BY

OTTO HEHNER, F.C.S.

Public Analyst for the Isle of Wight

AND

ARTHUR ANGELL, F.R.M.S.

Public Analyst for the County of Southampton

Second Edition, entirely Re-written, Improved, and Augmented

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193. f. 61.

PREFACE TO THE SECOND EDITION.

WHEN we published, in April, 1874, the first edition of this book, we were well aware that a process for the detection and determination of foreign fats in butter was urgently needed, and that any method, based upon sound principles, would be warmly welcomed.

We are happy to state that we were not disappointed in our expectations. One chemist after another critically and carefully examined our process, and it was soon adopted, with some modifications in its execution, in nearly every laboratory all over the country in which articles of food are examined. Butter analysis has, in fact, now been placed upon as sound a basis as any branch of food analysis, and the most difficult of problems is considered to be solved by every one who has a voice in this matter. A few persons have not been wanting, who from prejudice, or from other causes, have struggled against the adoption of our process, but they have, happily, been overruled.

The composition of butter-fat has been closely studied during the last few years, and many interesting facts, of which we give a short account in the following pages, have been brought to light. The subject is as yet by no means exhausted, but as far as the practical part is concerned, we feel confident that no great or important improvements of the process will be introduced for some time to come.

That this second edition is indeed an improved and augmented one will be evident from even a very cursory examination of its pages, there being but few lines which do not bear the marks of the revision. The chapter on the analysis of butter-fat is indeed entirely re-written, and brought up to the standing point we have attained through the labours of Mr. Bell, Dr. Dupré, Dr. Muter, and others. An entirely new chapter on the specific gravity of butter-fat has been added.

We trust that the book will, in its new form, be as favourably received by both analysts and the trade, as it was in its first issue. We hope that a real want is satisfied by it, it giving to the analyst accurate methods for detecting adulteration, tested carefully and found sound and correct, and protecting the trade from unjust prosecutions under the Sale of Food and Drugs Act, and from the dangers of the old methods of butter analysis.

LONDON AND SOUTHAMPTON,
April, 1877.

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ITS ANALYSIS AND ADULTERATIONS.

CHAPTER I.

THE COMPOSITION OF BUTTER.

BUTTER consists of the fatty portion of the milk of the cow. It is suspended in the milk in the form of minute oil globules, which, on allowing the secretion to remain undisturbed for some hours, on account of their having a lower specific gravity than the liquid in which they float, rise to the surface and form a layer of cream.

It was for some time supposed that the fat globules in milk were prevented from coalescence by some kind of protecting membrane, presumedly albuminous, and this view appeared to be borne out by the fact, that the fat globules are not dissolved when the milk is agitated with ether, but only after desiccation will the milk yield up its fat to solvents. Recently, however, it has been shown that if the milk's solids be again taken up with water so as to re-form the milk, the same indifference to the action of solvents is observed. This proves that no true sac or pellicle can exist, but that the globular bodies are protected from immediate contact with the solvent by the presence of the surrounding medium.

Cream contains, besides large quantities of fat and water, notable proportions of casein and of sugar of milk. The relative amounts of these ingredients vary considerably, according to the time allowed for the separation of the cream, the temperature, the quality of the milk, and other circumstances, but genuine creams of good quality, such as have been analysed by Hassall with the subjoined results, yield not less than 30 per cent. of pure fat.

Samples 1–3 were purchased of milkmen, 4–6 being obtained direct from the dairy.

Water ...	62·12	61·50	63·24	49·10	43·04	45·82
Fat... ...	30·64	32·22	31·42	42·82	44·76	44·33
Casein ...	5·83	5·14	2·70	5·20	7·40	6·38
Sugar of milk	1·27	0·74	2·36	2·46	4·45	2·92
Ash... ...	0·14	0·40	0·28	0·42	0·35	0·50
	100·00	100·00	100·00	100·00	100·00	99·95

By violent agitation in a churn or any other suitable vessel the oil globules of the cream conglomerate for the most part, and uniting form a fatty mass, which invariably contains small quantities of the other constituents of the cream, which cannot be removed by mechanical means, if we except the small amount of sugar of milk which may be washed off. This mass, to which some salt is generally added during the process of preparation, is the butter of commerce.

Butter may vary much in colour and flavour, even when quite fresh and sweet, these qualities being governed by a great variety of circumstances. Thus the flavour of the food of the cow in many cases may be distinctly perceived in the fresh butter, while the colour ranges, according to season and food, from a rich to a very pale yellow.

Carefully prepared butter is homogeneous throughout its mass, pellucid in appearance, and free from superfluous water. It soon loses its sweet odour and taste, owing to the partial