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TECHNICAL HANDBOOK
OF
OILS, FATS AND WAXES
VOLUME I
Chemical and General
TECHNICAL HANDBOOK 
OF 
OILS, FATS AND WAXES

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WITH 33 ILLUSTRATIONS AND 36 PLATES

VOLUME I
Chemical and General

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PREFACE

THE present small treatise has been designed primarily, as its title indicates, to meet the need of the technical worker, the works chemist, and others less directly concerned in the technology of the oils, fats and waxes.

It has been the experience of the authors, extending over several years, that, in the case of technical men generally, there exists a wide knowledge of the practical issues of the subject concerned, side by side with much ignorance of the basic principles underlying such issues. In the following pages an endeavour has been made to explain in as simple a manner as possible the theoretical basis upon which the technical processes rest, as well as to describe the various reactions concerning the industry. Such explanations have been mostly printed in specially small type, so that in the case—doubtless of frequent occurrence—of such matter being already familiar, it may be readily passed over by the reader.

For the first time, we believe, a survey has been made of the whole subject of the oils, fats and waxes in a single treatise. An obvious advantage of this is the wider outlook so obtained, and the possibility of comparing within the limits of the one volume, the “natural” oils and fats with the mineral or hydrocarbon oils, and the “natural” waxes with those of mineral origin.

No attempt has been made to give an exhaustive account of the historical aspect of the various operations and of analytical procedure. If this is desired the reader must consult larger treatises.

The aim, on the contrary, has been to eliminate all matter, the omission of which is compatible with an adequate knowledge of the present-day methods of production, and of analytical control.

The authors have endeavoured to employ as far as possible, a style direct and succinct, and have made use of a special type to indicate at a glance the subject matter of each paragraph. They believe that in this way it has been possible so to minimise the space required as to obtain a volume of convenient size for handling, and adequate in all respects except for academic purposes.
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PREFACE

A special feature is the coloured diagrams of the more important analytical determinations. Used in the manner indicated the authors trust that these may prove of value, in particular to the works chemist.

Where possible in the detailed descriptions of individual oils and fats, a series of figures has been given showing (1) the average values (2) the normal variations, and (3) the outside limits recorded for the various analytical data. In the latter case, the authorities responsible for the figures are stated; in the case of the other two series of figures, these have been compiled by a careful comparison of results obtained, in many cases, by the authors, with those published by other chemists.

A companion volume on the practical analytical work referred to in various places in the book is in course of preparation and will shortly be published.

Acknowledgment must in general be made to such works as the now classical treatise on oils and fats by the late Dr Lewkowitsch\textsuperscript{1}, and to a less extent to other original papers and productions. The figures for the Refractive Indices are mainly those published by Messrs Bolton and Revis\textsuperscript{2}. We have to thank Messrs Archbutt and Deeley\textsuperscript{3}, and their publishers, for permission to print the table of Viscosities of Glycerine Solutions. The following firms have kindly placed at our disposal the plates for reproducing many of the illustrations of technical apparatus: Messrs Rose, Downs and Thompson, Messrs Greenwood and Batley, Messrs S. H. Johnson. Our thanks are also due to Mr A. F. Fryer, M.Sc., F.I.C., who kindly consented to finally revise the proofs. For the rest, the authors trust that a practical acquaintance with works processes and of analytical methods extending over a number of years may prove to be of value and service to those engaged in this most interesting and important branch of chemical industry.

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January 1917.

\textsuperscript{1} Chemical Technology and Analysis of Oils, Fats and Waxes. Dr Julius Lewkowitsch. 5th edition. Macmillan. 4 vols.
\textsuperscript{2} Fatty Foods. Bolton and Revis. Churchill.
\textsuperscript{3} Lubrication and Lubricants. Archbutt and Deeley. C. Griffin and Co.
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available for download from www.cambridge.org/9781107687318

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NOTES ON THE USE OF THE TABLES

Each table has a reference line, marked off in divisions corresponding to equal fractions of the various values. Opposite to these are placed sections hatched in colours to represent the various classes of oils, fats and waxes. The length of these sections indicates the extreme variations of each individual oil, etc. The line connecting each section with its corresponding name is placed in the position of the average value for each substance.

It is suggested that the tables may be used in the following manner:—

In order to identify an unknown oil, fat, or wax, the various values are obtained by analysis, and a rule or straight-edge is placed horizontally at these particular positions on the reference line, when the sections which appear cut by the straight-edge represent those oils, etc. which come within possible range of consideration. Further, the coloured line (connecting with the names of the oils, fats, etc.) which is nearest to the straight-edge will indicate the most probable one, since it approaches most closely to the average value for this particular oil, fat, or wax.

Using the tables in succession—commencing preferably with the iodine value—and assuming only a single oil, fat, or wax to be present, the correct result can be rapidly obtained, since all other possibilities are automatically eliminated. Thus, if on reference to the table for iodine values the straight-edge intersects say four oils, etc., two of these may be above or below the straight-edge in (for example) the specific gravity table, and of the two remaining possibilities, one may be eliminated on reference to the table of saponification values.

In the case of mixtures of oils, fats and waxes, the problem of identification is a much more complex one, but the tables will still be found helpful in arriving at the correct solution.

In addition to their use for analytical determinations, the tables are also intended to have an educational value to the student. For this purpose, they will repay careful study. When the particular oil, fat or wax is under consideration, its relative position on each of the tables should be noted, and, in this way, a clear conception will readily be obtained of its distinctive features and of its class relationships.

A glance at one of the tables will also serve to show whether that particular test is of service in discriminating a given oil, etc., from any other oil, and thus save the labour of having to refer to the separate descriptions of individual oils.

ERRATA

Table of Specific Gravities (between pp. 68 and 69)—

Cod Liver Oil. Average value should read 0.935.
Lard. For 0.931 read 0.936 and the hatched bar at 0.934—0.938 (not 0.931—0.932).

Table of Iodine Values (between pp. 80 and 81)—

Neat’s Foot Oil, should read 69—72, average value 70.

Table of Bromine Thermal Test (between pp. 82 and 83)—

Neat’s Foot Oil should read 10—17, average value 13.7.