A PRACTICAL TREATISE

ON



# ANIMAL AND VEGETABLE FATS AND OILS:

COMPRISING BOTH FIXED AND VOLATILE OILS,

THEIR PHYSICAL AND CHEMICAL PROPERTIES AND USES, THE MANNER OF EXTRACTING AND REFINING THEM, AND PRACTICAL RULES FOR TESTING THEM;

AS WELL AS THE

MANUFACTURE OF ARTIFICIAL BUTTER AND LUBRICANTS, ETC.,

WITH LISTS OF AMERICAN PATENTS RELATING TO THE EXTRACTION, RENDERING, REFINING, DECOMPOSING, AND BLEACHING OF FATS AND OILS.

BY

WILLIAM T. BRANNT,

EDITOR OF THE "TECHNO-CHEMICAL RECEIPT BOOK," "PETROLEUM," ETC.

SECOND EDITION, REVISED, AND IN GREAT PART RE-WRITTEN

*ILLUSTRATED BY THREE HUNDRED AND TWO ENGRAVINGS.*

IN TWO VOLUMES.

VOL. I.

PHILADELPHIA:

HENRY CAREY BAIRD & CO.,

INDUSTRIAL PUBLISHERS, BOOKSELLERS AND IMPORTERS,

810 WALNUT STREET.

LONDON:

SAMPSON LOW, MARSTON & CO., LIMITED,

ST. DUNSTAN'S HOUSE, FETTER LANE, FLEET STREET, E. C.

1896.

# CHAPTER XIII.

## RENDERING TALLOW AND LARD.

*Rendering tallow.* This operation is generally conducted according to one of the following three methods:—

1. Over an open fire.
2. Over an open fire with sulphuric acid.
3. By steam.

*Rendering over an open fire* is the oldest method. The fat, chopped fine, is brought into a copper boiler bricked in so that only the bottom comes in contact with the fire. A small percentage of water is added, this being especially necessary in summer, when the tallow has lost much moisture by evaporation. The tallow, which is enclosed in cellular membranes, soon begins to melt after the fire is started, and, as the temperature in the boiler increases, runs from the membranes, which are burst by the heat. The mixture of fat bubbles and water gives to the liquid a milky appearance, but after the evaporation of the greater portion of water, the cell membranes become more contracted and the fat appears clear.

During the entire period of heating, which lasts one to one and a half hours, the mass must be constantly stirred with a wooden paddle to prevent the membranous substances from settling on the bottom and scorching.

When the fat ceases to throw up bubbles and appears clear on the surface, the fire is slackened and preparation made for the separation of the fat from the greaves or cracklings, as the membranous residue is called.

For this purpose the greaves are pressed down by a strong sieve or copper sheet, and the tallow penetrating through the meshes is ladled upon a linen cloth into a filtering basket rest-

ing upon another boiler, to remove the impurities as much as possible. When all the tallow is ladled out and the greaves freed as much as possible from fat by compression, the latter are placed in a woolen or hair-cloth press-bag and the fat retained by them regained by pressure with an ordinary screw-press.

Generally speaking, 80 to 82 per cent. of rendered tallow and 10 to 15 per cent. of greaves are obtained, though very pure, dry tallow may yield as much as 90 per cent. and more.

The greaves were formerly burnt under the boiler or fed to dogs, chickens, and hogs. But in many places they form at present an article of commerce, as they contain about ten per cent. of fat, which can be extracted by a suitable solvent, such as benzine or carbon disulphide, and used in the manufacture of lubricants. The exhausted residue, if not burnt, is used in the manufacture of glue, potassium ferrocyanide, or manure.

On account of the noisome odors developed, rendering tallow over an open fire is not allowed in most cities or in the neighborhood of habitations, without suitable arrangements for the removal of the noxious gases.

The simplest method is to provide the boiler with a well-fitting lid with a pipe through which the gases escape into the chimney, and hence into the higher strata of the air. There must be, further, a stirring apparatus, consisting of a shaft standing in the centre of the boiler and provided below with arms and on top with a crank. Through the opening in the lid through which the stirring apparatus passes, air is sucked in by means of the chimney, and the gases are carried off.

This can, however, only be effected with a very strong draught, as otherwise the gases would escape through the opening before reaching the chimney.

This arrangement is rather incomplete, but good results are obtained by burning the gases in the manner shown by Figs. 204, 205, and 206.

There are 16 boilers A, each provided with a helmet B, with a pipe-like shoulder, and the man-hole *C* for charging and

# CHAPTER XIV.

## REFINING TALLOW—HARDENING, BLEACHING.

THE product obtained by rendering and straining is not entirely free from admixtures of fine undissolved substances, and the tallow must therefore be subjected to a refining process.

For ordinary soaps, etc., the ordinary commercial tallow can be used, but for toilet soaps, etc., it has to be refined. This is effected, according to the old methods, by remelting the tallow with five per cent. of water over an open fire, according to the recent method, by the introduction of steam into the rendering boiler.

The water must be constantly kept near the boiling point, and kept intimately mixed with the tallow by a stirring apparatus, so that the mass resembles an emulsion.

After about one hour the source of heat is withdrawn and the mass allowed to rest. The light scum rises to the surface and is removed with a perforated copper ladle; the coarser impurities fall to the bottom, making the aqueous fluid turbid, while a grayish mucous mass separates on the line between tallow and water.

To prevent rapid solidifying, especially in winter, the boiler is covered with a lid and bags or cloths.

After a rest of ten or twelve hours the tallow is ladled out or drawn off through a faucet into moulds or barrels.

To promote the separation of the water from the tallow, some tallow-melters add, during the re-melting, common salt, alum, or sal ammoniac, their effect being based upon the different specific gravities of water and the salt solutions.

Clarifying by steam is effected in the manner already described. See Gallhorn, Flottman & Co.'s apparatus, Figs. 208 and 209.