

MARGARINE AS A BUTTER SUBSTITUTE

By **KATHARINE SNODGRASS**
Research Associate, Food Research Institute

AN impartial survey of a controversial subject, this book describes the past and present status of the margarine and butter industries and of the competition between them. Emphasis falls not only upon the economic aspects, but also upon the technological, legal, and nutritional.

No. 4

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FATS AND OILS STUDIES OF THE FOOD RESEARCH INSTITUTE

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No. 4 / / / / December 1930

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FOOD RESEARCH INSTITUTE
STANFORD UNIVERSITY, CALIFORNIA

THE FOOD RESEARCH INSTITUTE

was established at Stanford University, California, in 1921, jointly by the Carnegie Corporation of New York and the Trustees of the Leland Stanford Junior University, for research in the production, distribution, and consumption of food.

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Although the writer is responsible for the major portion of this work, certain sections have been prepared by Dr. Carl L. Alsberg and Dr. Alonzo E. Taylor, directors of the Food Research Institute, and by Mr. John B. Hurlbut and Mr. Robert F. Lundy, of the Institute staff. Dr. Alsberg prepared chapters xi, xii, and xiii on the technology of margarine manufacture; Dr. Taylor, chapter xiv on the nutritional aspects of the subject; Mr. Hurlbut analyzed the United States Supreme Court decisions applying to state and federal margarine laws in chapters iv, viii, and ix and the Wisconsin decision in chapter vii; while Mr. Lundy prepared the appendix material on state margarine legislation. In addition to their actual contributions, Dr. Alsberg, Dr. Taylor, and Mr. Hurlbut have been generous with suggestions and criticism at various stages of the investigation.

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K. S.

STANFORD UNIVERSITY, CALIFORNIA
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MARGARINE AS A BUTTER SUBSTITUTE

CHAPTER I

INTRODUCTION

Margarine, or oleomargarine, as it is commonly called in the United States, is a fatty product used principally as a substitute for butter. It is made of animal fats or vegetable oils, and therefore is not a dairy product, although it is usually emulsified in milk, and consequently contains small amounts of milk elements. Two general types of margarine are recognized in this country: one a combination of animal fats and vegetable oils, in which oleo oil is predominant; the other, a strictly vegetable oil product, in which coconut oil is usually the principal ingredient. The first type is generally termed oleomargarine, the second nut margarine, although to comply with American law all margarine must be labeled "oleomargarine," regardless of the materials used in it.¹

PRINCIPAL INGREDIENTS OF MARGARINE

Oleo oil; the principal animal fat used in margarine, is the more liquid portion of what is known as oleo stock. Oleo stock is the fat obtained from the caul, ruffle, intestines, and certain other organs of beef cattle when rendered at a temperature of from 155° to 160°F. immediately after slaughter. This stock yields two fractions of lower

¹ In this study we have used the term margarine in referring to both types of product because this is in accord with international practice. It is convenient at times, however, to use the term oleomargarine when reference is to the product containing animal fats. The American law on the subject is known as the Oleomargarine Act. According to American official regulations, nut margarines must be made from the oil of nuts, such as coconuts, peanuts, palm kernels, rather than from the oil of seeds, such as cottonseeds or soy beans.

and higher melting points, oleo oil and oleo stearin. The latter is used principally in lard compounds, although small quantities go into margarine.¹

Usually mixed with the oleo oil in American oleomargarine are neutral lard and small amounts of cottonseed oil. Neutral lard is made from the leaf and back fat of hogs, rendered at a low temperature (the best grades at about 120°F.). Cottonseed oil, as the term implies, is the oil obtained by crushing cottonseed. It is always refined before it is used in margarine.²

This combination of oleo oil, neutral lard, and cottonseed oil, with perhaps small admixtures of other vegetable oils, when emulsified in milk, the moisture worked out, and the product salted, resembles butter sufficiently to constitute a substitute for it. It is of much the same consistency, has somewhat the same taste, and behaves in more or less the same fashion when heated. Until the war this was the only type of margarine manufactured in any considerable volume in the United States. The proportions of the different ingredients varied somewhat in the different brands, but there was little variation in raw materials.

During the war, however, as a result of the scarcity and high price of animal fats, nut margarines were introduced in increasing volume. Gradually this type of margarine has gained in popularity until now approximately two-thirds of the national output contains no animal fats at all. Such margarine is made chiefly of coconut oil, with admixtures of other vegetable oils, principally peanut oil.

Coconut oil, a fat of stiffer consistency than lard, is obtained by crushing copra, or dried coconut meats. It is always refined before it is used in margarine. Peanut

¹ Oleo stock is known as *premier jus* in Europe; oleo oil as oleomargarine.

² For a brief discussion of methods of rendering animal fats and of expressing and refining vegetable oils, see C. L. Alsberg and A. E. Taylor, *The Fats and Oils: A General View* (Fats and Oils Studies of the Food Research Institute, No. 1), February 1928, pp. 20-33.

oil has a lower melting point than coconut oil, and also must be refined to be suitable for use in margarine.

The combination of these materials, with coconut oil greatly in preponderance, when emulsified in milk and properly worked and seasoned, gives a product which can also be used as a substitute for butter. In consistency it resembles butter perhaps less than margarine containing animal fats, but has an agreeable taste which makes it entirely palatable to many people.

The foregoing statements indicate briefly the principal or usual ingredients of American margarine. Palm kernel, soy bean, and palm oil are other oils sometimes used. Palm kernel oil is similar in many ways to coconut oil and may be substituted for it, while soy bean oil is a liquid oil, in that regard resembling cottonseed oil. Palm oil is little used in this country, because most of it arrives in too rancid a condition for edible uses. It is of about the consistency of butter, and probably will be used for margarine in the future when methods of expressing it are improved.

In color there is an important distinction between butter and margarine. At certain seasons of the year, particularly when the cows are feeding on green pasture, butter has a natural yellow color; but in order that this color may be uniform throughout the year, and regardless of the condition of pastures, it is customary to color butter artificially.¹ Annatto, a vegetable coloring matter, was formerly generally used, but is now being somewhat superseded by oil-soluble dyes, such as Sudan III, certified by the United States Department of Agriculture.²

¹ The coloring of butter is not always customary; in Australia the use of color in butter and margarine is now prohibited (*Report of the Imperial Economics Committee on Marketing and Preparing for Market of Foods Produced within the Empire: Fourth Report—Dairy Produce*, Cmd. 2725, London, 1926, p. 121).

² Annatto is a yellowish-red dye obtained from the pulp enclosing the seeds of the arnotto tree of Central America.

Margarine, on the other hand, is usually white when it appears on the American market. Since the most of the fats that are used in margarine are white or nearly white (either naturally or as a result of refining, bleaching, or hydrogenating), the great bulk of the manufactured product is also approximately white. As a general thing, a packet of coloring matter accompanies the retail package, but manufacturers are prohibited by law from coloring the product artificially except on the payment of a tax of 10 cents a pound. Certain fats, such as deeply pigmented oleo oil or dark-colored cottonseed oil, give a natural product distinctly deeper than white. This is not subject to the 10-cent tax.¹

GEOGRAPHICAL SOURCES OF INGREDIENTS

The materials used in oleomargarine (i.e., margarine made principally of animal fats) are usually of domestic origin. Oleo oil is obtained from the appropriate fat of cattle domestically produced; neutral lard is similarly obtained from hogs; and cottonseed oil is a by-product of the domestic cotton crop. Therefore, whatever competition with dairy products oleomargarine entails is the competition of one product of the farm with another product of the farm. Little interclass or international competition is involved.

With nut margarine the situation is different. Coconut oil, the principal ingredient, is entirely of foreign origin, or, rather, produced outside of the continental United States. Coconuts are produced in all parts of the tropics, but the principal regions of commercial development are the tropical islands of the Pacific, and India and Ceylon. The American supply of oil is obtained primarily from the Philippine Islands because, under the relations subsisting between the United States and the Philippines, it

¹ Further discussion of the problem presented by this type of margarine will be found on pp. 68-70.

may be imported from there free of tariff duty. About half of the oil comes into the country as copra to be crushed and, if necessary, refined here; the other half enters as crude oil, and is merely refined here in case it is to be used in edible products. For soap and other inedible uses comparable refining is usually unnecessary. Some of the copra that comes here is from regions outside of the Philippines, but the Philippines are practically the exclusive source of coconut oil imported as such.¹

Peanut oil, the other most important ingredient of nut margarine, is also as a rule imported from abroad, either in the form of nuts or as oil. This is not because this country is dependent on foreign supplies, but because the bulk of the domestic crop is sold to better advantage for use as nuts than for oil. Our imports come primarily from China, and in the past a greater proportion of them has entered in the form of nuts for crushing here than in the form of oil. Both nuts and oil are subject to tariff duty.²

Palm oil and palm kernels come from the same tropical plant, and consequently are imported directly or indirectly from the tropics.³ The principal producing region is West Africa, but Sumatra in the Dutch East Indies is forging ahead as a producer. Palm oil is imported directly from the country of origin or indirectly from Europe. Palm

¹For more detailed discussion of these points, see Katharine Snodgrass, *Copra and Coconut Oil* (Fats and Oils Studies of the Food Research Institute, No. 2), April 1928.

²See U.S. Tariff Commission, *Peanuts: Preliminary Statement . . . Pursuant to the Provisions of Section 315, Title III, of the Tariff Act of 1922* (June 7, 1928); also *Statistics of Fats, Oils, and Oleaginous Raw Materials* (U.S. Department of Agriculture Statistical Bulletin 24), September 1928; and P. G. Wright, *The Tariff on Animal and Vegetable Oils* (New York, Macmillan, 1928). Wright believes the tariff on peanut oil might well be removed along with the tariff on other imported oils, because he does not hold it to be of benefit to American agriculture, but he thinks American peanut growers should continue to have the benefit conferred by the tariff on the nuts (see p. 237).

³It is easy to confuse these two oils, but they are different in chemical and physical characteristics and are generally used for different purposes. Palm oil is obtained from the pericarp of the fruit of the palm oil tree (*Elaeis guineensis*), while the palm kernel oil is from the kernel of the same fruit.

kernels are imported and crushed for oil here, or imported as oil from Europe. The older American tariff laws did not contain provision for taxing imports of palm kernel oil or palm oil, but agitation for placing duties on palm kernel oil in the new act was successful.¹ The importation of both types of oil has been increasing recently.

Soy beans are grown in this country as a forage crop, but very few are crushed for oil. The oil is almost entirely imported from Manchuria, where growing and crushing them is a principal industry. The beans were imported over a tariff of 2½ (now 2) cents a pound. As already noted, only small amounts are used in margarine. The paint industry takes most of the imports.

This brief résumé indicates that the great bulk of materials that enter into nut margarine in any quantity is obtained from abroad, and most materials are produced in the tropics. Their importation, consequently, is in direct competition with the production of domestic fats, whether they be dairy or animal fats.

LEGAL RESTRICTIONS ON THE MANUFACTURE AND SALE OF MARGARINE

Because of its nature as a butter substitute, margarine has been subject to legal regulation in the United States practically ever since its first introduction in the 1870's. Federal law provides not only for the licensing, at fairly high rates, of manufacturers and dealers, but also for a manufacturing tax of ¼ cent a pound for uncolored margarine and 10 cents a pound for colored. In addition, there are elaborate federal regulations for the labeling, advertising, packaging, and use of the commodity. These are enforced by the Bureau of Internal Revenue.

¹ Duties in the new tariff are: butter, 14 cents a pound; margarine, 14 cents; peanut oil, 4 cents; coconut oil, 2 cents; palm kernel oil, 1 cent; cottonseed oil, 3 cents; soy bean oil, 3½ cents; cottonseed, 1/3 cent; soy beans, 2 cents; copra, free.

The purpose of this legislation is twofold. It aims primarily to protect butter producers from the fraudulent competition of the substitute, but by taxing colored margarine at such a high rate it practically prohibits the manufacture of yellow margarine. Under a 10-cent tax, colored margarine is practically eliminated from commercial channels.

Moreover, only animal fat from establishments under the inspection of the Bureau of Animal Industry may be used in margarine; and all margarine shipped in interstate or foreign trade, whether it be made of animal fats or vegetable oils, is subject to the Food and Drugs Act.

In addition to the federal oleomargarine law, there are laws for the regulation of the manufacture and sale of margarine on the statute books of almost every state in the Union. Although the justification for these laws is prevention of fraud, they have been enacted in many cases with the purpose of curtailing the use of margarine within the borders of the several states. Many of these laws forbid the sale of colored margarine. Some prohibit its use, whether colored or uncolored, in public institutions. One taxes it. Where fraud prevention has been the sole aim, the laws, as a rule, provide merely for labeling, packaging, and the like in such manner that there can be no deception in the sale of the commodity as butter.

The federal law taxing the product was passed in 1886 and amended in 1902 and 1930. It has been reasonably well enforced. Nevertheless, the opposition of the dairy industry has continued, and scarcely a session passes in federal or state legislatures without the introduction of measures for and against further control or regulation.

In recent years, with the shift in manufacture from oleomargarine to nut margarine, the controversy has broadened out into an effort on the part of dairy interests to prevent, or at least curtail, the importation of all foreign fats suitable for manufacture into margarine. Tropi-

cal vegetable fats are much more cheaply produced than domestic animal fats, such as formerly went into margarine, and cost only a fraction of the cost of butter fat.

BASIS FOR THE SPECIAL PROTECTION OF DAIRYING

The dairy industry claims special protection from margarine manufacture on several grounds. Early in the history of the controversy between the two industries, the size and importance of dairying—the millions of individual producers involved—was cited as reason for protection against a small, highly organized industry like margarine manufacture. With the change from farm to creamery manufacture of butter, this argument is now not so much heard, although the tremendous value of dairying in the national economy and the intimate relation of creamery operations to dairying are pointed to as cause for protection. When margarine was first introduced, its hygienic status was seriously questioned, on the theory that the fats from which it is made were indigestible and the process of manufacture unsanitary. Nowadays such arguments are seldom heard, but butter interests still claim that the nutritive value of margarine is greatly inferior to that of butter. The fraud argument also persists, although it too has changed in character. There is little doubt that in the 1890's much margarine was sold as, or for, butter. This was the reason for the elaborate legal regulations that had their inception at that time. This type of fraud is controlled now, but it is claimed by dairy interests that there is still deception in that advertisements and propaganda aim to persuade the public that margarine is as valuable an element of the diet as butter.

The only really new argument against margarine is the economic one. The shift from animal fats to vegetable fats as ingredients of margarine gives the dairy industry a new case against the manufacture of the sub-

stitute. Vegetable fats are not only much more cheaply produced than animal fats, but are mainly of foreign origin. The American public has accepted the high-tariff policy. The dairy industry naturally claims that it requires and deserves protection from cheap foreign vegetable oils; like other manufactures it claims the home market.

One of the most potent arguments for protection of dairying against the competition of substitutes has been relatively little employed by the organized dairy industry. This is based upon the special place of dairying in any system of agricultural crop rotation. That chemical elements which are removed from the soil in the process of plant production must be returned to it again, if the fertility of the soil is to remain unimpaired, is common knowledge. This is one reason why rotation of crops is always better for the land than a one-crop system of agriculture, for with rotation some of the chemical elements taken from the soil by one plant may be replaced by another, and diseases and pests which flourish on one tend to be repelled by, or do not thrive upon, others.

If crop rotation is practiced, it is usually in combination with hog raising or dairying. Under these circumstances there are further advantages to the land as compared with a system of one-crop farming, since much that is taken from the land in the form of feed is returned to it as animal waste. In hog raising many of the chemical elements required to produce corn for feed are returned to the soil in the form of manure. In dairying, elements used in the production of grain, hay, or alfalfa for feed are similarly returned again.

From the point of view of national economy, fertile soil is desirable not in and of itself, but for the crops it will produce. Worn-out land produces small, inferior crops, or none at all, in contrast with the larger crops, of better quality, to be had from new or constantly renewed

lands. Large crops of high quality do not always bring larger returns to producers than smaller crops of inferior quality, but the gain to the nation as a whole cannot be contested. Regions of high fertility support larger populations at higher standards of living than regions where the reverse condition prevails.

There is therefore good reason from the national point of view for the encouragement of the livestock industries, particularly dairying. Especially as compared with extensive grain or cotton farming, there are manifest advantages in all forms of animal husbandry. The bearing of this on margarine legislation is apparent. If margarine manufacture is viewed as a competitive industry to dairying and the building up of the dairy industry is considered of primary importance, legislation curtailing or even prohibiting the manufacture of margarine may come to be regarded as wise national policy.

THE CONSUMER'S INTEREST IN CHEAP FOOD

The strongest reason advanced for an unrestricted margarine industry is that it provides a cheap substitute for a desirable, almost necessary, element of the diet. In general, it is abhorrent to public opinion to tax, or in other ways restrict, the production of a food product, the more so if the product is one used mainly by the poorer elements of the community. In fact, so strong is present sentiment against making food supplies more costly that it seems unlikely that new legislation could now be passed for the direct taxation of any food commodity.

Consumers as a group are unorganized. Tremendous sums have been spent by the dairy and margarine industries in the legal controversy over the regulation of margarine production. The interests of the consumer have not been seriously considered at any time in this entire struggle. Yet it is a matter of considerable public interest, first, that the relative food value of butter and margarine

be known; and second, that the cheaper product be not unreasonably taxed or regulated for the benefit of the dearer.

SCOPE OF THIS STUDY

It has been our purpose in preparing this work to investigate thoroughly all the various angles of the fifty-year struggle between these two industries. This has involved study of the legislative history, consideration of technological factors and of nutrition, as well as economic developments. These three main topics form the subject-matter of Part I, Part II, and Part III, respectively. The work was commenced as a commodity study of margarine, entered into because of the notable increase in the use of coconut oil in margarine in recent years. It has grown into a fairly detailed study of the significance of the competition between margarine and butter, first, historically and as a legal question; second, from the nutritional point of view; and finally, as a matter of economic, agricultural, and political policy.

PART I. HISTORY OF LEGISLATION TO CONTROL THE MANUFACTURE OF MARGARINE

CHAPTER II

HISTORICAL BACKGROUND

The introduction of margarine into the United States in 1874 occurred at a time of great agricultural unrest, when dairying as well as most other branches of farming were expanding more rapidly than the consumption requirements of the country warranted. The Homestead Law of 1862 which provided for the free disposal of the public domain—then including much of the territory west of the Mississippi—was primarily responsible for the opening up of so much land; but other factors, such as the building of the transcontinental railroads, the increasing industrialization of the East with its resulting labor and housing problems, the restlessness of the population after the Civil War, and the tremendous increase in immigration, played their part. Recognition of these facts is essential to an understanding of the legislative temper of the period. A surplus of farm products was being produced. The introduction of margarine as a substitute for one of the principal cash crops of the farm was naturally opposed with great bitterness.

THE OPENING UP OF NEW LAND AFTER THE CIVIL WAR

The Beards trace the origin of the idea of a farm for every citizen back to the earliest days of the Republic, but account for the passage of the Homestead Act in 1862 by the increasing unrest of the working classes of the East

during the period preceding the Civil War.¹ With the passage of that act every settler who would establish a five-year residence on the land was given 160 acres free, and by a later provision soldiers returning from the Civil War were given an equal amount of land without the residence requirement. This led to a mad scramble for desirable land in the West, not only by those who abandoned farms in the East to take them up, but by former town dwellers and by the throngs of immigrants who were arriving each year from Europe. To quote the Beards, "The 'terrible 'sixties' of suffering in the East and South were the 'roaring 'sixties' of prosperity in the West."² Railroad builders, operating with the aid of lavish land grants from the government and large domestic and foreign loans, pushed their projects westward till they reached the Pacific.³ Freight rates were high, and the railroads speculated in land, but even so, they gave an incalculable impetus to agricultural development. With the financial crash of 1873 railroad construction came to a standstill and the entire country suffered severe depression, but before the end of that decade railroad building was resumed; and following this period of development freight rates declined and a further stimulus was thus added to the others favoring Western expansion.⁴ Meanwhile, European and Eastern capital was finding increas-

¹ See C. A. and M. R. Beard, *The Rise of American Civilization* (New York, Macmillan, 1927), I, 646-49, 690-91. The official public land policy, introduced by Alexander Hamilton in 1790 and in effect until the Homestead Act of 1862, was sale of the land, in the early years for the redemption of the public debt, later for general revenue purposes. See E. F. Best, "The Utilization of the Vacant Public Lands," *National Geographic*, 1897, VIII, 50.

² *Op. cit.*, II, 131.

³ Land to the extent of 156 million acres was granted to the railroads by the United States government between 1850 and 1877. See L. H. Haney, "A Congressional History of Railways in the United States, 1850-1887," *Bulletin of the University of Wisconsin*, 1910, VI, 14.

⁴ Railway mileage increased from 30,626 in 1860 to 52,992 in 1870; to 93,267 in 1880; to 167,191 in 1890; and to 198,964 in 1900 (*Statistical Abstract, 1919*, p.797).

ing employment in the West outside of the railroad field. This had its disadvantages to the West, since funds could be withdrawn when times were hard; but on the whole it was a great stimulus to rapid development. It was natural under these conditions that Eastern landholders should be discouraged as they saw the value of their properties decline and their markets invaded by the products of the country west of the Mississippi.

The West was not settled over night, but some 65 million acres of land were given away by a bountiful government between 1860 and 1880.¹ By 1885 the last belt of arable land in the central frontier had been settled and within a few years after that the Northwest had been similarly opened up to the boundaries of fertile land. By 1884 four railways connected the Mississippi Valley with the Pacific, thus bringing this vast area into contact with Eastern markets.

As a natural consequence of the tremendous economic changes that were taking place, the period following the Civil War was also one of great political unrest. There was bitter resentment over the Civil War and the reconstruction of the South. The division between the industrial East and the agricultural West was becoming increasingly pronounced. The struggle between Western farmers and the railroads was at its height. Societies of protest were numerous and vociferous. Among the farmers the Grange movement of the 'seventies and the Populist party of the 'eighties and 'nineties were probably the most influential. Dairy men were prominent in these movements. They were organized into local and state associations and took an active part in all kinds of legislation affecting farm interests.

These factors are of great importance to an understanding of the antagonism of the dairy industry to the

¹ See E. L. Bogart, *The Economic History of the United States* (New York and London, Longmans, Green & Company, 1912, 2d edition), p. 308.

introduction of substitutes for their products. It is quite possible that if margarine had been introduced at a time of prosperity or stability in the dairy industry, the objection to its manufacture would have been much less bitter than it has been.

DAIRYING FROM THE CIVIL WAR TO 1900

At the time of the Civil War, New York was the leading dairy state of the Union, but the industry was also well developed in New England, Pennsylvania, Ohio, Illinois, and Indiana in the North; and in Virginia, Georgia, Kentucky, and Tennessee in the South. Texas also had a large number of cows, but these were not raised primarily for milk. The total cow population for the country as a whole, in 1860, was about 8.5 million head.

Ten years later, in 1870, the total number of cows was very little greater, but the distribution had changed decidedly. None of the Southern states ranked in the first ten except Texas, where conditions were unusual; but rapid expansion had occurred in Iowa, Wisconsin, and Michigan.¹ The North Central states, including New York and Pennsylvania on the east and Missouri, Iowa, and Wisconsin on the west, accounted for almost two-thirds of the milch cows of the country. At least two national associations had been organized to further the interests of this group of dairymen.²

During the next two decades, i.e., from 1870 to 1890, the increase in dairying was phenomenal. At no other time in our history has there been a comparable growth.³ New York continued to be of great importance, but the outstanding growth was in Iowa, Minnesota, and Wis-

¹ Dairying in the South declined after the Civil War. Great numbers of farms were abandoned.

² The American Dairymen's Association in 1863 and the Northwestern Dairymen's Association in 1867. These are referred to by H. E. Alvord in "Dairy Development in the United States," *Agriculture Yearbook, 1899*, p. 391.

³ See statistics and dot maps in *Agriculture Yearbook, 1922*, pp. 298-301.

consin. The New England states and the South lost ground. During this period a number of state dairy associations were formed, and wielded large influence over state legislation.

The same period saw the rise of the range cattle industry of the West. Texas had been "cow" country before the Civil War, but it was not until 1870, or thereabouts, that the Rockies and the Far West came to figure as important range country. Then developed the practice of driving Texas cattle to the Northern ranges for feeding and later to the corn belt for fattening for market.¹

PRICE DECLINE FOLLOWING THE CIVIL WAR

This entire period from the late 'sixties until the middle of the 'nineties was one of declining prices, not only for agricultural commodities but for manufactured goods as well. There was a brief period of price advance in the late 'sixties and another in the late 'seventies, but otherwise the advances in the general index were so brief as scarcely to interrupt the downward course. Prices of agricultural commodities in general were weak throughout the period except from 1878 or 1879 to 1881. Conditions in this country were not essentially different from those in other parts of the world, in fact probably less serious than in such a country as England.² Two of the principal factors that were responsible have been mentioned: namely, the tremendous amount of new land that came into productivity, and the increasing accessibility

¹ See R. A. Clemen, *The American Livestock and Meat Industry* (New York, Ronald Press, 1923), pp. 175-81. Also C. A. and M. R. Beard, *op. cit.*, II, 144.

² There is a marked divergence between the movements of wholesale price index numbers for the United States, England, and Germany during the Civil War and post-war period, but this was because the United States was on a paper-money basis, while the European countries were on a gold basis. This fact has been clearly demonstrated by W. C. Mitchell in *Gold, Prices, and Wages under the Greenback Standard* (University of California Publications in Economics, Vol. 1), March 27, 1908. After the resumption of specie payments in this country in 1878, prices here and abroad were again brought into general agreement.

of the land to markets that resulted from the development of the railroads. Another factor, at first not appreciated but later of great importance, was the increasing productivity of each unit of land, resulting from new inventions. The inventions of the period were very important. They applied primarily to grains, but there were also improvements in other farm implements, in railway-car refrigeration, and so on.¹ The monetary situation was also in part responsible for the price decline of the period. Monetary reorganization in Europe, causing shifts from a silver to a gold-currency basis, greatly increased the requirement for gold. At the same time production increased, but not proportionately. This was given by Sauerbeck as the second major cause of declining prices during this period.² He recognized the opening up of virgin land to be the principal cause.

So far as one can tell after this lapse of time, dairying suffered no more, and probably less, than the other important types of farming. Dairymen worked longer, but otherwise probably suffered less than others. Butter prices, when corrected for changes in the general price level, were stronger than those of wheat, oats, corn, cattle, or hogs, probably because less affected by international conditions. Cotton values were much weaker than those of any of the other principal crops. They declined with only brief interruptions from 1863 until 1899. Testimony taken at the hearings on the oleomargarine bill of 1886 substantiates these conclusions. A number of witnesses testified that dairy prices had not moved out of harmony with other prices. Some declared that they had declined less than others.³ The times were undoubtedly

¹ Alvord states that an examination made sometime after 1875 of patents issued in the United States showed the invention of a new churn every ten or twelve days for more than seventy years (*Agriculture Yearbook, 1899*, p. 391).

² Augustus Sauerbeck, "Price of Commodities and the Precious Metals," *Journal of the Royal Statistical Society*, 1886, XLIX, 619.

³ *Senate Miscellaneous Documents*, Vol. 5, No. 131, 1885-86, pp. 184-86 (49th Congress, First Session, Serial No. 2346).

difficult for farmers. Frontier communities had the advantage of virgin land, but their risks from crop failure, animal diseases, remoteness from market, were tremendous. In the more settled communities, on the other hand, the risks were less, but the competition from the newer regions made the problems no less pressing. There is nothing to indicate, however, that dairying was less profitable than other types of farming.

BUTTER MAKING A HOUSEHOLD INDUSTRY UNTIL THE 'NINETIES

The period which saw the rapid opening up of the West also saw the first development of large-scale industry in the United States. Prior to the Civil War the principal industries had been located in the East, but the factors that pushed population west also drew manufacturing across the Alleghenies into the Central states. In the earlier days business and industrial units had been relatively small. But after the Civil War, with the railroads to bring raw materials from a distance and deliver finished goods to remote markets, with the cheap and abundant labor supply provided by unrestricted immigration, and the accompanying growth in population, individual business units began to combine and expand in their effort to establish nation-wide markets for their products. And in this process of combination and expansion, the weaker units were ruthlessly forced to the wall in order that the stronger might consolidate their positions.

This factor is of great importance to an understanding of the controversy between the margarine and dairy interests, for almost from the beginning oleomargarine was a packing-house product—and the packers had the reputation of being among the most ruthless business organizations of the period—while butter remained in large part a household industry until well into the present century. The sympathy of the public was entirely with the dairy

farmer in his struggle against the intrusion of the packer-made product.

The nature of dairy products is such that factory technique cannot be so easily applied to them as to certain other food products, notably grains. Flour milling was well established long before the more perishable farm products, such as fresh meat and butter, were prepared for market by factory process. Large-scale operations in the latter commodities had to wait for the development of refrigeration and rapid transportation. Meat packing developed on a large scale before butter manufacture, because lard, tallow, smoked, cured, and pickled meats could be transported some distance and kept a reasonable length of time without refrigeration.

Factory production of cheese preceded that of butter by some ten years. According to Alvord, the first cheese factory was built in 1851 in Oneida County, New York.¹ Developments were not very rapid during the 'fifties, but the Civil War gave such an impetus to demand that by 1866 there were 499 cheese factories in New York State alone. By 1869 there were more than 1,000 factories in the country as a whole, and the factory method of manufacture had practically superseded the making of cheese on farms. Success in this led to experiments with butter making on a factory scale. The first butter factory, or creamery, was built in 1861 in Orange County, New York. In the early days butter and cheese were frequently made in the same factory at different times, or butter and skim-milk cheese at the same time.² The early practice was for a group of farmers to co-operate to supply the factory with fresh milk each day.

Butter production by factory methods made slower inroads on farm production than was the case with cheese. In 1879 the ratio of creamery to farm production of butter

¹ *Agriculture Yearbook, 1899, p. 384.*

² *Ibid., p. 386.*

was about 1 to 26, and in 1889 about 1 to 6; it was not until the late years of the World War that creamery production equaled the production on farms. The principal reason for the tardiness of factory development has already been suggested: namely, the difficulty of obtaining a factory supply of cream in suitable condition for churning without waste of the by-products in the milk. In the early years whole milk was delivered fresh to small creameries once or twice a day. There it was "set" in cans in cool water in preparation for churning. Although we have no reference to it, the skim milk was presumably returned to the farms for feeding animals, but much of it was undoubtedly thrown away. About 1875 this method was improved upon in that the "setting" was done on the farms, and agents of the creamery collected only the cream. The skim milk then remained on the farms for feeding stock. A little later still—in 1879, according to Alvord¹—the centrifugal cream separator came into use, and whole milk was again delivered to the creameries where it was quickly separated and the skim milk returned at once to the farm. Finally, later still, with the improvement and cheapening of the separator, this process could be performed on the farms and only cream need be delivered at the creamery. This stage of development was reached about 1895.

Since that time, probably the outstanding technical development has been the use of lime in neutralizing cream of high acidity before churning it into butter. Even with refrigeration much cream, especially in the summer in the Middle West, arrives at the creamery too sour to make butter of satisfactory flavor and keeping quality. To correct this, the practice was instituted in 1910 or 1912 of counteracting the acidity by the use of lime. With the use of this technique, centralized creameries have been established often great distances from their source of

¹ *Agriculture Yearbook, 1899, p. 395.*

supplies. In recent years, however, there has been an increasing recognition of the superior quality of sweet-cream butter. Such butter keeps better than butter made from cream which has been permitted to become very sour, even though later neutralized. Consequently, though the use of neutralizers continues, every effort is being made by creameries to obtain their cream as fresh as possible.

From this it is apparent that the distance between farm and creamery has always presented serious problems. In the early days the creamery could not be more than a few miles from its source of supplies, because milk had to be delivered fresh by wagon over rough roads from the farms each day. Even in the period of the creamery centrifugal separator, the distance from farm to creamery could not be great if the skim milk returned to the farm was to be worth anything. Obviously, plants of considerable size could not develop under those conditions. At present, however, with the separator in general use on farms, when transportation has been greatly speeded up, when refrigeration is customary, and when new ways of utilizing skim milk have been developed, the creamery may be many hundred miles from the farm and still have an abundant source of supplies.

With these developments have come new economic problems. We refer particularly to the competition between the centralized creamery, drawing its cream largely from regions not primarily adapted to dairying where cream is produced only incidentally, and the small independent or co-operative creamery, operating within narrower limits in the dairy regions.

An indication of the tardy development of large-scale manufacture of butter is given by the decennial census returns. In 1879 the average unit capitalization was only \$2,443; in 1889, \$3,519; in 1899, \$3,928; in 1909 only \$8,407. The most important growth in the size of establishments

has occurred since the World War. The average capitalization, according to the 1930 census, is not yet available.

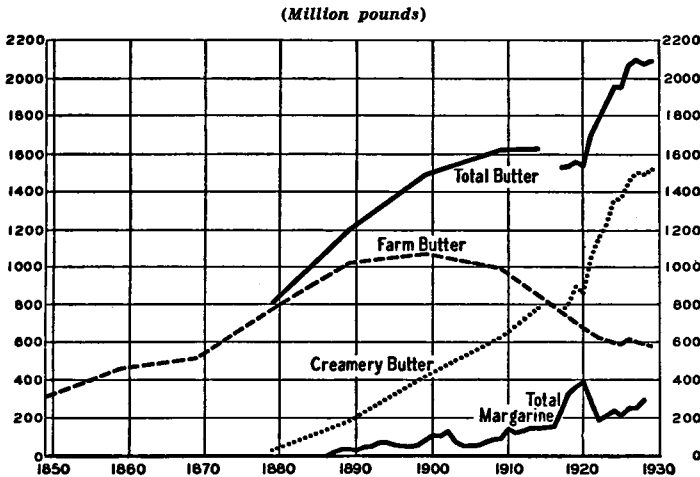
Margarine, on the other hand, has always required relatively large aggregations of capital for its satisfactory production. In the 'seventies there may have been a certain number of individuals who experimented with the production of the commodity; but, once the method of manufacture became standardized, it was produced by organizations with sufficient capital to afford plant and equipment. It has not been manufactured, however, exclusively by the large packers, although they have been an important element of the industry from the beginning. There have always been, in addition, a few large independent producers and a number of smaller independents. The industry, however, has never consisted of numerous establishments, approximately 30 representing the total in the 'eighties and about 65 now.

Discussion of method of manufacture of margarine is deferred to Part II (p. 121) where it is taken up in detail. Here it is important to emphasize the fundamental differences in the organization and political temper of the butter and margarine industries in the early period. One consisted of hundreds of thousands of individual, or sometimes co-operating, producers, organized only loosely in local, state, and perhaps national dairy associations; while the other was composed mainly of a few financially powerful, closely knit business units with reputations none too savory as to how their power had been attained. The two industries were on opposite sides of the agricultural market. Dairymen had meat as well as milk and butter to sell; the packers were only incidentally producers of margarine, but were primarily interested in the economical purchase and sale of livestock and meat products. The clash of these two sets of forces provided one of the bitterest legislative struggles of the last quarter of the nineteenth century.

LONG-TIME TREND OF BUTTER AND MARGARINE PRODUCTION

Before considering the legislative outcome of this struggle, it may be well to have a graphic picture of the relative importance of butter and margarine production over a period of years and of the growth in each. These are depicted in Chart 1. Prior to 1917 the only statistics

CHART 1.—UNITED STATES PRODUCTION OF BUTTER, ANNUALLY, 1849-1929, AND OF MARGARINE, 1886-1929*



* Data from Appendix Tables I and II.

of butter production were those provided by the decennial censuses. Since that date monthly reports of creamery production have been published by the Bureau of Markets¹ of the Department of Agriculture and biennial ones by the Census Bureau. These two, when put on a comparable basis, do not agree. We have preferred to use

¹ Later merged with other offices to form the present Bureau of Agricultural Economics.

those of the Bureau of Agricultural Economics because of their frequency and the continuous character of the relation of the Bureau to the industry. The Bureau claims that its reports cover at least 95 per cent of the production of the creameries of the country. Farm production of butter is naturally much more difficult to gauge than creamery production. The Department of Agriculture now publishes annual estimates, but these are simply rough approximations. In the chart, estimates have been interpolated for intercensal years.

The margarine statistics are more satisfactory than either of the other two series, since they are based on reports required by law to be made by all margarine manufacturers to the Bureau of Internal Revenue.

Even at the peak of production in 1920 margarine was produced in only about one-fourth the volume of butter production. A second point of interest here, because of its significance to the market at that time, was the very rapid expansion of the production of farm butter in the two decades from 1870 to 1890. A third fact of outstanding importance is the gradual and then rapid decline in farm butter production after 1889 and the much more than compensating increase in creamery production.

Tracing the trend of margarine production in somewhat greater detail, we find a gradual growth from 1887 (when the Oleomargarine Act became effective) to 1894; then a slump for a few years followed by a more pronounced increase which reached its culmination in 1902, at the time of the passage of the second or amendatory act; a marked slump after that until 1906, when production began gradually to increase; no pronounced growth until 1917; in the next five years great expansion and then decline; since 1922 irregular advance.

No consecutive statistics of margarine production are available before 1887. Estimates made at the time of the Congressional hearings in 1886 ranged as high as 300

million pounds.¹ These were patently absurd, however, and probably were not believed even by those who made them. E. A. de Schweinitz, biochemist in the Department of Agriculture, writing in 1895, stated that 45 million pounds had been sold in the year 1883.² This estimate seems reasonable, and probably represents rather the maximum than the minimum production prior to the act of 1886.

TREND OF EXPORTS OF AGRICULTURAL PRODUCTS,
PARTICULARLY BUTTER

It is also essential to an understanding of the early legislative situation that an examination be made of the trend of foreign trade during the period, particularly in butter. During the Civil War and the years immediately following, the balance of American trade in general was unfavorable to the United States, as it had been during most of the earlier history of the country. Capital was being imported on such a large scale that not even the gold exports, resulting from the discovery of gold in California, could top the balance. Beginning with 1874, however, there was a reversal of this relationship, primarily the result of the expansion of agricultural exports from this country. Such exports were particularly large from 1879 to 1881, but throughout the last quarter of the century they were the principal factor responsible for the shift in the trade balance. The importance of this to the business life of the country was recognized at the time, and any policy that was likely to put it in jeopardy was strongly opposed by all interests involved.

The net trade position of the United States with regard to butter for the past fifty years may be briefly summarized thus: Until the World War, we were definitely net

¹ H. C. Bannard, "The Oleomargarine Law," *Political Science Quarterly*, December 1887, II, 553.

² See E. A. de Schweinitz, "Butter Substitutes," *Agriculture Yearbook*, 1895, p. 446.

exporters; in 1914, however, imports exceeded exports and again from 1920 to 1928, with an interruption of only one year, imports were consistently above exports.¹

The volume of exports varied considerably from year to year before the war, the highest figure being 39 million pounds. There were two periods when exports were relatively large: the first one from 1877 to 1881, the boom period of American trade, and the second from 1896 to 1902. Otherwise, the trend of exports was downward, except sporadically. Great Britain has uniformly been the most important customer. When her takings have been large, exports as a whole have been large, and vice versa.

The decline of the greatly expanded export trade of the late 'seventies and early 'eighties had a marked effect on margarine legislation. It was thought that the adulteration of butter with margarine and the fraud perpetrated in its sale were jeopardizing American foreign trade, just as the absence of federal meat inspection in this country was jeopardizing the foreign trade in livestock and dressed meat.² As a matter of fact, since the large exports of 1879-81 were in part due to bad crop conditions in Europe, they would probably have declined whether or not there had been adulteration and false branding. In any case, the widespread opinion that the latter was essentially responsible for the loss of trade was an important factor in leading to legislative action to restrict the substitute commodity.

Similarly, the second period of expansion in butter exports, from 1896 to 1902, is closely related to federal legislation on margarine. Fraud continued to be widely practiced in the substitution of margarine for butter even after the passage of the 1886 act, and the re-working, or renovation, of inferior butter became more general than

¹ See Appendix Table I for foreign trade statistics.

² See *Senate Reports*, Vol. 3, No. 829, 1889-90 (51st Congress, First Session, Serial No. 2705), particularly p. 28. An act providing for the federal inspection of meat for export was passed August 30, 1890.

it had been before. Also, as in the earlier period, a good deal of this fraud was perpetrated on the foreigner. With the passage of the more severe legislation of 1902, American exports of butter declined and continued small until the outbreak of the World War, except for one year. Since the war they have been small.

EXPORTS OF OLEO OIL

Oleo oil, the principal animal fat from which margarine is made, has been exported in considerable volume ever since the 'eighties. The growth of the trade between 1885 and 1890 was subject of comment in connection with the development of the European margarine industry.¹ As early as that, the Netherlands had taken the lead in Europe in the manufacture of margarine and was finding the United States its principal source of supply for oleo oil. Exports from here in 1884, the first year for which they were separately reported, were 38 million pounds, of which 33 million went to Holland.

Growth in this trade continued through the 'nineties and into the next decade, reaching a culmination in 1908 with an export of 212 million pounds. The Netherlands has always been the chief taker, but Germany has also purchased a large volume. Since 1908, on the other hand, except for a brief period immediately after the war, the trend of exports has been downward, markedly so from 1908 to 1918. This development has probably been in part a result of greater American demand for oleo oil, especially during the war, but perhaps more important has been the increasing use of vegetable fats in place of oleo oil in European margarine.

¹ See *House Miscellaneous Documents*, Vol. 15, No. 18, 1891-92, pp. 289-93 (52d Congress, First Session, Serial No. 2973).

CHAPTER III

EARLY MARGARINE LEGISLATION

It is difficult today, after more than twenty years of strict enforcement of the federal Food and Drugs Act, to realize how general was the adulteration of foods in this country prior to the passage of that act.¹ There can be no doubt, however, that in the 'eighties and 'nineties foods and drugs were adulterated to a greater or less extent the country over.

THE WIDESPREAD ADULTERATION OF FOODS AND DRUGS IN THE 1880'S AND 1890'S

The Division of Chemistry of the Department of Agriculture accumulated evidence on this subject long before it was given power to enforce the pure food law, and incorporated this in a series of publications entitled *Extent and Character of Food and Drug Adulteration*.² In these bulletins is a great mass of material taken primarily from the reports of state and municipal food commissioners or health officers, describing in detail the adulterations that they found in their various districts. Most of these adulterations were harmless. They were the substitution of cheaper for dearer materials in the manufacture or preparation of such things as butter, cheese, milk, tea, coffee, cocoa, and a hundred other commodities in everyday use. A. J. Wedderburn, who compiled the reports, estimated that 15 per cent of the foods used in the country were adulterated, but that probably not more than 2 per

¹ The original act was passed June 30, 1906. The Congressional hearings and debates make illuminating reading.

² U.S. Department of Agriculture, Division of Chemistry Bulletins 25, 32, and 41, published in 1890, 1892, and 1894, respectively. The extent of adulteration is particularly considered in Bulletin 41, pp. 11-13.

cent of the adulteration was actually harmful.¹ He summarized the situation in the following words:

That adulteration is general is proved . . . as is also the fact that no kind of food, drugs, or liquors is free from the finishing touches of the manipulators. It may be therefore concluded that the practice is general and the character principally fraudulent, with but occasional criminal additions, the latter, however, too frequently causing loss of life and health.

The Division of Chemistry also prepared more scientific data regarding the nature of the adulterations in a series of documents published between the years 1887 and 1902 on *Foods and Food Adulterants*.² These included the following ten groups of commodities:

- I. Dairy Products (1887)
- II. Spices and Condiments (1887)
- III. Fermented Alcoholic Beverages, Malt Liquors, Wine, and Cider (1887)
- IV. Lard and Lard Adulterations (1889)
- V. Baking Powders (1889)
- VI. Sugar, Molasses, Confections, and Honey, and Their Adulterations (1892)
- VII. Tea, Coffee, and Cocoa Preparations (1892)
- VIII. Canned Vegetables (1893)
- IX. Cereals and Cereal Products (1898)
- X. Preserved Meats (1902)

From this list it will be seen that dairy products were the first commodities to be considered. This was not only because adulteration was probably more prevalent in this group than in any other, but because the dairy interests were organized to oppose unfair manipulation and degradation of their products and because it was recognized that dairy products, particularly milk, were peculiarly essential in the diet.

¹ Bulletin 41, p. 13.

² Bulletin 13, Parts I to X.

EARLY STATE LEGISLATION TO CONTROL THE SALE OF
MARGARINE

Municipal and state legislation preceded federal legislation on food adulteration. The problem came close home to the consumer; so it was natural that it should be handled in local politics before it reached the federal Congress. At least four states, New York, Pennsylvania, Delaware, and Maryland, and the District of Columbia, had passed legislation "to prevent deception in the sale of butter and cheese" prior to 1880; and by the time of the passage of the federal legislation on margarine in 1886 no less than 22 states already had legislation on this subject on their statute books. As was brought out in a report of the statistician of the Department of Agriculture, published in 1886, these state laws were of two sorts: (1) regulative, providing that adulterated articles should be sold for what they really were, providing regulations for labeling, and so on; (2) prohibitory laws, forbidding the manufacture of such adulterated articles or their offer for sale.

The earliest margarine laws were of the regulative variety. Such were in force in 1886 in the District of Columbia, New Hampshire, Massachusetts, Rhode Island, Connecticut, New Jersey, Delaware, Maryland, Georgia, West Virginia, Indiana, Iowa, Nebraska, Nevada, and California. Prohibitory laws were in force in Maine, New York, Pennsylvania, Michigan, Wisconsin, Minnesota, Ohio (with an important limitation.)¹

The District of Columbia act, passed by the federal Congress, is quoted below,² since many of the regulative measures of other states were patterned on it. As will be

¹ U.S. Department of Agriculture, *Report of the Condition of Winter Grain, the Progress of Cotton Planting, and on Freight Rates of Transportation Companies* (Report of the Statistician, No. 29, New Series), May 1886, p. 195.

² *Congressional Record*, Vol. 8, Part 1, December 2, 1878—February 3, 1879, p. 583 (45th Congress, Third Session).

seen, it aimed to prevent fraudulent sale of the commodity by requiring proper labeling by manufacturers and dealers and by fixing penalties in case of failure to do this. It must be realized that at that time margarine was uniformly colored yellow, and consequently resembled butter closely in appearance.

Be it enacted, &c., That every person who shall manufacture for sale or who shall offer or expose for sale any article or substance in semblance of butter or cheese, not the legitimate product of the dairy, and not made exclusively of milk or cream, but into which the oil or fat of animals, not produced from milk, enters as a component part, or into which melted butter or any oil thereof has been introduced to take the place of cream, shall distinctly and durably stamp, brand, or mark upon every tub, firkin, box, or package of such article or substance the word Oleomargarine, in plain Roman letters, not less than half an inch square, placed horizontally in proper order thus: OLEOMARGARINE. And in case of retail sales of such article or substance in parcels the seller shall in all cases deliver therewith to the purchaser a written or printed label bearing the plainly written or printed word Oleomargarine, in type or letters as aforesaid; and every sale of such article or substance not so stamped, branded, marked, or labeled shall be void, and no action shall be maintained for the price thereof.

SEC. 2. That every person who shall sell, or offer to sell, or have in his or her possession with intent to sell contrary to the provisions of this act any of the said article or substance required by the first section of this act to be stamped, marked, or labeled as therein stated, not so stamped, marked, or labeled, or in case of retail sale without delivery of a label required by section 1 of this act, shall for each such offense forfeit and pay a fine of \$100, to be recovered by indictment in any court of the District of Columbia of competent jurisdiction for the trial of misdemeanors, and the one-half of such fine when paid to go to the informer and the residue to be paid into the treasury of the District of Columbia.

SEC. 3. That every person who shall sell or offer or expose for sale, or who shall cause or procure to be sold or offered or exposed for sale any article or substance required by the first section of this act to be marked, branded, stamped, or labeled, not so marked, branded, stamped, or labeled, shall be guilty of a misdemeanor, and on trial for such misdemeanor proof of the sale or

offer or exposal alleged shall be presumptive evidence of knowledge of the character of the article so sold or offered.

The New Hampshire law required that any article made in imitation of butter be colored pink. Other laws required public notice in case margarine was served in restaurants and boarding houses. The view was widely held at the time that consumption was negligible in private families and occurred principally in public eating places where proprietors could impose upon unwitting patrons.

As a result of the ineffectiveness of most of this type of legislation and the widespread distrust of the commodity on grounds of health, seven states (mentioned above) passed downright prohibitory legislation. They were not content to impose fines or fix other penalties for fraudulent sale of the substitute but altogether prohibited its manufacture and sale within their borders. This was the case, although, in the effort to insure the constitutionality of these laws, it was customary for the framers to so word and entitle them that they appeared merely to aim at the prevention of deception in the sale of dairy products or to preserve the public health.

All of these prohibitory laws were passed in the spring or early summer of the year 1885, and all have similar features. The Maine law, approved March 3, 1885, placed a penalty upon anyone "who, by himself or his agent, manufactures, sells, exposes for sale, or has in his possession with intent to sell" spurious butter or cheese. Section 6 of the New York act, passed on April 30, 1885, and amended June 9, 1885, stated,

No person shall manufacture, out of any oleaginous substance or substances or any compound of the same other than that produced from unadulterated milk or of cream from the same, any article designed to take the place of butter or cheese produced from pure, unadulterated milk or cream of the same, or shall sell or offer for sale the same as an article of food.

Other provisions were of the same intent. The Pennsylvania law, approved May 21, 1885; the Michigan law, approved June 12, 1885; and the Minnesota law, approved March 5, 1885, all had provisions similar to those of the New York law; while the Ohio law, passed April 27, 1885, imposed the same prohibition but excepted from the terms of the law margarine manufactured from beef suet and milk. The Wisconsin law placed a fairly heavy penalty upon "anyone who manufactures spurious butter or cheese, or knowingly sells it or offers it for sale."¹

Such was the status of state legislation at the time of the passage of the federal act of 1886.² Serious difficulty was experienced in the enforcement of these laws, since there was frequently no provision for the payment of enforcement officers. At the same time, detection required a great deal of time and money. Local boards of health were not adequately financed. The ordinary police were not competent. Consequently, the laws were often dead letters.

THE FEDERAL ACT OF 1886

It was not, therefore, until after this type of legislation had been widely adopted by the states, and then only after "more thorough discussion and more reckless opposition" than had been applied to any measure in Congress in the previous ten years,³ that the federal law on this subject was passed in 1886.

Resolutions and petitions on the subject of food adulteration were received by the federal Congress as early as 1879. Then followed the introduction of bills into the

¹ Exact citations are not given to these laws, but fairly detailed excerpts or discussion of them may be found in *Report of the Condition of Winter Grain, etc. (op. cit.)*, pp. 203-09.

² Act of August 2, 1886 (24 U.S. Stat. 209, chap. 840).

³ As stated by the chairman of the House Committee on Agriculture. See *Congressional Record*, Vol. 17, Part 5, May 11-June 9, 1886, p. 5201 (49th Congress, First Session).

House of Representatives and the Senate, some aiming at the eradication of all types of adulteration, but more of them specifically directed at butter substitutes. The Forty-seventh Congress (meeting from December 1881 to March 1883) was the first to consider the matter seriously. It saw the introduction of a number of bills, three of which were favorably reported on by the committees of the House to which they were referred. The aim of the first of these was to prevent adulterated foods and drugs from being shipped from abroad into this country, and to prevent the manufacture and sale of such in this country (*H.R. 4789*). The second purposed to tax the manufacture and sale of oleomargarine (*H.R. 6685*). The third sought to regulate the exportation of articles made in imitation of butter and cheese (*H.R. 4909*). None of these, however, was debated on the floor of the House.

The following Congress, which convened in December 1883, saw renewed efforts for legislation concerning food and drug adulteration in general and margarine in particular. The latter, however, overshadowed the former. Many industries would be adversely affected by general adulteration laws, while the organized dairy interests could more readily overcome the scattered opposition of a few margarine manufacturers. A resolution of investigation into food and drug adulteration, which was reported favorably by a select committee on public health, was recommitted by vote of the House. A little later, a substitute resolution of this committee for inquiring only into adulteration of exports and imports was voted down. The Committee on Agriculture, which failed to report upon the one general adulteration bill introduced early in the session, did recommend the adoption of a resolution of inquiry into adulterations of dairy products, and the Committee on Commerce reported favorably on a bill to regulate the export trade in butter. Although this session of Congress also closed with nothing definite accom-

plished, the stage was set for the important developments of the succeeding session.

In February 1886 a great convention of dairy interests from 26 states was held in New York City, and there instituted a nation-wide campaign to place the dairy industry on "an equal footing with its dangerous competitors." Following that, a flood of petitions from almost every state in the Union swept on to Washington, reaching its crest in May preceding the passage of the Oleomargarine Act by the House on June 3.

The Forty-ninth Congress (convened in December 1885) responded with the introduction of no less than 21 bills on food adulteration, 16 applying specifically to butter. Half of these provided for a tax on the manufacture and sale of imitations; the rest merely for regulation. Several were concerned with the regulation of the export of butter. In spite of the taxation feature, the agricultural interests succeeded in having all but one of the bills which were introduced in the House and referred to the Ways and Means Committee transferred to the Committee on Agriculture. This committee was favorable to the dairy interests and pushed the legislation with all energy to a successful conclusion.

The original oleomargarine bill (*H.R. 8328*), which the committee unanimously sponsored, provided for annual licenses for manufacturers and for wholesale and retail dealers in margarine at a cost of \$600, \$480, and \$48, respectively, and, in addition, for a manufacturing tax of 10 cents a pound. This manufacturing tax was the crux of the controversy. Those who favored a 10-cent tax admittedly wanted to stamp out the margarine industry, either because they believed the commodity injurious to health or because they wanted to eliminate competition with butter. A tax of this size the House would not sponsor, and consequently reduced it to 5 cents before passing the bill.

Extensive hearings were held before the Senate Committee on Agriculture and Forestry. These dealt extensively with the nutritive value of margarine, and left no doubt in unprejudiced minds that the commodity itself was a healthful and digestible food. Consequently, when the House bill was referred to the Senate, the 5-cent tax was further reduced to 2 cents. In the Senate, as in the House, the support of the measure was more than sufficient to carry it. The final vote in the House was 177 for, 101 against, 45 not voting. In the Senate it was 37 for, 24 against.

The terms of the act are given in detail in Appendix I (p. 281). Summarized briefly, they include definitions of butter and of margarine; special taxes for manufacturers, wholesalers, and retailers of margarine of \$600, \$480, and \$48, respectively; regulations as to the packing of the commodity, i.e., in wooden tubs or firkins of not less than 10 pounds, labeled as "oleomargarine"; a manufacturing stamp tax of 2 cents per pound; penalties of fines or imprisonment in case of failure to obey the law. Nothing was said about the color of the commodity, although its similarity to butter in this regard was recognized as presenting the most serious problem for enforcement officials.

ANALYSIS OF THE VOTE

Henry C. Bannard, writing in December 1887, analyzes the vote in the following fashion.¹ He says the bill was passed under the union of groups of three different points of view: (1) those who wanted to suppress a food they believed "foul in its nature and deleterious to the public health, or perhaps a positive poison"; (2) those who wanted to prohibit the sale of any article that competed with butter; and (3) those who wanted to legislate against the fraudulent sale of oleomargarine as genuine butter. It seems incredible now that intelligent people—legisla-

¹ "The Oleomargarine Law," *Political Science Quarterly*, II, 546.

tors, in fact—should have believed the stories that were current at the time regarding the way margarine was made. In spite of the testimony of the most reputable chemists of the day, undoubtedly many Congressmen and Senators, and probably the majority of the people they represented, believed it was frequently made from packing-house waste and other materials of foul and repellent nature. Professor Morton, president of Stevens Institute, testifying before the Senate Committee on Agriculture and Forestry, made the following remarks:

. . . . We have been told about the vile compounds that have been used in making the oleo—the fats of cats and dogs and animals which died of disease.

To anyone who knows about it these stories are simply absurd. It is utterly impossible to do any such thing. As I have said, if the animal has been dead a short time the fat cannot be used. For instance, you could not use fat from the meat which is hung up and exposed for sale in market for the purpose of making oleomargarine. Although such meat is not hurt for ordinary use, and can be cooked and eaten, the fat of it would be utterly ruined for the purpose of making oleomargarine.¹

Other distinguished chemists testified to the same effect.² But the misinformation persisted. According to Bannard, the samples of margarine that were shown in the House at the time of the debate on the bill were later proved to “have been unfairly and unscrupulously concocted by the lobby that clamored for the passage of the bill.”³ Professor Charles F. Chandler, of Columbia University, who believed implicitly in the nutritive and hygienic quality of margarine, testified at the same Senate hearings that “the state of New York is spending \$50,000

¹ “Testimony Taken before the Committee on Agriculture and Forestry, United States Senate, in Regard to the Manufacture and Sale of Imitation Dairy Products,” *Senate Miscellaneous Document*, No. 131, 1886, p. 60 (49th Congress, First Session, Serial No. 2346).

² *Ibid.*, p. 71.

³ *Op. cit.*, p. 548.

a year to disgust people with oleomargarine and artificial butter."¹

Probably Professors Chandler and Morton may have believed too implicitly in the purity and wholesomeness of margarine; nevertheless, it is certain that representatives of the dairy interests prejudiced the minds of legislators against the commodity at the time of the passage of the act. Perhaps the most fair-minded statement on the subject is that of H. P. Armsby, the distinguished expert on nutrition, then on the staff of the Pennsylvania State Agricultural Experiment Station, to the following effect:

The manufacturers claim that imitation butter can only be made from the best quality of fat from freshly killed animals, and I know of no evidence which disproves their assertions. The sensational article recently published in a prominent agricultural paper in the Northwest, accompanied by cuts of the numerous organisms found in butterine, is of no significance in this connection, both because the species described are all harmless, and because no comparative examinations of genuine butter were made. It is highly probable that many samples of the latter would show as miscellaneous an assortment of formidable looking, harmless organisms as did the butterine.

On the other hand, however, there is at present no guaranty, except the statement of the manufacturers, that diseased fat is not or cannot be used, the manufacture being conducted entirely without any official inspection, and visitors being in most (not all) cases excluded. I believe that the chances of disease being conveyed in this way are small, but they are not yet proved to be non-existent.

As regarding filthy processes of manufacture, it may safely be asserted that butterine could not successfully imitate butter were it not as clean as most things are which pass for clean in this dirty world.²

The second group that Bannard mentions as responsible for the legislation comprised those who wanted to

¹ *Op. cit.*, p. 76.

² *Science*, May 28, 1886, VII, Old Series, 472. Armsby refers to butterine instead of oleomargarine. The two commodities were the same, except that butterine contained a certain amount of butter while oleomargarine did not.

prohibit the sale of any article that competed with butter. These were the outspoken representatives of the dairy farmers who did not hesitate to declare their opposition to any article that might jeopardize the butter market. A representative from New York State made the following remarks:

What then do we propose by this bill? We propose, under the Constitution, if you please, to give incidental protection to the agricultural industries of the country. . . . Who is there who believes for a moment that oleomargarine would be sold in the markets of the United States if the purchaser knew the vile compound he was buying? . . . I grant, sir, this measure may possibly have the effect of stamping this industry out of existence.

Another New Yorker stated:

This oleomargarine business is a bad business, and the sooner it is exterminated the better it will be for us.

A member from Wisconsin said:

I should regret the reduction [of the tax from 10 cents] in fear that it might not accomplish the object that, I am free to say, inclines me to the support of the measure under consideration; for I fly the flag of an intent to destroy the manufacture by taxing it out of existence.¹

These indicate the most extreme position. Others looked upon the tax as a sort of tariff protection for agriculture and made a bid for the vote of Eastern manufacturers on the basis of mutual advantages. Butter imports were subject to a tariff of 4 cents a pound at that time, but since they were negligible in volume the industry gained nothing from the tariff.² The tax on margarine was expected to do more for the overburdened agriculture of that day.

The third group favoring the legislation consisted of

¹ These are a few of the citations quoted by Bannard, *op. cit.*, pp. 550-52.

² U.S. Treasury Department, *Digest of Decisions . . . under the Customs Revenue Laws* (1918), I, 365.

fair-minded individuals honestly seeking a method of eliminating the widespread fraud in the sale of margarine as butter. There was no doubt that fraud was common, as will be shown later on. It was also apparent that state legislation was inadequate to cope with it. They desired legislation of some sort, but in most cases would have preferred to avoid taxation. The difficulty was to discover a method of enforcing correct branding without the taxation feature. With taxation, the industry came under the supervision of the Bureau of Internal Revenue, which already had surveillance of the liquor industry.

Those who opposed the legislation might be similarly grouped in three main classes: (1) those who represented the margarine interests directly, or indirectly through the raw materials used—primarily, oleo oil and cottonseed oil; (2) those who considered federal legislation unconstitutional; (3) those who favored federal action but opposed taxation, particularly under the Bureau of Internal Revenue, as a method of enforcing it. These groups, however, were not so positive in their stand or so direct in their methods as were their opponents. Western livestock interests openly fought the measure on the ground that it would curtail the use of oleo oil. The packers claimed that their product was a wholesome one, hygienically manufactured. They opposed taxation, but did not appear to object seriously to supervision. Representatives from the South were almost unanimously opposed to the bill, not only on the ground that it would affect the cottonseed oil market adversely, but also because they were opposed to the extension of the internal revenue system. The tax on liquor had been a Civil War measure, and as they wished to see it, and the organization that collected it, completely done away with, they naturally opposed its extension to other commodities.

In the opinion of most Southerners and of many representatives from other parts of the country, the states

had jurisdiction over all matters concerning the general welfare; and if this legislation was to be justified at all, it was on the grounds of health or for the prevention of fraud, and fell within the province of the states. As Barnard put it, ". . . is this a proper matter for the attention of Congress? Are the clauses of the Constitution relating to the 'general welfare,' to 'regulation of commerce between the states,' to be construed as including these matters of domestic detail?"¹ It has already been pointed out that it was primarily because state legislation had failed in enforcement that federal legislation was sought. This was the retort usually made to arguments opposing federal legislation.

As to whether Congress had the right to levy a tax on one domestic industry for the purpose of protecting another, there was also violent difference of opinion. Although many claimed that Congress did not have that power, others pointed to the famous case of *Veazie Bank v. Fenno* (8 Wall 533), decided in 1869, in which the Supreme Court decided that Congress had the power to tax state bank notes even out of existence in its efforts to establish a national currency. At that time the court had said, "The power to tax may be exercised oppressively upon persons, but the responsibility of the legislature is not to the courts, but to the people, by whom its members are elected." This case was cited many times in the course of the debates in House and Senate. However, since Congress had power over all matters pertaining to the currency under the Constitution, there was no exact analogy between the two circumstances.

President Cleveland, in a message sent to the House at the time of his signing the act, considered this phase of the question in some detail. He said:

¹ See also C. Warren, *The Supreme Court in United States History* (Boston, Little, 1922), III, 288-89, 347-48.

This upon its face and in its main features is a revenue bill, and was first introduced in the House of Representatives, wherein the Constitution declared that all bills for raising revenue shall originate.

The Constitution has invested Congress with a very wide legislative discretion both as to the necessity of taxation and the selection of the objects of its burdens. And though if the question was presented to me as an original proposition I might doubt the present need of increased taxation, I deem it my duty in this instance to defer to the judgment of the legislative branch of the Government, which has been so emphatically announced in both houses of Congress upon the passage of this bill. . . .

It has been urged as an objection to this measure that, while purporting to be legislation for revenue, its real purpose is to destroy, by the use of the taxing power, one industry of our people for the protection and benefit of another.

If entitled to indulge in such a suspicion as a basis of official action in this case, and if entirely satisfied that the consequence indicated would ensue, I should doubtless feel constrained to interpose Executive dissent.

But I do not feel called upon to interpret the motives of Congress otherwise than by the apparent character of the bill which has been presented to me, and I am convinced that the taxes which it creates cannot possibly destroy the open and legitimate manufacture and sale of the thing upon which it is levied.¹

A question which might have been expected to be considered more thoroughly than it was concerned the desirability of encouraging an article such as margarine because of its relative cheapness. Certain organizations representing the working classes sent memorials to Congress opposing the measure, but on the whole the opposition on these grounds was less important than might have been anticipated. As has been said, the measure was passed primarily because the dairy interests wanted it and because various non-dairy interests wanted to curb adulterations in foodstuffs.

¹ *House Executive Documents*, Vol. 35, No. 368, 1885-86, pp. 1-2 (49th Congress, First Session, Serial No. 2403).

CHAPTER IV

DEVELOPMENTS LEADING TO THE AMENDMENT OF THE FEDERAL ACT

Under the terms of the law, the Bureau of Internal Revenue undertook supervision of the margarine industry in 1886, and its annual reports since that date furnish an authentic body of testimony regarding later developments. Statistics of production were first collected at that time, and reports as to the number of licensed manufacturers and dealers began to be made. This control increased with the further development of legislation, and the statistics have also been elaborated. From the time the act went into effect, however, production statistics have been regularly published.

DIFFICULTIES OF ENFORCEMENT

It became apparent almost at once that the problem of enforcement was going to be difficult because of the similarity in the appearance of margarine to butter. The licensing of manufacturers and dealers presented some problems; but more serious was the deception practiced by retailers upon consumers in the sale of margarine for butter. After the passage of the act, whatever small or irresponsible manufacturers had been in the industry were eliminated, and it was not difficult to collect the special tax of \$600 a year or the manufacturing tax of 2 cents a pound from the larger manufacturers.

There was more evasion of licenses among wholesale dealers and still more among retailers; but the crux of the difficulty was with the retailers, whether licensed or not, who sold the commodity for butter whenever they could. As early as 1887, the Commissioner of Internal

Revenue recommended in his *Annual Report*¹ that dealers' taxes be reduced to one-fourth the size provided by the law, on the theory that this would reduce evasion and would make possible a closer surveillance of retail practices.

It was not until 1893, however, that the Commissioner published a thoroughgoing analysis of conditions. At that time he reported as follows:

This product has become a recognized article of food, and its manufacture one of the established industries of the country. There is in nearly all the States an increasing demand for it under its proper name and by persons fully informed as to the nature of the substance. While it is used as a substitute for butter, for which it is intended, and comes into competition with the lower grades of that article, its production and sale have not, as shown by commercial reports and statistics, reduced the price of the higher grades of butter. The most reliable writers in this country on food products, and those who have given the subject careful study, state that oleomargarine, carefully and properly prepared, is a healthful article of diet and a wholesome substitute for butter and can be furnished at less cost. To prevent its sale as butter, which in appearance it so closely resembles, and to compel its exposure for sale as oleomargarine, the laws enacted for the control of the manufacture of and traffic in it should be rigidly enforced. This is no less due to the producers than to the consumers of butter, and to the public.

It is believed that very little of the oleomargarine manufactured in the country is placed upon the market without the payment of the tax. There are, however, many evasions of the laws by wholesale and retail dealers who have paid special taxes as such, and in some parts of the country produce dealers who sell oleomargarine seek to evade the payment of the special tax. Both authorized and unauthorized dealers sell and offer it for sale as butter, resorting to various methods to deceive the purchasers or to avoid the penalties imposed by State laws prohibiting its sale. It is sold in unstamped packages, or in packages on which the marks and brands are illegible, or which are carefully concealed from the purchaser and can only be discovered by very close inspection. The laws and regulations governing the traffic in this

¹ P. cxxxii.

article are not unreasonable or oppressive. Their requirements are only such as it is believed are necessary to compel the dealers to sell the article for what it really is and under its proper name. The demand for it as a food product has become so universal that, in my opinion, opportunity should be offered for its legitimate sale in any community where it is wanted by consumers.

The special taxes imposed upon wholesale dealers (\$480), and retail dealers (\$48), are exorbitant compared with the special taxes imposed upon other occupations, and I respectfully submit for your consideration the propriety of a reduction of the special tax imposed upon wholesale dealers in oleomargarine to \$120, and the tax imposed upon retail dealers to \$12 per year. I am satisfied that the reduction of the taxes to the sum above named would not result in a loss of revenue.¹

This unsatisfactory situation naturally gave rise to much agitation on the part of dairy interests to bring the commodity under control. They approached both state and federal legislatures, but were more effective in gaining the ear of state assemblies than in persuading Congress to amend the law at once. It will be remembered that at the time of the passage of the federal act no less than seven states, and these among the most densely populated in the country, had prohibitory legislation on their books. This legislation had as a rule been enacted only after unsuccessful experiments had been made with merely regulatory legislation.² Some of these laws forbade the manufacture and sale of all "spurious" butter and cheese; others specified that all animal fat, vegetable fat, and adulterated dairy fat came under this classification. However, as already indicated, except where funds were provided for enforcing the law—as in New York—and where a zealous officer or commission was in charge of enforcement, conditions were not different from those which were described above by the Commissioner of Internal Revenue.

¹ *Annual Report, 1893*, pp. 179-80.

² See above, pp. 6-8.

THE SUPREME COURT AND STATE LEGISLATION

The constitutionality of these prohibitory state laws was also open to question. Prior to 1886 none of them had been tested in a court higher than the New York Court of Appeals. That court, in June 1885, had declared the New York law unconstitutional in the case of *People v. Marx* (99 N.Y. 377), on the ground that the object of the act, notwithstanding its title, was not to displace existing provisions against fraud and deception in the manufacture and sale of butter substitutes, but rather to prohibit their manufacture and sale for the sole purpose of protecting the dairy industry. No argument that the prohibited articles were injurious or deleterious to the health of the community was made. Nor did the New York court find in the act any element of fraud prevention, but rather only a bold and absolute prohibition of butter substitutes to protect those engaged in the manufacture of dairy products against the competition of cheaper substances.

Soon after the passage of the federal act, however, the constitutionality of the Pennsylvania law, which was prohibitory and substantially the same as the New York statute, was challenged in the Supreme Court of the United States, in the case of *Powell v. Pennsylvania* (127 U.S. 678). In contrast with the position taken by the New York court, the federal court with little hesitation upheld the prohibition as a valid exercise of the police power of the state.

POWELL VERSUS PENNSYLVANIA

The latter decision, delivered April 9, 1888, by Justice John M. Harlan, involved the sale of margarine which was manufactured within the state of Pennsylvania. The supreme court of the state had sustained the validity of the law, and an appeal was taken to the United States Supreme Court on the ground that the statute was in violation of the due process and equal protection clauses of the Fourteenth

Amendment. The prohibition was upheld on the grounds that it was a reasonable measure for the protection of the public health and for the prevention of fraud. The court was of the opinion that it was for the state legislature to determine whether regulation was impossible and prohibition necessary adequately to promote the public health and to prevent fraud and deception; in the case under consideration there existed no basis upon which to declare such determination unreasonable. No attempt was made judicially to inquire into the healthfulness or unhealthfulness of the product. In fact, it was assumed by the court that most margarine was unhealthful. The lower court had rejected the evidence offered to prove that the compound was wholesome. In this connection, Justice Harlan remarked: "It will be observed that the offer in the court below was to show by proof that the particular articles the defendant sold . . . were, in fact, wholesome or nutritious articles of food. It is entirely consistent with that offer that many, indeed that most, kinds of oleomargarine butter in the market contain ingredients that are or may become injurious to health." And again: "If all that can be said of this legislation is that it is unwise, or unnecessarily oppressive to those manufacturing or selling wholesome oleomargarine, as an article of food, their appeal must be made to the legislature, or to the ballot box, not to the judiciary." Justice Stephen J. Field vigorously dissented, basing his opinion largely upon the decision of the New York court in the Marx case.¹

The decision was a decided victory for the dairy in-

¹ In his dissenting opinion, Justice Field said: "Upon first impressions one would suppose that it would be a matter for congratulation on the part of the State that in the progress of science a means had been discovered by which a new article of food could be produced, equally healthy and nutritious with, and less expensive than, one already existing, and for which it could be used as a substitute. Thanks and reward would seem to be the natural return for such a discovery, and the increase of the article by the use of the means thereby encouraged. But not so thought the legislature of the Commonwealth of Pennsylvania."

terests; but its effect was felt to be substantially lessened by another decision of the Supreme Court in the famous case of *Leisy v. Hardin* (135 U.S. 100), decided April 28, 1890. This case involved the seizure by a local official of a shipment of beer transported from Illinois into Iowa, where its manufacture and sale was prohibited by state statute. The court held that for the state to prohibit the sale by the non-resident importer of intoxicating liquor that was shipped in from the outside, so long as it was in the original package, was an infringement upon the power of Congress to regulate interstate commerce, and therefore unconstitutional. Justice Harlan, who had delivered the decision in the Powell case, dissented, with Justices Gray and Brewer. It will be seen, however, that the doctrine of *Leisy v. Hardin* was not entirely followed in the later oleomargarine cases which raised the same issue.

Congress almost immediately attempted to counteract the effect of the *Leisy v. Hardin* decision by passing the Wilson Act of 1890, which reads as follows:

An act to limit the effect of the regulation of commerce between the several States and with foreign countries in certain cases.

Be it enacted by the Senate and the House of Representatives of the United States of America in Congress assembled, That all fermented, distilled, or other intoxicating liquors or liquids transported into any State or Territory or remaining therein for use, consumption, sale, or storage therein, shall upon arrival in such State or Territory be subject to the operation and effect of the laws of such State or Territory enacted in the exercise of its police powers, to the same extent and in the same manner as though such liquids or liquors had been produced in such State or Territory, and shall not be exempt therefrom by reason of being introduced therein in original packages or otherwise.¹

It was not until 1902, however, that similar legislation was passed for margarine, although Congressional records of the 'nineties are strewn with bills proposing to do

¹ Approved August 8, 1890 (26 U.S. Stat. 313, chap. 728).

this. Several of these were favorably reported by committees and some were debated on the floor, but no formal action was taken until the later date. As a matter of fact, by that time the significance of such an enactment was much weakened by Supreme Court decisions.¹

"ANTI-COLOR" LAWS PASSED BY THE STATES

Meanwhile the tendency of state legislation was away from downright prohibitory rulings toward those that set up a means of distinguishing between margarine and butter. Since color was the most distinguishing feature, this was utilized. The first law to forbid the sale of margarine "colored in imitation of butter," so far as we know, was a New Jersey act of March 22, 1886. This was followed by Maryland in 1888; but it was not until 1893 or later that the "anti-color" laws became common in state legislation. In 1902, at the time of the amendment of the federal act, no less than 32 states had such laws on their statute books.² These laws were probably considered approximately prohibitive because it was not thought at that time that a market could be developed for uncolored margarine.

¹ In this connection Warren (*The Supreme Court in United States History*, III, 453-55), states: "By the Wilson Act of 1890, Congress restored to the States their control over liquor upon its arrival within the State; but this statute resulted in little benefit to the prohibition States, since, while the Court held it constitutional, it also held that the word 'arrival' meant not physical arrival within the State but commercial arrival by delivery to the consignee, the status of interstate transportation not being concluded until such delivery. The same doctrine as to the want of power in the States to interfere with the objects of interstate transportation when in their original packages was applied by the Court to State legislation on the subjects of oleomargarine and cigarettes. For thirteen years, the National power over liquor transportation growing out of this Original-Package Doctrine reigned supreme. . . . To put an end to this situation, Congress passed the Webb-Kenyon Act of 1913, penalizing the shipment or transportation of liquor intended to be received, possessed, or sold either in original package or otherwise in violation of State laws. Though the constitutionality of this law was doubted by President Taft and by most of the Bar, it was supported by the Court in decisions which gave greatly added scope to the power of Congress to transfer its authority to the States. The Reed Amendment of 1917, also supported by decisions of the Court, was the culmination of this form of National legislation."

² For a list of these states, see pp. 90-91.

PLUMLEY VERSUS MASSACHUSETTS

The first Supreme Court decision testing this type of law was in the case of *Plumley v. Massachusetts* (155 U.S. 461), decided on December 10, 1894, Justice Harlan delivering the opinion of the court. The validity of such legislation, so far as it applied to margarine manufactured and sold within the individual state, was beyond question, in view of the decision in the Powell case. It still remained for the court to determine, however, whether such legislation could be valid as applied to the sale of original packages received in interstate commerce. Plumley, a representative of a Chicago packing house, sold margarine colored in semblance of butter in the original package in Massachusetts in defiance of the state statute prohibiting its sale. Relying on the *Leisy v. Hardin* case, he contended that the Massachusetts law was repugnant to the commerce clause of the Constitution. In perfect consistency with the dissent of Justice Harlan, but somewhat inconsistent with the position of the majority in *Leisy v. Hardin*, the court held that the state, in the exercise of its police power, could prohibit the sale of artificially colored or adulterated margarine even in original packages imported from other states, when such sale might lead individuals to purchase what they might not intend to buy. The original-package doctrine enunciated in the liquor case was held to be inapplicable, because in that case the article sold was what it appeared to be, namely, genuine beer, and not a liquid or drink colored artificially so as to cause it to look like beer.

It was urged upon the court that by the taxation act of August 2, 1886, Congress had fully legislated on the subject of margarine. To this contention Justice Harlan replied: "... There is no ground to suppose that Congress intended in that enactment to interfere with the exercise by the States of any authority they could rightfully exercise over the sale within their respective limits of the

article defined as oleomargarine." The court assumed that the product was healthful or not necessarily unwholesome. The decision rests entirely upon the ground that the state has the right to protect its citizens against fraud and deception in the sale of articles brought in from beyond its borders. Justice Harlan pointed out that Massachusetts did not forbid the manufacture and sale of all margarine, but only such as is colored in imitation of yellow butter. To the argument that under the Constitution the state had no power to prohibit the sale in the original package by the importer of colored margarine brought in from other states, he said: "If there be any subject over which it would seem the States ought to have plenary control, and the power to legislate in respect to which it ought not to be supposed was intended to be surrendered to the general government, it is the protection of the people against fraud and deception in the sale of food products." He denied that this was a reversal of the position taken by the court in the case of *Leisy v. Hardin* by saying that in the liquor case no question of fraud prevention was present and that only genuine beer, not imitation beer, was involved. The three dissenting members, Justices Field, Fuller, and Brewer, contended that by the act of 1886 Congress had recognized margarine as a legitimate article of commerce and vigorously denied the right of a state to exclude from commerce such articles because their appearance might deceive purchasers in regard to their qualities. Whether or not the distinction made by the majority of the court has merit is not important to this discussion. At any rate, the decision left the states free to prohibit absolutely the sale within their borders of all margarine colored in imitation of butter.

SCHOLLENBERGER VERSUS PENNSYLVANIA

The doctrine of the Plumley case was not extended, however, to legislation which purported to prohibit com-

pletely the manufacture and sale of all margarine, colored and uncolored. In 1898, the constitutionality of the Pennsylvania statute was again challenged before the United States Supreme Court. It will be remembered that the Powell case did not involve the rights of an importer under the commerce clause of the Constitution, but only the right of Pennsylvania to prohibit the manufacture and sale of all margarine within the state—which is, of course, a totally different thing from the right of a state to prevent the introduction and subsequent sale within its borders of all margarine. In *Schollenberger v. Pennsylvania* (171 U.S. 1), with *Leisy v. Hardin* as precedent, the statute was held to be unconstitutional to the extent that it prohibited the sale by the consignee or importer of margarine in the original package brought in from another state. The court was of the opinion that margarine, as a product, had been recognized by the federal act of 1886 as a legitimate article of food and commerce, and said further:

The general rule to be deduced from the decisions of this court is that a lawful article of commerce cannot be wholly excluded from importation into a State from another State where it was manufactured or grown. A State has power to regulate the introduction of any article, including a food product, so as to insure purity of the article imported, but such police power does not include the total exclusion even of an article of food.

The changed attitude of the court as to the healthfulness of the product is significant. In the Powell case, margarine was assumed to be deleterious to human health. In the Schollenberger case, on the other hand, the court took judicial notice of the fact that it is wholesome and nutritious, saying:

. . . . It may be admitted that oleomargarine in the course of its manufacture may sometimes be adulterated by dishonest manufacturers with articles that possibly may become injurious to health. Conceding the fact, we yet deny the right of a State to

absolutely prohibit the introduction within its borders of an article of commerce, which is not adulterated and which in its pure state is healthful, simply because such an article in the course of its manufacture may be adulterated by dishonest manufacturers for the purposes of fraud or illegal gains. The bad article may be prohibited, but not the pure and healthy one.

In comparing this with the Plumley case, the court pointed out that the Massachusetts law prohibited the sale of margarine colored in imitation of butter; that there the fraud and deception element was strong; and that the decision in that case rested upon the principle "that the term 'commerce among the States' did not mean a recognition of a right to practice a fraud upon the public in the sale of an article even if it had become the subject of trade in different parts of the country."

At the same time the case of *Collins v. New Hampshire* (171 U.S. 30) was heard and decided. The New Hampshire statute prohibited the sale and manufacture of margarine unless it was colored pink. As in the Schollenberger case, the issue centered around the right of an importer to sell the product in original packages introduced from another state. The court held the act to be in effect completely prohibitory on the ground that, if complied with, the condition required would effectually prevent any sale, and unconstitutional to the same extent as the Pennsylvania law. The decision follows and rests upon the same reasoning as set forth in the Schollenberger case.

Neither of these decisions overrules or modifies the position taken in the Powell case. It was not intimated in either of them that the right of sale extended beyond the first sale by the importer. But the effectiveness of the statutes involved was, of course, greatly impaired. While the Supreme Court did not deny, nor has it since denied, the right of a state completely to prohibit the manufacture of margarine within its borders, or the sale

within its borders of margarine so manufactured, it did deny the right of a state to prevent the introduction from other states of all margarine and its subsequent sale in the original package. Apparently as a result of the Schollenberger decision, Pennsylvania amended its legislation in 1899 to an anti-color basis.

SUMMARY

The situation in the 'nineties may then be summarized as follows: The decisions of the United States Supreme Court were to the effect that a state might prohibit the manufacture and sale of all margarine within its borders, without violating the federal Constitution, if such prohibition did not prevent the sale by the importer of original packages introduced in interstate commerce; a state might prohibit the manufacture and sale within its borders of margarine colored in imitation of butter even as against the rights of an importer under the commerce clause; but a state might not prevent the sale by the importer of all margarine in original packages introduced in interstate commerce under a completely prohibitory law.¹

Turning from law to practice, it may be said that margarine manufacturers were abiding by the terms of the 1886 act so far as payment of license fees and the manufacturing tax were concerned. But the problem of selling the commodity honestly under its own label was becoming increasingly difficult since the most populous states forbade the sale of margarine "colored in semblance of butter." Since state laws were far from consistently enforced, however, and since the federal law regarding labeling could be easily evaded, much margarine colored in semblance of butter was sold even in such states. Uncolored margarine was produced in negligible volume at that time.

There was some evasion of the license tax by whole-

¹ These decisions stand at the present time. Further discussion of them will be found on pp. 89-91.

salers, but considerably more by retailers. This was encouraged by the fact that taxes were very heavy—\$480 and \$48 a year, respectively. There was also much deception by retailers in the sale of margarine as butter. The law required that “retail dealers in oleomargarine must sell only from original stamped packages in quantities not exceeding ten pounds.”¹ One- and two-pound packages were unknown. It was very easy to deface the label on a ten-pound tub of margarine and sell the contents for butter; or otherwise to substitute margarine for butter.

All reasonable people recognized that the law of 1886 was inadequate and needed amendment. The outcome was the amendment of 1902, providing a tax, which, for all practical purposes, was prohibitive on margarine “colored in semblance of butter.”

THE 1902 AMENDMENT

As already pointed out, most of the bills introduced into Congress for the amendment of the law during the 'nineties were drafted on the same plan as the Wilson Act; they aimed at bringing the commodity, when shipped in interstate trade, under the jurisdiction of the laws of the state to which it was shipped.² It was not until 1899 that the idea of discriminating in the rate of taxation on colored margarine, as distinguished from uncolored, appeared in the proposals for legislation. According to Weist, the idea originated with the National Dairy Union, and the question was agitated through state dairy associations.³ The bill embodying the idea was introduced into the House by Representative Grout of Vermont on December 12, 1899, as *House Report 3717*. It was known as the “Grout bill,” and furnished the skeleton of the amendment as finally passed in 1902.

¹ 24 U.S. Stat. 209, chap. 840.

² See above, p. 48.

³ E. Weist, *The Butter Industry in the United States* (Columbia University Studies in History, Economics, and Public Law, Vol. 69, No. 2), 1916, p. 256.

Like the earlier legislation of 1886, the 1902 legislation was bitterly fought in both houses of Congress. Hearings were held by the House Committee on Agriculture and the Senate Committee on Agriculture and Forestry.¹ Extensive committee reports were published, and there was heated debate on both floors.

The 10-cent tax was the focal point of the attack. Those who favored the measure insisted that such a tax was necessary to put margarine on a price parity with butter and thus remove the stimulus to fraud. Those who opposed it claimed that the fraud could be eliminated by more moderate measures, e.g., by further regulations as to the packing and labeling of the commodity, reduction of retailers' licenses, and similar methods. They protested that the margarine industry would be ruined if forced to pay such an exorbitant tax. They believed there would be no market for the uncolored product.

This point of view was represented in a bill, recommended by the minority of the House Committee on Agriculture, providing for the packing of the commodity in one- and two-pound rolls, the rolls to be stamped in sunken letters with the word "oleomargarine"; the same word to be stamped also on the wrappings. Otherwise, this minority bill left the 1886 law practically unchanged, i.e., as to the 2-cent tax, license taxes, coloring of the commodity, and so on.²

As in the earlier contest, those who favored the more stringent regulations most actively were Northerners, many of them from agricultural districts. The South opposed them, partly because margarine gave an outlet to cottonseed oil, partly because the 1886 act was still considered unconstitutional by many. Livestock interests of

¹ *House Reports*, Vol. 7, No. 1854, 1899-1900 (56th Congress, First Session, Serial No. 4027). *Senate Reports*, Vol. 4, No. 2043, 1900-01 (56th Congress, Second Session, Serial No. 4066).

² *House Reports*, Vol. 2, No. 255, 1901-02, pp. 12-13 (57th Congress, First Session, Serial No. 4400).

the West also opposed the measure, on the ground that it would curtail the market for oleo oil and neutral lard. Certain labor groups protested against it, arguing that butter prices would be advanced if margarine were eliminated from the market. In fact, there were mutterings of the danger of a butter trust.

Appendix I (p. 281) contains the 1902 amendments to the earlier act. The three principal provisions were: (1) that margarine shipped from one state into another was subject to the laws of the state to which it was shipped; (2) that margarine colored in semblance of butter was subject to a manufacturing tax of 10 cents per pound, while the uncolored product was taxed $\frac{1}{4}$ cent per pound; (3) that wholesale and retail dealers' licenses were reduced to \$200 and \$6, respectively, when uncolored margarine only was traded in; otherwise license taxes remained the same as in the original law.

ADULTERATION OF BUTTER

The point has already been made that adulteration, whether of butter or any other commodity, is a relative matter. This fact had not been sufficiently taken into account in the margarine legislation of 1886. Butter might still be adulterated, but, unless there was total adulteration, the product was not subject to the law. Partial adulteration, or adulteration proper, was not dealt with. In the new legislation an effort was made to correct this omission. The 1902 amendment contained, in addition to the three principal provisions regarding margarine noted above, the following provisions regarding adulterated and renovated butter:

1. Adulterated butter was defined as

a grade of butter produced by mixing, reworking, rechurning in milk or cream, refining, or in any way producing a uniform, purified, or improved product from different lots or parcels of melted or unmelted butter or butter fat, in which any acid, alkali, chemical, or any substance whatever is introduced or used for the pur-

pose or with the effect of deodorizing or removing therefrom rancidity, or any butter or butter fat with which there is mixed any substance foreign to butter as herein defined, with intent or effect of cheapening in cost the produce or any butter in the manufacture or manipulation of which any process or material is used with intent or effect of causing the absorption of abnormal quantities of water, milk, or cream.

2. Renovated or process butter was defined to mean butter "which has been subjected to any process by which it is melted, clarified, or refined and made to resemble genuine butter, always excepting 'adulterated butter'."

3. Manufacturers of both products were made subject to special taxes: \$50 a year for manufacturers of renovated butter, \$600 for manufacturers of adulterated butter.

4. Wholesale and retail dealers in adulterated butter were made subject to special taxes of \$480 and \$48 per annum, respectively.

5. Manufacturers of adulterated butter were required to pay a tax of 10 cents per pound, and of renovated butter $\frac{1}{4}$ cent a pound.

6. There were also regulations regarding the packing of these commodities similar to those for margarine (see Section 6 of the Oleomargarine Act of 1886). Adulterated and renovated butter were thus made subject to approximately the same regulations as colored and uncolored margarine, respectively.

EFFECT OF LEGISLATION ON PRODUCTION, 1886 TO 1902

The effect of legislative enactments on volume of production of margarine has already been mentioned. Since no statistics of production are available before the passage of the act of 1886, the reduction in the volume of production that occurred as a result of the original enactment cannot be measured. However, there is every reason to suppose that there was a reduction. Numerous small, ir-

responsible manufacturers who could operate on a narrow scale under the earlier régime were almost certainly forced out of the industry by the prospect of taxes and government supervision provided for in the act. The elimination of these doubtless cut into production. That means that the output of 34 million pounds produced in the fiscal year 1888, the first year of government supervision, was probably less than in immediately preceding years.

Year by year, following 1888, there was an increase in production until 1894. In that fiscal year the volume of output was 70 million pounds, or approximately twice what it had been seven years earlier. Following that, however, it declined for several years and did not recover again until 1898. The decline is traceable probably in some degree to the decision handed down by the Supreme Court in 1894 in the case of *Plumley v. Massachusetts*, which was unfavorable to the industry in that it upheld the right of the state of Massachusetts to prevent the importation within its borders of margarine colored in semblance of butter.

Beginning in 1898 again there was a marked increase in production which reached its culmination in 1902 (fiscal year) with a volume of 126 million pounds. The amendatory act brought this to a swift close, however, and production dropped in the following year to only 73 million pounds and continued small for several years. The following tabulation shows production of margarine in the United States for fiscal years, 1888-1903, in million pounds:

1888	34	1896	51
1889	36	1897	46
1890	32	1898	58
1891	44	1899	83
1892	48	1900	107
1893	67	1901	105
1894	70	1902	126
1895	57	1903	73

CHAPTER V

ENFORCEMENT AND PROPOSALS FOR FEDERAL LEGISLATION SINCE 1902

Following the 1902 amendment to the federal act of 1886, margarine production fell off very materially and remained small for several years. During this period legislative interest in this commodity rather subsided. Important work was done, however, in other branches of pure food legislation.

FOOD AND DRUGS AND MEAT INSPECTION ACTS

On June 30, 1906, the original Food and Drugs Act was passed, and on the same date provision was made for federal inspection of meat in interstate and foreign commerce. There had been earlier federal legislation with regard to meat inspection, but it had applied only to meat for export.¹ The 1906 legislation was the first comprehensive enactment on the subject.² With the passage of these laws the long struggle against the adulteration of foods and for the sanitary preparation of meat, which had begun in the 1870's, was brought to a culmination.

It cannot be said that this legislation could not have been made effective earlier because the power of Congress over interstate trade was not recognized; it is true, nevertheless, as Warren has suggested, that the awakening of Congress to the "vast power wrapped up in the commerce clause" of the Constitution was a gradual process. As early as 1887 it had relied upon its authority

¹ Act of March 3, 1891 (26 U.S. Stat. 1089, chap. 555).

² See L. B. Zapoleon, *Inedible Animal Fats in the United States* (Fats and Oils Studies of the Food Research Institute, No. 3), 1929.

over common carriers engaged in interstate trade in passing the Interstate Commerce Act of that year; and in 1890 it had further utilized its powers with the passage of the Anti-Trust Act. Nevertheless, it was only gradually, as the Supreme Court interpreted these and other laws, that the full extent of Congressional authority was recognized.

The two laws passed in 1906 applied to foodstuffs shipped in interstate or foreign commerce, including margarine. The Meat Inspection Act conferred jurisdiction over the manufacture of all margarine containing any component derived from cattle, sheep, hogs, or goats. More recently this act has been amended to cover the products of the slaughter of horses, but there is no record that horse oil is ever used in margarine. The act empowers federal officials to supervise the manufacture of margarine to insure that the processes are sanitary; that only wholesome materials are used; and that the branding is legal. In the manufacture, animal products obtained only from slaughterhouses under federal inspection may be used. The Meat Inspection Act exercises no control whatever over margarine unless it contains fat from one of the above listed meat animals. The Food and Drugs Act, on the contrary, exercises control over all margarine, whether containing animal products or not; but this control only begins at the time the margarine is shipped or offered for shipment in interstate or foreign commerce. The Food and Drugs Act takes no jurisdiction over the manufacture itself. It is concerned only with the prevention of adulteration and misbranding of all kinds of margarine that pour into interstate or foreign commerce, whether or not they have been manufactured under inspection authorized by the Meat Inspection Act.

In short, there are three laws with which manufacturers and dealers in margarine are concerned: the Oleomargarine Act, administered by the Bureau of Internal Revenue of the Treasury Department; the Meat Inspection

Act, administered by the Bureau of Animal Industry of the Department of Agriculture; and the Food and Drugs Act, now administered by the Food, Drug, and Insecticide Administration (until 1927 by the Bureau of Chemistry) of the Department of Agriculture. All manufacturers have to comply with the Oleomargarine Act. Manufacturers of margarine containing any product of cattle, sheep, swine, or goats have to comply also with the Meat Inspection Act if their product is shipped in interstate or foreign trade. Manufacturers producing margarine solely from vegetable products need not comply with the provisions of the Meat Inspection Act. Manufacturers of all types of margarine are subject to the provisions of the Food and Drugs Act in regard to that portion of their product that passes into interstate or foreign commerce.

FURTHER AMENDMENT OF THE MARGARINE LAW RECOMMENDED BY THE BUREAU OF INTERNAL REVENUE

The lull that followed the passage of the 1902 amendment to the Oleomargarine Act was short lived. It was a number of years before the subject was debated in Congress with anything like the heat of the earlier years; but the Bureau of Internal Revenue found the law a difficult one to enforce, even more difficult in some ways than the liquor excise law. The history of these difficulties may be traced in the annual reports of the Commissioner.

Beginning with the report for 1909, emphasis is placed upon the increasing defiance of the law, and recommendations are made for its further amendment. In 1910 the same facts and recommendations were reiterated. In 1911 the whole situation was thoroughly reviewed and recommendations made for improvement. This last discussion is quoted in full below, since it gives an authoritative description of conditions at that time.

Attention was called in the reports of 1909 to the defects in the oleomargarine statutes as construed in the United States courts

and to the deplorable situation occasioned thereby. Continued efforts to enforce this law serve but to disclose the situation more clearly. The present law imposes two rates of taxation, one 40 times as great as the other, on oleomargarine, the rate being determined by whether or not the product is artificially colored, which has proven a very poor method of determining the tax liability. The law provides that upon oleomargarine there shall be assessed and collected a tax of 10 cents a pound, provided that when oleomargarine is free from artificial coloration that causes it to look like butter of any shade of yellow said tax shall be one-fourth of 1 cent per pound. For a time after the passage of this law the oleomargarine manufactured was, on account of the nature of the ingredients used, white, or a very light color, and the yellow color was obtained by using artificial coloring agents, such as are generally used in the manufacture of dairy butter. While large amounts of oleomargarine, as it reached its final purchasers, was artificially colored, the Government succeeded in collecting tax at the higher rate on only a small proportion thereof for the following reasons: Under the law the oleomargarine is permitted to be packed by the manufacturers and sold in large firkins or tubs containing about 60 pounds with a stamp on the outside showing proper tax payment. The retail dealer would buy a small number of tubs of artificially colored oleomargarine tax paid at 10 cents a pound. He would then proceed to buy large numbers of tubs tax paid at one-fourth cent a pound. He would pay the special tax as a dealer in colored oleomargarine. The stamp on the tub does not have to be destroyed until the tub is empty, and the courts have held that a tub is not empty as long as any merchantable oleomargarine remains therein. The retail dealer, therefore, would sell from his tubs of the colored product, and, in general, the product would be sold as butter, and when a certain number of tubs would be nearly empty the dealer would remove them, together with a corresponding number of tubs tax paid at the lower rate, to some place in his private residence, or other place securely guarded, and there simply mix a little coloring matter in the white goods, refill the tubs in which had been colored oleomargarine, destroy the stamps on the tubs emptied of their white contents, take the refilled tubs back to his place of business, and continue selling therefrom. Field officers discovered this done in numbers of cases, and in many other cases had reason to feel confident that the same processes were going on without being able to secure legal evidence thereof. Great difficulty has been experienced in securing convictions even where the facts of ma-

nipulation have been undisputed. In order to hold a person manipulating oleomargarine liable as a manufacturer, not only the manufacture, but the sale of the product must be shown, and legal evidence as to both manufacture and sale is often impossible to secure. By the simple process above enumerated the retail dealer, with equipment of the very simplest kind, and with the minimum of labor and trifling expense and practical immunity from detection because of the fact that the oleomargarine laws do not provide the summary rights and remedies allowed Government officers in enforcing other internal-revenue laws, can add 9¼ cents to every pound thus manipulated, and, by furnishing this to his customers when they call for butter, he is enabled to dispose of the product, which cost him 12 to 15 cents per pound, at anywhere from 25 to 40 cents a pound. The comparative immunity from detection and punishment and the great financial profit growing out of the transaction have proved sufficient inducement to cause thousands of otherwise reputable grocers, market men, and dealers to engage in the nefarious business of defrauding the Government of its revenue and perpetrating a fraud on their customers. It is confidently believed that the oleomargarine law is, at this time, corrupting and debauching more taxpayers and affords the opportunity for greater fraud upon the public than any other statute with which the Internal Revenue Bureau has to deal.

During the past two years, however, a considerable change has been brought about in the manufacture of certain grades of oleomargarine which has introduced even more difficulty in the administration of the law, and that is the discovery of the method of extracting various vegetable oils, such as peanut oil, soya-bean oil, soy-bean oil, mustard oil, etc., which carry naturally a high degree of yellow coloring and which are sufficiently neutral and nutritive to be used as one of the actual ingredients in the manufacture of oleomargarine. Oleomargarine manufactured with one of these oils as a component ingredient carries a yellow color equal to that imparted by the addition of artificial coloring agents, yet no artificial coloring can be detected by any chemical reaction at this time known, with the result that a tax thereon of only one-fourth of 1 cent per pound can be collected. The present law, therefore, taxes in a manner intended to be prohibitive only one method of securing a certain result—that is, securing yellow color by artificial means. It does not tax the result itself, and a new method for securing such result, not within the purview of the statute, having been discovered, the law is rendered prac-

tically nugatory. There is some question as to whether oleomargarine manufactured with the yellow oils referred to is quite so palatable or saleable as that manufactured white and then colored. The sale of the product manufactured from the yellow oils, however, while still small, appears to be steadily increasing, and with its increase the artificial coloration by dealers may be expected to decrease in proportion.

At present, the color of the product is, therefore, practically no indication as to whether or not artificial coloration has been resorted to. Only in a few jurisdictions does it appear possible to secure convictions under the present law. In fact, anything like a satisfactory administration of the present law is clearly impossible.

It is strongly urged that there should be a complete revision of the oleomargarine statutes; that the double rate of taxation should be abolished and that a flat rate be adopted in lieu thereof; that the practice of handling oleomargarine in bulk in large packages be prohibited; that the manufacturers be required to pack oleomargarine in approved statutory packages running from one-half to five pounds, and that each and every package shall be sealed with a revenue stamp affixed; that the product shall be sold only in original unbroken packages, and that heavy penalties be denounced for removal from factory in other than stamped packages and for any dealer having in his possession or selling any oleomargarine not covered by proper stamps, and that heavy penalties be denounced for selling oleomargarine as butter. The package and stamp laws provided for the manufacture and sale of tobacco are believed to be the best yet devised. It appears that these statutes can be made applicable almost in toto to the manufacture and sale of oleomargarine, and it is earnestly recommended that Congress enact legislation incorporating the administrative features contained in the tobacco laws.

Had the tax on oleomargarine been two cents a pound during the past fiscal year instead of a nominal rate of ten cents and an actual rate of one-fourth cent a pound, the revenue would have been increased by \$1,793,100.79, a large sum expended in attempting to enforce the present statute would have been saved, and the corruption of great numbers of American citizens, as well as a fraud on the public to an extent not generally dreamed of, would have been prevented. It is earnestly hoped the Congress will take action in this matter during the coming season.¹

¹ Commissioner of Internal Revenue, *Annual Report, 1911*, pp. 17-19.

THE PALM OIL CASES

Meanwhile two cases on the subject of color had been tested out before the United States Supreme Court. These were *Cliff v. United States*, 195 U.S. 159 (1904), and *Moxley v. Hertz*, 216 U.S. 344 (1909). Both involved the question of the use of palm oil for the purpose of coloring the product, and the second case would not have come before the highest court had the earlier decision left no points in doubt. The question at issue was whether the use of palm oil, an admittedly wholesome vegetable fat of a naturally deep orange color, constituted artificial coloring of the product under the terms of the law, and required the payment of a 10-cent tax on the finished commodity. The court ruled that it did, on the ground that the proportions of palm oil used were so small as to be unimportant except for coloring purposes. These decisions strengthened the position of the Bureau of Internal Revenue, but did not deter manufacturers from experimenting with other coloring agents which could be used in sufficient volume to constitute legitimate ingredients. They then turned, as suggested above, to such materials as peanut oil and soy bean oil.

Thus it was found that, in spite of the amendment of 1902, conditions continued to be about as bad as before. Exactly the same type of fraud was practiced by retailers, while manufacturers were apparently more guilty than before. Under a double taxation system, i.e., 10 cents a pound for colored margarine and $\frac{1}{4}$ cent a pound for uncolored, there was much greater temptation to manufacturers than under the single rate system prevailing before. Some manufacturers paid only the $\frac{1}{4}$ -cent tax, though they made an artificially colored product;¹ others got around the law by using dark-hued raw materials that

¹ *Annual Report, 1914*, p. 21.

gave the resulting product a natural yellow color. Revenue officials apparently despaired of enforcing the color regulations of the act, and therefore recommended that they be done away with.

More and more it was recognized that the best way to protect the consumer was to guarantee him the manufacturer's original package. This was true not only of margarine, but of other commodities also. The most serious fraud was practiced by retailers after the breaking of the original package. Such fraud could be avoided if there were no tampering with the package between manufacturer and consumer. It was for this reason that the Commissioner recommended the packing of the commodity in one-half to five-pound rolls to be sold to consumers in original unbroken packages.

As was to be expected, Congress was not readily convinced of the unworkableness of the law. It took cognizance of the situation in committee hearings and debates, particularly in the Sixty-second Congress (1910-12),¹ but these failed to result in amendment of the law. Legislation of three main sorts was recommended. Dairy interests were willing to have the 10-cent tax eliminated, but only on condition that all manufacture of yellow margarine be prohibited. Other groups favored following the recommendations of the Bureau of Internal Revenue. Still others wanted the removal of the manufacturing tax *in toto* and the industry left subject to license only. *House Report 19338* (62d Congress), introduced by Gilbert N. Haugen, of Iowa, expressed the wishes of the dairy group; *House Report 20281* (same Congress), introduced by Ashbury F. Lever, of South Carolina, that of the second group; while the Burluson bill (*H.R. 13842*, 61st Congress) was sponsored by the third.

¹ See hearings on bills proposing to amend oleomargarine laws, House Committee on Agriculture, February 28 to April 2, 1912.

USE OF COTTONSEED OIL TREATED WITH SULPHUR

Meanwhile, it was discovered that certain manufacturers had been defrauding the government of large sums of money by using cottonseed oil treated with sulphur to manufacture a margarine which they claimed was naturally yellow in color, but which actually was yellow only because of the sulphur treatment. The Bureau of Internal Revenue attempted to collect the unpaid taxes, but was unsuccessful; and the whole matter was referred to a special committee of Congress for investigation. The report of this committee is quoted at some length below (though in literary style it leaves much to be desired), since it clearly indicates the type of problem enforcement officials had to meet.

For some time a controversy has existed between the Treasury Department and certain manufacturers of oleomargarine as to the rate of tax which should be imposed by the department on oleomargarine made by certain manufacturers thereof, during the years 1911 and 1912. . . . The facts out of which this controversy grew originated with the manufacturers of oleomargarine using a colored cottonseed oil in the manufacture of oleo, known as fulvous oil, golden yellow, butter oil, etc. . . .

1. The committee finds that the manufacturers of oleomargarine for the past 10 years have used every method known to science to get an oil not prohibited in the manufacture of oleo by reason of the unhealthfulness of the article or the color of the finished commodity, so not to subject the oleo to a tax of 10 cents per pound; and in their investigations the manufacturers through their own bureaus of chemistry, aided and assisted by private chemists, have experimented with sesame oil, mustard-seed oil, peanut oil, soy-bean oil, etc. During the same time the refiners of cottonseed oil have conducted scientific investigations with a view of evolving a process of refining cottonseed oil which when refined would retain its natural color as found in its crude state, only cottonseed oil being used in the manufacture of oleo; but all of said experiments and investigations have proven fruitless, either because of the fact of the high expense attached to said processes or to the fact that the finished commodity failed by reason of the taste thereof to meet the demands of the trade.

2. The committee finds that unrefined cottonseed oil is highly colored, and that the normal refined cottonseed oil is colorless, white, or a tinge of yellow, and that the Louisville Cotton Oil Co., an oil refinery, claimed to have discovered a secret process of refining cottonseed oils which would give it a color and when refined was free from artificial coloring matter, and that said company sold large amounts of this oil to the manufacturers of oleo, which was used by them in the manufacture of said commodity. . . .

4. That some of the manufacturers of oleo submitted samples of this colored oil to the department for analysis and examination before using the same in the manufacture of oleo, and at the time of submitting said oil for examination sought permission of the department to use the same in the manufacture of oleo at the rate of one-fourth cent per pound.

5. That the department at the time said oil was submitted to it, or soon thereafter, examined the same for artificial coloring matter and found none, and it so expressed itself to Armour & Co., who submitted said samples. But it informed said manufacturer that it believed said oil to be artificially treated or colored, and at the same time and later informed the manufacturers that it would not undertake to prescribe a formula for their commodity, but should a colored oleo appear on the market it would be subject to investigation, and if found to contain artificial coloring matter, either as a result of coloring matter in the oil or in any other ingredient, it would be subject to a tax of 10 cents per pound. . . .

7. That the Treasury Department has no concern whatever in the ingredients entering into oleo, except to see that no artificial coloring matter enters into the finished commodity, which would give it the shade or color of butter, either through the ingredients entering into the finished commodity or the finished commodity itself, its concern being only over tax liabilities or the revenues on the Government.

8. That colored oleo, looking like butter, during the years 1911 and 1912 appeared upon the market in the ordinary and usual channels of trade upon which a tax of one-fourth cent per pound was paid.

9. A sample of colored oleo during the month of January, 1912, was submitted to the Bureau of Chemistry in the Agricultural Department for examination, and said bureau transferred the same to the Bureau of Animal Industry in the same department, where it was chemically analyzed and the fact revealed that said oleo was artificially colored and that the colorant used was sulphur.

10. That the Bureau of Animal Industry has nothing whatever to do with the revenues of the Government, its function being to look after the healthfulness of the commodity. While it permitted cottonseed oil as an ingredient of oleo, it prohibited the use of sulphur.

11. That the Bureau of Animal Industry, looking after the healthfulness of the commodity, in the month of February, through an order issued by it, prohibited the use of sulphur in cottonseed oil used in the manufacture of oleo or in the finished commodity.

12. That after sulphur was discovered in the oleo as herein set out a large number of samples of fulvous oil, golden yellow, butter oil, etc., were examined; in some of said samples sulphur was found and in some no sulphur was found. But all of said oils so examined presented a color showing artificial treatment.

13. The committee finds that in the process of refining cottonseed oil it is possible by heating the same and while in its heated condition to pass sulphur or sulphur fumes through said oils and thereafter by a process of washing or refining wash or blow the sulphur out of it, and yet the oil retain an artificial color.

14. The committee further finds the first time the Bureau of Animal Industry examined said oil or oleo for sulphur was in January, 1912, and found the same by making or applying what is known as the silver test—a standard test for sulphur.

15. The committee finds that the Treasury at the time said colored cottonseed oil was submitted to it examined the same for coal tar and vegetable color and failed to find any such coloring matter in said oil. But the committee finds that after January, 1912, the Bureau of Chemistry, in the office of the Commissioner of Internal Revenue, on an examination of samples of this oil and oleo found the same to contain abnormal quantities of sulphur.¹

Later portions of the report are concerned with the question of penalties, in which we are not interested.

FURTHER DIFFICULTIES OF ENFORCEMENT

The Commissioner of Internal Revenue continued to reiterate year after year the difficulties of enforcement of the law and the desirability of further amendment. In his *Annual Report* for 1913 the Commissioner said:

¹ *House Reports*, Vol. 1, No. 1572, 1912-13, pp. 1-3 (62d Congress, Third Session, Serial No. 6334).

The present oleomargarine law is not satisfactory either from an administrative or revenue standpoint, and should be so amended as to remedy it in both respects.

In any of the three or four large cities of the country, the Government, unless the illicit traffic in the manufacture and sale of oleomargarine is controlled, will lose more taxes from this source than would be lost in the way of taxes on distilled spirits illicitly produced in all the Southern States.¹

In his report for 1914 he stated that it had been found that manufacturers had defaulted on taxes to the extent of more than \$15,000,000. They had paid the $\frac{1}{4}$ -cent tax when liable to the 10-cent tax.² In 1915 he repeated his earlier recommendations with regard to a change in the law, but with greater emphasis:

These results, growing out of the thorough and sweeping investigations and vigorous efforts to enforce this law, only emphasize the incentive to fraud under the present oleomargarine statutes and the need of amendatory legislation to correct these faults, and at the same time afford adequate protection to the revenues and to the public.

It is again recommended that the present law be amended by repealing those provisions imposing double rates of tax upon the product and special taxes on dealers, and substituting therefor a flat rate per pound upon the product and single rates of special taxes upon wholesale and retail dealers, with provisions for individual or original packages of certain sizes fixed by law, all of which shall bear tax-paid stamps, marks, and brands so as to clearly identify the character of the product to the purchaser.

Under such a law imposing a flat rate of 2 or 3 cents per pound on the product and special taxes of \$240 and \$24 per annum upon wholesale and retail dealers, respectively, without regard to the color of the product, it is estimated upon the basis of production for the fiscal year ended June 30, 1915, that the total collections would amount to between \$4,500,000 and \$7,000,000 per annum, with a continued increase in collections from this source in proportion to the increase in the production of oleomargarine from year to year.³

¹ Pp. 15-16.

² P. 21.

³ Pp. 27-28.

In 1916 and in 1917 he again recommended the amendment of the law, but stated that as a result of vigorous prosecution during the three preceding years there had been fewer violations than before.¹

All this time, however, Congress failed to respond to his urgent recommendations, and no change was made in the law.

THE UNDERWOOD AMENDMENT, 1917

In February 1917, a new Congressional drive was made by Senator Underwood of Alabama, for the thoroughgoing revision of the law. His ostensible purpose in seeking for a change in the tax, to a flat rate of 2 cents a pound, was to increase revenue for war purposes. His proposals were put in the form of an amendment to the revenue bill (64th Congress, *H.R. 20573*) and thus submitted to the Committee on Finance of the Senate. After debate in the Senate, the amendment finally came to a vote on February 28, 1917, and was defeated by 59 to 21.

In his amendment Senator Underwood incorporated the principal recommendations of the Bureau of Internal Revenue of the preceding ten years, including the provision for a flat tax for colored and uncolored margarine, regulations for the packing and labeling of the commodity, to wit:

SEC. 501. All margarine shall be packed by the manufacturers thereof in separate sanitary "manufacturers' original packages" of one-fourth, one-half, 1, 2, 3, 5, or 10 pounds each, except as provided in section 400 of this act; and said "manufacturers' original packages" shall be packed in "shipping packages" containing not less than 10 pounds each, upon each of which shall be plainly branded, stamped, or printed the word "margarine" and a label as follows: "Notice—The Manufacturer of the 'margarine' herein contained has complied with all the requirements of the law. Every dealer is cautioned not to break or deface the 'manufacturers' original package' herein contained or the revenue stamp

¹ See *Annual Report, 1916*, p. 21.

or stamps thereon." Upon each of "manufacturers' original packages" shall be plainly branded, stamped, or printed the word "margarine," together with a caution as follows: "Notice—Every person is cautioned not to use either this package or the stamp or stamps thereon again, or to remove the contents of this package without destroying the stamp, under the penalty of the law in such cases."¹

Wholesale and retail dealers' taxes were made uniform at \$60 and \$6, respectively.

In spite of the conformity of the bill to the wishes of the Commissioner of Internal Revenue, it did not have the support of the Secretary of the Treasury, W. G. McAdoo. He and his subordinate stood on opposite sides of the question.² Whether this was an important factor in defeating the bill, it is impossible to say. Far more important, undoubtedly, was the deep-seated conviction of Congress that its earlier legislation expressed the desires of its constituents and that any concession to the margarine interests would rouse opposition.

DEVELOPMENTS IN THE PACKING OF MARGARINE

A rider, however, was attached to a bill passed on October 1, 1918, on the subject of the packaging of margarine. It stated, among other provisions, that "retail dealers must sell only from original stamped packages, in quantities not exceeding ten pounds, and shall pack the oleomargarine sold by them in suitable wooden or paper packages, which shall be marked and branded as the Commissioner of Internal Revenue, with the approval of the Secretary of the Treasury, shall prescribe."³

As a matter of fact, although there had been no pro-

¹ *Congressional Record*, Vol. 54, Part 4, February 13-24, 1917, pp. 3749-50 (64th Congress, Second Session).

² See letter of W. G. McAdoo to Senator F. N. Simmons of February 8, 1917, *Congressional Record*, Vol. 54, Part 4, February 13-24, 1917, p. 3752 (64th Congress, Second Session).

³ Act of October 1, 1918 (40 U.S. Stat. 1008).

vision in the earlier laws for retailers to sell margarine in one-pound and other relatively small packages, regulations had been promulgated by the Bureau of Internal Revenue, as early as 1901, permitting manufacturers to put up such packages, and it had been the practice of a portion of the trade since about that time.

During the 'eighties and 'nineties the bulk of butter and margarine was sold by retailers from tubs, boxes, or firkins, packed by the manufacturers. During that period molds were not uncommon, but the "printing" or cutting of butter or margarine in small blocks was just beginning. The margarine regulations, promulgated by the Commissioner of Internal Revenue on June 19, 1895, provided that:

All oleomargarine shall be packed by the manufacturer thereof in firkins, tubs, or other wooden packages. No packages shall contain less than 10 pounds. The law does not fix the maximum size of packages. The use of wooden and paper devices to preserve the form of prints inside of the manufacturers' packages will be permitted. Manufacturers may put up oleomargarine for export in wooden, tin, or other vessels containing not less than 1 pound each, which must, however, be packed in tubs, firkins, or other packages.

In other words, packages as small as one pound might be used for margarine for export, but this was not permitted for the domestic market. Manufacturers might use "devices to preserve the form of prints" within the larger packages, but they could not use separate cartons.

In 1901, the Commissioner further revised the regulations, stating that "manufacturers are permitted to pack prints, bricks, and rolls in statutory packages." This regulation stood until June 1923, when the further addition was made: "Manufacturers may subdivide the contents of an original package into prints, bricks, or rolls, and incase such prints, bricks, or rolls in cartons or wrappers or both."

The John F. Jelke Company was apparently the first margarine manufacturer to use prints. They state that they "first put oleomargarine in package form in parchment wrappers without cartons under the brand 'Holstein' sometime in the late 'nineties. . . . We sold goods in parchment wrappers without cartons for several years, and began the use of cartons probably about 1907 or 1908. . . ." Other companies followed the lead of Jelke, and increased quantities of margarine were put out in print form with paper wrappers between 1902 and 1905. A few years later cartons began to be used, and had been extensively adopted several years before the war. Since the war, according to one manufacturer, 90 per cent of the product has been sold in one-pound packages. About all that is sold in bulk goes to the baking trade. With the introduction of vegetable margarine during the war, the same method of packing was adopted as had been successful in the animal-fat branch of the industry.

Senator Underwood's measure contained nothing radically new on the subject of the packaging of the commodity, except that less than ten-pound packages were to be considered manufacturers' original packages. At the time it was introduced, one-pound packages were the rule of the industry, rather than the exception. But the internal revenue stamp was affixed not to the individual one-pound package (*nor is it now*), but to the manufacturers' original package, containing ten pounds or more of margarine. In this the situation is different from that of certain other commodities under the supervision of the Bureau of Internal Revenue, such as cigarettes, where the stamp is affixed to the individual consumer's package.

INCLUSION OF COLORING MATTER IN ORIGINAL PACKAGES OF MARGARINE

About the same time that it became common practice for manufacturers to put margarine on the market in

pound packages, the Bureau of Internal Revenue promulgated a Treasury Decision (*T.D. 1502*, May 26, 1909) stating that the Oleomargarine Act did not specifically and in exact terms prohibit the packing of small quantities of coloring matter in manufacturers' original packages. It was further stated that any manufacturer of margarine who packed coloring matter in his original packages did so at his own risk, and that if the product so packed was found on the market in the hands of any person intending to manufacture it into articles subject to tax, for the purpose of fraudulently selling such manufactured articles, or with design to evade the payment of the tax, it would be seized. How general the practice of including coloring matter was at that time is not known. Some manufacturers enclosed it, possibly the majority. At present, the practice is very general. Practically every original package of margarine shipped out contains coloring matter, either liquid in capsules or in powdered form in paper or other containers. This permits the enclosure of such a capsule or other container with each pound package of margarine sold by the retailer.

Present regulations permit the printing of instructions for coloring margarine on cartons or wrappers, provided that immediately below such instructions a statement is also printed as to who may color the product without incurring liability under the law.¹ There are only two groups that fall within this category: private individuals preparing margarine for use within their own families, and public institutions, completely under state control, coloring margarine for the use of inmates and employees.²

¹ U.S. Bureau of Internal Revenue, *Regulation No. 9*, Section 44.

² *Ibid.*, Section 29.

CHAPTER VI

RECENT DEVELOPMENTS IN FEDERAL LEGISLATION

From the war period until 1928 the federal Congress exhibited little interest in margarine. A few bills were introduced at practically every session, but they died in committee and were never debated on the floor. It seemed as though the controversy had either been satisfactorily resolved or else crowded into the background by more pressing problems of the war and post-war period. When it finally came up again, in 1928, a new phase was presented, though the old question of color was involved.

The Bureau of Internal Revenue reports show a similar absence of consideration of the subject until 1928. In the *Annual Report* for 1919 the Commissioner stated that there had been over 4,000 violations of the law during the preceding year, the most flagrant of them the coloration of uncolored margarine for sale as butter.¹ In later reports, however, no further mention was made of the enforcement problem until 1928. The following excerpt from the *Annual Report* for 1928 (p. 49) summarizes the situation at that time:

Certain yellow cooking or baking compounds which were made from the same ingredients and in the same manner as oleomargarine except that they were churned in water instead of milk, and which appeared to the department to be more in the nature of butter substitutes than true cooking or baking compounds, were held by *Treasury Decision 4006*, approved April 1, 1927, subject to tax as oleomargarine. Two manufacturers affected thereby obtained injunctions restraining officials of the department from enforcing the decision with respect to their particular

¹ P. 59.

products. As a result the decision was revoked. Subsequently bills were introduced into Congress (*H.R. 10958* and *S. 3247*) to amend the definition of oleomargarine to such an extent as to make it clear that these compounds were to be taxed as oleomargarine. While both bills were reported favorably by the committees to which they were referred, neither came to a vote. The production of these colored cooking compounds is increasing and unless they are required to be tax paid as oleomargarine they will eventually supplant the tax-paid product to a considerable extent. The oleomargarine and dairy interests for the first time joined forces in advocating adoption of this legislation.

COLORED COOKING COMPOUNDS

It is necessary to go back a little to understand this situation. As early as 1922 the Nut Grove Butter Company (later known as the Higgins Manufacturing Company), of Rhode Island, began the manufacture and sale of a colored cooking compound, known as "Nut-Z-All," the ingredients of which were (for 100 pounds of product) 80 pounds of coconut oil, 20 pounds of peanut oil, 3 pounds of salt, and 0.1 per cent of coloring matter. This product, unlike the ordinary cooking compounds on the market, was emulsified, but instead of being emulsified in milk, was emulsified in water. Its moisture content was about the same as butter (16 per cent maximum), while cooking compounds ordinarily contain less than 1 per cent of moisture. As indicated, it was colored yellow, in this respect also differing from other cooking compounds.¹

Prior to the introduction of the commodity on the market, the manufacturers submitted the formula and a sample of the product to the Bureau of Internal Revenue to obtain a ruling as to whether it came under the oleomargarine statute. The Bureau ruled that it did not, but reserved the right to revoke this decision in case it was later found that the method of packing or advertising led

¹ The ingredients given above should make more than 100 pounds of margarine. These are the proportions given in the court decision, *Higgins v. Page*, discussed farther on.

the consumer to believe he was receiving a butter substitute instead of a cooking compound. Later in the year the Bureau did revoke its decision and announced that in the future the commodity would be taxed at 10 cents a pound. The tax was paid on a small quantity of the product, but appeal was then made to the courts for recovery of the sum. The case came before the United States District Court, District of Rhode Island, and was decided on April 15, 1924.¹

The questions the court considered were (1) whether this product fell within the statutory definition of oleomargarine, and, as a part of that inquiry, (2) whether the product was "made in imitation or semblance of butter, or, when so made, calculated or intended to be sold as butter or for butter." In consideration of the first point, the court noted that in the definition of oleomargarine in the act of 1886 vegetable oil does not appear in the list of ingredients except in combination with annatto, a coloring matter.² All of the ingredients listed are animal fats. No comma separated the words "vegetable oil" from "annatto" in the original document. Although it was recognized by the court that annatto might be dissolved in oil, and that vegetable oils were used in the manufacture of oleomargarine to only a limited degree in 1886, the court stated: ". . . I doubt the intention of Congress to coin a new term, 'vegetable oil annotto,'

¹ *Higgins Manufacturing Company v. Page, Collector*, 297 Fed. 644.

² This portion of the act reads as follows: "That for the purposes of this act certain manufactured substances, certain extracts, and certain mixtures and compounds, including such mixtures and compounds with butter, shall be known and designated as 'oleomargarine,' namely: All substances heretofore known as oleomargarine oil, butterine, lardine, suine, and neutral; all mixtures and compounds of oleomargarine, oleo, oleomargarine oil; butterine, lardine, suine, and neutral; all lard extracts and tallow extracts; and all mixtures and compounds of tallow, beef fat, suet, lard, lard oil, vegetable oil annotto, and other coloring matter, intestinal fat, and offal fat made in imitation or semblance of butter, or when so made, calculated or intended to be sold as butter or for butter."

³ Spelled "annatto" in *Webster's New International Dictionary*.

though it is not improbable that both vegetable oil and annatto were enumerated as colorants rather than substantial elements of the compounds." As to whether the product fell within the statutory definition of oleomargarine, on the basis of ingredients, was therefore not conclusively determined.

On the second issue the court took a definite position. It held that not only was the product not packed in a similar way to butter (a triangular package was used), nor labeled in a fashion to deceive (it was marked "Nut-Z-All," "Nut product," "Prepared for cooking and baking"), but it also did not taste like butter. The color was the only important point of resemblance. The decision was therefore favorable to the manufacturer. The case was not appealed by the Bureau of Internal Revenue.

As a result of this decision, a number of firms began the manufacture of this type of colored cooking compound. By 1928 there were at least 11 such firms, and the volume of output was estimated at 7,500,000 pounds a year, though it may have been considerably more.¹ The Bureau of Internal Revenue was apparently convinced that the product was sold by retailers as butter, but it was constrained from action by the court decision referred to above.

On April 1, 1927, however, it issued a new *Treasury Decision* (4006), declaring all colored cooking compounds taxable as colored oleomargarine. This resulted in appeals to the courts on the part of the Higgins Manufacturing Company and the Baltimore Butterine Company for injunctions to prevent the Bureau from collecting the tax. The Higgins case was tried in the United States District Court, District of Rhode Island, the decision being rendered on July 18, 1927,² and the Baltimore

¹ See House Committee on Agriculture, *Hearings on House Report 10958*, April 17-20, 1923, Serial M, p. 109.

² 20 Federal, 2d Series, p. 948, and Equity No. 47120.

Butterine Company case in the Supreme Court of the District of Columbia, holding an equity court.¹

The district court in Rhode Island declared that the action of the Bureau of Internal Revenue, in issuing such a decision, was in defiance of the earlier decision of that court, and stated: "This is an extraordinary situation, and calls for the interposition of injunctive relief." The Supreme Court of the District of Columbia agreed with the position of the district court in Rhode Island, adding: "It is clear that the defendant by means of a mere regulation cannot enlarge the provisions of the act, and such a regulation cannot be enforced." Both courts, therefore, enjoined the Bureau of Internal Revenue (temporarily and permanently) from collecting the tax.

As indicated above, the Bureau of Internal Revenue then appealed to Congress to re-define oleomargarine in such a way that these materials would be included under the terms of the law. *H.R. 10958* and *S. 3247* (70th Congress, First Session) contained the provisions desired by the Bureau. These read as follows:

That for the purposes of this act certain manufactured substances, certain extracts, and certain mixtures and compounds, including such mixtures and compounds with butter, shall be known and designated as "oleomargarine," namely: All substances heretofore known as oleomargarine, oleo, oleomargarine oil, butterine, lardine, suine, and neutral; all mixtures and compounds of oleomargarine, oleo, oleomargarine oil, butterine, lardine, suine, and neutral; all lard extract and tallow extracts; and all mixtures and compounds of tallow, beef fat, suet, lard, lard oil, and other animal oil or fat, vegetable oil, annatto, other coloring matter, intestinal fat, and offal fat—if (1) made in imitation or semblance of butter, or (2) calculated or intended to be sold as butter or for butter, or (3) churned, emulsified, or mixed in cream, milk, water, or other liquid, and containing moisture in excess of 1 per centum. This section shall not apply to puff-pastry shortening not churned or emulsified in milk or cream, and having a melting point of one hundred and eighteen degrees Fahrenheit or more.

¹ Opinion of court not yet published.

Hearings were held on the bills before the Senate Committee on Agriculture and Forestry and the House Committee on Agriculture, during the course of which the issues involved were clearly defined. It was stated by the manufacturers of the colored cooking compound that the Oleomargarine Act permits the manufacture of a deeply tinted margarine made from naturally tinted oleo oil without payment of the 10-cent tax. They contended that the large packers have a monopoly of such oleo oil and use it in the manufacture of margarine, but will not sell it to their competitors. Packers not manufacturing margarine, they contended, do not separate the deeply tinted oleo oil from other oil which they render. Consequently, they stated, it was impossible for manufacturers like themselves to obtain a naturally tinted oil to use in margarine. They stated that they were willing to pay the 10-cent tax if the packers were required to pay the same on their tinted product.

It was also brought out at these hearings that a second method of manufacturing a tinted margarine "free from artificial coloration" is in use in this country. This is the process of the Capital City Products Company, and involves the treatment of cottonseed oil and coconut oil in such a way as to bring out latent color in the oil after the processes of refining and hydrogenating have been completed. The margarine made by this process has been adjudged a naturally colored product by a court decision of the United States District Court for the Southern District of Ohio, Eastern Division, handed down February 28, 1928.¹

In this case a retailer attempted to recover a tax assessed against him by the Bureau of Internal Revenue, the alleged basis for the tax being that the margarine which he was selling was not free from artificial coloration.

¹ *A. E. Foley v. Newton M. Miller, Collector of U.S. Bureau of Internal Revenue*, 24 Fed. (2d) 722.

tion. The product was manufactured by the Capital City Products Company and consisted of 30 per cent highly colored oleo oil, 11 per cent white neutral lard, 15 per cent highly yellow cottonseed oil, 12 per cent hydrogenated yellow cottonseed oil, 12 per cent hydrogenated coconut oil, 10 per cent yellow soy bean oil, and 10 per cent pale yellow oleo stock.

In rendering its decision, the court stated that it was conceded, "or at least not disputed, that all the ingredients used in the product, save and except the hydrogenated cottonseed oil and the hydrogenated yellow coconut oil, are such ingredients as would entitle the product to come under the proviso of the amendment [1902] and assessable at the lower rate of tax." The decision hinged on whether these oils, representing together 24 per cent of the formula, were "free from artificial coloration that caused it to look like butter of any shade of yellow." The court took account of the Supreme Court decisions in the McCray case, the Cliff case, and in *Moxley v. Hertz*, making the distinction, however, that in the case under consideration the colored ingredients constituted a substantial portion of the whole product and formed a "bona fide food component part of the manufactured article," thus differing from products tested in earlier cases.¹ There remained to be decided whether the claims of the manufacturer were true, that the process involved merely the bringing out of color latent in the oils, and not the addition of extraneous color. The chemist who invented the process testified that the restoration of color was caused by molecular rearrangement. The court stated that the "theory of molecular rearrangement is old, not provable, but generally recognized in the science." The product was therefore declared one of natural coloration.

In the course of stating his opinion, Justice Hough

¹ See above, p. 60.

made certain remarks bearing on the contentions of the manufacturers of colored cooking compound. He stated:

The two oils under discussion [cottonseed oil and coconut oil] thus treated are also introduced as a substitute for the yellow oleo stock. Oleo stock is produced from selected fat, yellow in color, from selected beef, and has long been known as a constituent component of oleomargarine. The supply, however, is limited, and is said to be seasonal, and independent manufacturers have difficulty in obtaining it, especially at certain times of the year, for the reason that the packers control the supply and are also usually manufacturers of oleomargarine. These facts make the substitute not only cheaper, but also desirable, because unlimited.¹

The two Congressional committees were apparently convinced that the Oleomargarine Act should be amended in such a way as to bring the cooking compounds under the terms of the law, but not the product made from yellow oleo oil or from yellow cottonseed or coconut oil. The amendment as quoted above was favorably reported by both committees. In it no cognizance is taken of so-called "tinted" products, i.e., those made of naturally colored oils.

Although this amendment was favorably reported, no action was taken on the floor of Congress during the Seventieth Session. Apparently there was a faction in the House of Representatives that wanted tinted margarine included under the 10-cent tax. Whether this accounted for the failure of the amendment to come to a vote or was only one factor in the situation, we are not in a position to know.

¹ Our own investigation of this question substantiates Justice Hough's statement. We inquired of all renderers of oleo oil as to whether they separated the more deeply pigmented from the light-hued fats and as to the variability of the supply of dark-hued fats. We received replies from all but a small number of renderers. The large packers reported that they made the separation, but that the supply of dark-hued fats was limited and of a seasonal character. None of the other renderers who reported separated the dark from the lighter oils. The dark color of the oil is primarily due to grass feed, although apparently the fat of cows is more likely to be dark than of steers. Grass-fed cattle are slaughtered as a rule in the late summer or early autumn. Consequently, this is the period when dark oleo oil is available.

THE SECOND BALTIMORE BUTTERINE COMPANY DECISION

During the summer of 1929 two further decisions were handed down by federal courts, the first favorable to the manufacturers of colored cooking compounds, the other unfavorable. The first was tried before the District Court, Southern District of Georgia.¹ The plaintiffs were the Baltimore Butterine Company, the Dixie Margarine Company, the Standard Nut Margarine Company, National Foods, Inc., E. F. Drew and Company, and the Ed. S. Vail Butterine Company; and the defendant was Eugene Talmadge, Commissioner of Agriculture of the State of Georgia.

The circumstances of the case were as follows: These companies, which had been selling colored cooking compounds, under various trade names, in the state of Georgia, were informed by the Commissioner of Agriculture that this must cease, or he would seize all such products, whether in the hands of retailers and dealers or of wholesalers and jobbers, and would prosecute such purveyors under the authority of the Food and Drugs Act. The manufacturers petitioned the court to enjoin the Commissioner temporarily and permanently (1) from confiscation of these properties and (2) from sending letters to food dealers containing derogatory statements regarding their products and from publishing such statements in the *Georgia Market Bulletin*.

It was the claim of the Commissioner that the cooking compounds were adulterated because water and salt were added beyond 1 per cent. He also claimed that they were misbranded because they imitated creamery butter in the type of package used. The product was packed in square cartons, the pound divided into four parts, and it was colored like butter.

None of these claims was granted by the court. It

¹ 32 Federal, 2d Series, pp. 904-11, May 13, 1929.

found that these products were not "mixed edible fat," as was contended by the Commissioner, but merely vegetable fats plus salt and water and a harmless coloring matter. The fact that they were not 100 per cent fat did not prove them to be adulterated. As to the charge of misbranding, it was held by the court that there was nothing in the labeling that suggested creamery butter. The fact that the packages were similar to butter packages was not sufficient ground for the charge of misbranding. Furthermore, the court did not find the product a close imitation of butter. The action under heat, the taste, and the odor were distinctive. The court remarked that "the fact that sometimes it was used as a substitute for butter without being declared to be such would not justify its being banned under this act." The Commissioner, therefore, was permanently enjoined from taking action against the manufacturers or against those selling their products, and from publishing derogatory statements regarding the products.

THE HARROW-TAYLOR BUTTER COMPANY DECISION

Since then a new decision has been rendered by a federal court declaring yellow cooking compounds subject to the 10-cent tax. This is the case of the *Harrow-Taylor Butter Company v. Noah Crooks, United States Collector of Internal Revenue*, the decision having been rendered on August 5, 1929, by the United States District Court for the Western Division of the Western District of Missouri. The Harrow-Taylor Company sued to recover taxes paid by them at the rate of 10 cents a pound on 5,000 pounds of "Rich Nut Shortening." The court considered the four claims of the Harrow-Taylor Company, which are as follows: (1) that Rich Nut Shortening is not within the purview of the Oleomargarine Act; (2) that if so, said act is unconstitutional; (3) that the questions here involved have been previously adjudicated; and

(4) that the evidence shows that such substance was neither made in imitation or semblance of butter, nor was it calculated or intended to be sold as butter or for butter.

Under the first heading the court reviewed the matter considered in *Higgins Manufacturing Company v. Page*, referred to above, particularly as to whether the law was intended to cover products made exclusively of vegetable oils. It will be remembered that that decision did not rest on this issue, though it was considered. Judge Reeves in interpreting that decision stated: "Said opinion must be considered, however, as holding that there was such a mixture or compound as could be made up of vegetable oil and other ingredients excluding animal fats and that in a proper case such substances might be classed for the purposes of taxation as oleomargarine." In his opinion a "reasonable interpretation" of the law would cover margarine made of vegetable oils.

The second contention of the Harrow-Taylor Company, namely, that the act is unconstitutional, the court did not seriously consider. It stated that there was no question as to the right and power of Congress to impose such a tax. The third contention was also held to be without basis since the case under consideration was different in important regards from other cases previously decided.

It was in negation of the claim under the fourth heading that the court placed the greatest emphasis. It stated that although this commodity was labeled "shortening," it was "made in imitation or semblance of butter" and was "calculated" and "intended to be sold as butter and for butter." Unlike "Nut-Z-All," it was packed in the same form as butter. The evidence was overwhelming that it not only looked but tasted like butter. Though it was used as a shortening, doubtless, it was intended primarily to compete with butter substitutes. The court declared the commodity taxable, therefore, at 10 cents a pound.

PASSAGE OF THE 1930 AMENDMENT

The Seventy-first Congress again concerned itself with the amendment which had failed to come to a vote in the Seventieth Congress. The bills which had failed of passage in the preceding Congress were reintroduced; further hearings were held; and *H.R. 6* was passed and approved by the President on July 10, 1930. Its text is to be found in the appendix. Its language is substantially that of *H.R. 10958* and *S. 3247* (70th Congress, First Session), quoted above. It differs in that for the phrase "and other animal fat" are substituted the words "fish oil or fish fat" in anticipation of the probable use of marine oils. It also takes cognizance of the presence of salt as well as of moisture; and it exempts specifically (in addition to puff-pastry) shortening not churned or emulsified in milk or cream, salad dressings, mayonnaise dressings or mayonnaise products, and liquid emulsions, pharmaceutical preparations, oil meals, liquid preservatives, illuminating oils, cleansing compounds, and flavoring compounds. These exemptions were specifically added because the definition of margarine is so inclusive that conceivably it might be interpreted to include them. The language of the bill as passed is believed also to exempt ice cream. The operations of the new law, and the reactions of manufacturers, remain to be observed.

CHAPTER VII

RÉSUMÉ OF STATE LEGISLATION

Before considering in detail how the two most controversial features of the law, namely, the tax and fraud elements, have fared at the hands of the United States Supreme Court, it will be well to summarize the developments in state legislation. This can be done chronologically by a review of the legislation in effect at the time of the passage of the federal act of 1886, again in 1902 when that act was amended, and finally at the present time. In that way a more or less accurate picture can be obtained of developments in each state over a considerable period of time. Space does not permit a separate account of developments in each of the forty-eight states.

STATE LEGISLATION IN 1886

The statistician of the Department of Agriculture made a report in 1886 on the status of state legislation at that time.¹ According to him, 24 states, in addition to the District of Columbia, had enacted margarine legislation. Of this number, 17 were regulative measures, providing penalties for the sale of margarine as butter, while 7 were prohibitory in character, aiming at the complete exclusion of the commodity from within the boundaries of the enacting state. The small letters, "r." and "p.," indicate this distinction. The states were: California (r.), Connecticut (r.), Delaware (r.), District of Columbia (r.), Georgia (r.), Indiana (r.), Iowa (r.), Maine (p.), Maryland (r.), Massachusetts (r.), Michigan (p.), Missouri (r.), Minne-

¹ See *Report of the Condition of Winter Grain, etc.*, pp. 195-209.

sota (p.), Nebraska (r.), Nevada (r.), New Hampshire (r.), New Jersey (r.), New York (p.), Ohio (p.), Pennsylvania (p.), Rhode Island (r.), Vermont (r.), Virginia (r.), West Virginia (r.), Wisconsin (p.).

As has already been pointed out, prohibitory legislation was declared unconstitutional by the Supreme Court of the United States in so far as it interfered with interstate commerce in the commodity, although the states were permitted to protect their citizens from fraud by refusing to permit the importation and sale of margarine colored in semblance of butter. Consequently, state enactments looking to the total prohibition of the commodity had to be revised, and the form that revision took was the prohibition of the manufacture and sale of margarine colored in imitation of butter. By 1902, when the federal act was amended, there were 32 states which had enacted such legislation. These included all the states that had previously enacted prohibitory laws, as well as many that had had merely regulatory laws.

STATE LEGISLATION AS OF 1900

The following list indicates the status of state legislation in 1900, as reported in a Senate report of January 26, 1901.¹ From this it will be seen how general was the shift to the anti-color basis in the 1890's. By "anti-color" in this and later references, we mean laws prohibiting the sale of colored oleomargarine.

States	Date of law	Type of law
Alabama	Feb. 18, 1895	Anti-color
Arizona		No law
Arkansas	Apr. 2, 1885	Label
California	Mar. 4, 1897	Anti-color
Colorado	Apr. 1, 1895	Anti-color
Connecticut	1895	Anti-color
Delaware	May 8, 1895	Anti-color
District of Columbia..	Mar. 2, 1895	Label

¹ *Senate Reports*, Vol. 4, No. 2043, 1900-01, p. 593 (56th Congress, Second Session, Serial No. 4066).

States	Date of law	Type of law
Florida	Feb. 17, 1881	Must notify guests
Georgia	Dec. 16, 1895	Anti-color
Idaho	Jan. 27, 1885	Label
Illinois	June 14, 1897	Anti-color
Indiana	1883	Label
Iowa	1893	Anti-color
Kansas	.....	No law
Kentucky	1898	Anti-color
Louisiana	July 6, 1888	Label
Maine	Mar. 27, 1895	Anti-color
Maryland	1888	Anti-color
Massachusetts	June 11, 1891	Anti-color
Michigan	Apr. 15, 1897	Anti-color
Minnesota	1899	Anti-color
Mississippi	Mar. 9, 1882	Label
Missouri	Apr. 19, 1895	Anti-color
Montana	1895	Taxed 10 cents per pound
Nebraska	Mar. 16, 1895	Anti-color
Nevada	Feb. 14, 1881	Label
New Hampshire	Mar. 29, 1895	Anti-color
New Jersey	Mar. 22, 1886	Anti-color
New Mexico	.....	No law
New York	Apr. 10, 1893	Anti-color
North Carolina	Feb. 28, 1895	Label
North Dakota	1899	Anti-color
Ohio	May 16, 1894	Anti-color
Oklahoma	.....	No law
Oregon	1899	Anti-color
Pennsylvania	1899	Anti-color
Rhode Island	1882	Label
South Carolina	Mar. 9, 1896	Anti-color
South Dakota	1897	Anti-color
Tennessee	1895	Anti-color
Texas	.....	No law
Utah	Mar. 8, 1894	Anti-color
Vermont	1884	Pink coloring
Virginia	Jan. 29, 1898	Anti-color
Washington	Mar. 11, 1895	Anti-color
West Virginia	Feb. 16, 1891	Pink coloring
Wisconsin	1895	Anti-color
Wyoming	.....	No law

PRESENT STATUS (1929) OF MARGARINE LEGISLATION
BY STATES

Since the passage of the 1902 amendment with its 10-cent-a-pound tax on colored margarine, the agitation among the states for anti-color laws has subsided. In those states where the fight has continued between dairy interests and margarine manufacturers, it has been in the support of honest labeling, such as prevention of the use of dairy terms and insignia on packages containing margarine; or in more extreme cases, in the taxing of margarine or the licensing of dealers (in addition to the federal taxes and licenses), or in so prescribing the method of manufacture that the commodity would be eliminated altogether. In general, enactments looking merely to the elimination of deceptive insignia and those requiring the payment of licenses, in other words, those to prevent fraud, have not been controverted; but those placing a state tax on the commodity or placing severe difficulties in the way of its manufacture have been defeated by popular referendum or declared unconstitutional by the courts. These points will be considered later in this section (see pp. 95-98).

Although more detailed information is given in Appendix II (p. 294), it seems desirable here to summarize the present status of state legislation in more or less the same fashion as has been done for the earlier years. Dates are not included in this tabulation, since many of the laws are aggregations of enactments of different dates. The provisions that are found commonly at the present time, in addition to the anti-color stipulation, are as follows:

1. That the commodity shall be clearly labeled "oleo-margarine" on the container from which it is sold. The size and type of letters to be used are usually stipulated, and that they shall be printed in black ink on a white ground.

2. That no dairy terms, such as "cream," "cow," etc., or pictures suggestive of farm life, shall be used as advertising matter on the tubs or cartons in which margarine is packed.

3. That public eating places, serving margarine in place of butter, must announce this fact on placards prominently exhibited, or on bills of fare. A few states practically prohibit the use of margarine in such places by requiring that the plate used for serving shall be conspicuously marked "oleomargarine."

4. That state institutions, sometimes excepting penal institutions, shall not use margarine.

In addition, several states require that manufacturers, dealers, and restaurant operators pay state as well as federal license taxes. States which have anti-color laws ordinarily have otherwise stringent regulations, while those that are content with the proper labeling of the commodity usually do not have severe regulations about use in public institutions and similar matters.

States	Type of law
Alabama	Anti-color
Arizona	No law
Arkansas	Label; practically prohibited from public eating places
California	Label; colored margarine prohibited from public eating places and institutions; manufacturers', dealers', and restaurant licenses
Colorado	Anti-color
Connecticut	Anti-color; manufacturers', dealers', and restaurant licenses
Delaware	Anti-color
District of Columbia..	Label
Florida	Emphasis on fraud; wholesalers' licenses
Georgia	Label
Idaho	Anti-color; dealers' licenses
Illinois	Anti-color

States	Type of law
Indiana	Label
Iowa	Anti-color; use in state institutions prohibited
Kansas	Label
Kentucky	Label; dealers' licenses
Louisiana	Label
Maine	Anti-color
Maryland	Anti-color
Massachusetts	Anti-color
Michigan	Anti-color; use in state institutions, except penal, prohibited
Minnesota	Anti-color; use in state institutions prohibited
Mississippi	Label; dealers' licenses
Missouri	Anti-color; practically prohibited from public eating places
Montana	Anti-color; dealers' licenses
Nebraska	Label; manufacturers' and dealers' licenses
Nevada	Label
New Hampshire	Anti-color
New Jersey	Anti-color
New Mexico	No law
New York	Anti-color; use in institutions receiving state funds prohibited
North Carolina	Label
North Dakota	Anti-color
Ohio	Anti-color; use in state institutions prohibited
Oklahoma	Label
Oregon	Anti-color
Pennsylvania	Anti-color; manufacturers', dealers', and restaurant licenses; use in charitable and penal institutions prohibited
Rhode Island	Label
South Carolina	Anti-color
South Dakota	Anti-color
Tennessee	Anti-color
Texas	No law
Utah	Dealers' licenses; sales taxes

States	Type of law
Vermont	Anti-color; dealers' licenses
Virginia	Label
Washington	Anti-color; use in institutions receiving state funds prohibited
West Virginia	Anti-color regulation (not law)
Wisconsin	Anti-color; use in institutions receiving state funds prohibited
Wyoming	Anti-color

OUTCOME OF RECENT LEGISLATION IN CALIFORNIA, OREGON, WASHINGTON, WISCONSIN, AND UTAH

Recently there have been more extreme enactments in California, Oregon, Washington, and Wisconsin, but these have all been defeated by popular referendum or declared unconstitutional by the courts. Utah has also passed a more stringent law recently, but it has not yet been tested in the courts.

The California dairy law, passed in 1925, provided among other things for a tax of 2 cents a pound on margarine.¹ There were also stipulations regarding the labeling and coloring of the commodity, the licensing of dealers, etc., but these were not notably different from provisions in the previous law of 1923. The primary aim of the new legislation was to place a special manufacturing tax on margarine. This law was rejected at a popular referendum on November 2, 1926. The California law of 1923, therefore, stands as the present law of the state.²

In Washington and Oregon, efforts to curb the margarine industry took a somewhat different form. In Oregon a law was passed in 1923 which provided that no dairy products could be used in butter substitutes manufactured from vegetable oils.³ This was considered at the time as a practical prohibition of vegetable margarine.

¹ Deering's *General Laws of California, Supplement 1925-27*, Act 1945, Section 12, p. 1032.

² See Appendix II (p. 294) for a verbatim copy of the California law.

³ Chapter 168, *General Laws of Oregon, 1923*, p. 241.

The law was rejected, however, by referendum vote on November 4, 1924, 157,324 votes being cast against it to 91,597 for it. A similar law was passed in Washington in the same year, and it, too, was defeated by referendum vote.¹

In spite of the popular defeat of similar laws in Washington and Oregon, the Wisconsin state legislature passed a law in 1925 prohibiting the manufacture or sale of butter substitutes in which milk or cream was combined with other oils.² No distinction was made between vegetable and animal oils. In August of that year, the Dairy and Food Commissioner of the state was enjoined from carrying out the provisions of the law; and on January 18, 1926, the act was declared unconstitutional by the circuit court and the Commissioner permanently enjoined from enforcing it. The Dairy and Food Commissioner then appealed to the supreme court of the state, which upheld the lower court.

Since this decision has been widely influential in preventing further state legislation along these lines, it may be well to summarize the findings of the court.³

The state supreme court upheld the circuit court in its view that the terms of the act amounted to a prohibition of the manufacture and sale of margarine. In this connection it stated: "There is not a scintilla of evidence that there has ever been upon the market in commercial form a substance known as oleomargarine which did not combine milk or milk fats with some oleaginous substance." It concluded therefore that "there can be no doubt that Chapter 279 had for its sole purpose the prohibiting of the manufacture and sale within the state of Wisconsin of oleomargarine as that term is defined by the laws of

¹ Chapter 22, *Laws of Washington, 1923*, p. 48.

² Chapter 279, *Laws of Wisconsin, 1925*, p. 355.

³ *John F. Jelke Company, et al., v. Emery*, 193 Wisconsin, 311; 53 A.L.R. 463.

the United States and as it is ordinarily used and understood in commercial transactions.”

The trial court in its findings of fact found margarine to be a wholesome and nutritious product, and the supreme court of the state took judicial notice of the fact that other courts had endorsed the healthfulness of margarine. The Powell and Schollenberger cases, decided in the federal courts years before, were analyzed and discussed. It was pointed out that in the Schollenberger case the Supreme Court of the United States took judicial notice of the wholesomeness, nutritiousness, and healthfulness of margarine as an article of food. The Wisconsin court then concluded that the reasoning supporting the Powell decision had been entirely wiped away and that it remained only as “authority as to the power of the state to prohibit the manufacture and sale of an adulterated, unhealthful, deleterious article, but now has no application to oleomargarine. . . .”

This seems a rather extreme position for the court to have taken in view of the fact that the decision of the United States Supreme Court in *Powell v. Pennsylvania* was founded upon more than the assumption that margarine was unhealthful and deleterious. The Pennsylvania law prohibiting the sale and manufacture of margarine was upheld not alone as a reasonable exercise of the state’s police power to protect the public health, but also as a reasonable measure to prevent fraud. The federal court undoubtedly placed more emphasis upon the element of health protection than upon the element of fraud prevention. But, be that as it may, it cannot correctly be stated that the reasoning supporting the decision of the Powell case was entirely destroyed when the court in later years recognized margarine as a healthful and nutritious article of food. The fraud issue remained.¹

¹ This point was discussed somewhat on pp. 47-48, and will be touched upon further on pp. 100-101.

The court, however, considered the Wisconsin statute a fraud measure. It was argued by the state that margarine was bought and sold as butter, or as a dairy product, and that the advertising employed by the industry was deceptive. The trial court, however, found from the evidence that these arguments were unfounded, that margarine had not been sold as butter in Wisconsin for many years, that it was advertised and sold on its own merits, and that there was no fraud or deception practiced in its sale in Wisconsin. The supreme court of the state, on these findings of fact, accordingly held that the statute could not stand as a fraud-prevention measure.

The court also considered the validity of the contention that the act was justified for the sake of protecting the dairy industry of Wisconsin. On this subject the court stated that there was no basis in the evidence upon which a claim of unfair competition by the margarine industry could be based. The court felt that the argument in support of the statute rested on the proposition that legislatures may promote one industry at the expense of another, while as a matter of fact "the Constitution was devised for the express purpose of withdrawing from Legislatures the power to do that very thing." The court added that "from the standpoint of constitutional right the Legislature has no more power to prohibit the manufacture and sale of oleomargarine in aid of the dairy industry than it would have to prohibit the raising of sheep in aid of the beef-cattle industry or to prohibit the manufacture and sale of cement for the benefit of the lumber industry."

The Utah statute, passed in March 1929, provides, among other things, for a sales tax on margarine amounting to 5 cents a pound for the uncolored and 10 cents a pound for the colored. This is the only state in the country that now has a tax on the commodity, aside from the federal manufacturing tax.

CHAPTER VIII

PREVENTION OF FRAUD

The preceding chapters have presented a fairly detailed account of the development of legislation in federal and state governments for the control of the manufacture and sale of margarine. Such detailed treatment would scarcely have been called for except for the purpose of determining the underlying basis for such action, its present significance, and justification.

Although it has frequently appeared that legislation has been enacted which expressed merely an unreasonable antagonism of the dairy industry to the introduction of a butter substitute, the fundamental reason for the legislation has been, and still is, the protection of butter from the unfair competition of the cheaper product. It will be worth while to consider developments briefly from this particular point of view.

The early federal legislation, calling for the honest labeling of margarine and providing for a 2-cent tax on all types of margarine, whether colored or not, was not successful in preventing the fraudulent sale of margarine for butter. Consequently, several states set about to correct the situation by legislating for the complete prohibition of the sale of margarine within their borders. Such legislation, however, met with difficulties when it was tested in the courts, and the states were then forced to find some other way of safeguarding the butter market. The result was the use of color as the distinguishing feature between butter and margarine, and the passage of the so-called anti-color laws. In due time this same idea found expression in federal legislation in the 1902 amendment, which provided a high tax on colored margarine and a merely nominal tax on the uncolored.

Even with the passage of this measure, however, the problem of fraud was not solved. Certain manufacturers found ways of making a colored product, not subject to the 10-cent tax, from naturally colored fats; and others outwitted the spirit of the legislation in their method of labeling and packing the substitute commodity. State laws continued to be amended with a view to correcting this situation and elaborate federal regulations were developed. Consequently, we find that at the present time there is an extensive and elaborate body of legislation, both state and federal, looking solely to the prevention of fraud in the manufacture and sale of margarine. Even so, the dairy industry still claims that fraud persists in the sale of margarine for butter.

WHEREIN IS THE FRAUD AT PRESENT?

It is very difficult to see how there can be outright fraud at the present time. Regulations regarding the labeling of the commodity require that every package be marked with the word "Oleomargarine" in letters three-quarters of an inch high.¹ No insignia or trade names suggestive of dairying are permitted. Certainly if the purchaser of a package of margarine can read, he knows that he has bought margarine, not butter.

The only recent legal evidence as to the extent of fraud was furnished by the Supreme Court of the State of Wisconsin in its decision in *Jelke v. Emery* (193 Wisconsin 311) referred to above (p. 96). There it was stated unequivocally that margarine had not been sold as butter in Wisconsin for many years. It was also stated that it was advertised and sold on its own merits. No fraud or deception was found to exist in its sale in that state.

The Federal Trade Commission has proceeded in recent years against several manufacturers using advertising matter of the type discussed in the preceding para-

¹ U.S. Bureau of Internal Revenue, *Regulation No. 9* (1925), Section 50.

graphs.¹ The manufacturers involved agreed to desist from certain alleged unfair methods of competition. Some of the phrases and words in their advertising objected to by the Commission were as follows: "churned especially for lovers of good butter"; "only pure fresh pasteurized milk, and rich fresh vegetable oils . . . the reasons for its wholesomeness"; "made in the milky way"; "fresh milk from Select-Dairies, which is weighed, tested for richness, and then pasteurized and then ripened (just as is done in all modern creameries) at an even moderate temperature. The choicest creamery butter is made in this way"; "Country Style Rolls"; "Creamy Richness—Can't Be Beat"; "Fresh Churned Daily"; etc.

Representatives of dairy and creamery interests claim that the fraud is of a more subtle sort. It is carried on by advertising and publicity methods that aim at persuading the public that margarine is as valuable an element of the diet and as pleasing to the taste as butter, though much cheaper in price. These ideas are presented not only through the usual mediums of newspapers, magazines, and bill boards, but also through so-called educational channels, such as radio speeches, pamphlets for dietitians, and the like.

CHARACTER OF ADVERTISING

In order to test these charges, the Food Research Institute, in December 1929, asked all members of the margarine industry to submit to it samples of their advertising material then in use. This request was complied with by most of the larger manufacturers. Many smaller manufacturers did not respond to the inquiry, possibly because they did not care to submit their advertising matter or perhaps because they do not advertise on any considerable

¹ Federal Trade Commission press release of Friday, April 13, 1928, "Oleomargarine Stipulation No. 186"; press release of Saturday, November 10, 1928, "Oleomargarine Stipulation No. 293"; press release of Wednesday, March 26, 1930, "Oleomargarine Stipulation No. 435."

scale. The manufacturers of yellow cooking compounds, for the most part, did not respond.

How this advertising compares in truthfulness with advertising in general in this country, we are not in a position to judge, since we are not experts in advertising. It has certain characteristics, however, which can be analyzed by the novice, by the consumer.

For the most part, margarine is advertised on its own merits, as was stated by the Wisconsin supreme court. In none of the advertisements submitted to us was butter mentioned, and in many it was not suggested. In a few cases, however, the comparison was openly suggested in words, and in several more it was less directly insinuated by the use of yellow as a color for the margarine depicted, or elsewhere in the pictorial display. Since margarine is not usually yellow when placed on the market, it would seem that there is an element of deception in depicting it that color. On the other hand, since it is permissible to color it in the home and since most of the advertisements show people being served margarine at the table, manufacturers using this type of advertising can make a case for themselves. They may urge that advertisements depict the article ready for use, not ready for sale, just as in the case of other foods.

The advertisements which are more questionable from the point of view of business ethics are those which suggest the comparison with butter more directly or which may be taken to imply that margarine contains a larger content of milk elements than is the case. One manufacturer invites a comparison between butter and margarine on the theory that "you can't tell the difference" between them. Several advertisements that were submitted to us might be taken to imply that margarine is in considerable part a milk product. In both these types of advertising, however, it could be claimed that there had merely been a stretching of the truth. Many consumers honestly can-

not tell the difference between butter and margarine in the matter of taste, and they have no personal method of measuring nutritional effect. Milk is customarily used in the manufacture of margarine and gives some flavor to the product. Manufacturers cannot be gainsaid the privilege of stating that it is used.

The promotional or pseudo-scientific brochures published by manufacturers of margarine in certain cases contain statements and make claims for the product which could not be substantiated from the scientific literature. Several manufacturers of nut margarine claim that their product contains vitamin A, though they give no proof of how it is introduced into it. At least one implies that his product contains vitamins C and D as well.¹ But whether these are less accurate than statements and claims made by other manufacturers, including butter manufacturers, seems doubtful. Practically all manufacturers and salesmen claim virtues for their products which they would find it difficult to demonstrate to scientists.

The discussion thus far has applied to the advertising of margarine, not colored cooking compound. Here the situation is somewhat different, margarine as well as butter manufacturers desiring the protection from the cooking compounds which butter manufacturers in the past have desired from margarine. Two federal courts have handed down decisions bearing upon this question. The District Court of the Southern District of Georgia (32 Federal, 2d Series, p. 904) did not deem the sale of these colored cooking compounds an unfair menace to butter manufacturers, but in another case the District Court for

¹ The procedure of a British manufacturer who has introduced vitamins A and D into margarine is in marked contrast to the procedure of American manufacturers. Planters Foods, Limited, the British firm, submitted samples of their margarine to the Royal Institute of Public Health and to the Pharmaceutical Society of Great Britain for feeding experiments to determine the potency of the vitamin content of their margarine. These unbiased societies both confirmed the statement of the manufacturers that their margarine contains approximately the same content of vitamins A and D as butter.

the Western Division of the Western District of Missouri returned opposite findings, declaring that although the specific product considered was truthfully labeled it was such a close imitation of butter that it should be taxable as colored oleomargarine at 10 cents a pound.

THE SUPREME COURT ON FRAUD

No case has come before the Supreme Court for many years testing the powers of the states to protect the butter industry from the competition of substitutes. It is to be conjectured, however, that it would not go so far as it went in the Powell case (1888), but would rather support the position taken by the Supreme Court of the State of Wisconsin in its decision in the *Jelke v. Emery* case.

It will be remembered that the Supreme Court decision in the Powell case rested upon the grounds that the prohibitory statute of the state of Pennsylvania was a reasonable exercise of the state's police power to protect the public health, and to prevent fraud and deception. In the Schollenberger decision ten years later the court took judicial notice of the healthfulness of margarine, thereby wiping out probably the greater part of the reasoning supporting the decision in the Powell case. Of the content of that decision, the fraud basis alone remains.

The Supreme Court seems to be now on the frontier of fraud legislation. The line defining the powers of a state to protect its citizens from fraud and deception in the manufacture and sale of commodities of internal commerce has not been completely worked out.

For instance, in the case of the *Hebe Company, et al. v. Shaw* (1919), 248 U.S. 297, the court upheld the right of the state of Ohio completely to prohibit the sale of a product, assumed to be wholesome and nutritious, consisting of evaporated skim milk combined with coconut oil, and plainly and truthfully labeled as such. There was difference of opinion among the members of the court as to

whether the intent of the Ohio statute was to prevent the manufacture and sale of a product admittedly inferior in quality to condensed whole milk, or merely to guarantee the quality and purity of the product known as condensed milk. Justice Oliver Wendell Holmes, in writing the majority opinion, accepted the former interpretation and upheld the constitutionality of the statute on the fraud basis. He remarked that the consumer in many cases never sees the label, and thinks he is buying condensed whole milk when he buys condensed milk. Upon this reasoning the decision in the Powell case might be sustained today. A somewhat different attitude was taken, however, in *Weaver v. Palmer Brothers Company* (1926), 270 U.S. 402. The court there considered a Pennsylvania statute which forbade the use of shoddy in comfortables and mattresses. Judicial notice was taken of the fact that shoddy might be rendered perfectly harmless by sterilization, and the act as a health measure was accordingly declared invalid. And in considering the statute as a fraud-prevention measure, it was held that inasmuch as the business involved was legitimate and useful and was subject to all reasonable regulation provided for in the statute, the prohibition could not be sustained as a measure to prevent deception. The court seemed to be of the opinion that the use of shoddy for the purposes mentioned could be regulated by proper inspection and labeling requirements.

It is somewhat difficult to reconcile these two cases, unless the inherent difference in the two commodities is borne in mind. It is obviously far more difficult to deceive customers in the purchase of more or less permanent articles of considerable value, such as mattresses, than of inexpensive objects like cans of condensed milk. There is a closer analogy between margarine and condensed milk, however, than between margarine and mattresses, so if this reasoning has any validity the decision of the

court in the Hebe case has more bearing on the interpretation of margarine legislation than has the *Weaver v. Palmer Brothers Company* case.

In this same connection, an interesting comparison may also be made between the Plumley and Schollenberger cases discussed above. Both of them, it will be remembered, involved the rights of an importer in interstate commerce, and hence are authority only by analogy for the problem now under consideration. In the Plumley case prevention of fraud was of primary influence in sustaining the decision, the assumption being apparently that anti-color legislation had been enacted by the state of Massachusetts for the express purpose of preventing fraud. In the Schollenberger case, which involved a completely prohibitory law, the Supreme Court apparently did not think the sale of margarine in general contained a sufficiently strong element of fraud and deception to warrant a holding similar to the decision in the Plumley case. It will be remembered that in the Plumley case the original-package doctrine was not applied, while in the Schollenberger case it was applied. As was before pointed out, the Powell and Schollenberger cases arose under the same statute but with distinctly different issues raised. Of the protection-of-health and prevention-of-fraud bases of the Powell decision, the fraud element was by far the weaker and less significant of the two.

We have little more than conjecture to go on, then, in any consideration of the probable present position of the Supreme Court on state legislation aiming at severe limitation or prohibition of the manufacture and sale of margarine for the protection of butter from fraudulent competition. However, since fraud in the sale of margarine as butter appears to be insignificant and advertising methods not more deceptive than in the case of other products, there is reason to infer that the court would not find justification for the complete suppression of the commod-

ity under the powers of the states. The Hebe decision is probably the strongest argument against this inference.

FURTHER GUARANTEES AGAINST DECEPTION

Although it appears to us that there is relatively little deception in the sale of margarine, unless it be in advertisements claiming vitamin content, it may be desirable to suggest ways in which the present federal regulations might be amended to give further guarantees against fraud.

Firstly, it might be required that margarine be packed in a different shape from butter. A triangular carton, a cube, any shape easily distinguished from the customary butter carton (which would then have to be standardized) could be determined upon. However, the expense of designing and installing new packing machinery would be raised as an objection.

Secondly, a statement might be required of every manufacturer, to appear on the carton, showing in percentage amounts the ingredients of the finished product. In this way there could be no deception as to the relative volume of milk elements in margarine as compared with butter.¹ To this proposal it might be objected that manufacturers would find it impracticable to change their formulas with the shifts in relative prices of raw materials. Costs of production might in consequence rise and these would be passed on to the consumer. The constitutionality of such a requirement is not here under discussion.

Finally, the internal revenue stamp might be affixed to individual pound packages of margarine instead of to original packages. It seems improbable that retail dealers nowadays tamper with packages of margarine, but this would be an additional safeguard to the consumer that he was getting the product as put up by the manufacturer.

¹ A precedent for this might be found in the fact that certain states require manufacturers of baking powder to indicate ingredients on the outside of the can, but not necessarily their proportions.

CHAPTER IX

THE TAX FEATURE OF THE LAW

The federal law provides for a 10-cent-a-pound tax on all colored margarine manufactured and a ¼-cent-a-pound tax on uncolored margarine. None of the state laws provides for the taxation of the commodity except in Utah, which has a 10-cent sales tax on the colored product and a 5-cent sales tax on the uncolored.

The high tax on colored margarine has undoubtedly been a most potent protection to the dairy industry. It ranks in importance with the tariff as a method of preserving the market for dairy and creamery interests. It has practically eliminated margarine colored (at time of sale) in imitation of butter.

If the fundamental justification for the margarine legislation is the prevention of fraud in the sale of margarine for butter, it may be asked whether a tax of such discriminatory nature is necessary for this purpose. If the purpose is protection for dairying, the question has a different aspect.

ADVANTAGE OF THE TAX FOR REGULATORY PURPOSES

At the time of the passage of the original margarine law and also at the time of the amendment of the act, when the present tax feature was added, there was no federal Food and Drugs Act on the statute books. The elaborate machinery that has been worked out for the administration of the pure food law was unforeseen at that time. Since 1906 that law has been quite thoroughly tested in the courts and has proved for the most part an

excellent instrument for the control of false and misleading branding of foods shipped in interstate trade. It has no application in intrastate commerce, however, nor does it provide for supervision of manufacturing processes.

The success of the Bureau of Chemistry (now the Food, Drug, and Insecticide Administration) in this field of fraud prevention leads one to inquire whether it has the power sufficiently to protect butter from the unfair competition of substitutes. Margarine made of animal fats for interstate trade is subject at present to inspection not only by agents of the Bureau of Internal Revenue of the Treasury Department, but by those of the Bureau of Animal Industry of the Department of Agriculture. Elimination of the Bureau of Internal Revenue would not leave this branch of the industry, as at present organized, without supervision at the place of manufacture. It would, however, leave the manufacture of the vegetable product without surveillance at that point. At present, practically all manufacturers, certainly all using animal fats, ship their product in interstate trade; hence, are under the supervision of the Food, Drug, and Insecticide Administration. If there were no Oleomargarine Act on the statute books, however, small factories could (and probably would) be organized to do an intrastate business only, and these would not be subject to the federal Food and Drugs Act.

This indicates the purpose served by the tax feature of the law. All manufacturers, regardless of whether their shipments are for interstate or intrastate trade, must pay the tax to the federal government and must comply with the federal margarine law. It is a great advantage to the butter industry, as compared with other industries, to have the additional protection which this provides. Margarine is the only food commodity of importance so taxed and one of a very small list of commodities of all sorts, the manufacture of which is subject to tax.

PURPOSE OF THE TAX

Distinction must be made between the $\frac{1}{4}$ -cent tax and the 10-cent tax. The first may be considered regulatory, the second discriminatory or protective, as one views it. However, if the discriminatory tax were done away with and a flat tax put in its place, the problem of regulation would be a very different one from what it is today with this tax in effect. The great bulk of margarine would almost certainly then be colored yellow and the prevention of its use as butter would be a much more difficult problem than it is at present. Present regulations regarding the labeling of the commodity might continue to be effective, but its use in public eating places and under similar conditions would probably be greatly increased. There would then be a repetition of earlier attempts at control of food habits, the difficulties of which we are seeing demonstrated again in the enforcement of the Eighteenth Amendment.

Whether the tax on colored margarine needs to be as much as 10 cents a pound to give butter fair protection is another matter. Let us look at the matter from the economic point of view. The higher the tax on colored margarine, the less of it will be manufactured and sold. The public certainly prefers the commodity colored yellow and probably is willing to pay a reasonable sum above the price of uncolored margarine to have this service performed by the manufacturer. Ten cents a pound is entirely incommensurate with the value of the service, however. From the point of view of the butter manufacturer, on the other hand, a 10-cent tax probably appears necessary to safeguard his market for low-grade or at least low-priced butter.

The tax feature thus challenges one to ask what is the fundamental purpose of the law. The 10-cent tax can scarcely be justified as a fraud-prevention measure, al-

though it doubtless can be in the minds of many as a method of protection to the dairy industry. It may be claimed that although butter is the only commodity to be so protected by an internal revenue tax, many commodities receive as great or greater protection from the tariff on imports. Whether the tax appears just or not depends largely, therefore, on the point of view. A tariff on imports, where effective, protects an industry from foreign competition and sometimes from domestic competition, as, for instance, where raw materials of competing industries are not similarly taxed. The internal revenue tax on margarine protects the dairy industry from the competition of another domestic industry, though one using largely imported raw materials.

THE POSITION OF THE SUPREME COURT

We are not in position to suggest how the Supreme Court would view the taxation feature of the law were this to be brought before it at the present time. The only test case that has ever come before the court was in 1904, in *McCray v. United States* (195 U.S. 27).¹ The court examined the statutes involved, and saw upon their face an excise measure. The decision stated:

Undoubtedly, in determining whether a particular act is within a granted power, its scope and effect are to be considered. Applying this rule to the acts assailed, it is self-evident that on their face they levy an excise tax. That being their necessary scope and operation, it follows that the acts are within the grant of power. The argument to the contrary rests upon the proposition that, although the tax be within the power, as enforcing it will destroy or restrict the manufacture of artificially colored oleo-

¹ The act of August 2, 1886, was attacked in the case of *In re Kollock* (1897), 165 U.S. 526, as containing an unconstitutional delegation of legislative power. Although the statute as a revenue measure was not challenged, the Supreme Court in its decision said: "The act before us is on its face an act for levying taxes, and, although it may operate in so doing to prevent deception in the sale of oleomargarine as and for butter, its primary object must be assumed to be the raising of revenue."

margarine, therefore the power to levy the tax did not obtain. This, however, is but to say that the question of power depends, not upon the authority conferred by the Constitution, but upon what may be the consequence arising from the exercise of the lawful authority.

Conceding the obvious fact that Congress possesses no general police power to regulate the manufacture and sale of articles of food within the states, the decision in the McCray case stands for the proposition that if Congress has the lawful power to tax a particular subject or privilege, under the Constitution, and if the measure on its face is a taxation measure, then the court will not look behind the statute to examine the motive or the resultant effect. Perhaps the court did not fully realize at the time the import of the doctrine announced. The fact that the tax was excessive, that in fact it might be completely prohibitory, was held to be immaterial. Under the doctrine of that case, Congress may in effect invade the police power of the states and regulate matters of purely internal and domestic concern, by levying an oppressive and prohibitory tax and providing criminal penalties for the evasion thereof.

In 1919, the court took much the same position in the famous drug case, *United States v. Doremus* (249 U.S. 86), Justice William R. Day delivering the opinion, and Chief Justice Taft, and Justices McKenna, Van Devanter, and McReynolds dissenting. The Harrison Act requires those who produce, import, manufacture, or sell opium or cocoa leaves, or their compounds or derivatives, to pay a special tax of one dollar a year. Section 2 of the act also contains a significant list of regulations. It is made unlawful for any person to dispense such drugs except upon a written order on a form issued by the Commissioner of Internal Revenue, which order must be preserved for two years accessible to official inspection. It is also made unlawful for any person to obtain the drugs by means of the order

forms for any purpose other than the use, sale, or distribution thereof by him in the conduct of a lawful business in said drugs. Doremus was indicted for failing to comply with these regulations. Upon demurrer to the indictment, a district court of Texas held Section 2 of the act unconstitutional on the ground that it was not a revenue measure but an invasion of the state's police power. The Supreme Court reversed the decision, but those dissenting agreed with the lower court.

Justice Day, speaking for the majority, said:

The only limitation upon the power of Congress to levy excise taxes of the character now under consideration is geographical uniformity throughout the United States. This Court has often declared that it cannot add others. Subject to such limitation Congress may select the subjects of taxation, and may exercise the power conferred at its discretion. . . . the fact that other motives may impel the exercise of the federal taxing power does not authorize the courts to inquire into the subject. If the legislation enacted has some reasonable relation to the exercise of the taxing authority conferred by the Constitution, it cannot be invalidated because of the supposed motives which induced it. . . . Considering the full power of Congress over excise taxation, the decisive question here is: Have the provisions in question any relation to the raising of revenue?

In spite of the fact that it was patent that the intention of Congress in enacting Section 2 was regulation rather than revenue, and that the court itself in an earlier case¹ had assumed that the statute had a moral end as well as revenue in view, it was held, nevertheless, that the provisions of Section 2 of the act had something to do with facilitating the collection of revenue. Its constitutionality was accordingly upheld.

The court, however, seemed to realize that it was headed in a dangerous direction and that it was time to retreat when the child labor tax case, *Bailey v. Drexel*

¹ *United States v. Jin Fuey Moy*, 241 U.S. 394.

Furniture Company (259 U.S. 20), came before it three years later. While the decision in that case did not reverse the position of the court in the margarine and drug cases, it does evidence a distinct change in spirit. The opinion was delivered by Chief Justice Taft, with Justice Clarke alone dissenting. The Child Labor Tax Law provides, among other things, that any person operating a mine or quarry in which children under the age of sixteen years have been employed or permitted to work during any portion of a taxable year, or a mill, cannery, workshop, or factory in which children under the age of fourteen years have been employed or permitted to work, should be subject for any taxable year to an excise equivalent to 10 per cent of the entire net profits received for such year from the sale or disposition of the product of his mine or other establishment. Knowledge upon the part of the employer that the child or children employed were within the age limit was made a prerequisite to the payment of the tax. In other words, only those who knowingly violated the act were made subject to the tax. The act was held unconstitutional on the ground that on its face it was not a revenue measure, but rather a clear attempt on the part of Congress to penalize, and thereby discourage and suppress, certain conduct, the regulation of which belongs exclusively to the states. The decisions in both the McCray and Doremus cases were commented upon and distinguished from the case before the court.

In the drug case the court was able to see some relation between the regulatory provisions of the Harrison Act and the raising of revenue and the collection of the excise imposed. In construing the Child Labor Tax Law it could see no such relation. Chief Justice Taft said: "We must construe the law and interpret the intent and meaning of Congress from the language of the act. The words are to be given their ordinary meaning unless the context shows that they are differently used. Does this law impose a tax

with only that incidental restraint and regulation which a tax must inevitably involve? Or does it regulate by the use of the so-called tax as a penalty?" The court was struck by the elaborate regulations upon the face of the act, and especially by the fact that the employer who did not know that the child or children were under the age limit did not have to pay the tax. "Out of proper respect for the acts of a co-ordinate branch of the Government," said Chief Justice Taft, "this court has gone far to sustain taxing acts as such, even though there have been grounds for suspecting, from the weight of the tax, it was intended to destroy its subject. But in the act before us the presumption of validity cannot prevail, because the proof of the contrary is found on the very face of its provisions."

It is difficult to see how the court can, with logic, uphold the Drug Act and invalidate the Child Labor Tax Law. It would seem that the provisions of both, on their face, evidence the sole intent of regulation. One involved child labor and the other the dispensing of drugs. Perhaps the difference in economic interests involved may explain the difference in results reached. Perhaps the tradition of excise taxes on narcotics had some influence.

It is even less easy to reconcile, at least in substance, the decisions in the child labor case and in the margarine case. Congress has no general powers of regulation either over the employment of children in industry or over the manufacture and sale of margarine within the states. Both the statutes involved in these cases stand as clear invasions, under subterfuge, of the states' reserved powers. True, the margarine law, on its face, appears as a bona fide excise measure, while the other, on its face, is a plain attempt on the part of Congress to regulate child labor within the states. However, the intent and necessary result of both stand on the same footing, regardless of what observations of motive may be made from the statutes themselves. In one the motive is expressed in the

act; in the other it is hidden from view. The distinction seems artificial, yet has been controlling with the court. The 10-cent margarine tax was intended to be prohibitory, yet the court had to close its eyes to the fact. The doctrine of the McCray case seems to be that a statute which on its face is a bona fide revenue measure will not be rendered invalid as beyond the constitutional powers of Congress merely because of the fact that its purpose is prohibition and its effect to raise little or no revenue. But, according to the decision in *Bailey v. Drexel*, if such purpose and effect may be observed from the face of the act, it will be invalidated.

The latter decision does not reverse or disprove the position taken by the court in the margarine case. In fact, the court said, in the *Bailey v. Drexel* decision: "If it [the statute] were an excise on a commodity or other thing of value we might not be permitted under previous decisions of this court to infer solely from its heavy burden that the act intends a prohibition rather than a tax." In distinguishing the two cases it was said that the margarine tax was attacked merely as excessive and prohibitory, and that it did not show "on its face, as does the law before us, the detailed specifications of a regulation of a state concern and business with a heavy exaction to promote the efficacy of such regulation." But certainly prohibition is a more violent exercise of power than regulation, and the court treats it as such in defining the limitations upon the states' police power.

If the substance and not the shadow, as Justice Holmes might say, were considered, it would seem difficult for the court to sustain the margarine tax today. The decision in *Bailey v. Drexel* must certainly be regarded as a retreat by the court, in spirit at least, from its original position. Yet there is nothing tangible in that decision to justify one in thinking that the McCray decision would be overruled were the same statute to be again tested before the court.

CHAPTER X

FOREIGN MARGARINE LEGISLATION

There is no country that has legislated against the manufacture and sale of margarine so strictly as the United States, except Canada.¹ There its importation, manufacture, and sale are prohibited by law. The United States is the only country where its manufacture is subject to tax. In France the coloring of the commodity is prohibited. But, although legislation is more severe in these three countries than elsewhere, in all countries where it is used in considerable volume it is subject to public regulation of some sort. Proper branding and registration by manufacturers and dealers are required everywhere; and in a number of countries there are regulations as to the amount of butter fat to be included, the manufacture of the two products (butter and margarine) in the same establishment, and similar matters.

The British law is representative of the milder type of legislation. Passed the next year after the American law, in 1887, it merely requires that margarine be labeled, and that manufacturing establishments be registered and open to inspection by public health officials.² In 1899 this law was amended to cover the registration of wholesale dealers as well as manufacturers. In the same year the Sale of Food and Drugs Act restricted the use of butter in margarine to 10 per cent.³ In Holland the industry is

¹ In South Africa, no table margarine may be manufactured or imported. Its manufacture for culinary purposes is, however, permitted.

² 50-51 Victoria (1887), chap. 29.

³ 62-63 Victoria (1899), chap. 51, secs. 5 and 7, and Margarine Clause of the Sale of Food and Drugs Act. In the Irish Free State, legal enactments are practically identical with the British law.

subjected to approximately the same degree of regulation.¹ All who manufacture or trade in margarine must be registered; the commodity must be properly labeled; it may not be manufactured, stored, or sold in the same place with butter. It must contain 80 per cent of fat. The Danish law formerly forbade the use of coloring matter, but now permits it. Otherwise, it simply carries the usual stipulations as to labeling, fat content (80 per cent), no more than 3 per cent butter fat, prohibition of the use of waxes and preservatives other than salt, etc.² In France, on the other hand, coloring is still prohibited; butter and margarine may not be manufactured in the same establishment; and not more than 10 per cent of the fat used may be butter.³ Germany, Austria, and Belgium require the use of sesame oil in order that margarine may be detected from butter by the chemical color test characteristic of sesame oil.⁴ France, Great Britain, and Germany regulate the amount of butter that may be churned with the other oils. As already mentioned, a Canadian law, passed in 1914, prohibits the importation, manufacture, and sale of the commodity.⁵ The provisions of this law were temporarily set aside from 1919 to 1924, but are now in effect.

In New Zealand, where dairying is a foundation stone of the national economic structure, an act was passed in 1895 governing the manufacture of margarine, and a later consolidating act in 1908. The purpose is said to be to discourage the use of margarine as a substitute for butter, and the statement is made that margarine is not in fact used to any extent in this way; its main sale is to pastry cooks and biscuit manufacturers. Butter, butter fat, or

¹ Law of August 13, 1908.

² Law of April 1, 1925.

³ Law of April 16, 1879, amended July 23, 1907.

⁴ J. Lewkowitsch, *Chemical Technology and Analysis of Oils, Fats, and Waxes* (London, Macmillan, 1922, 6th edition), II, 221.

⁵ *Session Laws*, 1914, chap. 7, sec. 1.

milk may not be mixed with margarine; coloring matter may not be added; any weight of margarine, 2 pounds and under, must be sold in cube form; the word "margarine" must be branded distinctly on packages and the words "butter," "butterine," and words resembling these must not be used; not less than 5 per cent by weight of sesame oil or 1 per cent of potato starch or Queensland arrowroot (*Canna edulis*) must be mixed with margarine. It is reported that in recent years production in New Zealand has increased.

In Australia the legislation affecting margarine differs from state to state, tending on the whole to resemble the regulatory devices of New Zealand. As in New Zealand, it is commonly provided that coloring matter must not be added; that any weight of margarine, 2 pounds and under, must be sold in cube form; that packages containing margarine must be so labeled, and the words "butter" and "butterine" must not be employed; and that there must be admixture of potato starch, or Queensland arrowroot, or sesame oil. Several Australian states, however, permit the use of butter fat, though not more than 5 or 10 per cent. Three states require that margarine shall not be manufactured within 100 yards of an establishment where butter is produced; and four states require that, when margarine is served to customers in public eating houses, the receptacle must be conspicuously placarded to show that it contains margarine. Some states require manufacturers of margarine to keep books showing the quantities of fat, butter, milk, and cream purchased for the manufacture of margarine, and also the names and addresses of buyers.

Thus, it may be said that wherever the commodity is used it is subject to public regulation, though nowhere, except in Canada, to such an extent as here. If developments in Denmark may be considered indicative of other parts of Europe, restrictions are being gradually lightened there.

It is interesting to speculate as to why the regulation of this commodity has been so much more stringent on this side of the Atlantic than in Europe. It is not because dairying is more important here than there. Two explanations seem possible. Firstly, the European countries in which dairying is important have foreign outlets for their butter production. Under these circumstances, the menace of the substitute commodity matters less, perhaps not at all, to vested dairy interests. Frequently, a better price may be obtained abroad than at home. Secondly, rights and interests of consumers are perhaps given more attention in Europe than in newer countries where population is less dense. Here and in the British domains the rights of producers are matters of the greatest concern to legislative bodies. Legislation looking to the protection of industrial rights are of paramount interest. By contrast, rights of consumers are given relatively little attention. Our experience is not broad enough to permit us to state that the reverse holds true in northern Europe. But it is true that the working classes of northern Europe are more vocal, and consequently probably more powerful as a class than on this side of the Atlantic. Also, cheap food has been considered a matter of primary public concern for generations there. Here the emphasis is on high wages rather than on low living costs.

The bearing of these matters on legislation looking to the limitation of the use of margarine in the diet is obvious. In Europe, the commodity has been considered a valuable substitute for an expensive article of food, and its manufacture usually has not been discouraged except in so far as was necessary to protect the butter industry from fraud. Here, on the other hand, rights of butter producers have been given precedence over rights of consumers, and the manufacture of the substitute commodity restricted probably beyond the point necessary for the prevention of fraud in large measure.

PART II. TECHNOLOGICAL DEVELOPMENTS AND DIETARY CONSIDERATIONS

CHAPTER XI

THE MÉGE-MOURIEZ PROCESS AND THE EARLY MANUFACTURE OF MARGARINE

Attempts to produce a substitute for butter were frequent in Europe during the second and third quarters of the nineteenth century. A number of factors were responsible for stimulating inventors to enter this field, but probably the most important were the increasing pressure of the population on the food supply and the advance in the use of machinery which required lubrication. The first led to high prices for butter and other foods; the second increased the demand for all types of fats and oils suitable for lubrication purposes, and thus indirectly affected the cost of living.¹ Conditions in the United States were fundamentally different from those in Europe because of the sparseness of population and the extent of undeveloped country. Here, there was indefinite oppor-

¹ Allan McPhee, in *The Economic Revolution in British West Africa* (London, Routledge & Sons, 1926), p. 31, mentions two other facts which affected the consumption of fats in Europe, namely, the increasing cleanliness of Europeans and the increasing vogue for nocturnal illumination. Cleanliness required soap, and additional supplies of oils were necessary to make it. Vegetable as well as animal oils were used for illumination prior to the introduction of petroleum products. Another factor of importance was the development of the meat-canning industry, which deprived the trade of the carcasses which had previously been boiled down for the supply of fats and oils. Later, the transport of carcasses under refrigeration caused a further reduction in available supplies of animal fats. This oceanic trade in carcasses began in New Zealand in the early 1880's and was soon extended to other producing countries. Cf. *Report of the Imperial Economic Committee . . . Dairy Produce*, p. 115.

tunity for expansion of dairy herds and increase in the supply of butter. There was also a much larger potential supply of other fats and oils, since cattle herds and the cotton crop could be increased—to mention only the two principal sources of non-dairy fats. The eagerness with which experiments were made in the production of margarine in this country was an indication of business enterprise rather than of any fundamental need for the substitute commodity such as existed in Europe.

INVENTION OF MARGARINE A RESULT OF THE DEFICIENCY OF FATS IN EUROPE

Viewing Europe as a unit, there is a large deficiency of fats. In the north the Dutch and Danes have dairy surpluses, but the deficiencies in northern Europe as a whole are such that there is now a net annual import of about half a billion pounds of animal fats alone. Although the deficiency has not always been so great, northern Europe has been importing fats in considerable volume for more than two generations. Western Europe is not only too densely populated to support dairy and cattle herds sufficient to provide the fatty element of the diet, but there is also a deficiency of vegetable fats (west of Russia). At the time of the introduction of margarine there was an appreciable acreage planted to rapeseed in France and Germany, but not enough to take care of the growing requirements of the population; and in the years since then this acreage has been greatly reduced. Southern Europe was in a different situation because of her wealth of olive oil.

The development of railroads in the middle of the nineteenth century and the extension of industry also created a vast new field for the use of fats and oils. In America animal fats were abundant and could be used for this purpose without endangering the food supply, but in Europe there was no such surplus and new for-

eign sources of supply had to be found. It was at this period that tropical oils were first introduced into Europe in large volume; Russia and America were also drawn upon.

The invention of margarine occurred, then, at a time of definite need in Europe for a cheap substitute for butter. It was the direct result of an offer of Napoleon III to confer a prize upon the individual who could prepare for commercial exploitation a fat which would be as appetizing, nutritious, and stable as butter, and to place at his disposal a factory at Poissy, near Paris, for the manufacture of the product.

Most of the previous methods devised for the manufacture of butter substitutes had yielded a bland, soft fat, a substitute for lard rather than for butter. Their principal economic advantage had been that by freeing suet from flavor and softening its consistency they made it acceptable in northern Europe and America as a cooking fat.

PROPERTIES PECULIAR TO BUTTER

Butter, as contrasted with most other fats, has certain peculiar properties which must be imitated in any successful substitute. It has, for example, a low melting point, 28° to 35°C. (82° to 95°F.), so that it melts on the tongue. It would be a simple matter to prepare a large variety of blends of natural fats and oils of this melting point, but the mixtures lack the peculiar consistency of butter. Most mixtures of this sort melt rather quickly; that is to say, as they are warmed they do not soften very much until they reach a temperature close to their melting point, when they become mushy, and at the melting point rapidly liquefy. As butter is warmed, on the other hand, it softens gradually, and only finally melts. Moreover, ordinary fats, or fatty mixtures with the melting point of butter, have a different consistency in other

respects. They are not so plastic as butter, and cannot so easily be spread on bread. At the temperatures at which they are solid, they are apt to be brittle rather than plastic, and on the tongue they feel granular rather than smooth. The peculiar melting property of butter is due in large part to the character of the fats of which it is composed, and its plasticity is due in large measure to the fact that it is an emulsion. Its characteristics as an emulsion of fine droplets of water in a matrix of fat determine its appearance as well as its plasticity. Butter, moreover, has a flavor which no other natural fat possesses. Finally, it exhibits a behavior when heated that is exhibited by no other natural fats. It browns and foams, gives off a unique odor, and develops a unique flavor. It also emulsifies well into sauces. These characteristics as a cooking fat are more important in northern Europe, where butter has long been the preferred cooking fat of the wealthier classes, than in southern Europe, where it has always been scarce and of poor quality and where olive oil remains the preferred cooking fat.

Butter, furthermore, has a characteristic appearance. It is of a varying shade of yellow and has a peculiar translucency, which it has been found difficult to imitate. This color, where permitted by law, is of course imitated in substitutes by tinting with a suitable amount of dye dissolved in oil. The dye formerly most commonly used was annatto, a vegetable product, but in recent years oil-soluble aniline dyes, mostly sudans, have been used more generally. In the United States nearly all butter is artificially colored with the same dyes. The color of butter varies somewhat with the breed of cow producing it and greatly with the feed. In the spring and early summer, when there is an abundance of green feed, it is a deeper shade of yellow than at other times. This type of butter was most highly prized by our ancestors, in spite of the fact that it often had aromatic flavors, such as that of

garlic, and presumably the artificial coloring of butter was inaugurated to imitate it. At present the general public knows little concerning the quality of butter produced at different times of the year, and the purpose of coloring seems to be mainly to give the product uniformity in appearance. The average person, if he is offered the same article but of a different shade of color from day to day, becomes suspicious that some of the product may have been spoiled. This is the justification that the dairy industry advances for the universal artificial coloring of butter.

THE MÈGE-MOURIEZ PROCESS

A butter substitute to be satisfactory must imitate reasonably well the characteristics of butter, namely, melting point, consistency, flavor, behavior in cooking, general appearance. Though it is being approached, this result has not yet been achieved, despite many years of manufacture of butter substitutes. The first acceptable butter substitute was produced by the French chemist, Mège-Mouriez, to whom the prize offered by Napoleon III was awarded in 1870. A patent was issued to him in England on July 17, 1869. Presumably, his application for a French patent (*brevet*) bore an earlier date, but it was not the practice of the French government at that time to make public the specifications of patents, so that the first printed record of Mège-Mouriez' process seems to be the English patent.

His process is adequately described in the patent, thus:

a fatty body, identical in chemical composition with butter, is obtained from fresh suet by crushing it between rollers under a stream of water, further washing it, and then digesting it with artificial gastric juice. The fat is extracted, melted, passed through a sieve, and poured into boxes to set, after which it is cut into pieces which are wrapped in cloths and pressed between hot plates. A fatty body is expressed, and may be agitated in a closed vessel, cooled, cut up, bleached with acid, and washed with water.

This purified fat is mixed at animal heat with water containing small quantities of bicarbonate of soda, casein of cold milk, and mammary tissues, along with yellow colouring matter. This is digested, allowed to settle, decanted, and cooled, and yields a preserved butter. Fresh butter is obtained by agitating the above mixture until a cream is formed, which is then treated as usual to obtain the butter.¹

The process, then, consisted essentially of four steps: (1) the mincing and washing of fresh fat; (2) digestion of the minced fat with artificial gastric juice; (3) expression of the softer portion of the fat from the harder; (4) digestion and agitation of the soft fat thus obtained with milk and mammary-gland tissue extract.

Step 1 contributed to improving the flavor of the fat, since thorough washing of the finely minced material removed non-fatty contaminations. This step, however, cannot be regarded as new.

What Mège intended to accomplish by step 2 is not quite clear. It is not apparent whether he intended it to be a special manner of rendering or whether he thought it changed the chemical nature of the fat. According to Boudet,² Mège based his process upon observations of his own on cows on a restricted diet. He found that under these conditions the cows lost weight and yielded a decreasing amount of milk, but that this milk always contained butter fat. Mège reasoned that this butter must be derived from the body fat of the animal which, having been resorbed and entrained in the circulation, was deprived of its stearin by respiratory combustion and furnished its oleomargarine to the mammary gland, where, under the influence of the pepsin of the mammary gland, it was transformed into "*oléo-margarine butyreuse*," that

¹ William Clayton, *Margarine* (London, Longmans, Green & Company, 1920), p. 3.

² Félix Boudet, "Extrait d'un rapport au conseil de salubrité de la Seine sur le produit présenté sous le nom de beurre artificiel, par Mège-Mouriez," *Moniteur Scientifique-Quesneville*, September 1872, 369^e Livraison, pp. 741-44.

is to say, into butter. This hypothesis, devised to explain the behavior of dairy cows upon a restricted diet, seems to us today quite fanciful, but it led, nevertheless, to the first useful process for making a butter substitute. It was in his endeavors to imitate what he assumed to be the physiological processes of forming milk fat that Mège hit upon his now famous process.

What is not clear in regard to step 2 concerns the digestion with pepsin resulting from the addition of sheep's stomach. The English patent may be interpreted as implying that Mège believed digestion with artificial gastric juice converted the fat into "a fatty body identical in chemical composition with butter." Of course it has no such effect. Troost, however, reporting upon Mège's process, states that the purpose of the peptic digestion was to free the fat from membrane and that a temperature of 45°C. must not be exceeded in order to avoid the development of a tallowy odor.¹ The statements of Boudet² are to the same general effect. The probabilities are that Mège used peptic digestion not because he believed it changed the fat chemically, but in order to avoid high temperatures, for, as Boudet states,³ it was believed that fats were decomposed when heated in the presence of organic matter. With peptic digestion Mège hoped to set the fat free at a low temperature. It may, however, be questioned that he got much peptic digestion in the earlier form of the process, since he added enough sodium carbonate to give the water present an alkalinity equivalent to 0.1–0.5 per cent sodium carbonate, enough to inactivate pepsin.⁴ In the English patent, however, he speaks of using artificial gastric juice. He was compelled to keep the temperature as low as 45°C., because at much higher

¹ Troost, "Beurre artificiel par M. Mège-Mouriez," *Moniteur Scientifique-Quesneville*, September 1872, 369° Livraison, pp. 740–41.

² *Op. cit.*

³ *Op. cit.*

⁴ Troost, *op. cit.*

temperatures pepsin is destroyed. He thus discovered, more or less accidentally, that rendering at a low temperature yields fat free from flavor and odor. We now know that the presence of gastric juice is unnecessary. The reference in the English patent to the conversion of the fat into a fatty body identical with butter probably refers to the process as a whole. The essence of step 2, then, is that rendering at low temperatures yields a fat free from flavor, a most important discovery, without which the manufacture of margarine from animal fat would be impossible.

Step 3, the expression of the softer portion of the fat from the harder, actually results in the production of a fat of different chemical composition, resembling butter in melting point and to some degree in consistency. However, the process was not new, but had been in use for a long time in one form or another, in connection with the production of a hard fat for the candle industry.

Step 4, the agitation of this fat with milk and extract of mammary-gland tissue, Mège thought actually changed the chemical nature of the fat through the action of a ferment, or, as we should say today, an enzyme, present in the cow's udder. It was believed at that time, and for some decades thereafter, that the flavor of butter was due to the presence of certain volatile acids that are not commonly found in other fats. Undoubtedly, Mège believed that extract of cow's udder, acting upon fat in the presence of milk, produced these acids. In this he was mistaken; they are not so produced. Even if they were, they would not impart the full flavor of butter. We now know that the aroma of butter does not depend in the main upon these acids, but upon the products of the growth of micro-organisms contained in milk. In his day, little was known concerning the rôle played by micro-organisms. The age of Pasteur, of Robert Koch, and of Christian Hansen had not yet arrived. However, step 4 does repre-

sent an important discovery, namely, that by churning with milk some of the flavor of butter may be imparted to fat. In addition, the churning served to emulsify the fat, i.e., to break it up into fine globules in milk and then to impart to the product some of the texture of butter.

Mège-Mouriez, then, deserves credit for two important discoveries: (1) that a bland, neutral fat may be obtained by rendering with water at low temperatures, and (2) that working a fat with milk tends to impart to it more or less the flavor of butter. He deserves credit, of course, also for combining his discoveries with well-known processes in a sequence which produced, for its time, a reasonably satisfactory butter substitute.

The name "margarine," which Mège-Mouriez applied to the finished butter substitute made by his process, goes back to the year 1813 when it was first used by Mège-Mouriez' teacher, Michel Eugène Chevreul, the great authority on the chemistry of fats. At a meeting of the French Academy on July 13, 1813, Chevreul had reported upon a fat-like substance that he had prepared, which he had named margarine. In 1816, he published further investigations upon it and described what he supposed to be a new fatty acid, with the formula $C_{17}H_{34}O_2$, which he named margaric acid. The name was derived from the Greek word for "pearl," since the crystalline substance had a pearly luster.

Mège-Mouriez gave to the soft fraction of the fat, expressed after digestion, the name "oleomargarine," since he believed it to consist of a mixture of olein and margarine. We now know that margaric acid, also known as daturic acid, occurs rarely, if at all, in animal fats. What Chevreul regarded as margaric acid, derived from these sources, was a eutectic mixture of stearic and palmitic acids. Hence, the terms oleomargarine and margarine, chemically speaking, are misnomers, but they have been adopted universally.

The French public health authorities became interested in margarine promptly after its invention, and Félix Boudet, a distinguished French chemist, was retained to prepare a report upon it. His findings were published in France in 1872,¹ in America in 1874 in an abbreviated translation.² On April 12, 1872, the sale of margarine was officially approved in Paris, but its sale as butter forbidden. It seems originally to have been placed upon the market in two forms: unchurned, as a culinary fat, a use it still retains today as a shortening; and churned with milk and udder extract, as a butter substitute.

¹ *Op. cit.*

² "Extract of Report Made to the Board of Health of the Department of the Seine on the Product Presented under the Name of Artificial Butter by M. Mège-Mouriez"; by M. Felix Bondel, translated from the *Moniteur Scientifique* by F. H. Hoadley, B.A. (*American Chemist*, April 1874, IV, 370-72). It will be noted that Hoadley gives Boudet's name incorrectly as Bondel. The correct name is used elsewhere in the *American Chemist*.

CHAPTER XII

THE SHIFT IN RAW MATERIALS

Rapid progress was made in the technology of the industry, but this is not the place to describe the host of patents or the processes that at one time or another were described or tried out. It is worth while to consider here only those that illustrate the evolution of the industry. Nor is it our purpose to present here a treatise on the manufacture of margarine which might serve as a guide to the operating manager of a plant. All that is attempted is to present a simplified outline of the practices of the industry such as would prove of interest to the general reader.

During the decade that followed the issuance of Mège's patents, other processes for the production of butter substitutes were patented, but none of them was able to hold its own in competition with that of Mège, although a number of factories using other processes operated for a time. The history of the technology of the early years of the industry in America has been written by Mott,¹ the chemist of the United States Dairy Company.

EARLY IMPROVEMENTS

The first notable improvement was the abandonment of peptic digestion and the use of udder extract. According to Franzen,² Mège-Mouriez, himself, gave them up. However, in an English patent issued to him under the number 2731, on July 16, 1877, and in his United States

¹ H. A. Mott, Jr., "Manufacture of Artificial Butter," *American Chemist*, December 1876, VII, 233-41.

² Hans Franzen, *Margarine* (Leipzig, Otto Spamer, 1925), p. 2.

Patent No. 8424, dated September 24, 1878, both peptic digestion and the addition of cow udder were retained in the specifications. Just when these procedures were abandoned in Europe, the writer has been unable to determine. In America they had been abandoned before 1877, for in that year Mott described in great detail the process used in Brooklyn, as modified by him, and made no mention of peptic digestion or the use of udder extract.¹

For some years the industry employed only materials from near-by abattoirs. As production grew, fats were imported into Europe, principally from the United States, which was then producing a large surplus above its current needs. Margarine, itself, was not much exported from America, since it is more perishable than the fats used in its manufacture. The international trade in the earlier years was predominantly in oleo oil, which, properly prepared, does not deteriorate rapidly.

The earliest change in raw materials apparently was made in Chicago by the substitution of lard for some of the oleo oil. This gives the finished product greater smoothness and a more translucent appearance, especially in cold weather. Margarine, as originally made, was apt to become hard and brittle in cold weather, and not to spread well. The lard used was of the grade known as neutral or neutral lard, made from fresh leaf fat in the same manner as oleo stock. No doubt the fact that at that time neutral lard was said to be cheaper than oleo oil was also a factor.

The use of lard gave Chicago packers an advantage, since they were close to the sources of supply; but the addition of substantial amounts of butter to margarine, soon after the use of neutral lard began, gave them a further advantage, since they were also closer to the surplus butter-producing regions than Eastern manufactur-

¹ *Op. cit.*, pp. 236-41.

ers. Margarine containing substantial proportions of lard and of butter was termed butterine and regarded as a more or less distinct article. It was apparently much superior in flavor and texture to ordinary margarine. Butterine was being produced in quantity by 1883.

INTRODUCTION OF VEGETABLE OILS

In the pressing of oleo oil from oleo stock, stearin is obtained in varying amount, according to the temperature of pressing and the degree of pressure exerted. This product is of stiff consistency, and in the early days of the margarine industry there was a good market for it in the stearin- and stearic-acid-candle industry. Indeed, there was formerly a great industry devoted to the separation of many kinds of fats into a hard fraction, stearin, and a more or less liquid oil. The stearin went to the candle maker and the oil was used in lubrication on metal-cutting tools and in lamps to replace whale oil, which had been rising in price. The advent of petroleum affected these industries unfavorably. The demand for stearin for candles and the demand for animal oils for illumination naturally fell off, at least relatively. The fat-pressing industry steadily dwindled. As candles were supplanted by petroleum lamps, the demand for oleo-stearin (as the stearin obtained in the pressing of oleo stock to obtain oleo oil was called) fell off. In consequence, there was every incentive for manufacturers of margarine to use unpressed oleo stock directly, rather than only the oleo oil that could be expressed from it. This necessitated the mixture with it of a liquid oil to reduce the melting point of the suet. Manufacturers had but to follow the example of those who were beginning to make imitations of lard by mixing vegetable oil with tallow.

The mixing of oil with tallow was an old practice. It had been followed in the household in southern Ger-

many by mixing together tallow and specially treated rapeseed oil.¹ Commercially, the introduction of the practice was slow, because cheap vegetable oils that were bland enough in taste to be acceptable were not available till methods of refining had been developed. For this reason the mixing of tallow and vegetable oils in imitation of lard was practiced before vegetable oils were used in margarine, because an oil needs to be less perfectly refined and deodorized for the former purpose than for the latter.

Thus it appears that soon after 1870 the adulteration of lard with cottonseed oil and the production of an imitation lard by melting together cottonseed oil and tallow or stearin began to be practiced in America. On October 17, 1871, United States Patent No. 120026 was issued to H. W. Bradley for the refining of cottonseed oil by treatment with chemicals, steam, and oxygen at a high temperature, and also for the production of a shortening from such refined oil by mixing it with tallow. The claim is made in this patent that cottonseed oil, by reason of its offensive taste and smell, had not heretofore been used for this purpose. How rapidly cottonseed oil came to be used in this manner, it is now impossible to say. In 1873, Rondebush was granted English Patent No. 4209 for mixing some suitable oil, such as cottonseed oil, with suet. In 1882, United States Patent No. 258992, reissued as No. 10161, and United States Patent No. 262207 were issued to Samuel H. Cochran, involving a new method of refining and the mixing of cottonseed and its equivalent oils with tallow, beef stearin, or lard to make a shortening. This process was actually in commercial use for a time. In 1882, United States Patent No. 264545 was issued to George S. Marshall for making shortening from tallow and cottonseed or other vegetable oils, which in many

¹ Emil Jacobsen, editor, *Chemisch-technisches Repertorium*, 1875, Erstes Halbjahr, p. 186.

ways is analogous to the patent issued to Cochran. The practice of adulterating lard with cottonseed oil and tallow was certainly widespread in Chicago by 1882 or 1883.

Since only a very bland vegetable oil is utilizable in margarine, the oils first used in it must have been those that when cold pressed are directly edible without refining, for in the 1870's methods of refining were quite imperfect. Thus, on February 21, 1875, United States Patent No. 173591 was issued to Garrett Cosine for an improvement in the process of making artificial butter, involving the use of fats from fruits and nuts, peanut, sweet almond, and olive oil only being specifically mentioned. In 1880, Hofmann was granted English Patent No. 3867 for the use of peanut, sesame, and hazelnut oil. All these are oils that need no refining to make them edible. In 1882, P. Jeserich and C. A. Meinert were granted a German patent (D.R.P. 19819) for the refining of crude plant fats with superheated steam and magnesia to render them suitable for use in margarine. In the following year, they were granted English Patent No. 915 for margarine made from vegetable fat.

Cottonseed oil is not edible unless refined, and methods of refining were evolved but slowly. Indeed, it was only about 1900 that complete success in refining was achieved by David Wesson. Hence, cottonseed oil did not come into use in margarine in all probability until later than certain other oils which are edible without refining. When cottonseed oil was first actually used in margarine, it seems now impossible to say. In 1882, United States Patent No. 263042 was issued involving the manufacture of margarine from oleomargarine and stearin pressed from cottonseed oil. The purpose of the use of vegetable stearin is said in this patent to be the improvement of texture. The quantity used was from 10 to 40 per cent, according to the season of the year. On October

31, 1882, a patent was issued to Oscar H. Coumbe and Robert R. Roberts for a butter substitute consisting in part of cottonseed oil or other vegetable oil. On November 14 of the same year, United States Patent No. 267637 was issued to Henry R. Wright covering the manufacture of artificial butter from a variety of fats and oils, including cottonseed oil. In 1886, Professor Morton testified to the use of cottonseed oil in margarine, "where the oleo-margarine oil . . . has not had as much of its stearine removed from it as is required to bring it to the consistency of butter."¹ At the same time Professor Chandler testified that cottonseed, and also sesame, oil were in use.

From this time on the use of vegetable oils increased steadily. In 1887, Brannt and Wahl² published formulae for the use of cottonseed, peanut, olive, and palm oils. Palm oil was used in small amount, because, being orange in color, it improved the color of the finished product.

As early as 1887, a product was placed upon the German market under the name "Pflanzenbutter" (plant butter) consisting of coconut oil principally.³

By 1886, the use of cottonseed oil was common, but the proportion was small, 5 to 6 per cent, and it was used principally in cold weather for softening purposes. The grade used was known as salad oil, for large quantities were consumed on the table either as such or as an adulterant of olive oil. Nevertheless, methods of deodorizing had not yet been perfected, as any one old enough to recall the salad oil of those days will remember. Cottonseed oil was not yet suitable for use in large proportion in the better grades of margarine. A little later, so-called coconut butter consisting either of pure refined coconut oil or of mixtures of coconut and palm kernel oil

¹ *Senate Miscellaneous Document, No. 131, p. 56.*

² W. T. Brannt and W. H. Wahl, editors, *Techno-Chemical Receipt Book* (Philadelphia, H. C. Baird & Company, 1887), p. 130.

³ *Wagner's Jahres-Bericht über die Leistungen der chemischen Technologie, 1887, p. 1091.*

began to appear upon the European market. These were probably, at least at first, despite the name, intended rather as lard than as butter substitutes.¹ According to Sir William George Watson, coconut oil began to be used in Europe in the 'nineties, particularly as a cooking fat, and was introduced into margarine in the next ten years.² In 1896, Ruffin was granted English Patent No. 1827 involving the use of coconut oil in margarine. In 1900, Warr and Wright were granted English Patent No. 22602 covering a margarine made of nut oils and milk. While this product does not seem to have come upon the market in large volume till later, Russell and Kirkham reported as early as 1904 that the margarines then upon the market had changed very much in character in that they contained more plant fat than oleomargarine.³ According to the Imperial Economic Committee, at the outbreak of the war, British margarine consisted of seven parts animal to three parts vegetable products. By the end of the war, an average quality of margarine consisted of animal and vegetable products in the ratio of three to seven—an inversion of the pre-war proportions. By 1926, the average for all sorts was probably about nine parts of vegetable to one of animal fat.⁴

So far as concerns raw materials, the period 1880 to 1900 was characterized by the increasing use of vegetable oils. In this period, two types of margarine came to be produced: one, consisting wholly of animal fats; the other, consisting of a mixture of animal and vegetable fats. In the following decade, 1900-10, a third type of margarine appeared, consisting wholly of vegetable fats, principally

¹ Ludwig Medicus, *Kurzes Lehrbuch der chemischen Technologie* (Tübingen, H. Laupp'schen, 1897), p. 651.

² "The Manufacture of Margarine in the United Kingdom," *Journal of the Royal Society of Arts*, February 8, 1918, LXVI, 214.

³ Edward Russell and V. H. Kirkham, "Note on Some Physical Constants Obtained with Margarine," *Analyst*, July 1904, XXIX, 208.

⁴ *Report of the Imperial Economic Committee . . . Dairy Produce*, p. 115.

coconut and palm kernel oil, blended with such oils as those of peanuts, sesame, or cottonseed. In the second decade of the present century a fourth type became important, consisting of hydrogenated oils and ordinary vegetable oils. It is with this type of margarine that we must now concern ourselves, and this necessitates some consideration of the process of hydrogenating oils.

HYDROGENATION OF OILS

This process is based upon the pure science researches of Sabatier and Senderens.¹ The practical application of their discoveries was made by Normann in 1902. It had long been the effort of chemists to change the consistency of fats, principally to solidify oils, i.e., to raise their melting point. The successful solution of this problem, it was realized, would make it possible to use in large proportions such cheap vegetable fats as cottonseed oil, etc., in the manufacture of margarine and of lard substitutes. Chemists, working on a small scale, had succeeded in hardening the oils in the laboratory, but it was not until 1902 that the problem was solved by Normann through the application of the discoveries of Sabatier and Senderens. In that year a German patent (D.R.P. 141029) was issued. In 1903, English Patent No. 1515 was issued to Normann, and in 1906 the hardening of oils according to this patent was begun in England. The principle of the process is very simple. The oil is subjected to the action of hydrogen gas in the presence of finely divided nickel. The process is usually carried out in a closed vessel, sometimes under pressure and sometimes at higher temperatures. Under these circumstances the oil combines with hydrogen in amounts varying with the nature of the oil, the time elapsing, the temperature, and the pressure. The resulting product has a higher melting point, the degree to which the melting point is raised depending upon the quantity

¹ See *Annales de Chimie et de Physique*, 1905, IV, 319.

of hydrogen it has been allowed by the chemist to take up. Naturally, an invention as important as this has been the subject of a large amount of writing, and in considerable number patents have been issued for improvements or modifications. A detailed analysis of the history of the process, which has come to be known as hydrogenation, would be out of place in a treatise of this kind. The reader who may be interested is referred to the monograph of Ellis.¹

While the process of hardening oils by hydrogenation has been used quite extensively for a number of years in the United States, it has been applied to a larger extent in the lard-compound industry than in the margarine industry. One of the reasons is that while hydrogenation to a large extent improves flavor and odor, it is not possible merely by hydrogenation to convert an unrefined or otherwise unsuitable oil or fat into one bland or neutral enough for use in margarine. To be acceptable to the margarine industry the material before hydrogenation must be refined and of high quality. In other words, the cost of hydrogenation is superimposed upon the costs of refining, purifying, and deodorizing. Unless the raw material is relatively cheap or unless the hydrogenated product possesses some peculiarly desirable property, the added cost deters the manufacturer from using a hydrogenated product.

The principal use in the margarine industry in America at the present time is in the production of hydrogenated coconut oil, so called. Pure coconut oil cannot be much hardened by hydrogenation, since in its natural state, unlike most plant oils, it already holds nearly as much hydrogen as is theoretically possible. Technically speaking, it is nearly saturated with respect to hydrogen. The product that is known to, and used by,

¹ Carleton Ellis, *The Hydrogenation of Oils* (New York, D. Van Nostrand, 1919, 2d edition).

American margarine manufacturers under the name hydrogenated coconut oil consists of a mixture of coconut oil with a small proportion of a less saturated vegetable oil, most commonly peanut oil, the mixture having been hydrogenated to a definite melting point. It is prized by the margarine maker because it gives an improved texture to his product, especially in warm weather. This, it is stated, cannot be achieved by the use separately of coconut oil and partly hydrogenated peanut oil. Even with the use of hydrogenated oils the problem of preparing a margarine that will "stand up" in summer weather has apparently not been altogether achieved.

For a number of years Europeans made more use of hydrogenated oils in margarine than Americans. This was probably because of lower relative costs there than here. In recent years they have developed the use of hydrogenated whale and fish oil far beyond American practice. Sometime before 1913 the Norwegians began to harden whale oil on an extensive scale,¹ and almost immediately began to use it in margarine.² It is said to give to margarine a much desired translucent appearance and a smooth texture. It is also claimed that hydrogenated whale oil, like other hydrogenated oils, permits the incorporation of larger amounts of water without danger of weeping.³ The extrusion of water from the surface of margarine, or indeed of butter, is unfavorable to its keeping qualities, for the free water on the surface furnishes favorable environment for the growth of molds. It is also claimed that the incorporation of water improves spreading power. The manufacturer naturally

¹ H. T. Offerdahl, "Der Walfischfang und die technische Gewinnung und Verwendung des Walfischöles," *Berichte der Deutschen pharmazeutischen Gesellschaft*, 1913, XXIII, 558-69.

² See *Selvensieder Zeitung*, 1912, XXXIX, 1087-88; Bömer, *Zeitschrift für Untersuchungen des Nahrungsmittel und Genussmittel*, 1912, I und II.

³ See K. Brauer, "The Capacity of Hardened Fats for Moisture Content of Margarines Made from Them," *Zeitschrift für öffentliche Chemie*, 1916, XXII, 209-16.

desires to incorporate as much as he can, since water is the cheapest ingredient entering into the product. In most countries he is permitted to use 16 per cent, if he can, which is the amount found in butter. The point to be noted, however, is that the introduction of hydrogenation has made available oils not hitherto utilizable in margarine, and has gradually increased the variety of raw materials upon which the margarine manufacturer is able to draw. Among the most important of these at the moment are fish and whale oils, though, so far as the writer has been able to ascertain, they are not yet used in the American product. It is reported that margarine manufacturers fear that their opponents would use such a practice as a basis of attack upon the industry. Hardened fish and whale oils, however, are used in the United States in lard compounds.¹

The use of hardened whale oil will probably turn out to be a transitory phenomenon, lasting but a few years. Soon the present system of whaling will cease, because whales will have been well-nigh exterminated. Fish oils, however, will be much longer available.

EXPERIMENTATION WITH NEW OILS

Margarine manufacturers have been progressive in attempting to use new fats and oils as they have come on the market, or as well-known oils have become available in more perfectly refined condition. As rapidly as cottonseed oil, palm kernel oil, and coconut oil were obtainable perfectly refined, they were seized upon by margarine manufacturers. More recently they have used corn oil to some extent, and they are beginning to use shea butter, obtained from a nut from tropical Africa. In melting point and consistency this fat is said to be

¹ H. S. Bailey, *The Production and Conservation of Fats and Oils in the United States* (U.S. Department of Agriculture Bulletin 769), February 10, 1919, p. 14.

peculiarly suitable for margarine. It has not, so far as the writer is aware, been used as yet in America. Since 1914, babassu oil, from the nut of a Brazilian forest tree, has begun to be used to a slight extent, especially in Germany. In 1924, exports of the nuts amounted to 18,314 metric tons. It has not as yet been used in America.

Today the margarine manufacturer uses a variety of materials, which it is unnecessary to enumerate here. He is principally concerned in making up a mixture with a melting point between 22° and 27°C. (71.6° to 80.6°F.). He gives the mixture a higher melting point in warm weather, or if the goods are to be shipped to a warm climate. He compounds a mixture with a lower melting point for cold weather or a cold climate. He is guided in his selection of fats and oils to blend into such a mixture partly by price considerations and partly by consideration of the texture and color of the product that can be produced by the use of different materials. Some fats are like butter, in that they are not hard and brittle, at the temperature of the ice box, but plastic. When warmed, they soften gradually, more or less like butter. Other fats when cold are very brittle, and when warmed do not soften until they are about to melt. It is a matter of much skill and experience to blend fats together successfully so as to obtain a margarine which resembles genuine butter closely in appearance, texture, and consistency. Some fats are given the preference because they have a natural color that renders the finished product yellow. These are especially prized in countries where the coloring of margarine is forbidden or restricted, as, for example, in the United States by the imposition of a tax. Under these conditions yellow animal fats, for example, those of old cows, are eagerly sought for.

The statements concerning the interchangeability of the various fats and oils and concerning the possibility of changing formulae with market conditions or special

consumer requirements should not be interpreted to mean that every manufacturer is continuously changing his blends. It is merely to be taken to mean that these possibilities exist; they are taken advantage of to varying degrees by different manufacturers. In practice there is always great inertia and much reluctance to make any change so long as the consumer does not complain. Hence it comes that the United States manufacturers of vegetable margarine limit themselves very largely to coconut oil and peanut oil, while manufacturers of animal margarine confine themselves very largely to the use of oleo, neutral, and cottonseed oil. In Europe a much wider range of materials seems to be used; but even there, inertia, the difficulties of frequent changes in blends, limit in practice the adaptation of formulae to market conditions.

Thus in one sense it may be said that margarine is a standardized product, in another that it is not. In buying margarine the consumer expects to get a commodity of a certain texture, taste, and color. He will find that all margarines resemble one another, and approach a certain standard in these regards, but there will be considerable variation among different brands, and he will have a definite preference for certain of them as compared with others. In this connection, it may be said that many Europeans consider American margarine a product greatly inferior to their own.

INGREDIENTS OF AMERICAN AND EUROPEAN MARGARINE

The ingredients used in American margarine in the period since 1916 are shown in detail in Appendix Tables V A and V B. They include the volume not only of oils but of milk and butter as well. A study of these tables shows: (1) that oleo oil was the principal ingredient of American margarine until 1920; since then coconut oil has been used in greater volume; (2) that in 1916 cottonseed oil

and peanut oil were the only vegetable oils used in any quantity; (3) that these two continue to be used, but not to anything like the extent of coconut oil; (4) that packing-house fats were more important than vegetable fats until 1919, but that since then the reverse has been true; (5) that milk constitutes in most years between 20 and 25 per cent of the volume of raw materials used, though of course the greater part of it is eliminated in the manufacturing process and does not appear in the finished margarine; (6) that a small amount of butter is used, averaging usually between $\frac{1}{2}$ and 1 per cent of the total.

Usage differs somewhat from country to country, but animal fats are everywhere being displaced by vegetable fats. In Holland, Germany, Denmark, and Great Britain the vegetable product, or that made principally of vegetable oils, is in much more general use. In Scandinavia, perhaps in Holland and Germany as well, whale oil and other marine oils have come into use in recent years, but even there they probably constitute only a relatively small proportion of the total ingredients. It was stated in 1918 that whale oil was not used in British margarine at that time, but it is quite possible that it has been introduced in the interval since then.

Fritsch states that the best quality of French margarine is made of animal fats combined with a portion of peanut oil. Ten to 15 per cent of the latter is used in the combination in the summer and 40 per cent in the winter. Second-rate margarine, according to him, is usually a combination of animal fats with cottonseed oil. The United States Department of Agriculture, on the other hand, reported in May 1929 that "even in France, where oleomargarine consumption continues relatively unimportant and its use practically confined to culinary purposes, the vegetable types predominate."¹

The same tendency has been apparent in Belgium in

¹ *Foreign Crops and Markets*, May 20, 1929, XVIII, 715.

recent years. Formerly animal fats were the usual ingredients, but now vegetable fats are used much more generally. The same is true of Denmark. Danish margarine is apparently made in principal part of coconut oil. In 1926, a small ratio of hydrogenated whale oil was used; still less of beef fat; some cottonseed, peanut, sesame, and soy bean oil; but all of these together were only about half as important as coconut oil.

The chances are that Dutch and German manufacturers follow much the same technique as the Danes, although detailed statistics are not at hand. Imports of coconut oil (or copra, from which coconut oil is expressed) are far more important for both countries than those of any other suitable material. Germany also imports a large amount of palm kernels and peanuts, some cottonseed and soy bean, which are probably used at least in part in margarine. Animal fats may be used to some extent, but with the demand that exists for such fats in their original condition and the inadequacy—at least in Germany—of the domestic supply, it is unlikely that much of this type of fat goes into margarine.

The British industry does not publish details as to the ingredients used there. However, as with the Dutch and Germans, since the domestic supply of animal fats is limited and no vegetable fats are produced, imports indicate the usage in a general sort of way. The British import considerably more palm kernels for crushing for oil than copra or coconut oil, and although much of this goes into soap, probably more of it is used for margarine than for anything else. The British also import large quantities of cottonseed and peanuts, the oil from which is doubtless used to some extent in margarine. The main source of the British supply of oils is Argentina, from which more than 40 per cent of the imports into the United Kingdom are received. Other exporting countries of less importance from the point of view of the United Kingdom

market are the United States, Norway, and Holland. Supplies from Australia and New Zealand have declined in the last few years. In 1920 imports from these two dominions amounted to 3,500 and 2,500 tons, respectively, but in 1924 the quantities received were 1,000 tons in each case. Small quantities are also obtained from Canada and the Irish Free State. To a slight extent, hydrogenated whale oil enters into the composition of margarine. In 1926, the Falkland Islands and Norway were the most important sources of whale oil.

As already mentioned, in Norway, and probably in Sweden as well, hydrogenated fish oils are used, as well as vegetable oils. Some animal fats are used, but probably only for the very best quality of margarine. The United States Department of Agriculture reported in May 1929 that about 37 per cent of Norwegian margarine is now made, at least in part, of animal fats, as compared with 72 per cent in 1923.¹

This is by no means a complete statement of the materials that are used in the making of margarine in various parts of the world. It is sufficient, however, to indicate the growing importance of vegetable oils; the fact that animal fats are used in Europe only for the most select variety of the product, but more generally here; and that fish oil and other marine fats are used to some extent in northern Europe, but not in the United States.

¹ *Foreign Crops and Markets*, May 20, 1929, XVIII, 715.

CHAPTER XIII

MECHANICAL AND OTHER IMPROVEMENTS

While through all this period, from the late 1870's to the present day, technologists were endeavoring to make available a larger variety of raw materials for the manufacture of margarine, others were concerned with improving the technical processes. The abandonment of peptic digestion and of udder extract has already been mentioned. Credit for the next important improvement—the prevention of graining—was claimed by Mott.¹ If at the end of the process of churning, margarine is allowed to solidify gradually, it grains, that is to say, the fat forms crystals of appreciable size. This gives the product an opaque, dull appearance, a granular feel in the mouth, and interferes with its spreading properties. Mott avoided graining by rapidly chilling with ice. He described the whole process of manufacture² as perfected by him and used by the United States Dairy Company, as follows: The fat was thoroughly washed in tepid water. The water was then carefully drained away, and the fat disintegrated in a meat hasher. The water set free by the hashing process was carefully drained off and the disintegrated fat melted in a double-jacketed kettle at a temperature not exceeding 51.7°C. (125°F.). The molten fat thus rendered, freed from membrane and emulsified material, was allowed to set in a room warmed to 21.1°C. (70°F.). It was then pressed in a special room kept at a temperature between 25.4° to 32.2°C. (85° to 90°F.). One hundred pounds of the oil, thus expressed, which would have a

¹ H. A. Mott, Jr., "Manufacture of Artificial Butter," *American Chemist*, 1877, VII, 233.

² *Op. cit.*, pp. 236-39.

temperature of 21.1°C. (70°F.), were introduced into a churn with 15 to 20 pounds of sour milk. To color the product, a small amount of annatto and bicarbonate of soda were added. The materials were thoroughly mixed in the churn, and the mixture withdrawn through a hole at one end and allowed to fall into a tub containing cracked ice. As the oil flowed on the ice, it was kept in constant motion until the tub was filled with solidified oil, when another tub was put in its place. Graining was thus completely prevented. The solidified oil, after having remained in contact with the ice in the tub for two or three hours, was dumped upon an inclined table, where it was crumbled up so as to permit the ice to melt away and leave behind the solidified oil. Thirty pounds of this solidified oil were introduced into a churn with about 20 to 25 pounds of churned sour milk and the whole agitated for about 15 minutes to impart the butter flavor. The product was removed from the churn and worked and salted exactly like butter. One of Mott's contributions, then, consisted in introducing rapid chilling.¹

CHILLING BY SPRAY AND BRINE-COOLED DRUM

How early chilling with ice was first used in Europe, the writer has been unable to determine. It was not used in 1876 in the factory of F. A. Sargs Sohn und Cie in Liesing. There the final emulsion was allowed to run through a wooden gutter, through which at the same time a current of water was flowing in the opposite direction.² In the early days of the industry refrigerating machinery

¹ On August 24, 1875, William E. Andrew was granted a United States patent for substantially the same process. Upon this patent Mott makes the following comment: "I will not say that Mr. Andrew was informed of my discovery, although it looks very like it, as I had successfully used the process a year before the date of his patent, which was not obtained until August 24, 1875. With respect to the grain, I had completely removed the same some three years before that, which facts I am ready to prove at any time" (*op. cit.*, p. 235).

² Emil Jacobsen, *Chemisch-technisches Repertorium*, 1877, Erstes und Zweites Halbjahr, pp. 388-89.

had not been perfected. With the perfection of such machinery the use of ice was abandoned. In 1896, the use of a sheet of ice-cold water to solidify the margarine was patented (English Patent No. 20438), and shortly thereafter, in the same year, the use of a spray of ice-cold water for the same purpose (English Patent No. 22873). A year earlier, R. Bachaus had taken out a German patent (D.R.P. 88522) for cooling margarine by means of a finely divided spray of milk, and another patent was granted to J. C. Uhlenbroek in 1897 (D.R.P. 99470) in which cold skim milk or buttermilk was used in a similar fashion.

In 1907, a patent was issued to Schou (English Patent No. 12561) for chilling the emulsion of fat in milk by running it over a brine-cooled revolving drum. This procedure made it possible to solidify the fat rapidly out of contact with the cooling medium. However, the brine-cooled revolving drum for chilling fats rapidly was invented much earlier. It is due to Allbright and Burnham. United States Patent No. 287362 was issued on October 23, 1883, and No. 289809 on December 11, 1883, to O. G. Burnham. Allbright, now the president of the Allbright-Nell Corporation of Chicago, manufacturers of rendering and other packing-house equipment, was at the time chief chemist of the N. K. Fairbank Company of Chicago. Burnham was an engineer in the employ of the same company. This company was at that time the largest refiner of lard in the United States. They manufactured, in addition to pure lard, an adulterated product which later became known as lard compound, consisting of a mixture of tallow, cottonseed oil, and more or less genuine lard. In order to give this mixture, prepared by melting the fats together, the consistency of lard, it was necessary to chill it rapidly. For this purpose the lard roll, so called, covered by the patents above, was invented. It was used also for chilling pure lard.

The brine-cooled revolving drum to chill the emulsion in margarine manufacture is now used in some of the European margarine factories, notably in those under Dutch and Scandinavian management. So far as the writer has been able to ascertain, the method, though tried out in the United States by one or two concerns, has not been adopted in any factory in this country; the fat is universally chilled with a spray of cold water. In Germany, both methods seem to be used. According to Lebbin,¹ however, the spray method is given the preference in Germany.

USE OF SOUR INSTEAD OF SWEET MILK

Another line of advance in technology concerns the improvement of flavor. Mott² had discovered that churning with sour milk gave a more decidedly flavored product than churning with sweet milk. Later, bacteriologists discovered that the flavor of butter depends upon the growth of very definite species of lactic-acid bacteria. In 1890, V. Storch in Denmark and H. Weigmann in Germany introduced the use of pure cultures in butter making to sour the cream before churning, in preference to depending upon the accidental presence of these organisms. This procedure was rendered possible by pasteurization which had been discovered in the meanwhile. Pasteurization made it feasible to destroy most of the organisms occurring naturally in cream; the pasteurized cream was then inoculated with pure cultures of lactic-acid organisms and allowed to sour to a definitely determined degree. For this purpose the *Bacterium lactis acidis* *Leichmann* is said to be especially suitable. The sour cream was then churned. By this process a better flavored butter could be more uniformly produced than if cream

¹ Georg Lebbin, *Margarine* (Leipzig, Max Jänecke, 1926), p. 66.

² *Op. cit.*, p. 237. The Commissioner of Agriculture in his *Report for 1874*, p. 254, stated that margarine is churned with buttermilk or common milk.

were allowed to sour spontaneously. Just when this process was introduced into margarine manufacture is not known; but it seems to have been very soon after pure cultures began to be used in butter making.

It has long been recognized that when butter is churned it retains small amounts of the non-fat constituents of milk, curd ingredients, and these are thought by some to impair its keeping qualities. This seems to be true also for margarine. The milk with which the fat is emulsified leaves a certain amount of casein in the finished product which impairs its keeping qualities. Efforts to do away with the use of milk altogether were reported as early as 1911 (English Patent No. 24050). Instead of inoculating pasteurized milk with a pure culture of organisms, an artificial culture medium free from casein was prepared, in which the lactic-acid-forming organisms were grown. When this culture fluid had reached the desired degree of acidity, the fat was emulsified in it, and the manufacturing process continued as though milk had been used. So far as the writer has been able to ascertain, this procedure has been used nowhere in the United States. In Europe, opinions concerning its value seem to differ. It was used in Germany during the war in the interests of food conservation. At that time whey was also used instead of milk, and, according to Lebbin,¹ whey is still so used by a small number of manufacturers who desire to keep casein out of their products.

OTHER ADAPTATIONS FROM THE BUTTER INDUSTRY

The use of pure cultures, or, as they are known in the dairy industry, "starters," is not the only improvement in technique the margarine industry has adopted from the butter industry. During the last 30 years or more, there have been notable improvements in the machines used in large creameries, especially in butter-working tables and

¹ *Op cit.*, p. 36.

rolling and kneading machinery. Many of these improvements have been taken over and adapted by the margarine industry. Among these, machines for cutting butter into small retail units and automatically wrapping, weighing, and packaging them are especially important.

Another advance in the technology of margarine manufacture had its origin in the dairy industry. Within the last 15 years a very large production of skim-milk powder has developed. This powder is nothing but skim milk from which nearly all the water has been removed. From the best qualities of such powder, skim milk may be reconstituted merely by dissolving the requisite amount of powder in water. The logical location for a margarine factory is at the place of production of the principal raw material, fat, i.e., in the cities where slaughtering is concentrated, or at the ports where imported fats and oils enter. These locations, however, may not be near good dairy sections. Margarine factories situated at packing-house centers, or at ports of entry, may have difficulty in securing a regular, uniform, abundant supply of good fresh milk. The use of skim-milk powder makes such factories independent of a supply of fresh milk, since the powder may be kept without deterioration for long periods, especially if it is stored under refrigeration. In the United States, skim-milk powder is little used, but in some sections of Europe it seems to be used extensively.¹ Its principal use in the United States seems to be as an emergency resource when skim milk is in short supply. Ordinarily it seems to be cheaper for American manufacturers to use skim milk.

USE OF EGG YOLK AND LECITHIN

One of the essentials in imitating the appearance, consistency, and plasticity of butter is that a fine and permanent emulsion be secured. The literature of the margarine

¹ Lebbin, *op. cit.*, p. 33.

industry contains many patents and suggestions for the addition of a variety of substances to improve and facilitate emulsification. Of all these agents, the one that has been able to maintain itself with the greatest success is egg yolk. In May 1884, a German patent (D.R.P. 30442) was issued to Joseph Heissbauer,¹ covering the use of egg yolk as an emulsifying agent in margarine. In many of the countries of Europe the use of egg yolk has continued to a greater or lesser extent ever since. The yolk used in Germany is commonly imported from China preserved with common salt. In the United States, egg yolk is not used, so far as the writer has been able to learn.

The use of egg yolk removes in considerable measure one of the defects of margarine as compared with butter: its failure to brown on heating and to impart to foods fried in it the flavor of foods fried in butter. Opinions differ in regard to the origin of the flavor, the foaming, and also the browning when butter is heated. The development of flavor is attributed by some to the presence of lecithin, a complex substance containing, besides the constituents of fats (glycerin and fatty acids), phosphoric acid and a nitrogenous base, usually choline. The property of foaming when heated is attributed by some to the presence in butter of lecithin, but others object that the quantity of lecithin in butter is too small to cause browning, and attribute foaming as well as browning to the presence of casein and milk sugar.² Still others attribute the browning to the presence of milk sugar alone, and the foaming to the peculiar physical structure of butter. At any rate, it seems certain that the addition of lecithin to margarine causes it to foam; it is not so certain that it causes browning. It seems certain that the addition of

¹ See *Berichte der Deutschen chemischen Gesellschaft*, 1885, XVIII, Referata, p. 467.

² Cf. J. Lewkowitzsch, *Chemical Technology and Analysis of Oils, Fats, and Waxes*, II, 36; also J. T. Cusick, *Phosphorus in Butter* (Cornell University Agricultural Experiment Station Memoir 30), 1920.

sugar or syrup to margarine also causes foaming and browning. Since egg yolk contains very considerable amounts of lecithin, those who believe the flavor, browning, and foaming of heated butter are due to the presence of lecithin, principally European manufacturers, use egg yolk to give margarine these properties, as well as to improve emulsification. The addition of lecithin itself for the purpose of making margarine resemble butter more closely was patented (D.R.P. 142379) in 1902. Since the use of egg yolk or lecithin is not inexpensive, cheaper methods for causing margarine to brown when heated are also resorted to. The cheapest method is to add glucose, which when heated is partially converted into caramel. However, caramel is not without objectionable flavor. In the United States glucose is not used. In Germany, most commonly, both egg yolk or lecithin and glucose are added.

In the United States, the use of lecithin, if it occurs at all, is not extensive, despite the efforts of lecithin manufacturers to introduce it. Since it is now being manufactured cheaply on a considerable scale from soy beans, it is to be anticipated that it will find its way before long into American margarine factories.

EMULSIFICATION A DISCONTINUOUS PROCESS

In this connection, it is to be noted that emulsification in margarine manufacture is quite a different process from churning in butter making, although margarine manufacturers commonly speak of it, improperly, as churning. In butter churning, the purpose is to change the character of an already existent emulsion, cream. In cream, the fat droplets are in suspension; a watery medium surrounds them on all sides. Churning causes the fat droplets to run together; in doing so, they enmesh a certain amount of the watery medium. Butter is also an emulsion, as well as cream, but the rôles of fat and

watery medium are reversed. In butter, fine droplets of the watery medium are suspended in fat which surrounds them on all sides. In making margarine, one does not begin with an emulsion; one begins with large masses of melted fat mixed with skim milk. The purpose of agitating this mixture is to produce an emulsion. The final result is an emulsion of the same type as cream, i.e., one in which fine droplets of fat are suspended in skim milk, which surrounds them on all sides. It is quite different in physical character from butter in which fine droplets of skim milk are suspended in fat which surrounds them on all sides. Much research has been done for the purpose of developing a process that will produce margarine of the same physical structure as butter. Some manufacturers claim success.

ADDITION OF VITAMIN A

The most recent improvement has to deal not with texture, flavor, or appearance, but with nutritive value. Margarine makers are now trying to repair the natural defects of the substitute. We shall return to this topic in chapter xiv.

BUTTER AROMA

The nature of the substance or substances that impart to butter its peculiar aroma has been the subject of much investigation. As above pointed out, butter aroma is produced by the action of bacteria. Recently, it has been shown that this characteristic aroma is due, at least in large measure, if not wholly, to the very simple substance, diacetyl, which is the result of bacterial action.¹ This discovery should make it possible to improve the aroma of margarine and make it more butterlike, either by selecting for the starter (see p. 151) strains of microorganisms, the culture of which is characterized by a high

¹ C. B. van Niel, A. J. Kluyver, and H. G. Derx, "Ueber das Butteraroma," *Biochemische Zeitschrift*, 1929, CCX, 234-51.

diacetyl content, or else to make quite bland, flavorless margarine, and then give it artificially a butter flavor. It is even conceivable that a process of making margarine might thus be developed which does away entirely with the necessity of ripening with skim milk. Margarine made in this way would probably have better keeping qualities, for it would be freer from casein, milk sugar, etc., that now remain in margarine as contaminants derived from the skim milk employed in its manufacture.

It is reported that in Holland the discovery of van Niel, Kluyver, and Derx is already used in practice.

SUMMARY DESCRIPTION OF MANUFACTURING PROCESS

To summarize the evolution of margarine manufacture: It began in Paris in 1869 with a process involving digestion of fats with stomach and udder extracts. The process was first simplified by the omission of the use of such extracts. The texture was improved, first by rapid chilling with ice, then with a spray of cold water, or with revolving drums chilled with brine from within. The flavor was improved, first by using sour instead of sweet milk, then by using skim milk soured with pure cultures of bacteria. Emulsification was then improved by the addition of egg yolk or other substances. It was made to resemble butter in cooking by the addition of egg yolk, caramelizing sugars, or lecithin. Lastly, its nutritive value has been improved in some countries by the addition of vitamin. While these technical improvements were going on, the industry took advantage of the development of better butter-working machinery in the dairy industry and of better methods of refining and deodorizing, developed by the fats and oils industry in general. The result is that margarine manufacturers now employ a wide variety of raw materials, ranging from oleo oil, prepared from choice beef fat, to coconut and palm kernel oil, refined and pressed from materials produced in the tropics.

Present practice in the manufacture of margarine is as follows: Most margarine factories receive their fat and oil supply in the refined state, and this is therefore not the place to discuss methods of preparing fats and oils for margarine making. The solid fats to be used are melted, preferably separately without heating any one of them much above its melting point. This is commonly done in tinned double-jacketed vats provided with stirring equipment, steam being run into the water in the jacket. The requisite quantity of each fat or oil is weighed out and run into a mixing vessel, where the ingredients are thoroughly mixed and raised to a definite temperature, varying according to circumstances from 28° to 32°C. The blend of fats and oils is thereupon mixed with soured milk in the manner to be described later.

The practice in souring milk differs in different plants. A common procedure is as follows: A liter of skim milk is sterilized by pasteurizing at 90°C. for 20 minutes, and then cooled to 30°C. It is then inoculated with pure culture, the vessel fitted with a good close cover and held for 18 hours at 30°C. By the end of that time the milk is more or less clabbered, and has acquired a pleasant acid odor and taste. With a sterile spoon some of the cream layer is removed to inoculate another liter of pasteurized skim milk which is also incubated for 18 hours at 30°C. This second liter is the mother culture that is then used to inoculate the main body of milk to be used, being sufficient for 500 liters of skim milk. Before it is mixed with the bulk of the skim milk a spoonful is removed and used to prepare the starter for the next day's operations. It is thus unnecessary to use a fresh pure culture each day. However, in time, contamination occurs, so that it is the practice in most factories to begin over again with a pure culture at least once a week.

The bulk of the milk, with the mother culture, is then

allowed to stand at temperatures that vary in different factories from 15° to 30°C. until it has acquired the desired acidity. For this there seems to be no definite rule; different factories employ different practices.

The soured milk and the melted blended fats are then churned together in a special type of agitator. Many different designs are in use. In principle, the machine consists of a tinned metal double-jacketed vessel provided with some type of stirrer permitting violent agitation. The vessel is usually provided with a cover to prevent splashing, this cover bearing orifices, which may be closed, for the introduction of the charge. The vessel is also equipped with thermometer and glass-covered peephole.

The common procedure is to introduce the milk at a definite temperature. While the stirrer is working at full speed, the fat blend, also at a definite temperature, is allowed to flow in. The mixture is then cooled through the double jacket, and in the beginning the temperature sinks slowly. During this phase of the churning, the glass covering the peephole is wet by the mixture that is thrown against it, but not obscured or coated by it. Gradually, however, the mass may be seen to become less transparent and finally to stick as a tough layer to the glass. At this point the thermometer, which had been falling, begins to rise suddenly several degrees, an indication that some of the fat has begun to solidify. When this has proceeded to a certain point, the thermometer begins again to fall.

At this point the stirring is usually interrupted and the contents of the churn, which has about the consistency of a thin mayonnaise, is discharged against a powerful spray of water cooled to 0.5° to 1.0°C. The ice water and the chilled emulsion drop into a long trough. The margarine floats on top and is skimmed off.

At this stage the margarine is a coarse, crumby mass containing much water. It is now worked in an ordinary

butter worker which usually consists of fluted wooden rolls, between which the margarine is squeezed. The purpose of working is to give the product uniform consistency and to remove excess water. It is usually done in a series of machines of different construction. Salt is added at this stage.

Some manufacturers hold the margarine before or after working at a definite temperature to cure; others omit this holding. The margarine is then packed by the same automatic machinery that is used in creameries. If the margarine is not shipped at once, it is commonly held in cold storage till shipped, so as to avoid deterioration.

LIKELY FUTURE DEVELOPMENTS

It may perhaps be of interest to speculate concerning future technical improvements. It is to be anticipated, for example, that varieties of fats and oils not now used will be employed either because they will be found to possess valuable properties of consistency or color, or because they will be relatively cheap.

It is even possible that synthetically produced fats and oils may come into use to some extent. In a limited sense, a hydrogenated fat is a synthetic product. Hydrogenation, strictly speaking, is a process of synthesis. In fact, during the war, experiments were made in Germany to employ oils synthesized from fatty acids and glycol, following the suggestion of H. H. Franck.¹ There was a great shortage of fats in Germany and at the same time a great demand for nitroglycerin and therefore for glycerin, which is obtained by splitting fats and oils into glycerin and free fatty acid. From the free fatty acids the Bremen-Besigheimer Oelfabriken in 1917 made glycol esters of fatty acids synthetically. Glycol is a close relative of glycerine and may be made synthetically. It is also obtained as a

¹ Hans Franzen, *Margarine*, p. 18.

by-product in the manufacture of glycerin. Patents have been issued for this synthesis.¹ These compounds, glycol esters of fatty acids, could be used in margarine in amounts ranging from 2 to 10 per cent. Franck found that if present in not too great proportions, they were well digested.² They are said to be thick oils or hard fats that are indistinguishable from the corresponding glycerin compound, i.e., the corresponding true fats, in odor, taste, or appearance. Besides glycol esters, the corresponding compounds with ordinary ethyl alcohol were also used. These are thinner than the glycol esters; are said to bind less water; and to be less well suited for use in margarine. Moreover, it was claimed that margarine containing them did not keep well and acquired a disagreeable ester-like odor. With the end of the war and the return of the prices of fats to the normal, these war-time makeshifts were abandoned.

The synthesis of fats from glycerin and fatty acids has been done successfully as a laboratory experiment for many years. The process has not been commercialized, because the yields are small, natural fats cheap, and glycerin too expensive. Glycerin may, however, be secured through a modified alcoholic fermentation of sugar. The fatty acids themselves are cheap, for in the refining of fats and oils they are separated in considerable quantities and go to the soap kettle mixed with some fat and much impurity. They are, however, easily purified by vacuum distillation, and would be available for synthesis of fat, were that at present profitable.

Another direction in which improvement is probable in the near future is flavor. Progress will come either through better knowledge of the bacteria that produce

¹ H. Schlinck und Cie, D.R.P. 315222, June 11, 1916; also later patents.

² H. H. Franck, "Synthetische Fettsäureester und synthetische Fettsäuren," *Chemiker-Zeitung*, October 5, 1920, XLIV, 742.

butter flavor and of the conditions under which this flavor is produced, or else from a knowledge of the chemical nature of the substances that produce the flavor of butter. In both directions progress is being made. The recent discovery of van Niel, Kluyver, and Derx has been mentioned above. Whether or not this is the final solution of the butter-flavor question, that question will some day be answered by the chemist, and then it will become possible artificially to flavor margarine so its taste cannot be distinguished from that of butter.

Finally, a direction in which important improvements may be looked for is texture. As already indicated, this depends in part upon the character of the fats employed, but in part also upon the character of the emulsion. Until recent years, but little was known of the conditions that determine the character and stability of emulsions. Owing to the studies of colloid chemists, these conditions are gradually coming to be understood so that it is very probable indeed that the labors of these chemists will soon point the road to the desired improvements in the texture of margarine.

CHAPTER XIV

DIETARY CONSIDERATIONS

From a nutritional point of view, what may be regarded as the optimum American diet consists of two fractions, one which may be considered and demonstrated as indispensable, the other as supplementary. These can be estimated only roughly in calories, since the food requirements of different elements of the population vary with age, sex, occupation, climatic conditions, and other factors. Roughly, however, the indispensable fraction may perhaps contain 1,000 calories per day, the supplementary some 1,500 calories and upward. The indispensable components are milk and certain fruits and vegetables, especially the leafy vegetables, milk furnishing perhaps two-thirds of this amount and the fruits and vegetables one-third. In this indispensable fraction are secured the complete proteins, vitamins, mineral elements, and roughage necessary for the maintenance of nutrition and support of growth.

The other fraction of the diet contains the meats, cereals, legumes, carbohydrates, and oils and fats necessary to supplement the components of the indispensable fraction, and in particular to supply the heat units required to sustain the temperature of the resting body and support muscular exertion. The magnitude of this supplementary fraction, in terms of calories, may run for the adult male from 1,500 calories upward, depending on muscular activity. In the indispensable group of foodstuffs the range of riskless variation is narrow; but in the supplementary group there is a wide range. Indeed, it may fairly be said that, if the indispensable components

of the diet are adequately provided, other foods may be elected freely on the basis of custom, taste, and price, without fear of nutritional ill effects.

THE DIETARY COMPONENTS OF MILK AND BUTTER

Milk is thus regarded as the *sine qua non* of the optimum diet. To the organism it contributes proteins of high biological value, a representative assortment of mineral elements (though it is deficient in iron), vitamins, and milk sugar as well as fat.

The proteins of milk are of the highest quality, ranking with those of meat, and are of far greater value than the proteins of cereals. They provide all of the amino-acids necessary for proper nutrition.¹ Of the known vitamins, milk contains, with varying certainty of demonstration, A, B, C, D, and G. (These are also denominated the anti-ophthalmic, the anti-neuritic, the anti-scorbutic, the anti-rachitic, and the anti-pellagrous vitamins, respectively, to indicate the deficiency diseases which they prevent and correct.) Of these, cows' milk is known to be rich in the first two, A and B, and the last, G. It appears to be proved that even stall-fed animals produce a milk containing A and B if their rations properly combine grains, silage, and legume hay. The content of C and D, on the other hand, is more variable. Milk contains C if the diet of the cow is rich in feeds containing this vitamin; and it has a certain amount of D, though it is not rich in this vitamin as are many fish oils. Vitamin G, the anti-pellagrous vitamin, has only recently been distinguished from B. Milk is apparently one of the best sources of this vitamin. It is becoming clear that the cows' milk of the market cannot be counted on to supply vitamins A, C, and D to infants.

The fat in milk, i.e., butter fat, like other fats, is a mixture of glycerides of fatty acids. It is more digestible

¹ J. S. McLester, *Nutrition and Diet in Health and Disease*, p. 139.

than some fats because of its lower melting point and contains vitamins A and D to the extent that the milk of which it is a part contains (holds) those vitamins. It possesses, so far as known, no other peculiar virtues. The glycerides of the fatty acids contained in butter have the same caloric value as the glycerides of the same fatty acids occurring elsewhere in animal fats and oils (tallow, oleo oil, lard, lard oil, etc.) or in vegetable fats and oils. Milk contains small amounts of lipins, cholesterol or other sterols in traces, such as might possess a specific physiological value; but we have now no information to this effect.¹

Of the indispensable nutritional components present in milk, then, butter contains two—vitamin A and, to a less extent, vitamin D. The amount of these vitamins contained in butter, and in milk from which it was derived, depends primarily on the conditions under which the cows were maintained. If the ration of the milch cow is rich in feedstuffs containing vitamin A, the milk is rich

¹ Whether butter contains, outside of the known vitamins, any lipoidal or other substance of particular and specific nutritional influence is a question susceptible of experimental determination. More or less widely accepted in dairy circles is an assumption that the specific properties of milk as foodstuff are not limited to the known factors; and the corresponding hope is expressed that future investigations directed to this point would uncover in milk (and inferentially in butter) the presence of an additional indispensable factor of nutrition. Of course, no scientist closes the door to future investigation. The recent separation of vitamin D from vitamin A and of vitamin G from vitamin B indicates that the last word has not been said on the specificity of vitamins. At the same time, in view of the extraordinary amount of work devoted to the indispensable factors of the diet during recent decades, the expectation that milk (or butter) contains a hitherto unrecognized ingredient of indispensable influence seems highly improbable. This chapter is written on the basis of information available to date, but without any implication that other information of crucial importance may not sometime become established. A fractionation of butter, isolation of the lipid group, further fractionation of this group, and feeding tests on standardized animals, including the study of the effects of irradiation, might serve to indicate whether butter has additional and specific nutritional and therapeutic properties resident in some of the contained lipoids. If the outcome of such experiments were positive, the other animal fats and oils and the various vegetable fats and oils would then need to be studied according to the same methods.

in vitamin A. The content of vitamin D is much less abundant than that of vitamin A. Certainly, the best butter is not to be compared with cod-liver oil (or liver oil from other fishes) in respect of content of vitamin D.

Margarines made of animal fats contain vitamins if the animals from which the fats were derived were on green feed, but it seems generally agreed that the potency of animal margarines in this regard is not so great as that of butter. Margarines made of vegetable oils are almost devoid of vitamin A, since none of the vegetable oils contains significant amounts of this vitamin.¹ As to vitamin D, coconut oil has been demonstrated to contain it, so it may be assumed that vegetable margarines also have a certain amount of it, though not in a degree to correct deficiencies. We have seen no references in the experimental work to the vitamin D content of animal margarines, but in view of the fact that butter has only moderate amounts we assume that animal margarines have no more, probably less.

Vitamin A supports the growth of the growing child, and helps to maintain the integrity of tissues (especially epithelial) throughout life. When vitamin A is lacking, the growth of the young individual is retarded. If the deficiency of vitamin A is pronounced, degenerative and ulcerative conditions develop, such as the well-known xerophthalmia, and resistance to bacterial infection is reduced. Vitamin A is widely distributed in nature; among other foodstuffs, the leafy vegetables, the tomato, carrots, and yellow corn are rich in vitamin A. So far as known, extreme degrees of deprivation of vitamin A, such as

¹ This statement seems contradictory to the classification made by S. L. Smith, *Vitamins in Food Materials* (U.S. Department of Agriculture Circular 84), November 1929, p. 13, but we understand that the writer was there led to classify vegetable margarine among the foods containing vitamin A because of the artificial addition of the vitamin in certain margarines, e.g., Planters Foods, Limited (English). The experimental work has demonstrated the inadequacy of vegetable oils as a source of vitamin A.

would be revealed in xerophthalmia, are rarely, if ever, observed in this country; but there is some ground for believing that among the poorer classes the growth of many children may be retarded, and resistance to disease lowered, by deficiency of vitamin A. It is now recognized that vitamin A shares the growth-promoting influence with vitamins B and G.

What is urgently needed is a yardstick of vitamin A protection, a measure of the intake required at different ages. We possess no such thing, except for the white rat.¹ It seems, however, clear that there are two levels of thresholds of protection : (1) an intake barely sufficient to protect against xerophthalmia, and (2) a heavier intake necessary to maintain growth and permit of storage of vitamin A in the body. A safe measure for intake of vitamin A, no matter from what source derived, ought to provide for a reserve in the body.

Vitamin D has a specific relation to the bony structures, and lack of vitamin D is an etiological factor in rickets. When the mineral elements are lacking, the bones, teeth, and cartilages cannot be properly formed; but when the mineral elements are present, their utilization in the skeleton is rendered defective if there is an absence or deficiency of vitamin D. Vitamin D is, therefore, in a sense, a regulator of the calcium and phosphorus metabolism.²

¹ It seems hardly permissible as a scientific principle, though extremely safe as a standard of protection, to take the most sensitive animal (for each vitamin) and for human beings determine the recommended intake on the basis of body weight.

² Rickets is now regarded as a deficiency disease, the onset of which occurs during the first year of life. Cases apparently developing later are regarded as exacerbations of the disease overlooked at the onset; cases mild at the onset may become more pronounced several years later. Under these circumstances, rickets should be prevented rather than allowed to occur, though readily curable. The accepted diet during the first year of life, containing an adequate intake of mineral elements and of vitamin A, will not permit the onset of rickets if the infant receives the proper amount of sunshine. Lacking sunshine, however, the vitamin D content of milk is not sufficient to prevent the onset of rickets, which

At the same time, it seems clear that an important distinction obtains between vitamin A and vitamin D. Vitamin A is apparently not synthesized in the bodies of man and of the higher animals, who depend, therefore, upon their foodstuffs for vitamin A; but apparently vitamin D may be generated in the body through the action of sunlight. Sunlight has long been known to be curative in cases of rickets, an influence now explained as an effect of irradiation. Certain (short) rays of light are known to endow sterols¹ with the properties of vitamin D. By analogy, it is inferred that sunlight, acting through the skin, endows sterol-like substances within the body with the properties of vitamin D. In short, sunshine forms vitamin D in the living body. This distinction between vitamin A and vitamin D is highly important, since it follows that the body is not so dependent on dietary vitamin D as on dietary vitamin A.

It is frequently found in discussions of the nutritional value of butter that the virtues of whole milk have been attributed to butter fat. The fallacy of this is clear from the remarks above. Butter fat is merely one element of whole milk. The fat-soluble vitamins cling to it when a separation is made; but the proteins, mineral salts, and other vitamins that make whole milk such a valuable factor in the diet are not found in butter.

VARIATIONS IN THE AMOUNT OF FAT IN THE DIET

Normal bodies require a certain amount of fat in their dietary ration. Neither the minimal nor the ideal amount is known. This varies with the age, weight, climate, and

may be prevented with the use of codliver oil or viosterol. In short, the vitamin D of milk is not relied upon; where sunshine does not suffice, codliver oil or viosterol is used. Irradiation of milk and butter, for the purpose of increasing the content of vitamin D, is still in the experimental stage. In any event, butter scarcely enters into the diet of the child during the first year of life.

¹ An active and standardized sterol called ergosterol (viosterol) is now available on the market.

other factors in the environment of the individual. Circumstances and customs usually determine how much and in what form it is taken. A Chinese farmer probably gets most of his meager supply from the soy bean; the native Indian gets most of his from sesame and rapeseed, peanuts, or coconuts; the south European undoubtedly derives most of his from olives. In all these regions the consumption of meat and dairy products is low because they are scarce. On the other hand, in northern Europe, America, and the "new countries"—Argentina, Australia, and New Zealand—meat and milk are the natural primary sources of food fats.

Even within this group, however, the volume of consumption varies with the climate, standard of living, and dietary tastes of the people. In the Scandinavian countries, for instance, where bread is eaten very generously, the per capita consumption of margarine is heavy. In fact in that part of the world the fat in the diet as a whole is unusually large because the climate is cold and the population works hard and requires a rich diet. In the United States, on the other hand, the use of spreading materials is moderate, as compared with certain sections of northern Europe, but the consumption of meat is large. In Switzerland, milk and cheese are used very freely, but butter consumption is small. Individual nations have idiosyncracies of diet, not accounted for altogether by climate or natural resources, that cause wide variations in the per capita use of individual fats and in the fat ration as a whole.¹

¹ The following tabulation indicates the wide variation in estimates of pre-war per capita consumption of fats. These pre-war estimates are drawn from various sources, figured by various methods, not always for the same year, and are consequently not comparable, except very roughly. Those marked "C.S.I.R." are from *Les Ressources et les besoins alimentaires des pays alliés* of the Commission Scientifique Interalliée du Ravitaillement; those marked "Ballod" are from *Die Nahrungsmittelversorgung Deutschlands im ersten und zweiten Kriegsjahre*, by Karl Ballod; that marked "Eltzbacher" is from *Die deutsche*

DIETARY VALUE OF BUTTER AND MARGARINE

As a mixture of glycerides of fatty acids, and therefore in caloric value, the oils used in margarine are equivalent to butter fat. Consequently, if the substitution of margarine for butter is to be held objectionable on strictly nutritional grounds, this must be based (in the absence of a hypothetical and unidentified factor, as in the footnote on p. 165) either upon the contention that, when margarine is used instead of butter, the intake of vitamins is so reduced as to jeopardize the health of the consumer, or on the ground that margarine is less digestible than butter. Let us consider the question of vitamins solely in relation to vitamin A, since this is known to be much more important in butter than vitamin D. To what extent do Americans depend on butter for their indispensable vitamin A? When the cream is separated from the skim milk and the butter later separated from the buttermilk, in the skim milk and the buttermilk remain the proteins, mineral elements, and vitamins B, C, and G; the vitamins A and D

Volksernährung und der englische Aushungerungsplan, by Paul Eitzbacher; and that marked "Pearl" is from *The Nation's Food*, by Raymond Pearl.

Country	Grams per capita per day	Source
United Kingdom	{ 97	C.S.I.R.
	{ 73	Ballod
France	45	C.S.I.R.
Italy	75	C.S.I.R.
Germany	{ 106	Eitzbacher
	{ 54	Ballod
Austria-Hungary	28	Ballod
Russia	26	Ballod
United States	{ 170	Pearl
	{ 81	Ballod

We are not in position to appraise the value of the figures. The extraordinary variations between the computations of different estimators, and also the wide variations between countries, illustrate the untrustworthiness of the data. It would be highly important if we could secure for different countries the amounts of milk fat consumed as whole milk and as butter, but such data are not available even for the United States.

remain with the butter fat. Thus the act of butter making divides the good forces of milk, leaving each part deficient. It is only when the food supply of a country offers a large and varied assortment of foodstuffs containing the indispensable elements that the country finds itself in position to devote milk to butter making, with the consequent loss of the skim milk which is largely fed to animals. Butter, which comes into commercial being only at the sacrifice of valuable nutritive elements in the milk, is therefore hardly in a good position to lead a campaign for the indispensables of nutrition.

If one will survey the literature of vitamin A deficiency, it will be found that the conditions are associated not so much with shortage of butter as with shortage of other foodstuffs containing vitamin A. In countries of low economic level like China, milk is an expensive foodstuff, too expensive to be generally used as a source of vitamin A, which is obtained mostly from leafy vegetables and sprouts of legumes. In practically all regions of the world it is found that certain cheap fruits and vegetables are generally available as sources of vitamin A. In a country with a diversified supply of fruits and vegetables available more or less throughout the year, as in the United States, there is little difficulty for adults and children (beyond infancy) to secure a continuous supply of vitamin A at relatively low cost. Only where milk and butter *and* the vitamin-A-containing fruits and vegetables are both scarce and expensive, do we expect to encounter deficiency diseases due to lack of vitamin A. This is clear from the experiences of Denmark.

Under exceptional conditions, even in the United States, it occurs that individuals or groups are subsisting on the border line, in respect to vitamin A, and under such circumstances the substitution of margarine for butter, or of filled milk for whole milk, would jeopardize health. Where this occurs it is likely, however, that other

foods containing vitamin A (i.e., milk, citrus fruits, tomatoes, the leafy vegetables, or viscera and visceral fats) can be as readily and more advantageously provided to supplement the diet than butter. An entirely satisfactory diet can unquestionably be worked out by a dietitian on the basis of whole milk and margarine in combination with fruits, green vegetables, and miscellaneous other foods, as well as on part milk and part butter, with fruits and green vegetables. Not a few people, from choice or idiosyncrasy, use no milk or butter, without ill consequence to health.

From the standpoint of the dairy interests, it seems to us that too much stress laid on the nutritional aspect of the controversy between butter and butter substitutes may turn out to have been injudicious. Suppose a butter substitute is placed on our market endowed with all of the known nutritional attributes of butter. There is no technical reason why a butter substitute of good texture and flavor cannot be turned out with a high and uniform content of vitamins A and D. In fact, even now, at least one brand of margarine is on the market (English) which has been demonstrated to contain vitamin A, while vitamin D can be contributed by the process of irradiation. Under these circumstances dairymen may soon stand under the marketing disability of having overstressed a factor which technological advances have turned against them. There would be doubtful advantage in advertising butter as a source of vitamin D for children if exposing the children to the sun for a few minutes contributes the same influence. There would be doubtful advantage in advertising butter as a source of vitamin A for children if a standardized butter substitute contains the same amount of vitamin A. In such an eventuality, the burden of proof would lie on butter producers to demonstrate the existence in butter of some hitherto unknown indispensable factor of

nutrition, as suggested in the footnote on page 164. With the enlargement of information on the nutritional factors resident in the different foodstuffs and continuous advances in marketing and preparation of foodstuffs, it becomes increasingly more difficult for any one foodstuff to be advertised as the single or outstanding source of any indispensable factor of nutrition. This might be done for milk, but hardly for butter.

The view is widely held that butter is more digestible, better resorbed, than other fats. Its low melting point and the ease with which it is emulsified in the process of digestion are frequently given as the reasons for this.¹ As a matter of fact, there appears to be little scientific authority for this point of view as it applies to a comparison of margarine and butter. Margarine is manufactured in such a way that the melting point is very close to that of butter. The tests that have been made indicate very slight difference in the degree of digestibility of the various fats unless they are of very high melting point.² Nevertheless, the view continues to be widely held even among medical and nutritional experts that butter is more digestible than other fats. The difference holds elsewhere, but pork is not recommended over beef because the pork fat melts at lower temperature.

Even in such groups, however, butter may be said to be on the defensive as an element of the diet. Butter is only a partial substitute for milk, not a complete substitute, just as margarine is a partial substitute for butter, not a complete substitute. A ration of bread and milk would certainly be superior to a ration of bread with the butter contained in the same amount of milk. Fluid milk and butter are direct competitors. Compared with milk,

¹ See, for instance, McLester, *op. cit.*, p. 145.

² Graham Lusk, *Science of Nutrition* (Philadelphia and London, W. B. Saunders Company, 1928, 4th edition, reset), p. 50.

therefore, arguments of butter versus margarine suggest comparison of two substitutes, one less incomplete than the other, but both incomplete. When the manufacture of conserved milk is perfected, canned full milk will compete with butter, with the advantage of the nutritional superiority on the side of canned milk.

As a practical question, it has not been proved that in the United States at present the use of margarine in place of butter jeopardizes the health of groups or classes by bringing the intake of vitamins A and D near the danger line.¹ Much depends on the intake of milk. Doubtless, there are individuals in whom substitution of margarine for butter would provoke deficiency reactions. But, as already suggested, we have no yardstick of vitamin A ingestion. The purveyors of foods containing vitamins A and D are not hiding their light under a bushel, and the vitamin content of different foods is being nationally advertised to an extent approaching extravagance. The writer has known isolated groups of mountaineers who subsisted during the winter on salt pork, flour, beans, and sugar.² Such a diet is deficient in vitamins, and butter would represent a valuable addition; but vitamin-containing fruits and vegetables would have been cheaper and might have been just as good for such a group. Under such circumstances, butter, unless canned, could not have been shipped in; dried and canned whole milk would have been cheaper per unit of vitamins and in other respects better than butter. If cows were introduced, the milk were better consumed whole than churned. Rather

¹ In this connection, McCollum may be cited as follows: "Margarines are inferior to butter as sources of vitamins and in appetizing qualities, yet any fair-minded person who understands the modern knowledge of nutrition will admit that it is possible to plan a diet which would be adequate without including butter."—E. V. McCollum, "Present Day Knowledge of Foods," *Northwestern Miller*, February 5, 1930, CLXI, 463.

² As an interesting illustration, see the recent study by Helen S. Mitchell, "Nutrition Survey in Labrador and Northern Newfoundland," *Journal of the American Dietetic Association*, June 1930, VI, 29.

curiously, it is widely stated in the rural press that farmers often sell all their milk and provide their families with margarine.

Of course, isolated groups in certain regions, particular classes in certain cities, occasional families everywhere, and probably numerous individuals throughout the country suffer from lack of vitamin A, through neglect of the use of milk, butter, visceral meats, lettuce, watercress, oranges, tomatoes, and the numerous other fruits and vegetables containing vitamin A. But the extent to which the non-procurement of an adequate amount of vitamin A is caused by the substitution of margarine for butter, to the neglect of all other sources of vitamin A, is a question on which we possess no determinative information. Nor would one advance perceptibly toward an opinion if one assumed that it was a hypothetical x and not vitamin A that is lacking. It seems well to lean in the direction of a generous intake of milk and milk fat. But it does not follow that the use of one particular substitute (margarine) for one particular dairy product (butter) is necessarily and in all proportions reprehensible on nutritional grounds.

Margarines made from vegetable fats and oils are commonly devoid of vitamins, except the traces that get into them from the milk with which the fats are emulsified. If margarine were churned from whole milk, it would secure a proportional content of vitamin A. Margarines made largely from animal products may contain more or less vitamin, depending upon the nature of the feed of the animals from which the fats have been obtained. Butter from cows upon green feed contains ordinarily an abundance of the fat-soluble vitamin A,¹ whereas butter from stall-fed cows, receiving little or no green feed, silage, or legume hay, may contain only small

¹ J. S. McLester, *Nutrition and Diet in Health and Disease* (Philadelphia and London, W. B. Saunders Company, 1929), p. 139.

quantities of it. One of the objections that has been raised to the consumption of vegetable margarine is that it contains no fat-soluble vitamin A. In Europe, this defect has been attacked by certain manufacturers through the incorporation of fat-soluble vitamin A. Little is as yet known concerning the source from which the manufacturers obtain this vitamin, but to judge by the patents, a list of some of which follows, most of the vitamin is obtained from codliver oil.

German Patent D.R.P. 410650, 1922-25.—Animal fat rich in vitamin, in particular kidney fat, tallow, cod livers, and the like, are finely ground and mixed with oil or fat and melted at a temperature not to exceed 40°C. (104°F.). The solid, high-melting glycerids are then removed by crystallization.

Norwegian Patent No. 41688, July 1925, Smoerfabriken Flora. A.S.—Codliver oil to be added to margarine is treated to conceal the unpleasant taste, for example, by emulsification and removal of aromatic substances.

English Patent No. 237242, 1924, O. Mustad and Son, Norway.—Substances rich in vitamins are mixed with margarine or other edible fat in a vacuum or oxygen-free atmosphere, for example, carbon dioxide, nitrogen, or hydrogen.

German Patent D.R.P. 428897, 1923-24, Peter Möller Heyerdahl, Norway.—Liver oil is intimately mixed with olive oil, and then this mixture is incorporated in margarine. (Same as Canadian Patent No. 259310.)

In England, the Planters Foods, Limited, a subsidiary company of Lever Brothers, is putting out a margarine containing fat-soluble vitamin A and vitamin D, and also a concentrated preparation of fat-soluble vitamin A intended for the use of the medical profession in its practice. In the United States, several companies advertise that their products contain vitamins, but we have seen no demonstrations of this in feeding experiments.

PART III. ECONOMIC ANALYSIS

CHAPTER XV

THE RATE OF CONSUMPTION OF MARGARINE IN EUROPE AND AMERICA

The wife of a knighted professor in the University of Cambridge once remarked that the income tax resulting from the war had substituted margarine for butter on the academic board. An American manufacturer of margarine claims that the difference between the price of butter and of margarine for a family of five pays the premium on a life insurance policy for the head of the family. These statements go to show that as a usual thing people do not eat margarine in preference to butter, but for the sake of economy. The price of margarine is usually not more than half that of butter. Consequently, for people of limited means, this substitution provides a practicable dietary economy which cannot be overlooked. In this country people of ample means seldom resort to it except for cooking.

It is stated that in southern California there are large classes of consumers who definitely prefer nut margarine to butter. Such consumers may have a prejudice against the use of animal products for food, although it is claimed that it is the flavor of the vegetable margarine that appeals to them. According to our informants, once they become accustomed to this, they will not return to the use of dairy butter. This contradicts the more generally accepted belief that consumers tire of margarine, but can eat butter

day after day and year after year without desiring a change. Clearly, consumers do not like margarine as well as butter, or it would be sold in more nearly comparable volume.

In Europe, the middle class in all countries suffered such heavy expropriations as a consequence of the war that all sorts of economies have been resorted to, among others the use of margarine. Of just such poverty there is little sign in the United States, though the incomes of the class in the United States which in Europe would be called the middle class have probably not been expanded in proportion to the reduction of the purchasing power of the dollar. Of poverty in the working classes we have illustrations enough, and there are indications that among relatively low-paid workers, or those with large families, butter substitutes are used instead of butter for the sake of economy.

For use in cooking the situation is somewhat different. Margarine is one of the higher priced cooking fats, and in this country is used for cooking by those who can afford to be discriminating. In Europe the preference is not so marked. If pure animal fat can be obtained for the same amount of money, most north Europeans will prefer it, since they like the flavor and behavior of animal fats in cooking.

To what extent butter substitutes are used instead of butter because of ignorance of nutritional values is conjectural; despite instruction in the common schools and the widespread use of the supplementary luncheon for school children, doubtless there are many housewives lacking adequate appreciation of the nutritional differences between milk fat and other fats.

As a general rule, fats are more expensive elements of diet than carbohydrates (sugar, starchy vegetables), particularly in the temperate zone. This is not so true of the vegetable fats, especially the tree fats, such as those

of the oil palm and the coconut, which flourish in the tropics. The animal fats are everywhere produced at greater cost than carbohydrates because of the low ratio of conversion of feedstuffs into animal tissue. It will be realized that feed consumed by animals is used in good part for maintenance. Only a portion of it adds to the size or weight of the animal, and this amount varies with the age of the animal and the type and quantity of feed. Figured in terms of energy, a return in animal food of about 15 per cent of the feedstuffs applied may be considered representative for mature cattle.¹ This will have been converted from material primarily carbohydrate to fat and in part to protein. The recovery is higher in pork and it is still higher in the milk of the better grade of cows.

In all countries where fats are produced, whether they be vegetable or animal fats, there are still many farmers who grow these materials primarily to supply themselves and their families with food. But increasingly in all parts of the world farming is shifting from production for home consumption to production for sale, and with this shift there is a tendency for the producer to sell his more valuable animal products and retain for his own use the cheaper carbohydrates. This is probably not generally true of the wealthier class of producers, but even in rich countries like the United States it holds for the more impecunious or thrifty elements of the farming community. It is not uncommon in this country to find farm families shipping milk to the cities and eating margarine themselves. The underlying basis of Danish prosperity is the willingness of the farm community to sell its more valuable dairy fats and eat its cheaper animal and imported vegetable fats. This is not the only reason for the agricultural prosperity of Denmark. Climatic conditions

¹ See H. P. Armsby and C. R. Moulton, *The Animal as a Converter of Matter and Energy* (New York, Chemical Catalog Company, 1925), p. 223.

there, as in the British Isles, are particularly favorable to the growth of grasses rather than grains, and this makes dairying especially well adapted to Danish economy. Other animal industries, such as the raising of swine and poultry, are also profitable. The point to be emphasized is that thrifty Danish farmers are apt to ship out their valuable dairy and animal fat products and themselves consume the cheaper imported materials. In both the United States and Denmark there is less undernourishment than in many parts of the world because both countries are rich in food and prosperous, though in different ways. These examples indicate, however, the close relation between the wealth, or standard of living, of people and their consumption of fats, particularly dairy fats.

Rubner pointed out, many years ago, that when the cream separator was introduced the German peasants reduced their consumption of milk and butter. The peasant has always tended to sell what could be disposed of for the most money and to consume the remnants and the lower priced products. Separated cream became a high priced farm product, important in the cash income of the peasant, so it was shipped to market and the family did without. Margarine was the easiest product to turn to in the replacement of butter.

WIDE VARIATION AMONG COUNTRIES IN THE CONSUMPTION OF BUTTER AND MARGARINE

Margarine, being primarily a substitute for butter, is used only in temperate climates where butter is also used. It may be found in the temperate portions of Asia, but if so, we have no information about it. The principal known areas where it is used are the countries of northern Europe and the United States. In these countries the rate of consumption depends in part upon the availability

of other fats and the price of margarine relative to alternative materials, in part upon real wages and the standard of living, in part upon legislation encouraging or discouraging its use.

In view of these various facts, it is apparent that it is well-nigh impossible to determine what is the usual annual per capita consumption of butter and margarine within the zone where these are the predominant fatty spreading materials. However, on the basis of what statistical evidence is available, rough estimates can be made. These indicate that in Denmark per capita consumption of the two together is as much as 60 to 65 pounds a year; in France as little as 12 to 15 pounds. Probably the norm is between 20 and 25 pounds a year, if northern Europe and America are considered.

The per capita consumption of margarine alone is far larger in Denmark and Norway than in any other countries in the world. Recently the annual average has been as much as 45 pounds a year in Denmark, 34 in Norway. Elsewhere in northern Europe consumption varies from 10 to 18 pounds per capita a year. In 1927, Dutch per capita consumption was reported as 18 pounds, German and Swedish 16 pounds, British 13 pounds, and Belgian 11 pounds. The French and Italians, on the other hand, use very little margarine, the per capita rate of consumption being about the same as in the United States, 2 pounds a year or less. No statistics are available for Russia, Poland, or the Succession States, but probably in none of them is margarine used on the same scale as in northwest Europe. In the following subsections these countries are considered in the order of their importance as margarine consumers, figured on a per capita basis. This information is summarized briefly in Table 1. In each of the countries it will be noted that there was a substantial increase in per capita consumption between the years 1913 and 1924.

TABLE 1.—PER CAPITA CONSUMPTION OF MARGARINE IN EUROPE AND THE UNITED STATES, 1913 AND 1924-28*

(Pounds)

Country	1913	1924	1925	1926	1927	1928
United Kingdom	{ 7.76 }	{ 11.77 11.77 }	. . . . .	. . . . .	. . . . .	13.28
Germany	{ 7.93 }	{ 11.02 12.34 }	12.35	15.43	15.87	15.87
Netherlands	{ 4.40 }	{ 15.43 15.69 }	16.31	16.31	17.86	. . . . .
Sweden	{ 9.92 }	{ 12.27 12.27 }	14.63	15.37	15.99	. . . . .
Denmark	{ 33.06 }	{ 43.85 45.63 }	44.09	44.09	45.19	. . . . .
Belgium	{ 3.32 }	{ 7.42 }	. . . . .	. . . . .	. . . . .	11.50
Norway	{ 24.03 }	{ 35.49 35.27 }	35.71	34.17	34.30	. . . . .
France	{ 0.88 }	{ 1.54 }	. . . . .	2.20	. . . . .	. . . . .
Italy . . . . .	{ . . . . . . . . }	{ . . . . . . . . }	. . . . .	1.00	. . . . .	. . . . .
United States	{ }	{ 2.10 }	1.90	2.10	2.20	2.50

* Data in Roman type principally from U.S. Bureau of Foreign and Domestic Commerce, *The Margarine Industry of Europe* (Trade Information Bulletin 677), 1930. Otherwise, from correspondence with and publications of Bureau of Foreign and Domestic Commerce. Data in italic type from *Report of the Imperial Economic Committee Dairy Produce*.

DENMARK

In Denmark, fat is more highly prized, or at any rate more generally consumed, than in any other country for which there are records. The consumption of margarine is not only phenomenally high, but that of milk, butter, and cheese is much above the average of most of Europe, and that of meat is considerable.¹ This is probably be-

¹The U.S. Department of Agriculture reported in a letter to the Food Research Institute of March 20, 1928, that the per capita consumption of butter in Denmark in 1923 was 18.6 pounds—a figure exceeded only by Canada, Australia, and New Zealand. R. J. McFall in *The World's Meat* (New York, Appleton,

cause Denmark is primarily a dairy country, producing a large supply of this type of foodstuff. Denmark is usually cited as the premier example of a country which has applied industrial technique to agriculture. She has an animal population far greater than she has capacity to maintain on feedstuffs grown within her own boundaries. She consequently imports feed in order that she may export finished meat and butter and cheese. Her dairy industry is complemented by her swine industry, the skim milk of the one providing feed for the other. Vegetable oil seeds are imported and crushed for raw material for margarine (another outlet for skim milk), while the residue of the seeds, oil cake, is used as feed. Under this system, high-priced finished products are exported in return for cheap raw materials; at the same time there is little loss of soil fertility. The large consumption of margarine is not in this case an indication of national poverty, but is one element of an otherwise large, though relatively undiversified, diet. It is decidedly open to question, however, whether from the point of view of national well-being it is wise for any country to encourage the export of dairy products to the point where margarine must be consumed at the rate it is in Denmark. Xerophthalmia has appeared frequently in recent years in Denmark and is attributed to the restricted diet, particularly to the use of machine-skimmed milk and margarine, both lacking in vitamin A.

NORWAY

The high rate of consumption of margarine in Norway is due to a number of factors. In the first place, the number of cattle is not large and consequently butter

1927), p. 235, places the consumption of meat (including edible offal) in 1922 at 117.6 pounds. Cheese consumption in 1922 was 13.2 pounds, which was exceeded only by Switzerland. No recent statistics of milk consumption are available, but in 1914 the Danes were among the heaviest users of whole milk.

production is inadequate. At the same time the climate is cold, and people require a heavy diet. They possess large supplies of fish which probably figure more prominently in the diet than meat, but they also eat a good deal of bread, since they do not have the variety of other foods that is available in less rigorous climates. Much of the bread is made of rye flour, and is of a coarse, dark variety. The standard of living of the urban workingman is probably as high as elsewhere in Europe, but the rural and fishing population is not accustomed to more than the plainest living.

Vegetable oils are imported for manufacture, in part, into margarine, but there is also a large supply of whale oil, some of which is hydrogenated for such use.¹ A certain amount of animal fat is available from the domestic slaughter, though animal husbandry is not greatly developed.

HOLLAND

Although Danish and Norwegian per capita consumption of margarine is much greater than German or Dutch, the margarine industries of the latter countries are far more important in aggregate output.

The national economy of Holland is built up on a plan similar to that of Denmark. Climatic conditions are similar. The dairy and meat industries are of primary importance. Feedstuffs are imported, and finished products, such as meats, animal fats, butter, and cheese, are exported. Very important in this scheme of things is the importation of oil seeds, which provide not only the fat for margarine manufacture but the feed cake used by the dairy and meat industries. Much of this importation is from their own colonies, the Dutch East Indies. Margarine in turn is exported, or, if not in that form, is trans-

¹ It may be worth while to indicate why hydrogenation is so important in Norway. It is due to a highly developed electro-chemical industry made possible by cheap water power. This produces cheap hydrogen.

shipped as oil seed or oil, particularly to Germany, for manufacture and sale there. Holland differs from Denmark in that it is more highly industrialized. The diet of the people is more diversified.

The Dutch per capita consumption of fat is considerably less than the Danish. As already indicated, they use much less margarine; also less butter and less meat, while their consumption of cheese is only slightly greater. According to pre-war statistics, they also drank much less fresh milk.¹ They do, however, use considerably more fish than the Danes, and, as already indicated, they eat a greater variety of foods.²

GERMANY

In Germany, the real income of large elements of the community is distinctly lower than before the war. The country as a whole is less prosperous than either Holland or Denmark. Unemployment on a considerable scale has been chronic for a number of years. Nevertheless, the consumption of fats does not appear to be subnormal from a nutritional point of view, although it is doubtless less than before the war.

Germany in 1913 was at the peak of a forty-year advance in real wages and income. Her standard of living was high and her per capita food intake far above the average.³ According to the Eltzbacher Commission, the "average man" consumed 4,779 calories of food a day, as

¹ The U.S. Department of Agriculture reported the Dutch per capita consumption of butter in 1924 as 13.23 pounds; of cheese, 13.5 pounds. McFall (*op. cit.*, p. 239) reported meat consumption in 1922 as 45.77 pounds. This seems extraordinarily low.

² A fact hard to explain is that the marked difference in the consumption of fats in Holland and Denmark appears to be paralleled by similar difference in the consumption of food grain. Max Sering in *International Price Movements and the Condition of Agriculture in Non-tropical Countries*, translated by C. E. Stangeland (Berlin, Reichsdruckerei, 1927), pp. 118, 122, gives the Dutch per capita consumption of food grains in 1925 as 411.8 pounds and the Danish as 633.8 pounds.

³ See Max Sering, *op. cit.*, pp. 67-69.

compared with the consumption of 3,410 calories in the United Kingdom, 3,600 in France, 3,130 in Italy and 4,361 in the United States.¹ This large food consumption was an expression of the general prosperity of the population.

The consumption of fats has always been considerable. Agriculture has not focused its attention exclusively on dairy and meat products, as has been the case in Denmark, although in most of the country the landholdings are relatively small, and swine and dairy production is important. A much larger proportion of the feedstuffs required for the animal population is produced at home than is possible in either Denmark or Holland. Approximately a third of the important potato crop goes for feed in ordinary years. It appears that in recent years the consumption of butter has been relatively low in Germany, only 9.4 pounds per capita in 1923, while that of margarine was 15.9 pounds per capita in 1927. In the middle-class families, especially, margarine has replaced butter. On the other hand, the Germans even now appear to use far more meat per capita than the Dutch (115 pounds per capita in 1927, according to the United States Department of Commerce),² and their consumption of lard is also heavy. The animal fats are generally preferred to vegetable fats for their meaty flavor. No statistics are at hand to show the present whole-milk consumption, or that of cheese. Before the war they used a great deal of fresh milk, but their cheese consumption was not particularly heavy.³

The use of margarine is much more general now than

¹ R. J. McFall, *op. cit.*, p. 258. Carl Ballod in "Die Volksernährung in Krieg und Frieden," *Schmoller's Jahrbuch*, 1916, disputed the high figures advanced by the Eltzbacher Commission.

² See *Foodstuffs 'Round the World: Foreign Notes on Meats, Fats, Oils, and Livestock*, December 28, 1928, p. 5.

³ The U.S. Department of Agriculture reports German whole-milk consumption in 1913 as 61 gallons per capita, exceeded only by Sweden, Norway, and Switzerland.

it was before the war; some state that it is twice as large. There is reason to suppose that it may be at its maximum, since general economic conditions will doubtless improve, and the Germans prefer lard to margarine for many purposes. It has been reported by a representative of the United States Department of Commerce that a responsible member of the margarine trade in Germany anticipates a shift back to butter and lard on the part of many margarine consumers as economic conditions improve.¹ It is only recently that the price relationship has favored the consumption of lard as compared with margarine. From 1923 until the middle of 1926 lard was decidedly the more expensive commodity; then came a period of approximate parity between the two; while in the last six months (late 1929 and early 1930) lard has been cheaper than margarine.

UNITED KINGDOM

The British worker before the war was not enjoying so hearty a ration as the German. Real wages had been stationary or declining since about the beginning of this century, and conditions were not favorable for the working classes.² There has always been a wide disparity between the standard of living of the upper, middle, and lower classes in England. The upper classes before the war probably enjoyed as high a standard as anywhere in the world.

Per capita meat consumption has always been large, even among the poorer classes, and the average in recent years for the country as a whole is as high as anywhere on the continent, even Denmark.³ The British take their

¹ U.S. Department of Commerce, Foodstuffs Division, *Special Circular 226*, p. 2.

² See Norman Dearle, *The Cost of Living* (London, Philip Allan & Company, 1926), p. 98.

³ McFall (*op. cit.*, p. 156) gives the British average in 1924 as 127.3 pounds. The Danish per capita consumption was 117.6 pounds in 1922, according to

meat fat in different form from most continentals or Americans. They want their beef and mutton fat and their pork lean. Probably because of the nature of British agriculture, there is a much larger consumption of mutton than in most other parts of the world and a smaller consumption of pork, though the use of fresh pork is growing. Swine production, except in the American corn belt, goes with small landholdings, while large holdings are characteristic of British agriculture. With the damp climate and rolling terrain, cattle and sheep raising is much more developed than hog production. From a climatic point of view, it is surprising that Great Britain is not more of a dairy country than she is.

Except in connection with meat consumption, the British are not large users of fat, although the intake probably compares favorably with the urban districts of northern Europe. The per capita use of milk in 1922 was 30.9¹ gallons, as compared with 67 gallons in Switzerland and 50 gallons in the United States. Butter consumption was 15 pounds per capita in the same year as compared with 16.5 pounds in the United States and 12.4 pounds in Holland. The use of lard is probably not so great as in Germany, and that of cheese is definitely less than in Denmark and Holland. Margarine consumption, as already indicated, was about 13 pounds per capita in 1927, which is somewhat less than in Germany and Holland and far less than in Denmark or Norway.

Jam and marmalade play such an important part in

the same source. There is no certainty, however, that the two estimates include precisely the same items, and with all such estimates there is possibility of large error. McFall states (p. 156), "Consequently, it would appear that, with the exception of mutton and lamb, more meat is actually being eaten by the British today than ever before. Certainly the poorer people are eating more than ever, in spite of hard times."

¹ However, the milk consumption in the United Kingdom in 1923 was stated to have been only 19 gallons in the *Report of the Imperial Economic Committee . . . Dairy Produce*, p. 98. The manner in which this estimate was reached is not stated.

the British diet that the average consumer is probably not aware that his ration of fatty "spreading" stuffs is not so great as that of his continental neighbor. Sugar thus supplements fats in the English diet to a degree that is not true for other countries.

SWEDEN

Swedish consumption of margarine is about the same as the British, but otherwise the Swedes have a rather different fat diet. Sweden is primarily a dairy and live-stock country, with a relatively high consumption of dairy products and a moderate consumption of meats.¹ Milk consumption before the war was probably as high as any place in Europe. Butter consumption was 16.5 pounds in 1917, or at about the rate customary in the United States. The standard of living in Sweden seems to be below that of the Danes, but there is no deficiency of fats.

BELGIUM

In spite of its industrialization and the extreme density of population, Belgium is essentially a dairy and live-stock country. Its agricultural economy closely resembles that of Denmark and Holland. Considerable feedstuff is raised at home, but oil cake and seeds are imported for similar use. No statistics are at hand to indicate the consumption of dairy fats, but it may be safely assumed, in view of the density of population, that it does not attain the Danish figure, nor probably that of Germany or Holland. Meat consumption, exclusive of fowl, was 90.5 pounds in 1924, a high figure compared with the Dutch, but considerably less than the British.² Margarine consumption was 11.5 pounds per capita in 1927.

¹ See McFall, *op. cit.*, p. 305, for statement regarding meat consumption.

² McFall states, "Belgium is one of the most highly industrialized nations of Europe. At the same time her animal industry is developed more intensively than that of any of her neighbors" (*op. cit.*, p. 226).

FRANCE AND ITALY

The per capita consumption of margarine is very small in both France and Italy, even smaller than in the United States where the abundance of dairy products and other fats, combined with the high standard of living, makes the low rate of consumption easily understandable. Southern Europe is rich in olives, and the oil from this fruit is highly relished and widely used. The cuisine is based on vegetable oil. Animal fats, including dairy fats, are scarce and not in general use. Meat consumption is also relatively light.¹ This holds, in general, for Italy and more or less for southern France, although the general average of per capita consumption of meat and dairy fats is not low in France as a whole. McFall gives the consumption of meat in recent years as about 115 pounds,² which is relatively high, while the Department of Agriculture reports milk consumption in 1922 as 21.5 gallons (as compared with 30.9 gallons in Great Britain and 67 gallons in Switzerland), butter consumption in 1923 as 10.9 pounds, and cheese consumption in the same year as 13.5 pounds, both very respectable amounts.

The small use of margarine in France may be due in part to the legislation against coloring that is enforced there, as in the United States, but probably more important is the fact that France is not extensively industrialized and that farming is on the basis of small, independent holdings. This being the case, the standard of living is more simple, and dairy and animal fats are utilized directly instead of recourse being had to a manufactured product like margarine. In France, as in England, use is made of other food than fats to make bread palatable. The workman's lunch is apt to be bread, without butter or any other spread, but munched with or dipped in wine. The

¹ McFall (*op. cit.*, p. 577) gives 48.3 pounds as the per capita consumption in Italy in 1923.

² *Op. cit.*, p. 191.

Frenchman's wine thus takes the place of the Englishman's jam. The French also eat a great deal of sautéed food and salad, far more of the latter than most other Europeans. This becomes a vehicle for fats, and the diet is thus enriched. Margarine is probably used in northern France more for a cooking fat than for the table.

UNITED STATES

Consumption of margarine within the United States varies considerably from one section of the country to another, although it is small on a per capita basis in comparison with European countries, even in those parts of the country where it is relatively large. The average for the country as a whole was 2.8 pounds in 1929. California is the only state for which per capita consumption figures can be satisfactorily computed.¹ For other parts of the country the best that can be done is to figure the number of retail dealer licenses issued per capita of population. This indicates how consumption varies from district to district, though it does not show the amount of margarine consumed in different parts of the country. Table 2 gives total sales of margarine in California from 1919 to 1928 and the per capita consumption figured from that; while Table 3 (pp. 192-93) indicates the number of retail dealer licenses issued in the various internal revenue districts of the country. An analysis of these two tables gives a pretty clear idea of the relative importance of the commodity in different regions.

As has already been pointed out, the average per capita consumption for the country as a whole is a little under three pounds per annum. In a large country such an average means little, however. As Table 3 shows, the

¹ The Bureau of Dairy Control of the California Department of Agriculture reports total sales. From these figures per capita consumption can be estimated.

consumption of margarine in Montana, where there are only five dealer licenses held and only one retail dealer selling the product to every 139,000 inhabitants, consumption must be negligible as compared with its sale in Iowa, for instance, where there are 7,400 licenses held and one dealer for every 327 of the population. That table indi-

TABLE 2.—TOTAL SALES AND PER CAPITA CONSUMPTION OF MARGARINE IN CALIFORNIA, 1919-28*

(Pounds)

Year ending June 30	Margarine sold	Apparent per capita consumption
1919	6,945,467	2.09
1920	10,538,639	3.08
1921	13,633,522	3.80
1922	10,938,234	2.92
1923	12,481,326	3.19
1924	16,034,620	3.94
1925	14,611,538	3.45
1926	19,561,087	4.45
1927	17,922,107	3.93
1928	21,251,622	4.50

cates that consumption is probably largest in the following states or revenue districts: Kansas, Indiana, Iowa, Oregon, Washington, California, Nebraska, Ohio, Michigan, Colorado, South Dakota, Illinois, Minnesota, Missouri. In all of these states there is a dealer selling margarine for every 500 or less of the population.

The states in which the sale is smallest are: Wyoming, Montana, Mississippi, South Carolina, North Carolina, Pennsylvania, Texas, Georgia, New Mexico, Connecticut, Vermont, Alabama. In all of these states there are more than 1,500 people for every license held. In Wyoming, no licenses are held; in Alabama, one to every 1,753 persons.

* Data from E. C. Voorhies, *Economic Aspects of the Dairy Industry* (California Agricultural Experiment Station Bulletin 437), October 1927, p. 173.

TABLE 3.—LICENSES TO SELL MARGARINE AT RETAIL, BY STATES AND INTERNAL REVENUE DISTRICTS, COMPARED WITH THE POPULATION, FISCAL YEAR ENDING JUNE 30, 1928*

State or revenue district	Licenses for colored margarine	Licenses for uncolored margarine	Total	Population	Number of population per license
Alabama	52	1,389	1,441	2,526,000	1,753
Arizona	8	531	539	444,708	825
Arkansas	48	1,432	1,480	1,903,048	1,286
California (1st)....	...	3,727	3,727	.....	.....
California (6th)....	...	8,509	8,509	4,316,459	353
Colorado	1	2,362	2,362	1,058,722	448
Connecticut .....	...	899	899	1,606,491	1,883
Delaware	117	341	458	240,274	525
District of Columbia	115	443	558	528,000	946
Florida	44	2,288	2,332	1,317,160	565
Georgia	4	1,601	1,605	3,138,962	1,956
Idaho .....	...	699	699	522,000	746
Illinois (1st) .....	...	8,871	8,871	.....	.....
Illinois (8th) .....	...	6,565	6,565	7,202,983	466
Indiana	264	10,306	10,570	3,124,499	296
Iowa .....	...	7,400	7,400	2,422,915	327
Kansas	47	7,278	7,325	1,820,896	249
Kentucky	26	1,954	1,980	2,524,210	1,262
Louisiana	56	1,602	1,658	1,918,591	1,156
Maine .....	...	1,435	1,435	790,053	551
Maryland	610	1,958	2,568	1,580,268	615
Massachusetts .....	...	4,629	4,629	4,197,288	906
Michigan	2	10,516	10,518	4,395,651	418
Minnesota .....	...	5,416	5,416	2,651,306	489
Mississippi	55	302	357	1,790,618	4,974
Missouri (1st)	152	2,978	3,130	.....	.....
Missouri (6th)	20	4,008	4,028	3,498,143	488
Montana .....	...	5	5	694,965	139,000
Nebraska	7	3,410	3,417	1,384,703	404
Nevada .....	...	63	63	77,407	1,229
New Hampshire .....	...	699	699	453,608	648
New Jersey (1st) .....	...	2,277	2,277	.....	.....
New Jersey (5th) .....	...	3,540	3,540	3,680,482	632
New Mexico	3	194	197	388,146	1,950
New York (1st) .....	...	2,490	2,490	.....	.....

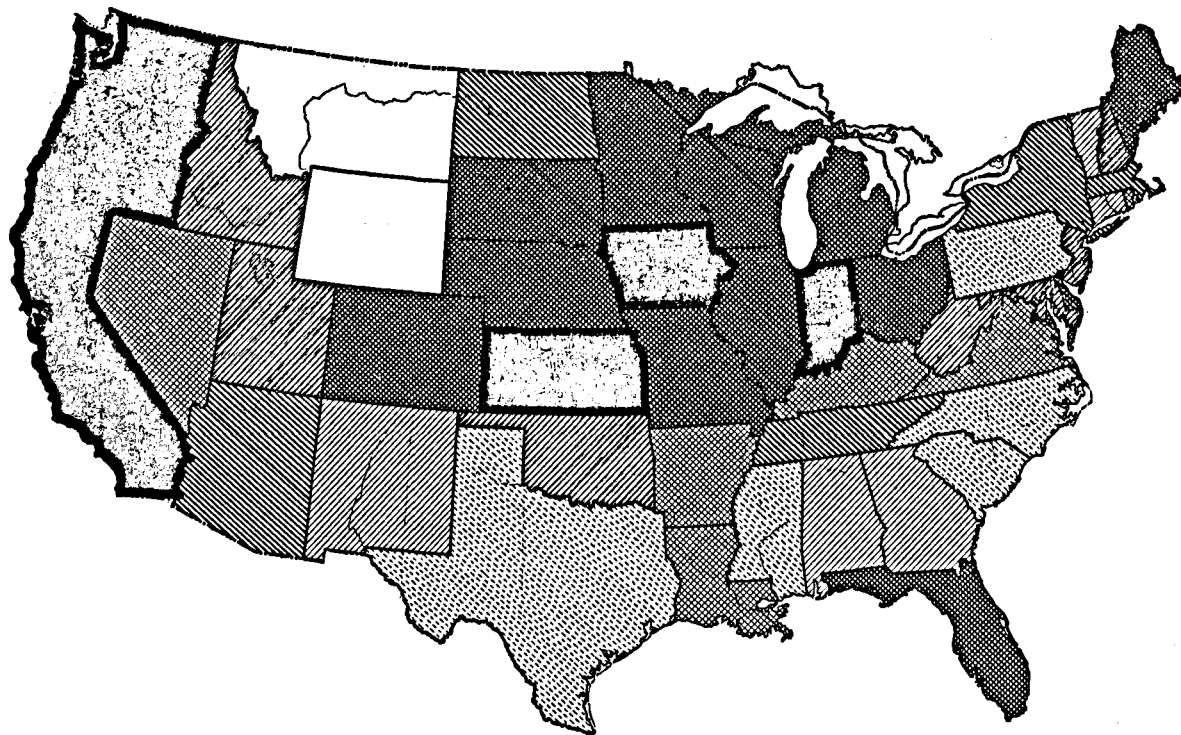
* Table contributed by Swift & Company. Licenses reported by Commissioner of Internal Revenue in his *Annual Report* for 1928, p. 114.

TABLE 3.—Continued

State or revenue district	Licenses for colored margarine	Licenses for uncolored margarine	Total	Population	Number of population per license
New York (2d).....	...	53	53	.....	.....
New York (3d).....	...	715	715	.....	.....
New York (14th)....	...	3,491	3,491	.....	.....
New York (21st)....	...	3,999	3,999	.....	.....
New York (28th)....	...	3,238	3,238	11,303,296	808
North Carolina.....	15	821	836	2,857,846	3,418
North Dakota.....	...	764	764	641,192	839
Ohio (1st).....	...	3,727	3,727	.....	.....
Ohio (10th).....	...	3,414	3,414	.....	.....
Ohio (11th).....	...	3,742	3,742	.....	.....
Ohio (18th).....	...	5,415	5,415	6,600,146	405
Oklahoma.....	72	3,498	3,570	2,342,474	656
Oregon.....	...	2,530	2,530	877,477	347
Pennsylvania (1st) .	...	1,874	1,874	.....	.....
Pennsylvania (12th) .	...	680	680	.....	.....
Pennsylvania (23d) .	...	1,623	1,623	9,613,570	2,300
Rhode Island.....	2	604	606	692,794	1,155
South Carolina.....	...	432	432	1,825,021	4,227
South Dakota.....	...	1,523	1,523	689,346	452
Tennessee.....	126	2,363	2,489	2,467,679	987
Texas (1st).....	29	945	974	.....	.....
Texas (2d).....	54	1,396	1,450	5,231,661	2,158
Utah.....	...	733	733	513,711	701
Vermont.....	...	196	196	352,428	1,762
Virginia.....	196	1,824	2,020	2,518,589	1,247
Washington.....	...	3,986	3,986	1,538,228	385
West Virginia.....	168	2,094	2,262	1,669,324	739
Wisconsin.....	...	5,007	5,007	2,884,734	577
Wyoming.....	...	.....	.....	.....	.....
Total.....	2,293	173,107	175,400	115,000,000	139,000

The map on page 194 presents the same material graphically. There it becomes quite strikingly apparent that consumption is largest in the agricultural states of the country, many of them important dairy states. These districts contain, nevertheless, many cities of considerable

LICENSES TO SELL MARGARINE COMPARED WITH THE POPULATION BY STATES OF THE UNITED STATES, 1928*



* Data from Appendix Table III.

size. It would be a mistake to assume that the consumption of margarine is large in agricultural districts merely because predominantly agricultural states show the largest number of licensed dealers per capita. There is considerable use of margarine among farm families, but it is probably as large or larger among town people. It is also interesting to note that, except possibly for Minnesota and South Dakota, none of the states included in this group has a particularly large foreign population. The sale of margarine is apparently not important in the industrial New England states or the other Eastern states except Delaware and Maine. It appears to be more important in what might be termed "typical" American communities, the Middle West and the Far West.

Margarine consumption was $4\frac{1}{2}$ pounds a year per capita in California in 1928; and yet it would appear to be less important there than in several other states. On this assumption, it may be 6 pounds a year or more in Iowa, Kansas, or Indiana.

Consideration of the list of states where the fewest margarine licenses per capita are held indicates that they fall into three main categories: (1) those that have severe state legislation, including dealers' licenses, such as Montana, Pennsylvania, Vermont, Connecticut, and Mississippi; (2) a rather large group of Southern states in which legislation is not particularly severe; and (3) a few of the more sparsely settled Western states. The Southern states are small consumers probably because there has not been a tradition of butter usage there as there has been in other parts of the country, and consequently the use of a substitute has not developed. Until recently there were very few dairy cows in the South, and butter was scarce and expensive. Southerners are heavy eaters of quick, light hot breads, and they eat these with molasses and syrup. They also eat a great deal of corn bread which cannot easily be spread with butter. Finally, lard has al-

ways been important in the Southern diet, and consequently other fats could be dispensed with. In the sparsely settled states of the West it is natural that margarine consumption should be small.

As an outgrowth of a study made by the Bureau of Labor Statistics and the National War Labor Board in 1918-19 into living costs of wage-earning families, the Department of Agriculture published a compilation of figures on the per capita consumption of margarine in various parts of the United States. The years 1918-19 represent a time of considerably larger average consumption of margarine than at present; also of somewhat different distribution of the product. The figures are of interest especially in that they support the more recent compilation of the Bureau of Internal Revenue in showing a much higher rate of consumption in the Middle Western states than in any other part of the country. The growth in the use of margarine in the West has occurred since the war. These figures¹ follow:

District	Per capita consumption (pounds)
North Atlantic	2.12
South Atlantic	1.31
North Central	6.81
South Central	2.48
Western	1.35
United States	3.41

The marked decline in the price of butter in the winter of 1929-30, at a season when it is normally high or advancing, has caused more than usual consideration to be given to the question of the relative importance of town and country consumption of margarine. It is the contention and complaint of the creamery industry that farmers, instead of supporting the market for their own

¹ From *Agriculture Yearbook, 1924*, p. 1127.

product, butter fat, by purchasing butter, are the principal users of margarine. Surveys have been made in various states of the Middle West, which appear to support this contention. One made in ten counties of Iowa by the Department of Agriculture of that state is said to indicate that 44 pounds of margarine is consumed in that section for every 56 pounds of butter. It was also stated that "in strictly rural sections there was a greater proportionate use of oleomargarine than in the cities." Average per capita consumption was estimated to be 7.6 pounds a year.¹

The reason for this situation has been suggested above: namely, that under a factory economy the thrifty or impecunious farmer naturally sells his high-priced butter fat and purchases the cheaper product, margarine, for his own use. If he retains enough whole milk to give an ample ration for all members of his family, there is no dietary argument against this. Obviously, however, if it becomes general practice, it holds a serious threat to butter interests, especially since similar practices abroad are constantly encroaching upon the foreign market for butter.

In summary, it may be said that American consumption of fats as such is moderate as compared with consumption in some foreign countries. The use of whole milk is relatively high, that of butter plus margarine perhaps above the average, but if so, only slightly above it, while that of cheese is relatively small. Americans use more meat, however, than is the custom in most countries, and thereby increase the animal fat in their diet.

¹A responsible member of the butter industry claims that in parts of Tennessee four pounds of margarine are used for every pound of butter.

CHAPTER XVI

THE TREND OF PRODUCTION AND CONSUMPTION OF BUTTER AND MARGARINE IN THE UNITED STATES AND EUROPE

Something has already been said about the trend of margarine production in the United States in its relation to federal legislation. In this chapter it is proposed to examine these statistics in greater detail and to compare the trend of margarine production and consumption over a series of years with that of butter.

For two reasons, statistics of margarine production are much more satisfactory than those of butter production. In the first place, as has already been pointed out, under the federal law of 1886 margarine manufacturers were required to report their output monthly to the Bureau of Internal Revenue, and as a result the reports of that Bureau provide a complete record from 1887 to the present time. In the second place, margarine is entirely a factory product, made by a limited number of plants. Statistics of butter production, on the other hand, have never been satisfactory. The number of creameries is very large, and statistics of their output have not been regularly compiled as a by-product of government regulation. Furthermore, the problem of estimating farm output presents great difficulties. Prior to 1914 the only reports were those of the decennial census. Now, two government bureaus report production, the Bureau of the Census of the Department of Commerce and the Bureau of Agricultural Economics of the Department of Agriculture. The reports of creamery production by the Bureau of Agricultural Economics are compiled from monthly statements of manufacturers, and

are at present probably 95 per cent, or more, complete for the industry. They furnish, therefore, an account of creamery production almost as complete as the Bureau of Internal Revenue reports for margarine. The farm-production figures published by this Bureau are estimates, based on an assumed line of trend from the decennial census report of 1919. The Bureau of the Census now takes a census of creamery production every other year and of farm production every ten years. For recent years we have preferred to use the figures of the Bureau of Agricultural Economics to those of the Bureau of the Census, because of the continuous relation of the Department of Agriculture with the industry and the check this furnishes on the statistics.

In Appendix Table I are assembled this series of butter-production estimates, and in addition the foreign-trade statistics and estimates of consumption, while Appendix Table II contains similar material applying to margarine. Chart 1 (p. 23) represents the production material in graphic form.

BUTTER PRODUCTION, 1849-1928

A study of Chart 1 (p. 23) shows that at the time of the introduction of margarine into this country, i.e., in the early 'seventies, butter production amounted to over 500 million pounds. The great bulk of it was made on the farms, factory production not being large enough to receive attention in the census until 1879. During the next three decades there was a remarkable increase in butter production. In 1879, according to the census, it was 794 million pounds; in 1889, 1,206 million pounds; and in 1899, 1,492 million pounds. The expansion of dairying, particularly in the Middle Western states, during this period has already been referred to (see p. 15). Until 1889 the bulk of the butter was made on farms, but during the 'nineties

factory production gained a secure foothold, and consequently between the census report of 1889 and 1899 there was a considerably greater growth in factory output than in farm production. Total farm production reached its apparent peak in 1899;¹ since that time it has been declining.

Chart 1 further shows that from 1899 to 1914 the rate of expansion of butter production was much less rapid than in earlier years. As a result of the decline in farm output, the line of trend flattens out decidedly. If the estimates are to be trusted, during that period farm production fell from 1,072 million pounds in 1899 to about 850 million pounds in 1914, while factory output increased from 420 million pounds to 760 million pounds. The reduction in farm butter output was probably primarily in butter for sale. Home needs of the farm family continued to be met by household churning, but the volume of shipments to market declined.

A change in the source of the statistics makes it difficult to estimate production in 1915 and 1916.² From 1917 to 1920, however, production was practically constant, the decline in farm output being about compensated for by the increase in factory production. Total production at that time was somewhat over 1.5 billion pounds.

The vicissitudes of the war and post-war years have been followed by a period of remarkable expansion, far more rapid than at any other time in the history of the industry. This is particularly true for the period from 1920 to 1924. Farm production has declined further, but factory output has increased enormously. It is a case of fac-

¹ The actual peak of production may have been before or after 1899. The census report for that year was larger than for any other census year.

² The census reports were the source of statistics of production for 1914 and earlier census years. The intercensal years were interpolated from a straight line of trend. Beginning with 1917, a different source was used, the estimates of the Bureau of Agricultural Economics. Consequently, no interpolation was possible for 1915 and 1916.

tory technique further triumphing over domestic economy. In the large markets of the country farm butter is practically unknown. Its use is limited to farm households and small agricultural communities. Total production has now passed the 2-billion-pound mark. Of this, factory production was approximately 1.5 billion pounds in 1929.

BUTTER PRODUCTION BY STATES

Creamery-butter production is large in localities where dairying is important, but there are important dairy districts, particularly near large cities, where butter production is distinctly subsidiary to the marketing of fresh milk, and there are other regions where other manufactured dairy products compete with butter for the farmer's supply of milk. Table 4 presents in juxtaposition the principal dairy states and the principal creamery-butter states. The

TABLE 4.—DAIRYING IN COMPARISON WITH CREAMERY-BUTTER PRODUCTION IN THE PRINCIPAL STATES, 1925*

State	Number of milk cows (thousands)	Creamery-butter production (thousand pounds)
Wisconsin	2,015	170,202
Minnesota	1,560	267,561
New York	1,383	18,237
Iowa	1,341	168,359
Illinois	1,049	63,750
Texas	985	14,777
Ohio	964	85,636
Pennsylvania	889	11,474
Michigan	850	71,857
Missouri	835	62,606
Kansas	760	50,094
Indiana	679	54,969
Nebraska	625	83,694
California	579	74,562

* Data from *Dairy Statistics* (U.S. Department of Agriculture Statistical Bulletin 25), February 1929, pp. 10-11, 78-79.

14 principal dairy states include the 11 principal creamery-butter states, but they do not lie in the same order, and two of the most important dairy states, New York and Pennsylvania, are very small producers of butter. This is because the cities in these states require the bulk of the milk for household distribution.

From this table it may be seen that Wisconsin is far more important than any other state in the Union in number of dairy cows. In butter production, however, it is greatly surpassed by Minnesota. In Wisconsin, cheese manufacture is important and much milk is shipped to Chicago for distribution to the household trade. New York is third in importance in number of dairy cows, but is only a small producer of butter because of the heavy demand of New York City for fresh milk. Iowa is a close third to Wisconsin as a butter producer, but has a much smaller cow population. The other Middle Western states do not specialize so greatly in dairying as Wisconsin, Minnesota, and Iowa, but their herds are large and their production of creamery butter considerable. As butter producers, they rank in the following order: Ohio, Nebraska, Michigan, Illinois, Missouri, Indiana, and Kansas. Outside of this region the only state that compares with these in importance as a creamery-butter producer is California. It stands fourteenth in order of importance in dairying, but sixth as creamery-butter producer.

The Middle Western states, then, are the great source of creamery butter in this country. The New England states no longer produce a significant amount; the Southern states have never been large producers; the mountain states are increasing their output, but cannot yet be put in the class with their Eastern neighbors; the Far West is more nearly comparable with the Middle West than any other part of the country, since butter making is important in Washington and Oregon as well as California, but the combined total of the three states does not equal that

of Iowa. In the East especially, but in all densely populated parts of the country, a large proportion of the milk supply is sold direct to consumers as whole milk. It is this that has forced butter production farther and farther west and into remote rather than near-city regions. This factor and the alternative uses of milk in cheese, condensed and evaporated products, and ice cream account for the principal differences in the rank of states as milk producers and creamery-butter manufacturers. Another matter that cannot be overlooked is that many cows included in statistical compilations as milch cows are "dual-purpose" animals, and are raised not primarily for milk but quite as much for meat. In other words, cow population (reported or actual) is far from an exact index of milk production.

Farm (or country-made) butter is relatively more important in the South than in the North. Texas produces the greatest volume of any state in the Union, but there is also a considerable production in Tennessee, Kentucky, Alabama, Oklahoma, North Carolina, and Georgia. A few of the Middle Western states (also Pennsylvania) produce almost as great a volume as these Southern states, but, in comparison with the milk available or the total butter production or consumption, farm-made butter is far more important in the South than in the North.¹

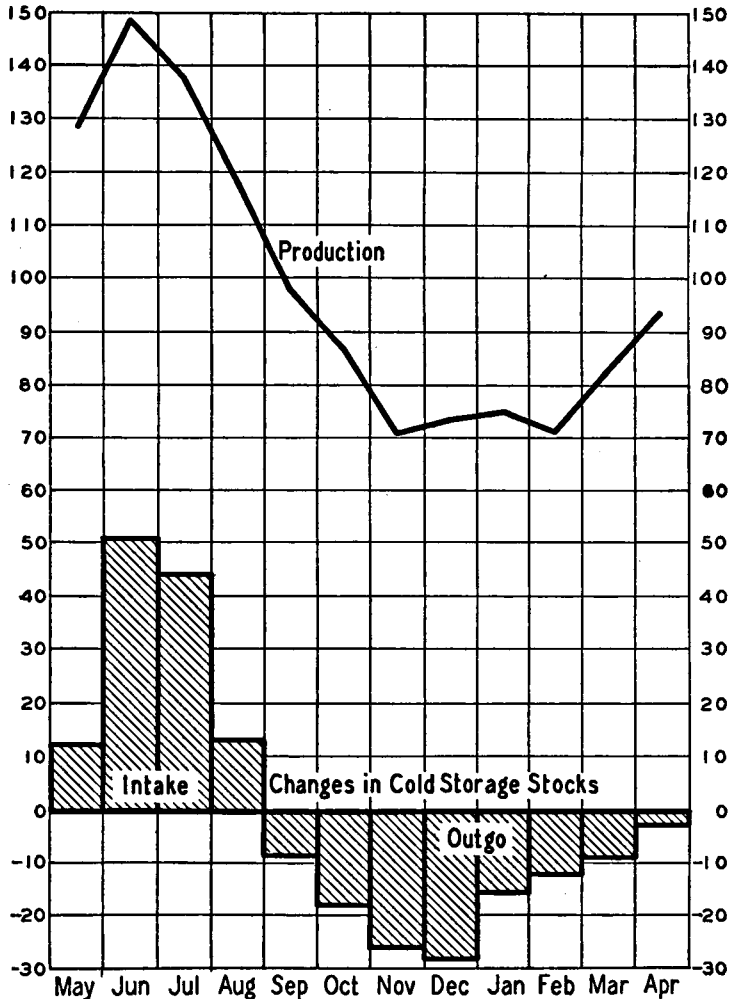
SEASONAL ASPECT OF BUTTER PRODUCTION

The production of butter has a marked seasonal variation because of the changes in the volume of milk produced at different seasons of the year. Chart 2 (p. 204) shows the normal seasonal movement of creamery production from 1917 to 1929, in relation to the cold storage of butter. Production of butter is here shown to be lower in February and November than in other months of the year. This impression is exaggerated in the chart by the fact

¹ For detailed statistics, see U.S. Department of Agriculture, *Dairy Statistics* (Statistical Bulletin No. 25), February 1929, p. 68.

**CHART 2.—SEASONAL VARIATION OF CREAMERY-BUTTER PRODUCTION
IN THE UNITED STATES IN RELATION TO AVERAGE INTAKE
AND OUTGO OF COLD-STORAGE BUTTER, 1917-29***

(Million Pounds)



* Data from *Agriculture Yearbook, 1928*, p. 987; U.S. Department of Agriculture, Market News Service, *The Domestic Dairy Market Situation and Estimate of Creamery-Butter Production, January 1930*; *Survey of Current Business*, February 1930, p. 96. Account was taken of secular trend in computing seasonal variation.

that both are short months. On a daily basis production is little less in these months than in December and January. Following these four months of low production come March and April, when production is moderately increasing, and after these two more, May and June, of rapidly increasing output. The peak of production is reached in June. July production is usually high, but normally not quite so high as June, and following that there is a steady decline until November. The year may then be broken up into three main periods, namely, four months of low output in the winter; four months of increasing output in the spring and early summer; and four months of decreasing output in the late summer and autumn.

Because of this marked seasonal characteristic of production, it is necessary to carry or store butter under refrigeration from the period of large supplies to that of lesser supply. The bar diagram in Chart 2 indicates the quantities of creamery butter going into and coming out of storage during different months of the year. Some butter goes into storage in May, but June and July are more important from this standpoint. Beginning in September, with the further decline in output, cold-storage supplies begin to be drawn upon, and this continues to be increasingly true during the winter months. With the cycle of increasing production in the spring, conditions change again, and though storage butter continues to be used, it is not at the rate of the winter months. At the peak of the building up of stocks, at the end of summer, there may be well over 100 million pounds of butter in storage, while at the end of the winter storage supplies usually do not amount to a tenth of this figure.

MARGARINE PRODUCTION, 1887 TO 1928

The production of margarine may be studied in detail by reference to Appendix Table II and Chart 1 (p. 23).

Breaking up the forty-year record, we find as many as eight distinct changes in the course or direction of the output of the industry. From the fiscal year 1887 until 1894, production increased from about 22 million pounds to about 70 million pounds. Following that there was a decline until 1897 when production was only 46 million pounds. This decline was followed in turn by a rapid increase until 1902, when production reached 126 million pounds, after which there was another precipitate decline in 1903 and 1904 to 50 million pounds. From 1906 to 1910 there was another period of expansion similar to that from 1897 to 1902, production increasing from 55 million pounds to 142 million pounds. That period in turn was followed by several years, from 1910 to 1916, of relative stability, when production ranged between 120 and 155 million pounds. Then came our entry into the war and a notable increase in demand. Production advanced to 233 million pounds in 1917 and then to 326 million pounds in 1918. The advance continued through the fiscal years 1919 and 1920, though at a slower rate, and reached its peak in 1920 with a production of 391 million pounds. Following that there were two years of declining activity that cut production in two. Output in 1922 was only 191 million pounds, as compared with 391 million pounds in 1920. Since then it has steadily increased except during the fiscal year 1925. Figuring from the point of lowest production in the two cases, the rate of increase has not been quite so great in margarine as in butter production, but it has permitted a steady growth in per capita consumption.

Circumstances extraneous to the market have had much to do with these abrupt changes in the trend of production. As will be shown later in chapter xix, margarine production is closely related to the price of butter, and this factor must be considered in any study of the industry. The supply of margarine itself may be readily ad-

justed to demand, and if the commodity were not so closely related to butter and had not been subjected to public control of one sort and another the trend of production would presumably have been consistently upward year after year.

The decline in production from 1894 to 1897 occurred at a time when butter prices were weak, presumably because of large supplies.¹ Such a situation in the butter market would naturally have reacted unfavorably on the margarine industry. The decline was also probably in part a result of the Supreme Court decision in the case of *Plumley v. Massachusetts* (155 U.S. 461), to which reference was made on page 50. That decision upheld the states in their legislation against colored margarine, and thus limited the actual and potential market for the commodity. Similarly, the upturn in production following 1897 occurred at a time of generally advancing butter prices, but the decision of the Supreme Court in *Schollenberger v. Commonwealth of Pennsylvania* (171 U.S. 1), handed down in 1897, may also have helped to strengthen prices.

The decline in production of margarine after 1902 was almost unquestionably the direct result of the amendment to the law passed in that year, although butter prices were declining also in the period between 1902 and 1904. There can be little doubt, however, that the change in the tax had a very important effect on the demand for margarine. Production did not begin to recover until 1907. The advance from that time until 1910 and the break in that year synchronized with similar movements in the butter market, but factors connected with the administration of the margarine law may have also played a part in determining the trend of production.

From 1906 through the war period there was a close

¹ As has already been indicated, annual figures of butter production were not available until 1917.

correlation between butter prices and margarine production. Advancing prices in butter were usually accompanied by an increase in margarine production, and vice versa. Legislative action was of much less significance.

Because of the change in the method of reporting butter production in 1917 it is impossible to know exactly how the war affected output, but it appears to have depressed it. With margarine there is no question. Production was greatly increased beginning with the year 1917, and did not decline again until 1921. It then declined for two years, but, as already noted, since 1922 has been increasing.

A second-degree parabola fitted to the production figures from 1904 to date (excluding 1917-21) indicates the general trend of production during that time. If this line is compared with the post-war trend of butter production, it seems that the rate of growth has been only slightly less rapid in margarine than in butter.

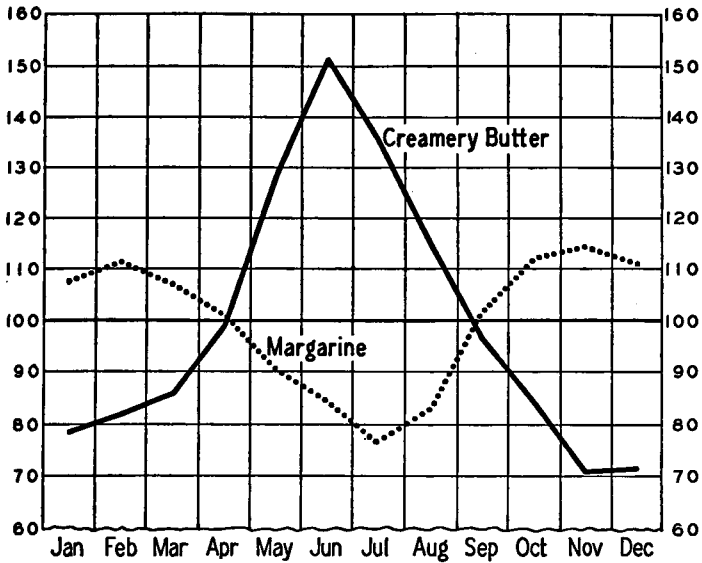
SEASONAL VARIATION IN MARGARINE PRODUCTION

Margarine production is not subject to natural conditions that cause a seasonal variation from month to month as is the case with butter, but for various reasons its production within the year tends to vary inversely with butter production. Consequently, we find that in the months when butter production is large that of margarine tends to be relatively small, and vice versa. Chart 3 presents this relationship graphically. It will be seen there that normally margarine production is high in January, February, and March; that during the following months it steadily declines until July; following that it increases again, and reaches a maximum in November.¹ The seasonal movement of butter production has been discussed above (p. 203).

¹ Further consideration of the seasonal relationship of the two commodities is taken up under the price discussion on p. 243.

CHART 3.—INDEXES OF SEASONAL VARIATION OF CREAMERY-BUTTER PRODUCTION AND MARGARINE PRODUCTION IN THE UNITED STATES, 1922-29*

(Percentages)



* Sources of data for butter production as in note to Chart 2; data on margarine from *Annual Reports* and press releases of the U.S. Bureau of Internal Revenue. In the construction of the indexes, account was taken of secular trend.

UNITED STATES FOREIGN TRADE IN MARGARINE AND BUTTER

American exports have never been large in either butter or margarine. There have been a few periods in which this country has shipped a considerable volume of butter abroad, but in general, and especially in recent years, exports have not been large. Oleo oil, on the other hand, has been an important article of export over an extensive period of time, though it, too, has been of declining importance in recent years.

As may be observed in Appendix Table I, there was something of a boom in American exports of butter in the late 'seventies and early 'eighties. For five years together, exports exceeded 20 million pounds a year, and in one year reached almost 40 million pounds. At that time margarine exports were not separately reported, and there is good reason to believe that a portion of this export was margarine, whether so labeled or not. During the next 25 years butter exports exceeded 25 million pounds a year at five different periods, but except in the late 'nineties these periods were very short. An annual export of 10 to 20 million pounds was much more customary. Nevertheless, it may be said that the heyday in the American butter export trade was from about 1875 to about 1906. Since that time, except for three years at the end of the World War, exports have been much smaller. Exports have been less than 5 million pounds more frequently than above that figure.

Margarine exports were first reported as such in 1884. At that time they amounted to 1.5 million pounds. During the 'eighties and 'nineties the volume reported as margarine exports probably represented only a fraction of the total exports of margarine, since much margarine was sent abroad as butter. The volume reached a total of 10 million pounds in only one year during those two decades. Since 1900 exports have continued small, less than 10 million pounds a year, except in 1906 and again in 1919 and 1920. During the latter two years they reached 18 and 20 million pounds, respectively. Since then they have been even smaller than before the war.

Imports of butter were negligible until about 1914. A tariff duty had been in effect ever since 1884, but imports had never been of a volume seriously to menace the domestic industry. However, following the reduction of the duty to 2½ cents under the Underwood Tariff of 1913, imports increased, and had it not been for the World War

they might have reached considerable proportions during that period. The war, however, restricted imports, and it was not until 1919 that they were again as large as in 1914. In 1919, 9.5 million pounds were imported; in 1920, 37.5 million pounds; and in 1921, 18.5 million pounds. Butter interests were so alarmed at this development that they petitioned for an increase in the tariff rate. Consequently, in the emergency tariff of 1921 the rate was increased to 6 cents and in the Fordney-McCumber Act of 1922 further increased to 8 cents a pound. This was something of a deterrent, and imports dropped in 1922 to 7 million pounds. In the next two years, however, they increased again, and butter interests again urged an advance in the rate. After some delay this was obtained by presidential proclamation (March 6, 1926), under the flexible provision of the Tariff Act, the rate then being increased to 12 cents a pound. Imports since 1925 have been consistently less than 10 million pounds a year. They have been larger, however, than the exports for the same years. The rate under the new tariff act is 14 cents.

Margarine imports are so negligible that they are not separately reported by the Bureau of Foreign and Domestic Commerce.

FOREIGN TRADE IN OLEO OIL AND NEUTRAL LARD

Oleo oil, the principal animal fat used in margarine, has been exported in much greater volume than butter or margarine throughout the history of its use. In 1884, the first year they were separately reported, exports amounted to 38 million pounds, and in succeeding years they increased more or less steadily until they reached 212 million pounds in 1908. Following that they declined, and were as low as 7 million pounds in 1918. During the years immediately after the war they increased again, but have more recently been declining year by year. Exports during 1928 amounted to 63 million pounds.

Neutral lard, the other important packing-house product used in margarine, was not separately reported in foreign-trade statistics until 1911. Prior to that it was counted with lard in general, the export of which has been at least 200 million pounds, and usually much more, ever since the 1870's. The export of neutral lard was somewhat greater in the four years from 1911 to 1914 than it has been at any time since the war. Exports were 24 million pounds in 1928.

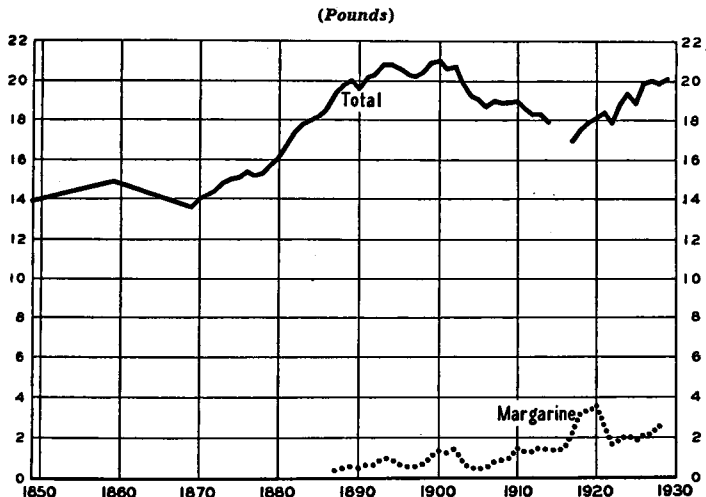
Germany, the Netherlands, and the United Kingdom have been the important takers of American oleo and neutral lard. They are the most important manufacturers of margarine.

TREND OF CONSUMPTION IN THE UNITED STATES

By adding imports to production, subtracting exports, and dividing the resulting figure by the population, a figure of per capita consumption of butter and margarine is obtained. This is graphically presented on an annual basis in Chart 4 for the period from 1849 to the present year. This is not altogether satisfactory, as there may be a large element of error in the estimates of the production of butter on farms. Reference to the chart shows that from 1850 until about 1880 there was no marked increase in the per capita consumption of butter. It was between 14 and 16 pounds a year. Margarine production was not reported at that time, but it was so small that, even if it had been reported, it would not have made much difference in the per capita consumption figure. During the 'eighties, consumption of these materials increased, from 16 to over 19 pounds for butter, and, if margarine is added, to 20 pounds per capita. It remained at approximately this figure during the 'nineties, but in the early years of this century began to decline. This trend continued until 1914 at least, when consumption of margarine and butter together was

about 18 pounds. A break in the statistics there makes the next two years impossible to calculate. Beginning with 1917 again, however, the trend has been toward larger consumption. The total consumption of the two commodities in that year was 17 pounds, while by 1926 it had increased to about 20 pounds.

CHART 4.—PRE CAPITA CONSUMPTION OF BUTTER AND MARGARINE TOGETHER AND OF MARGARINE ALONE IN THE UNITED STATES, 1849-1929*



* Data from Appendix Tables I and II.

During the years before the war, i.e., from about 1906 until 1914, when butter consumption was declining rapidly, margarine consumption increased from an average of half a pound per person to about 1.5 pounds. During the war, as was to be expected, it increased further to 3.1 pounds per capita in 1918 and continued to increase in 1919 and 1920. In the latter year it was the largest it has

ever been, namely, 3.5 pounds per person. During these same years butter consumption was the lowest it has been since the 1870's. In 1917 it was 14.7 pounds per person; in 1918, 14.4 pounds; 1919, 14.6 pounds; and 1920, 14.6 pounds. From 1921 to 1926, on the other hand, butter consumption increased rapidly, while margarine consumption was lower than the war-time level. The per capita consumption of butter in 1926 was 17.8 pounds as compared with 14.6 pounds in 1920; in 1927 it was 17.8 pounds; 1928, 17.4 pounds; 1929, 17.3 pounds; that of margarine was 2.8 pounds in 1929, as compared with a post-war low of 1.7 pounds in 1922.

The principal explanation for the declining consumption of butter between 1900 and 1914 is probably to be found in the decline in real wages during that period. Conversely, this same factor probably played a part in increasing the use of margarine during the same period. War conditions further emphasized the necessity for economizing food products, and margarine consumption consequently increased greatly, at the expense of butter. After the war and post-war depression, with the more favorable relation between earnings and the cost of living, butter consumption increased. At the same time margarine consumption increased, though on a lower level than during the war. In the past two years there have been slight reductions in the per capita consumption of butter, while the consumption of margarine has increased.

CONSUMPTION OF BUTTER IN CALIFORNIA

Reference was made above to the fact that statistics of per capita consumption of margarine are available for California, though lacking for other states. The California Bureau of Dairy Control publishes similar statistics of butter consumption. These indicate a relatively high rate of consumption in that state—in 1928, 22 pounds per cap-

ita as compared with a consumption of 17.4 pounds for the country as a whole.

It is not difficult to explain a relatively high consumption of butter in California in view of the high standard of living there and the dissemination of educational and health literature, but the high consumption of margarine and of butter combined is less easy to account for. It indicates a consumption of spreading materials 4.5 pounds above the average for the country as a whole.

THE SEASONAL VARIATION IN THE CONSUMPTION OF MARGARINE AND BUTTER

It may be assumed that the seasonal variation in the consumption of margarine is approximately the same as in the production, since very little is stored, and the foreign trade in the commodity is negligible. Chart 3 (p. 209), showing the variation in production, may, therefore, be considered indicative of consumption also.

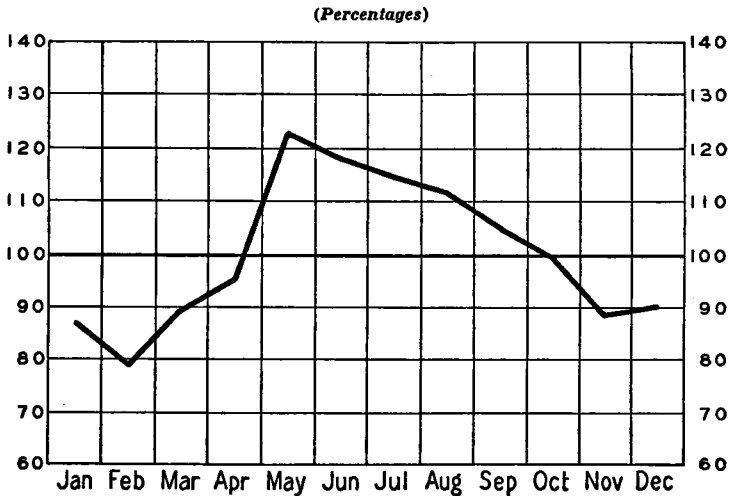
With butter the case is somewhat different. A considerable volume of butter goes into cold storage in the period of flush production that is drawn upon for consumption at other periods of the year. Consequently, it has seemed desirable to present the seasonal variation in consumption as well as production of butter during recent years (see Chart 5, p. 216, based on the period 1917-29).

In view of the staple nature of butter as an element of the diet, this chart shows a surprisingly large variation in the rate of consumption at different seasons of the year. The chart is expressed in percentage terms, but in actual volume national consumption has ranged in this period from an average of 119 million pounds in February to 185 million pounds in May.¹ No allowance is here made for the fact that February is a short month, but, even so,

¹ These averages are based upon figures that have been corrected for secular trend.

an extremely large variation is shown. Contrary to what might be expected by reasoning from the physiological point of view, consumption appears to be much larger in summer than in winter. Further consideration is given these matters in the discussion of prices in chapter xix, below. It is mentioned here to complete the general treatment of the subject of consumption.

CHART 5.—INDEX OF THE SEASONAL VARIATION OF CREAMERY-BUTTER CONSUMPTION IN THE UNITED STATES, 1917-29*



* Data from U.S. Department of Commerce, *Survey of Current Business*, December 1925, second semi-annual numbers thereafter, and February 1930. Index computed from monthly means adjusted for secular trend.

Relatively speaking, margarine passes through an even wider range between the months of highest and lowest consumption. As will be seen by reference to Chart 3 (p. 209), in recent years consumption has been at a maximum in November and at a minimum in July.

TREND OF EUROPEAN PRODUCTION OF MARGARINE

Although margarine was the invention of a Frenchman, it has never been an important element of the French diet, except possibly during the war. It has been much more widely used in other parts of northern Europe, particularly the Scandinavian nations, Germany, Holland, and the United Kingdom. Southern Europe has always used liquid oils, and continues to do so, while Russia apparently had a sufficiency of butter as long as conditions were normal, and even since then has not developed a margarine industry of any size.¹ Middle Europe undoubtedly uses margarine, but very little information regarding it is available on this side of the Atlantic.

In Europe, as in this country, the industry has been opposed from the beginning by the dairy interests of the various countries, and has everywhere been subjected to legal restrictions, although nowhere in Europe are these so severe as in the United States. Also, the opposition of the dairy interests there has been very much weakened by war and post-war developments, necessitating the practice of economy, while in this country there has been no similar weakening. Consequently, there has been a much more marked increase in the per capita consumption of margarine in certain of the European countries since the war than in this country. It is impossible to trace the growth in production in so much detail as for the United States, because very few countries have published the statistics with regularity. However, the statistical data for a few countries are sufficiently complete to show the trend. The post-war figures in comparison with those for 1913 are brought together in Table 5 (p. 219).

In Great Britain, and probably in the other allied countries as well, the peak of production was reached during

¹ In this connection, *Margarine-Industrie* (Berlin), March 1, 1929, XXII, 63, reports the building of a margarine plant in Leningrad by the Soviet government.

the war. The use of margarine had been increasing in Great Britain prior to the war, but probably at a very gradual pace.¹ As the war progressed and dairy and animal fats became scarcer and scarcer, it became necessary for more and more people to shift from butter to margarine. It has been estimated that the British production of margarine in 1913 was 84,000 tons (about 185 million pounds), and that it had increased by 1917 to 185,000 tons (407 million pounds).² Since the war, production has declined, but in 1925 it was still almost twice as large as in 1913. The President of the Board of Trade estimated the production in 1925 at 140,000 tons (308 million pounds).³ The United States Department of Commerce estimated it at 448 million pounds in 1926. The Imperial Economic Committee estimated the production of 1907 as 44,000 tons, of 1913 as 84,000 tons, and of 1925-26 as 150,000 tons.⁴

The Irish Free State produced margarine to a value of £265,130 in 1924, of £309,746 in 1925, and of £271,868 in 1926.⁵ In 1928, a duty of 3*d.* a pound was imposed. Figures for production in volume rather than value are not available, but, in 1928, 1,138 cwt., valued at £4,729, were imported and 16,340 cwt., valued at £58,771, were exported. The corresponding figures for 1929 were: imports, 947 cwt. (value, £3,990); exports, 21,408 cwt. (value, £75,773).

Danish production of margarine a little more than doubled in the years between the opening of this century

¹ The Standing Committee on Trusts of the British Board of Trade reported the growing popularity of margarine before the war. See *Report on the Oils, Fats and Margarine Trades* (Parliamentary Papers Commons, 1920, Vol 23, Command Paper 982).

² Estimates of Sir W. George Watson, quoted by the Ministry of Agriculture and Fisheries in a letter to the Food Research Institute of July 13, 1927. His estimates are: for 1913, 84,000 tons; 1914, 90,000 tons; 1915, 115,000 tons; 1916, 129,000 tons; 1917, 185,000 tons.

³ *Op. cit.*

⁴ *Report of the Imperial Economic Committee . . . Daily Produce*, p. 116.

⁵ Tariff Commission, *Report on Application for a Tariff on Margarine*, Eason and Son, Ltd., 40 and 41 Lr. O'Connell Street, Dublin.

and the outbreak of the war. The production in 1913 was 93 million pounds. During the next three years it continued to increase, but the blockade was then enforced, with the result that by 1918 production had fallen to only about 2.5 million pounds. Since then it has been advancing again, and in 1928 was about 168 million pounds a year.

TABLE 5.—MARGARINE PRODUCTION IN EUROPE, BY COUNTRIES, 1913 AND 1921-28*
(Thousand pounds)

Country	1913	1921	1922	1923	1924	1925	1926	1927	1928
Germany	496,035	.....	992,070	661,380	705,472	771,610	959,001	962,070	992,070
United King.	188,160	.....	.....	.....	.....	308,000	336,000	.....	448,000
Netherlands	194,987	218,859	193,791	237,549	233,302	291,078	296,263	339,831	.....
Denmark	98,255	122,796	123,237	143,740	152,999	154,768	154,323	158,399	168,300
Sweden	51,892	27,846	38,849	51,306	65,613	84,917	90,900	93,854	111,540
Norway . . . . .	.....	.....	.....	.....	94,623	97,554	94,376	95,429	.....
Finland	8,968	.....	.....	.....	11,355	13,470	15,430	.....	.....
France	33,069	.....	.....	.....	66,000	66,000	.....	.....	.....
Belgium	29,429	55,966	.....	63,981	66,054	79,366	61,729	.....	.....

* Data adopted from *Foreign Crops and Markets*, May 14, 1928, XVI, 704, May 20, 1929, XVIII, 716; and U.S. Bureau of Foreign and Domestic Commerce, *The Margarine Industry of Europe* (Trade Information Bulletin 677), 1930. The Belgian figures for 1921, 1923, and 1924 are computed from Belgium, Ministère des Affaires Etrangères, *Situation Economique de la Belgique*, 1924, p. 57. Dots (. . . .) indicate that data are not available.

The German government does not publish statistics of production, but the United States Department of Commerce has recently estimated the production in 1913 and the post-war years following 1921. These estimates show production to have been large, almost half a billion pounds, in the pre-war year and to have doubled between then and 1922. According to these estimates, there was a heavy slump in production in 1923, followed by gradual increases year after year until the present time, when production is approximately the same as in 1922, about a billion pounds a year. It is known that Dutch production in 1913 was about 195 million pounds and that it had in-

creased by 1916 to 378 million pounds. From then until 1919 there is a gap in our information. In 1919 and 1920, however, production was relatively but little greater than in 1913, and in the following year it was less than in 1913. Since then there has been marked expansion. The output in 1927 was some 310 million pounds.

Although Germany, the United Kingdom, Holland, and Denmark are the large European producers of margarine, the industry is important also in Norway, Sweden, and Belgium. As is indicated in Table 5 (p. 219), Norwegian production was 95 million pounds in 1924; Swedish production was 112 million pounds in 1928; and Belgian production was 62 million pounds in 1926. The large per capita consumption in the Scandinavian countries has already been referred to on pages 180-81.

With the closer and closer integration of the European margarine industry that is now occurring, and to which attention will be given in chapter xvii, large production may be anticipated in all countries where the new combine operates. Expansion will probably occur also in regions not hitherto exploited.

INTERNATIONAL TRADE IN MARGARINE

There is a large international trade in the raw materials from which margarine is made, particularly in copra and palm kernels, but the finished product is not transported on any considerable scale across national boundaries.¹ The principal trade is between Holland and the United Kingdom, but there are some exports from the Scandinavian countries and Holland to Germany. Most European countries have a tariff on margarine, but encourage the importation of the vegetable fats from which it is manufactured.

In the last few years net exports of margarine from

¹ See Snodgrass, *Copra and Coconut Oil*, p. 93.

Holland have averaged about 200 million pounds. During the war years they were somewhat larger, but the five-year average for the years immediately following the war (1919-23) was about 50 million pounds less. The 1913 exports were 157 million pounds. British net imports have been 120 to 150 million pounds a year in recent years. This is also somewhat higher than for the years immediately after the war, but the present tendency is in the direction of decrease rather than increase because of growth in domestic production.

Five years ago Germany had a net import of about 60 million pounds a year, but since then, primarily as a result of her increase of exports (but with a decrease in imports also), the balance has been reduced to less than 2 million pounds. The Scandinavian countries export small quantities of margarine, but in each case have a net import balance.

Statistics showing the net position of each of the more important countries are presented in Appendix Table VI. Such statistics are to be accepted with reservations because of the difficulties that customs officials experience in differentiating among the fats.

CHAPTER XVII

ORGANIZATION AND LOCATION OF THE MARGARINE INDUSTRY

At present in the United States the large meat packers produce something like one-third of the national output of margarine; the remainder is manufactured by other concerns, most of them outside of the meat trade.¹ The bulk of the packing-house product comes from the large Chicago companies—Swift, Armour, Wilson, and Cudahy. Production is not confined to their Chicago plants, but is carried on in various places throughout the country. The smaller independent packers do not produce margarine, except in one or two cases.

Outside of the packing-house group, there are several large margarine manufacturers, two of them as large as or larger than any of the packer producers. In addition, there are about 40 smaller manufacturers, some of the latter, however, producing 5 million pounds or more a year.

What financial interrelations exist among the various elements of the trade we are not in a position to know. Brands of certain companies are in some cases produced by other companies, but whether these are contractual relationships or something closer is not generally known. Several small firms have recently been purchased by large manufacturers, but as they have disappeared other inde-

¹ The United States census of 1925 showed a total margarine production for that year of 236,495,000 pounds, of which 170,233,000 pounds were produced by plants primarily engaged in margarine manufacture and 66,262,000 pounds by the meat-packing industry. More recent estimates of the trade place the proportion produced by the packers somewhat higher.

pendent units have taken their place. Best Foods, one of the largest of the non-packer producers and the predominant factor on the Pacific Coast, has recently been merged with the Gold Dust Company, manufacturers of the well-known cleanser of that name. In general, however, in this country the margarine and soap industries do not overlap, in spite of the similarity of raw materials.

As might be expected, all of the packers manufacture a combination animal-vegetable margarine, usually combining cottonseed or peanut oil with the animal fats. The independents, on the other hand, are about equally divided into those who produce a strictly vegetable or nut margarine and those who use animal fats in combination with vegetable oils. One of the largest non-packer manufacturers produces nothing but nut margarine. The other large producers outside of the packing industry use both types of fat. In fact, the plants manufacturing only a vegetable product are definitely in the minority and are all fairly new in the industry, although the production of vegetable margarine is now two-thirds of the total (see Appendix Table IV).

As has already been pointed out, all producers who use animal fats are subject to inspection by the Bureau of Animal Industry, as well as the Bureau of Internal Revenue. The Meat Inspection Act of 1906 provided for inspection of animals and animal products not only before and after slaughter, but also at all stages of preparation for interstate trade. Of the 71 margarine plants in the United States, 38 use animal fats and are subject to such inspection.

CONCENTRATION OF PRODUCTION IN A FEW PLACES

Margarine production has always been heavily concentrated in Chicago. This is natural in view of the large share in the output contributed by the large packing com-

panies, and the abundance and ready availability of animal fats there. A number of non-packer plants are also located in Chicago. Almost half of the national output is accounted for by the one revenue district. At present there is also a considerable production in California, New Jersey, Ohio, and Kansas, but elsewhere it is small. Until 1919 there was no margarine manufactured in California, but with the development of the Pacific trade in imported coconut oil and the growth of consumption there, particularly of nut margarine, production has come to be larger in California than in any other state except Illinois. The importance of New Jersey arises from similar factors. Close to port facilities, factories can readily utilize imported oils (or oil-bearing seeds) and at the same time take advantage of the most densely populated sales market in the country. The Best Foods Company is the most important single organization in California, while Best Foods and Swift produce the bulk of the New Jersey output. Other companies also operate in both states, but not on such a large scale. The large packers have margarine plants in Kansas City, and this accounts for the relatively large production there. The Ohio plants, on the other hand, of which there are three relatively large ones, are all non-packers, though not producers of nut margarine exclusively.

During the past 28 years, the industry has shifted considerably among the different states of the Union. In the early years of the century Illinois accounted for only about 40 per cent of the national production. Connecticut and Indiana, as well as Kansas and Ohio, had considerable output. By 1905-06 this situation had changed, Illinois accounting for 60 per cent or more of the production from then until the end of the war. Indiana and Connecticut declined greatly in importance in these years, and Kansas and Ohio became relatively less important.

As indicated above, it is only since vegetable oils, particularly coconut oil, have come into wide use, i.e., since about 1917, that California and New Jersey have become important producers. Since the war, the position of Chicago has been much less prominent than in the ten years previous. Recently Connecticut, which was formerly a fairly important producing state, and New York, which had a considerable production in 1920 and 1921, have disappeared from the picture.

The fact that the industry is definitely concentrated in a few states does not mean that consumption is localized. Practically all manufacturers produce for interstate trade. Chicago manufacturers have been known to ship to California. The larger packers and some of the independents have branch factories in various parts of the country from which the requirements of specific regions are supplied. Several of the California factories ship to states west of the Rocky Mountains. The Middle West is supplied from Chicago, Kansas City, Columbus, and other points, while the East is supplied not only from Eastern plants but by Middle Western producers as well.

MARGARINE PRODUCTION FREQUENTLY A SIDE LINE

In the organization of the packing-house companies, the production of margarine is viewed as a side line. The principal business is the slaughtering and packing of meat. The production of margarine is carried out in departments entirely separate from the rest of the packing houses, and financial gains and losses can be figured independently. Two of the packers, Swift and Armour, provide their margarine departments not only with animal fats from their own slaughterhouses, but also with vegetable fats crushed and refined in their own plants.

Several of the non-packer manufacturers, including Best Foods, Capital City, Glidden, and Troco, crush and

refine vegetable oils, or belong to organizations that do. Thus there is a degree of vertical integration in the industry even outside of the packing-house group. The non-packers, though in some cases subsidiaries of other organizations, are primarily margarine producers, but a number of them manufacture other products, such as mayonnaise, salad and sandwich dressings, cooking compounds, and candy. The packers manufacture soap as well as margarine, and consequently have soap, as well as margarine and other food products, as an outlet for their vegetable oils.

The crushing and refining of vegetable oils is usually carried on as an independent operation from the margarine manufacture, and the plants are frequently located in different cities and carry different names. However, as in California and New Jersey, margarine manufacture sometimes follows the general location of oil crushing. In these two cases, however, demand factors also influence these locations.

Several of the packers and some of the independent margarine producers also make and distribute butter, and the packers are also interested in the production and distribution of other dairy products. There is thus not only an integration between the margarine industry and other elements of the fats and oils trade, but also a certain, though more remote, connection between it and the commercial dairy industry.

ORGANIZATION OF THE EUROPEAN INDUSTRY

The history of margarine manufacture in Europe in the first few years after its introduction is not altogether clear. According to Clayton,¹ E. Pellerin bought the sole rights from the French inventor in 1871, and four years

¹ William Clayton, *Margarine*, p. 1.

later 300 tons per day were made in Paris alone. According to Fritsch,¹ Mège-Mouriez himself founded the Société Anonyme d'Alimentation with a capital of 800,000 francs, and was quite successful in this venture.

According to Fritsch,² attempts to produce artificial butter independently of the Mège-Mouriez process were inaugurated in the factory of Sarg at Liesing, near Vienna, by the American, Benford,³ who visited the Vienna Exposition in 1871 and took with him samples of American manufacture. Toward the end of 1873, Sarg began operations at Liesing by the Mège-Mouriez process, and by February 1874 was producing a good product. Soon thereafter the Vienna municipal authorities permitted its sale under the designation "Wiener Sparbutter" (Viennese economy butter). Owing to technical difficulties, progress was slower than in France, but by 1877 the daily production was equivalent to the butter of 30,000 cows.

According to Clayton,⁴ in 1874 Regondi and Chierichetti founded what grew into a large concern for the manufacture of margarine at Milan, Italy. A. Pellerin began manufacture in Scandinavia in 1876.

At the present time European production is practically controlled by two of the Dutch firms that began operations in the early 'seventies, Jurgens and Van den Bergh. These firms both started out primarily to manufacture margarine, but early in their careers branched out into the crushing and refining of vegetable oils, the manufacture of soap and candles, and similar operations. So far

¹ J. Fritsch, *Fabrication de la margarine et des graisses alimentaires* (Paris, Amédée Legrand, 1927, 2d edition), p. 56.

² *Op. cit.*, pp. 56-59.

³ The writer has been unable to identify Benford. A Dr. Belfield was active in Chicago at that time and developed a method for identifying the different animal fats by microscopic examination of their crystals. He testified before the Chicago Board of Trade in the famous McGeogh and Everingham case which involved the adulteration of lard.

⁴ *Op. cit.*, p. 2.

as we know, neither of them has ever been directly engaged in meat slaughtering or packing, although they may have subsidiary interests in these lines.

Van den Bergh early widened his margarine operations to extend outside of Holland, building a factory in Germany in 1887, another in Brussels in 1895.¹ He organized Van den Bergh, Limited, in England in 1890. Jurgens followed in the same direction somewhat later and organized important British and German subsidiaries. Even before the war these two firms held a large share of the German, Belgian, and British margarine business, as well as controlled the home market. According to Sir William George Watson,² of the Maypole Dairy Company (English), the Dutch found it necessary to establish German and Belgian factories because of the tariffs of these countries against Dutch margarine. Since there was no similar tariff obstructing importations into the United Kingdom, margarine was shipped as such from continental factories there until war conditions necessitated the establishment of factories in the United Kingdom also.

After the war these two firms continued to gain in power, especially in Germany where the scarcity of capital favored organizations with access to foreign money markets. It was reported several years ago that between them they controlled 60 per cent of the vegetable-oil-crushing and margarine capacity of Germany. They also added to their British interests until they controlled several of the largest of the producing units.

Until 1927 Jurgens and Van den Bergh operated independently of one another, competing actively in the domestic market, though frequently co-operating abroad. In 1927, however, they formed a combination providing

¹ For an interesting account of the development of these firms, see *Frankfurter Zeitung*, October 12, 1927, No. 758, p. 3.

² "The Manufacture of Margarine in the United Kingdom," *Journal of the Royal Society of Arts*, February 8, 1918, lxxvi, 213.

for common policies, especially as regards purchase of raw materials and sale of finished products. The list of subsidiary companies then included important elements of the margarine industry in Holland, Germany, United Kingdom, Belgium, France, the Scandinavian countries, Czecho-Slovakia, Austria, Hungary, and Jugo-Slavia. This combination was known as Margarine-Unie.

The British margarine industry was already highly centralized at that time, control resting mainly with Jurgens, Van den Bergh, and their subsidiaries, and with Lever Brothers. There, as on the Continent, the industry is closely related to that of vegetable oil crushing and soap making. Butter is also produced in several of the important plants. We know of no close association with meat slaughtering or packing.

In 1927, there were three factories in the Irish Free State, two in Cork, and one controlled by Jurgens in Waterford.¹

For several years past, the margarine makers of Europe have been merging into two groups—British and Continental—bearing the names Margarine Union and N.V. Margarine Unie. These companies, late in 1929, were consolidated with Lever Brothers, under an arrangement of division of correlating industries into two companies, called Unilever and N.V. Unilever. Control of the whole combine is to be divided equally between the two private groups—Lever on the one hand and Jurgens, Van den Bergh, and Schicht on the other. In widespread control of the raw materials, the oil seeds, and of the two chief outlets, margarine and soap, together with subsidiary outlets, this international combine now represents one of the strongest mergers of producers.

While in general the tendency in Europe is in the direction of integration, in Denmark, where the industry

¹ Tariff Commission, *Report on Application for a Tariff on Margarine*.

is important, the tendency was until recently in the opposite direction, namely, toward decentralization or localization. A few large factories control the bulk of the output (some of them operated by Unilever), but in recent years new factories have been springing up to fill local requirements, so that there are now 135 or more in all.¹ The vegetable-oil-crushing industry, which provides the margarine manufacturers with their raw material, continues, however, to be in the hands of a few firms.

The Norwegian industry is dominated by three factories, which produce two-thirds of the national output, but in all over 30 plants are in operation. As already mentioned, the Dutch combine operates in Norway, but, according to our understanding of the situation, does not control any of the largest factories. The invasion of foreigners is very much resented by the Norwegians. Sweden also has a well-developed margarine industry, operated in the main by domestic manufacturers, though it is reported that Unilever control three of the principal factories.

As already indicated, the German industry has come under the sway of the Dutch combine increasingly since the war. The German industry is located chiefly in the Rhine provinces, which are easily reached from Rotterdam. Everything indicates that the small independent German manufacturers are doomed because of the severe competition of the combine. In Belgium there are also a number of margarine factories, some of them independent, but many under the control of Unilever.

SIGNIFICANCE OF THE METHOD OF ORGANIZATION AND OPERATION

This description brings out certain facts which are of importance in any study of the margarine market. It

¹ See *Trade Information Bulletin* 677.

makes considerable difference from the marketing point of view whether a commodity is produced in the main part by large, financially powerful organizations or by small, weak ones. The presumption is that strong organizations can weather competition and general business depression far more successfully than weak ones. They can also initiate new policies, install new equipment, undertake advertising campaigns, and experiment with substitute materials, more readily than small organizations can.

Another matter of importance is whether the product is the main element of production or a joint- or by-product. If it is the main and only product of the industry, its price in the long run must cover all elements in the cost of production, in the short run at least the cost of raw materials and labor. On the other hand, if the commodity is one of several produced in the same plant, whether it be of co-ordinate or subordinate importance, its price, especially for short periods, may not be so closely related to costs as would be true if it were the sole product of the industry; in fact, may be quite unrelated to costs.

Other factors which have a similar bearing on the market are those connected with the standardization and distribution of the commodity. The marketing problem is very different in the case of a commodity which is custom made, or approaching that, from that of one whose manufacture is highly standardized. Men's clothing, for instance, must be manufactured and marketed under very different conditions from iron bars, or even loaves of bread. This distinction is of particular importance from the accounting point of view, since standardized products, when the volume of production is large, can be produced at a smaller cost per unit than under the reverse conditions. Similarly, as regards distribution, it makes considerable difference whether a commodity is

of such a character that it can be shipped great distances without deterioration or whether it spoils rapidly; also whether it be sold in small amounts by retailers, or in volume to large consumers. Finally, the part played by advertising and selling according to brands is a matter which must be considered in any marketing study. Even relatively standardized products, such as margarine, are usually sold according to advertised brands.

Enough has been said to indicate that the bulk of the margarine produced both in this country and abroad is the output of large manufacturing units of considerable financial strength. In this country the packers and a few large independents probably control 75 per cent of the output. Much of it is produced not as the sole or even main element of production but rather as a joint- or by-product. This is particularly true of the packers in whose economy it can only be viewed as a by-product. With the large independents it is a main product, although other commodities are also produced, while with the small independents it is either the sole or main product of manufacture.

This factor is important not only from the point of view of manufacturing, but from that of sales. The packer's main product is meat. His establishment is organized primarily to handle a large volume of meat at a small unit profit. Incidentally, he also produces a number of by-products upon which he aims to make a profit in the long run, but which he may sell at a loss for short periods if by so doing he facilitates the sale of his main product. This holds not only for production but for distribution. It costs little to deliver a small order of margarine to a butcher who is taking a large order of meat. In practice, this is actually the way the major portion of the packing-house product is sold, i.e., incidental to meat sales.

The manufacturer who is primarily or solely in the

margarine business, on the other hand, must cover all costs of manufacture and distribution in his long-time price of margarine. This fact may put him at a serious disadvantage in competition with the packers.

The extent of the standardization of margarine has been discussed briefly in Part II. On the whole, it must be considered a fairly well standardized product, though it does vary somewhat from one factory to another, and is subject to spoilage. It can be produced, therefore, in large volume at diminishing unit costs, a fact which has an important bearing on the size of the operating units engaged in the business at the present time. The aim of manufacturers is to keep the volume of output at the highest point consistent with plant efficiency and the marketing situation. Since there may be a limit to demand at a price which will cover all elements of cost, for the sake of plant efficiency a portion of the product may be manufactured for sale at just enough to cover costs of raw materials and labor with no allowance for overhead. To offset this, the remainder of the product must be marketed at a figure which exceeds total costs by at least the amount of this difference.

Most margarine is sold under widely advertised trade names. It is the practice of a number of firms to advertise a standard brand for which they attempt to obtain a uniform price, but to manufacture in addition other brands which are not advertised (although sold under trade names), for which they take what the market will bring. With most manufacturers, advertising costs are an appreciable element of total costs, probably at least 10 per cent.

CHAPTER XVIII

RECENT DEVELOPMENTS IN THE AMERICAN BUTTER INDUSTRY

There was a time when butter was the principal form in which American dairy products were marketed, but this is no longer the case. Modern conditions of refrigeration and transportation make it entirely feasible for whole milk to be delivered hundreds of miles without spoilage. It is consequently possible for urban populations to have literally as much fresh milk as they can pay for. There are practically no limitations to the supply in America at the present time.

In view of the premier position of fluid milk in the diet, what may be broadly regarded as the general conditions is for milk first to go into household use and thereafter into manufacture. That is, in a sense, fluid milk is the first product of the dairying industry and the various manufactured forms (butter, ice cream, cheese, condensed and evaporated milk, dried milk) are the second products. Some of them are or may be clearly by-products. But it would be incorrect, except in a national accounting, to draw such distinctions. There are regions in which cooperative producers' associations day by day deflect into other uses only such amounts of milk as cannot be absorbed by households and public eating places. But there are regions in which cows are maintained primarily for outturn of butter fat by farmers who are not equipped to market fluid milk, but only separated cream. Such regions have creameries organized to cover the outturn of the regions, and for a large part of the outturn these creameries are the only buyers of the farmers' product. Again, there are regions in which there is specialization

in the making of cheese, usually through co-operative action, where the cheesery is the principal buyer of milk. Finally, there are regions where the primary outlet for dairymen is the condensing plant. While, therefore, in the broad nutritional and agricultural senses, fluid milk is the primary product and the manufactured forms are secondary products or even by-products, in the regional sense butter, or cheese, or condensed milk may be the primary product. Improvements in refrigeration and transportation have greatly extended the radius of movement of fluid milk. But regional circumstances in production as well as investments by independents and co-operatives operate in favor of specialization in the manufactured products of milk.

THE GEOGRAPHICAL FACTOR

The importance of the market for whole milk to the butter market is fundamental to an understanding of the organization and location of the creamery-butter industry. It has already been shown (see p. 201) that several important dairy states are not large butter producers, and it was mentioned that the demand for market milk in the more densely populated parts of the country accounted for this. Butter production is no longer of much significance in any state east of Ohio, and even in that state the production of milk for household use and the manufacture of ice cream and concentrated milk products are encroaching on butter production. The important organizations in the eastern part of the country are Borden, Nestlé, and similar organizations which make a specialty of dairy products other than butter, but may manufacture their residual cream into butter. Small creameries continue to exist, but few of the large organizations in the industry have any interests in the Eastern states.

The largest organizations in the butter industry, as in

the margarine industry, have headquarters at Chicago, while the other large organizations are located elsewhere in the Middle West or on the Pacific Coast. Swift and Armour are both large butter producers. They have cream-collecting stations and manufacturing plants not only in Illinois, Indiana, Iowa, Kansas, Missouri, Nebraska, and Wisconsin, but in more remote regions such as the Dakotas, Montana, and Idaho. They also have a few plants on the Pacific Coast and in the central Southern states.

There are a number of other large concerns that operate in the Middle West, most of them not on the scale of the packers, but nevertheless very large organizations. These include such companies as the Blue Valley Creamery Company and the Beatrice Creamery Company of Chicago. Their creameries are primarily in Illinois, Missouri, Iowa, Kansas, Nebraska, and Michigan, but they have interests in the remoter dairy regions as well. Like the packers they are primarily in the butter business, but also engage in associated lines.

Throughout the Middle West and other dairy regions there are in addition great numbers of smaller, independent manufacturers and co-operative organizations. The co-operatives are particularly important in Minnesota and Iowa, but this type of organization can be found in all dairy regions.

The large organizations that collect cream from great distances and distribute butter nationally, i.e., the packers, Blue Valley, and similar companies, are known as "centralizers." The "co-operatives" and the "independents" are the other two classes of producers. The term "independent" is usually applied to the smaller manufacturer who may or may not have more than a local market. Some of the co-operatives, particularly the Land o' Lakes Creamery, Incorporated, in Minnesota, are relatively large producers and have a national market for their brands.

The situation on the Pacific Coast is somewhat different from that in the Middle West. In California there are two organizations manufacturing butter comparable in size with the centralizers, one an independent, the other co-operative, but they do not attempt to sell their product nationally. In addition, there are numerous small independent and co-operative creameries. In Washington and Oregon the companies evaporating or drying milk are of considerable importance, but there are also numerous independent and co-operative organizations manufacturing butter primarily, but also engaged in producing allied products.

TENDENCY TOWARD AMALGAMATION

In the last few years there has been a strong movement in the direction of amalgamation within the dairy-products industry. This has involved not only the purchase of small creameries by larger ones, but the balancing of production by the diversification of operations. Firms that before were only producers of butter have purchased ice-cream plants and gone into the distribution of milk to the household trade and the manufacture of concentrated milk products. In some cases these developments have been of a local character, i.e., firms carrying out such expansion have been content with relatively circumscribed fields of operations. In other cases, amalgamation has been on a national scale.

The motive behind it has been the desire on the part of butter manufacturers to obtain a place in the more profitable branches of the industry. There is good economic reason in sufficient diversification of operations for the greatest possible utilization of raw materials and plant. The demand for certain milk products is highly variable. This is notably the case with ice cream, but is somewhat true of other dairy products also. Sufficient

diversification to permit adaptation of production to demand is no more than prudent.

Expansion of operations by successful organizations, even on a national scale, is a natural development. Frequently, when such expansion has been undertaken, the plants that have been purchased have continued under the operation of the previous owners. Such amalgamations represent chiefly a merging of interests and unification of policy. Similar developments 25 or 30 years ago would have been looked upon with great suspicion, but now so many industries have been unified that there is no longer the same distrust of such developments.

There are several organizations, however, that fall in a somewhat different category. These are companies that have not developed with the industry, but have been organized in recent years to operate on a national or regional basis. They are not primarily interested in butter manufacture, but rather in milk distribution and other associated operations. Their plants are widely separated, the aim of their directors apparently being to tap the large centers of population rather than to build up a closely knit production organization.

Another new factor in the butter industry is the chain store. These companies not only are now large distributors of butter and other dairy products but have entered the production field as well. They may be of increasing importance in the future, since the chain-store method of distribution seems to be growing.

If these organizations and others of national scope pursue their present policies, it is quite conceivable that within ten years there will be practically no small, independent producers left in the industry. At present, many of the latter produce the bulk of their output on contract to the national distributing organizations. Such relationships may naturally develop from contractual ones into something closer and more permanent.

SIMILARITIES AND DIFFERENCES BETWEEN THE MARGARINE
AND BUTTER INDUSTRIES

Through the activities of the packers and a few other organizations, the margarine and butter industries overlap. As has already been pointed out, margarine is definitely a by-product with the packing houses. It provides an outlet for high-grade oleo oil and neutral lard. Butter production, on the other hand, has no organic relations to packing-house operations, but is a side line that has developed with the widespread geographic organization of the packers. In order that they might be assured of a supply of livestock, receiving stations were early established in all important agricultural districts. Depots for meats must be regionally maintained. Extension of operations to butter, cream, poultry, and eggs was a natural development of this process. As it has worked out, the skim milk which is a by-product in the manufacture of butter is an essential material for the manufacture of margarine.

The wisdom of the packers in producing and distributing such competing products as butter and margarine may be questioned. However, similar question might arise over the production and marketing of choice and inferior cuts of meat. The same extent of competition exists in the second case as in the first.

Aside from the packers, there are only a few organizations that manufacture both butter and margarine. The butter manufacturers, as already stated, tend to extend their interests to include other dairy products, and eggs, while the margarine manufacturers as a rule develop side lines in oil products.

The size of the two industries is very different. There are thousands of organizations manufacturing butter, only about 70 manufacturing margarine. It is true that the number of large butter manufacturers probably does not

exceed one hundred and that the trend of the industry is toward amalgamation. Nevertheless, the one is a relatively concentrated industry, the other at present greatly dispersed.

There is a further dispersion of interest in butter manufacture in that the relation between the creamery and the milk producer is necessarily very close. Many of the creameries advise dairymen on matters pertaining to the feeding and care of cows and the handling of milk. The relation between a group of farmers and the creamery to which they sell their milk is ordinarily more or less permanent. Prices of butter fat are established at central markets, and the differentials paid at plants are understood by the farmers delivering milk. If the creamery is reasonable in its business dealings, it is able to foster good will, improved animal husbandry, and sanitation throughout the community that supplies it.

There is no such relationship between the manufacturers of margarine and the producers of the raw materials that are used in it. Raw materials are purchased in volume from oil refiners or slaughterers. There is no direct contact between original producer and manufacturer. Margarine manufacturers have none of the opportunities of butter manufacturers to foster good or ill will among agricultural producers.

Methods of distribution are similar in the two lines in that sales are made direct to the retail trade where this is possible, otherwise through wholesalers and jobbers. Both commodities are advertised by trade names and all possible pains taken to establish a permanent market for definite brands. Off grades are sold at whatever price the market will bring.

CHAPTER XIX

THE RELATION BETWEEN THE BUTTER AND MARGARINE MARKETS

No study of the interrelation of these two commodities would be complete without an examination of their prices, since it is the difference in price that is primarily responsible for the displacement of butter by margarine. In fact, probably one of the main reasons why margarine causes such rancor in the butter industry is that the difference in costs (and consequently in prices) is so great that there is no possibility of its being wiped out by efficiency of operation on the part of the butter industry. Butter is unavoidably a relatively expensive commodity to produce; margarine relatively cheap. This places the butter industry at a severe and permanent disadvantage unless quality is taken into consideration. In this chapter and the next it is proposed to examine in detail the nature of the price relationship between the two commodities.¹

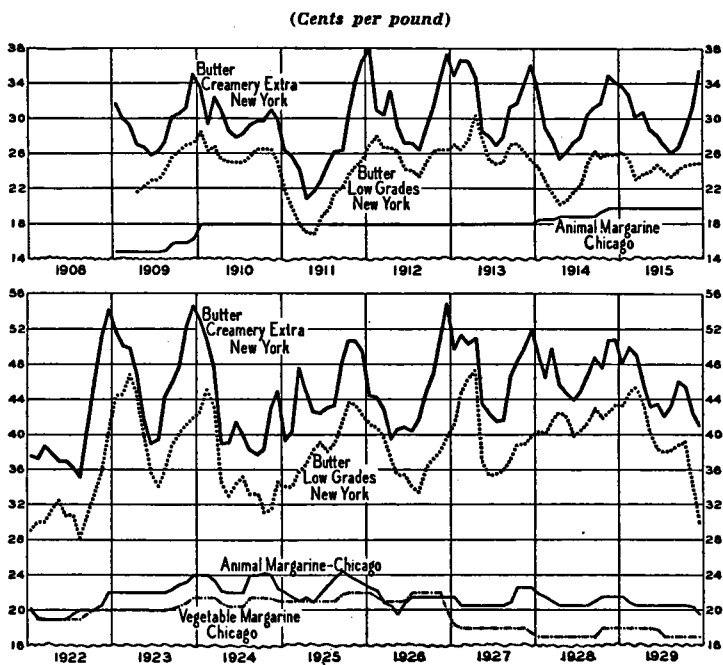
RELATIVE LEVEL OF MARGARINE AND BUTTER PRICES

Chart 6 (p. 242) gives a representative picture of the course of prices in the two markets. It is based on quo-

¹ It is to be recognized that henceforth the prices of butter and prices of margarine may behave differently than in the past because of the establishment of futures trading in butter. This provides for butter a price registration which it has not possessed and which is not in effect for margarine. There is, of course, futures trading in some of the raw materials sometimes used in the manufacture of margarine—for example, lard and cottonseed oil. But a manufacturer of margarine could hardly hedge by purchase of futures, whereas creameries are now in the position of hedging on the butter market. The advantage may turn out to be not all one-sided, since the margarine-maker foresees the price of butter, whereas the butter-maker cannot in the same way foresee the price of margarine.

tations for a high- and a low-grade butter, and for uncolored animal and vegetable margarine, in the pre-war period from 1909 to 1916, and the post-war period, 1922-29.

CHART 6.—WHOLESALE PRICES OF A HIGH-GRADE AND A LOW-GRADE BUTTER AND OF ANIMAL AND VEGETABLE MARGARINES IN THE UNITED STATES, MONTHLY, 1909-15 AND 1922-29*



* Data from U.S. Bureau of Labor Statistics, *Wholesale Price Bulletins* and *National Provisioner*.

Medium-grade butter follows high-grade butter very closely as to fluctuations and averaged only 2.18 cents lower during the eight years, 1922-29. Since it has no

independent variability, it has not been charted. Vegetable margarine was not on the market in the pre-war period, so there were no quotations for it during that time.¹

From this chart it is apparent that butter and uncolored margarine never overlap in price. During the past seven years the wholesale price of uncolored margarine has been, on an average, 15 cents or more below the price of inferior grades of butter. The difference between margarine and high-grade butter prices has been even greater.

Since margarine is a substitute for butter, it might be expected that during the months of butter scarcity in the middle of the winter margarine prices would advance to approximately the level of low-grade butter. Or, following a different line of reasoning, it might be anticipated that in the summer, when butter is plentiful, butter prices would fall to the margarine level. An examination of the prices shows, however, that at only three periods since 1909 has low-grade butter been priced within 5 cents of uncolored margarine. In general, prices of the two commodities tend to be closer in summer, when butter is plentiful, than in winter, when it is relatively scarce. This is because butter prices fluctuate with the seasons more than margarine prices and consequently approach closer to the level of margarine prices in summer than in

¹The discussion of prices in this book is based on quotations for the following grades of butter and margarine: (1) butter, creamery, extra, at wholesale in New York, same grade in the pre-war and post-war periods, quoted by the Bureau of Labor Statistics; (2) butter, low grade, at wholesale in New York, "process" before the war, "lower grades" since 1920, quoted by the *National Provisioner*; (3) margarine, animal fat, wholesale in Chicago, post-war, quoted by the *National Provisioner*; butterine, pre-war, quoted by the same periodical; (4) margarine, nut, at wholesale in Chicago, available only for the post-war period, also quoted by the *National Provisioner*. The average retail price of butter in the United States, as quoted by the Bureau of Labor Statistics, has also been examined, but this quotation has not been used in any computations. The same is true of quotations for medium-grade butter quoted by the *National Provisioner*.

winter. In recent years, however, the difference has usually been as much as 10 cents between low-grade butter and uncolored margarine even in the summer.¹

Colored margarine prices may be assumed to be at least 10 cents higher than uncolored, because of the 10-cent tax. This commodity, which, however, is so unimportant in volume as to be of no significance, may compete, therefore, directly with low-grade butter during the summer. Except for it, margarine and butter prices do not overlap even periodically.

DISPLACEMENT OF BUTTER BY MARGARINE

The partial displacement of butter by margarine is an established fact, already commented on above (see chapter xvi), and further emphasized in the tabulation on the opposite page, which shows the relative importance of the per capita consumption of margarine to that of butter, year by year, since 1889.

From this it will be seen that the per capita consumption of margarine was only 3.1 per cent of that of butter at the time of the taking of the 1889 census. By 1899 this ratio had increased to 5.5 per cent. Margarine consumption continued to increase in proportion to butter until 1902, when the law was amended; then it declined from 7.8 to 2.7 per cent in 1904. The ratio remained low for several years but gradually increased to 8.9 per cent in 1913. It remained at approximately this figure in 1914; it cannot be computed for 1915 and 1916 because of the absence of estimates of butter production; but in 1917 it had risen to 15 per cent of butter consumption. In the next three years margarine consumption reached its peak, while that of butter declined further. Between one-fifth

¹ Parenthetically, it may be said that the fact that uncolored margarine has been within 5 cents of the price of butter on occasions is an argument for the 10-cent tax on colored margarine.

and one-quarter of a pound of margarine was used for every pound of butter. After the war, butter consumption increased, so that from 1922 to 1926 the ratio of margarine consumption to that of butter was very decidedly lower than during the war (10-12 per cent). In the last few

TABLE 6.—RELATIVE IMPORTANCE OF CONSUMPTION OF MARGARINE PER CAPITA TO CONSUMPTION OF BUTTER, ANNUALLY, 1889-1929*

(Percentage, margarine consumption of butter consumption)

Year	Percentage	Year	Percentage
1889	3.1	1910	8.6
1890	2.6	1911	7.5
1891	3.6	1912	7.6
1892	3.6	1913	8.9
1893	5.1	1914	8.5
1894	5.1		
		1915 .....	.....
1895	3.5	1916 .....	.....
1896	3.0	1917	15.0
1897	3.1	1918	21.5
1898	3.6	1919	22.6
1899	5.5		
		1920	24.0
1900	7.1	1921	16.5
1901	6.7	1922	10.5
1902	7.8	1923	11.3
1903	4.2	1924	12.2
1904	2.7		
		1925	11.2
1905	2.7	1926	11.8
1906	2.7	1927	12.4
1907	4.4	1928	14.4
1908	5.0	1929	16.2
1909	5.6		

* Based on statistics of Appendix Tables I and II. All the weaknesses of the original figures apply to these. The butter figures apply to calendar years; those for margarine to fiscal years. Dots (.....) indicate that no data are available.

years, on the other hand, margarine has been gaining on butter again.

Competition, then, has been especially pronounced between the two commodities since 1917. The use of fats in the diet tends to be inelastic, and when for any reason the consumption of butter is curtailed the deficit is made up, at least in part, by other fats. This was evidently what happened in 1918-20, when, under the influence of high prices, per capita consumption of butter declined to the phenomenally low figure of 14-15 pounds a year, while that of margarine increased from 1.5 pounds, or thereabouts, to 3-4 pounds. It may be said that during the war butter interests lost to the margarine industry approximately one-sixth of their potential market and more than one-tenth of their usual market.

Conditions at that time were abnormal, but the hold which the margarine industry obtained then has been in part retained. In the last few years per capita consumption has averaged between 2.2 and 2.8 pounds a year for the country as a whole, as compared with 1 to 1.5 pounds before the war, while the ratio to butter consumption has risen from 7-8 per cent before the war to 14-16 per cent now. This indicates more of a gain for the margarine industry than is at once apparent because real incomes are now higher than they were before the war, and from that point of view more people can afford butter now than could then.

The consideration of special interest to the student of the market is how this displacement or shift has been brought about. Is it the result of a cheapening in the price of margarine as compared with butter, or is it due to improvement in the quality of margarine? Does it make itself felt throughout the calendar year, or only at times of relative scarcity of butter? Is there a market for margarine quite independent of the supply and price of butter? These questions will now be considered.

MARGARINE CHEAP IN PRICE

The best way to find out whether margarine is cheaper now, as compared with butter, than it was formerly is by an examination of the price of the one in terms of the other annually over a period of years. Such a comparison has been made for 1901-28 in Table 7 (p. 248). The same material is presented graphically in Chart 7 (p. 249).

In making such a comparison, we do not mean to imply that the two commodities are nutritionally, or in any other sense, the same. We are merely attempting to get at the reasons why consumers should be led to shift their demand from butter to margarine. Nutritionally, the two commodities have not changed during this period.

From this chart it is apparent that since 1919, except for one year, margarine prices have declined in relation to butter prices; in fact, this cheapening has been going on ever since 1915, as there have been only two years since then when margarine prices have advanced, as compared with butter, instead of declining. At present, margarine is cheaper in terms of butter than it has been at any time since 1901. We have no record prior to that year. In 1907, a panic year, it was about as low in relation to butter as in 1929. The first question raised above, it would seem, therefore, may be answered in the affirmative. Such a steady decline in the price of the substitute may be assumed to have been one factor, perhaps the major factor, accounting for the increase in its use.

This factor is probably of more importance than change in the quality of the margarine on the market. The most important change in the quality of margarine in recent years arises from the greater use of coconut oil now than was formerly the case. Although it is claimed by many that the nut margarines are superior to oleomargarine, this is a matter of taste which can scarcely be proved. However, the vegetable product may have attracted certain groups of consumers who have religious

MARGARINE AS A BUTTER SUBSTITUTE

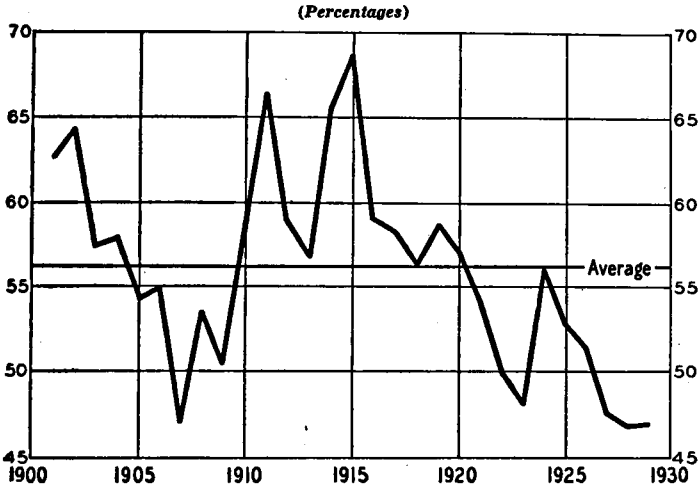
TABLE 7.—RATIO OF WHOLESALE PRICES OF MARGARINE TO WHOLESALE PRICES OF BUTTER, 1901-29*

(Cents per pound)

Year	Margarine	Butter	Ratio
1901	13.2	21.1	.626
1902	15.5	24.1	.643
1903	13.2	23.0	.574
1904	12.6	21.8	.578
1905	13.2	24.3	.543
1906	13.5	24.6	.549
1907	13.0	27.6	.471
1908	14.4	26.9	.535
1909	14.6	28.9	.505
1910	17.5	29.8	.587
1911	17.5	26.4	.663
1912	17.5	29.7	.589
1913	17.5	30.8	.568
1914	17.9	27.3	.656
1915	18.8	27.4	.686
1916	18.8	31.8	.591
1917	23.5	40.3	.583
1918	27.6	48.9	.564
1919	33.6	57.2	.587
1920	32.5	56.8	.572
1921	21.6	40.0	.540
1922	18.8	37.7	.499
1923	21.4	44.4	.482
1924	22.4	39.9	.561
1925	22.5	42.6	.528
1926	21.3	41.4	.514
1927	21.1	44.3	.476
1928	21.0	44.9	.468
1929	20.5	43.7	.469

* Based on wholesale prices of butter at Elgin, Illinois, 1900-13, and of butter, extra, at Chicago, since 1914; on butterine at Chicago prior to 1922, and animal-fat margarine since then.

CHART 7.—RATIO OF MARGARINE PRICES TO BUTTER PRICES AT WHOLESALE, 1901-29*



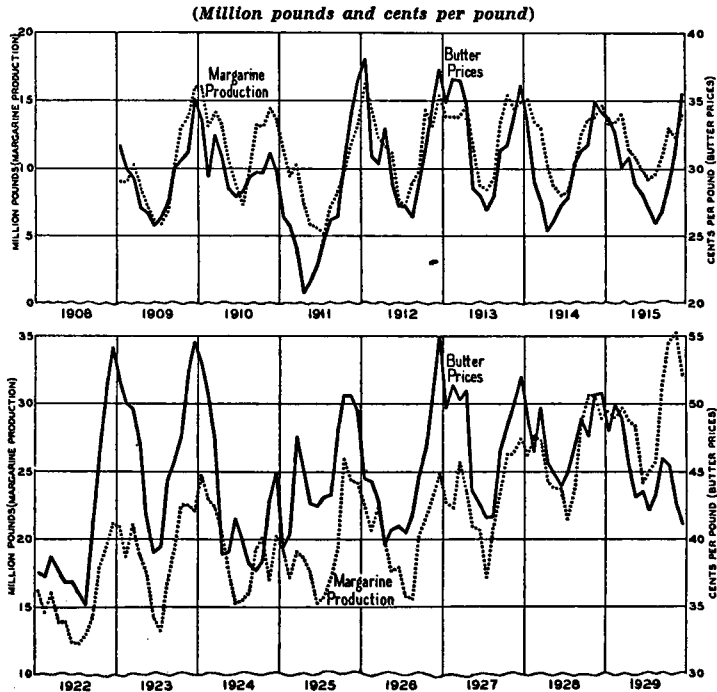
or other scruples against the use of animal products, i.e., Jews, Mohammedans, vegetarians. Nevertheless, it can probably be said with assurance that the cheapening in the price of margarine is the principal reason for its greater use now than formerly.

SEASONAL RELATION BETWEEN THE TWO MARKETS

Averages of annual prices are sufficient for a study of the displacement of the one commodity by the other over a considerable period of time. But before we can understand all aspects of the interrelationship between the two markets, study must be made of the monthly trend of consumption of the two commodities in their relation to prices. It is only thus that light can be thrown on the nature of the shift which occurs from one commodity to the other within the course of a year.

Chart 8 exhibits in conspicuous fashion the close relationship between the price of butter and the production of margarine, monthly, during the five years before the war and since 1922. The fluctuations in both series are here shown to be predominantly seasonal, butter prices and margarine production rising in winter and falling in summer, a fact which has been emphasized in chapter xv. This indicates unmistakably that high butter prices lead

CHART 8.—RELATION OF MARGARINE PRODUCTION TO BUTTER PRICES IN THE UNITED STATES, 1909-15 AND 1922-29*



* Data from U.S. Bureau of Labor Statistics, *Wholesale Price Bulletins*, and *Annual Reports* and press releases of the U.S. Bureau of Internal Revenue. Price quotations are for creamery-extra butter at New York.

consumers to shift to the use of margarine, and that, vice versa, low butter prices lead to a falling off in margarine consumption. As a rule, butter prices are high in winter, and consequently the increase in margarine consumption usually occurs at that time. A close correlation is maintained, however, even when butter prices do not follow their usual seasonal course, as, for instance, in the winter of 1910-11 and again in 1924-25.

As is shown in Chart 5 (p. 216), consumption of butter in this country is usually highest in the months of May, June, July, and August. It then declines rapidly to a low winter level which lasts from November to March. Consumption of margarine, on the other hand, is at its maximum from October to February; declines rapidly from then until July, when it begins to advance again. With both commodities there appears to be more of a level of consumption in the winter than in the summer. Variations, in other words, are greater from month to month in the summer than in the winter. Charts showing the seasonal variation in production of margarine and butter are to be found on pages 204 and 209. The consumption of margarine varies in approximately the same manner as the production. The consumption of butter, on the other hand, varies somewhat from production because account must be taken of foreign trade and stocks in cold storage.

The puzzling feature of the consumption curves is that they accord so poorly with accepted ideas regarding the consumption of fats. It has been assumed that people tended to increase their utilization of fats in the winter because of the greater need of the body for heat during cold weather. Butter consumption, however, and butter-plus-margarine consumption, have been approximately a third larger in summer than in winter during recent years. Consumption of margarine rises in winter and falls in summer, but since it is relatively unimportant in the diet as compared with butter it does not change the course

of seasonal consumption of fatty spreading materials as a whole.

It must be remembered in this connection that there are many other ways of obtaining fat in the diet than through spreads for bread. In winter the consumption of meat is relatively high, and gravies are used more freely than in summer. These are both important ways of increasing the fat in the diet. In summer, on the other hand, sandwiches and vegetables, both of which require butter or a similar spread, probably increase in use. These seasonal dietary variations help to explain the relatively low consumption of butter in the winter months.¹

But there can be no doubt that price plays a very important part in determining the rate of consumption of butter. Because of the inevitable seasonal characteristic of butter production, butter prices rise markedly in the winter, as compared with the summer. Primarily because of this rise, but for other reasons too, as noted above, consumption is much curtailed in winter. Among those families where butter is used as a spread for bread it is spread thinner; among those who also use it for cooking it is used less generously than in summer.

Margarine, on the other hand, not being subject to inevitable seasonal factors on the production side, shows no such variation in price between winter and summer. Since the rate of consumption depends a good deal on the price of butter, it rises from a low level in summer to a high one in winter. This is only in part a result of seasonal variations in the consumption of people who use margarine exclusively, but probably is accounted for mainly by shifts on the part of ordinary butter consumers from butter to margarine.²

¹ If in a diet one must depend on the vitamins in the spreading materials, then butter must be chosen and not margarine.

² Compare "Jahreszeitliche Schwankungen der Nachfrage bei Butter, Margarine und Schmalz und ihre Ursachen," *Blätter für Landwirtschaftliche Marktforschung*, June 1930, I, 20-24.

From this discussion it is apparent that the consumption of both butter and margarine are closely related to the price of butter. It is not to be concluded, however, that the margarine market is entirely dependent on butter prices, or that the butter market is altogether independent of the margarine market. The butter market reacts on the margarine market, and the margarine reacts on the butter market, but each is subject to factors both of demand and supply quite independent of the other. On the demand side, there are great numbers of people (probably the majority) who never use the substitute. Similarly, there are many people (though only a small minority) who never use butter. To them margarine is the accepted spread for bread. Butter is too expensive to figure in their economy. Still another group may consistently use butter as a spread for bread, regardless of the season or price, but equally consistently use margarine for cooking.

Outside of these groups of people of stable habits are many who shift either in part or altogether from the one commodity to the other. In summer they will use butter as a spread for bread, but margarine for cooking. In the winter, when butter is high, they will use margarine for all purposes. Or they may always mix or blend the two commodities, but increase the amount of margarine in the mixture in the winter, decrease it in the summer. Thus the interrelation between the two markets comes about. At the same time each maintains its more or less independent character as well.

In this connection, the quality of margarine is of importance. A certain amount of margarine, even of inferior quality, can probably be sold every year in this country if it is priced low enough. But the extent to which people who ordinarily use butter shift to margarine, either in the season of high butter prices or permanently, undoubtedly depends in part on the quality of

the margarine. If the margarine were not palatable, such people, in a country as prosperous as the United States, would probably work out other substitutes in their diet, or make the necessary sacrifice to have butter. It is these consumers who are the most likely potential converts to the permanent use of margarine. Whether they are converted must depend largely on the quality of the margarine as well as on the price of butter.

In summary, our investigation shows:

1. That margarine, as a rule, is priced as much as 15 cents lower than even low-grade butter. The two commodities are nearer the same price level in summer than in winter.

2. That margarine is cheaper now as compared with butter than at any time since 1901, the first year for which we have quotations. This is probably the principal reason why more margarine is consumed now, per pound of butter, than was the case before the war.

3. That both butter and margarine have independent markets; but that there is also strong interaction between the two markets because of the shift on the part of a certain number of butter consumers to margarine when the price of butter is high.

CHAPTER XX

FURTHER CONSIDERATION OF THE MARGARINE AND BUTTER MARKETS

There are several other problems connected with the market that need consideration. They may be outlined as follows:

1. What would happen to butter prices if margarine production were curtailed or prohibited altogether? In other words, how does the fact that a commodity like margarine is on the market in adjustable volume affect butter prices?
2. What accounts for the cheapness of margarine relative to butter in recent years?
3. How do business conditions affect margarine production?
4. Is competition increasing or decreasing within the margarine market itself?

No one can tell with certainty what would happen to butter prices if the manufacture of margarine were curtailed or prohibited. Presumably, the immediate effect of a curtailment of the margarine supply would be an increase in the price of butter, because the demand for butter would be increased. This might lead to importation of foreign butter over the tariff, and in due time to a reduction in price. However, with the present high tariff rate there would still probably be a large body of consumers who could not afford to use butter. These would then presumably resort to such substitutes as lard, jams or jellies, cheeses, and the like. Elimination of margarine, then, would not increase the demand for butter by the full amount of the reduction in margarine, but only

by a portion of this amount. But no one could forecast the net effect on butter demand or butter price.

Margarine and foreign butter act as the two principal checks on high butter prices on the supply side of the market. Prohibition of margarine would have little effect on butter prices if the tariff rate were low, because foreign butter would be imported. If the domestic supply were protected by a prohibitory tariff and a prohibitory margarine law, the price of butter could be advanced just as far as domestic demand would permit. As already indicated, there would be definite limits to this demand, however, because butter is not an essential commodity. The butter trade is convinced that consumption of butter declines radically if prices go beyond a "reasonable" point. This factor now acts as a check on high butter prices, particularly in the winter.

It may be concluded, therefore, that margarine production is one of the important factors bearing on the butter market, but that other factors are of equal or larger importance.

COCONUT OIL A CHEAP INGREDIENT OF MARGARINE

The increasing use of coconut oil in recent years is the principal reason for the cheapening of margarine as compared with butter. Oleo oil and neutral lard are more expensive. In 1913 and the early war years, coconut oil was as high or higher than they, but in most years since the war it has been much cheaper. Many high-grade margarines continue to include animal fats, but the cheaper grades are principally made of coconut and peanut oil, and the low prices ruling for coconut oil affect the average for all kinds of margarine. Table 8 (p. 258) shows prices of coconut oil, oleo oil, and neutral lard, annually from 1900 to 1929, expressed in actual terms and relative to 1913. The low level of coconut-oil prices, as compared with the other two, in all years, except 1914-16 and 1921,

is demonstrated. This is the principal reason why margarine is relatively cheap at the present time, but it should also be recognized that the edible oils and fats as a group—not only coconut oil—have been lower than many other groups of commodities since the war. This is true not only for the United States but for Europe also.¹

The increasing importance of coconut oil as an ingredient of margarine was indicated in chapter xii (p. 144). It was there shown that whereas practically none of this material was used in margarine before the war, in the fiscal year ending in June 1929, 42 per cent of all ingredients (including milk) was coconut oil. It is by far the principal ingredient both in this country and abroad. Naturally, if it is cheap, the finished product should be relatively cheap, no matter how good.

INCREASING COMPETITION AMONG MARGARINE PRODUCERS

Reference to Chart 6 (p. 242) will show how much more pronounced are the short-time fluctuations in margarine prices in recent years than they were before the war. Prices remained the same for years at a time during that period.² Now they fluctuate relatively little as compared with butter, but much more than they used to.

It is quite possible that the quoted prices for margarine do not correctly represent the market. Manufacturers are very reluctant to change the prices for their advertised brands, but they frequently do so for unadvertised or inferior goods. Under this system, quoted

¹ See Faure, Blattman & Company, *Review of the Oil and Fat Markets, 1927*, p. 11. It is there stated: "It is interesting to note, that, whilst the prices of lard and cotton oil in America are not appreciably lower than 1913 prices increased by the wholesale index figure, the prices of copra, linseed oil, and tallow in Europe are very appreciably below the average 1913 values increased by the wholesale index figure."

² In Great Britain, also, prices have been remarkably free from fluctuations for the period 1923-26. *Report of the Imperial Economic Committee . . . Dairry Produce*, p. 117.

TABLE 8.—ACTUAL AND RELATIVE PRICES OF COCONUT OIL, OLEO OIL, AND NEUTRAL LARD IN THE UNITED STATES, 1900-29*

(Cents per pound; index numbers, 1913=100)

Year	Coconut oil (Cochin)		Oleo oil extra		Neutral lard	
	Actual	Relative	Actual	Relative	Actual	Relative
1900.....	6.275	51.64	.....	.....	8.107	66.77
1901.....	7.716	63.50	.....	.....	9.903	81.57
1902.....	8.353	68.74	11.418	100.67 ^a	11.766	96.91
1903.....	6.308	51.91	8.424	74.27	9.961	79.82
1904.....	7.086	58.31	8.080	71.24	8.063	66.41
1905.....	7.487	61.61	9.707	85.58	8.696	71.63
1906.....	8.346	68.68	9.608	84.71	9.610	79.15
1907.....	10.015	82.41	9.857	86.91	9.432	77.69
1908.....	7.561	62.22	12.081	106.52	9.212	75.88
1909.....	7.917	65.15	12.592	111.02	12.605	103.82
1910.....	10.427	85.80	12.470	109.95	13.846	114.04
1911.....	9.592	78.93	9.749	85.95	10.370	85.41
1912.....	10.101	83.12	13.087	115.39	12.390	102.05
1913.....	12.152	100.00	11.342	100.00	12.141	100.00
1914.....	12.681	104.35	10.873	95.86	11.872	97.78
1915.....	12.609	103.76	12.197	107.54	12.031	99.09
1916.....	15.957	131.31	13.990	123.35	15.189	125.11
1917.....	20.548	169.09	21.692	191.25	24.343	200.50
1918.....	20.112	165.53	25.667	226.30	29.142	240.03
1919.....	19.527	160.69 ^b	30.692	270.60	33.215	273.58
1920.....	17.933	147.57	21.392	188.61	24.822	204.45
1921.....	12.562	103.37	11.333	99.92	13.634	112.30
1922.....	9.505	78.22	10.717	94.49	13.104	107.93
1923.....	10.178	83.76	12.972	114.37	14.355	118.24 ^c
1924.....	10.614	87.34	15.117	133.28	15.933	131.23
1925.....	12.355	101.67	13.708	120.86	19.260	158.64
1926.....	12.009	98.82	12.103	106.71	17.102	140.86
1927.....	9.750 ^d	.....	13.302	117.28	14.275	117.58
1928.....	9.570 ^e	.....	13.386 ^e	.....	13.660	112.51
1929.....	8.544 ^d	.....	10.069 ^f	.....	13.421	110.54

* Oleo oil prices were compiled from *Oil, Paint, and Drug Reporter*, 1902-13, and the *National Provisioner*, 1914-29. Coconut oil (Cochin) from *Oil, Paint, and Drug Reporter*, weekly, except 1920-26, when the annual surveys

prices may remain unchanged during a period of active competition.

This probably describes the situation in the margarine market in recent years. The same may have been true even in the pre-war period when prices appeared to be fixed, although probably not to the extent of the present time. The introduction of vegetable margarine and the use of coconut oil undoubtedly brought a new element into the industry and increased the competition among producers.

This subject is closely related to the question why margarine prices do not advance any more than they do with the rise of butter prices in the winter. It might be expected that, with the increase in consumption of margarine that always occurs in the winter, prices would advance more or less commensurately with butter. As a matter of fact, reference to Chart 6 (p. 242) will show that the winter level of margarine prices is usually higher than the summer level, though the difference is small as compared with the shift in butter prices between the two seasons. As has already been suggested, costs of producing margarine do not increase in the winter. There is no scarcity of raw materials at that time. Consequently, except under monopoly conditions, price advances would lead to an increase in supplies and in turn to a reduction in prices.

of *Oil, Paint, and Drug Reporter* were used. Coconut oil (Ceylon), 1927-29, from *Oil, Paint, and Drug Reporter*, annual surveys. Oleo oil, extra, from *Oil, Paint, and Drug Reporter*, 1900-13, and from the *National Provisioner*, 1914-29. Neutral lard from the *Oil, Paint, and Drug Reporter*.

* Ten months.

† Three months only.

• Six months.

• Coconut oil (Ceylon), domestic (in barrels), instead of coconut oil (Cochin). Relatives are not computed.

• Oleo oil, extra, in tierces for 9 months only. The relative is not computed.

† Oleo oil, extra, in tierces. The relative is not computed.

PRICE RELATION OF VEGETABLE AND ANIMAL-FAT MARGARINES

Thus far no mention has been made of the relation of the prices of vegetable margarine to animal margarine, though the reader has been referred to charts showing the relationship (see above, Chart 6). As a rule, vegetable margarine is 1 to 3 cents cheaper than animal-fat margarine at wholesale, though at times the difference is wiped out and vegetable margarine sells at a premium above the animal product. The vegetable product is the cheaper to produce, but since oleo oil and neutral lard are by-products their prices may be unrelated to the cost of production.

CHAPTER XXI

BUTTER IN COMPETITION WITH THE FATS AND OILS

It is important to recognize the broad fact that fats and oils form a continuously overlapping series from the cheapest vegetable oil to the dearest butter. Fats and oils possess two groups of characteristics, the one related to the three higher fatty acids whose glycerides make up in large part the body of every fat and oil, the other related to diverse components which vary from product to product. The calorific value of butter is practically the same as that of lard; it is other components than the triglycerides of palmitin, stearin, and olein that give butter its qualities superior to lard. Whenever fats and oils are used for the sake of the glycerides of the higher fatty acids, all of the fats and oils become substitutable to some extent. The extent of substitution has been greatly increased by technical developments in refining, decoloration, deodorization, neutralization, and hydrogenation. The substitutability of the several fats and oils is greater for industrial uses than for food uses. Nevertheless, it exists for the latter. With proper qualification and due regard for exceptional circumstances, it is correct to say that from the cheapest vegetable oil to the highest priced butter is a continuous series of overlapping commodities, overlapping in usage and in price.

It is now thoroughly apparent that many new problems have been created by the increasing use of coconut oil in margarine in recent years. Coconut oil is essentially a cheap commodity. Produced from coconuts that grow in abundance in the tropics and semi-tropics, it is being

imported at present into this country in the unrefined condition for between 8 and 9 cents a pound. As has been pointed out above (p. 256), there has been a steadily increasing use of it in margarine since the war, both in this country and abroad, until it is now the principal ingredient.

To indicate the rate of increase in its use here in recent years, the following tabulation of imports is presented. Copra imports have increased from a total of 287 million pounds in 1924 to 566 million pounds in 1929. Most of this volume comes from the Philippine Islands, but appreciable quantities are received from the British Malay States and from the South Sea Islands. It is all crushed for oil in this country. During the same period imports of coconut oil, as such, practically all of which come from the Philippine Islands, have increased from 204 million pounds to 381 million pounds. Total imports of copra and oil, expressed in terms of oil, then, were not far short of three-quarters of a billion pounds in 1929. The following tabulation summarizes net imports into the United States, in thousand pounds, for the years 1924-29.

Year	Copra	Copra as oil	Coconut oil	Total
1924.....	286,616	180,568	204,028	384,596
1925.....	360,233	226,947	213,411	440,358
1926.....	453,597	285,766	225,507	511,273
1927.....	446,165	281,084	267,095	548,179
1928.....	496,010	312,486	259,453	571,939
1929.....	566,239	356,731	381,065	737,796

Only a portion of this vast total enters into competition with butter in the form of margarine. In the fiscal year ending June 30, 1929, 171 million pounds of coconut oil were used in margarine. The principal part of the remainder imported was used in soap. Other edible uses were for pastry and cracker fillings and as a cooking fat.

Imports of copra into European countries have not increased in recent years at a comparable rate, except in the case of Germany, though they have been large for all northern Europe. The special conditions that have created the American situation do not exist abroad.

Copra is imported free of duty into all countries of temperate climate, on the theory that it is a useful raw material. Coconut oil, on the other hand, is practically everywhere subject to tariff duty (the United Kingdom is a notable exception) in order that the crushing of the copra for oil may give employment to domestic capital and labor. In the United States, however, Philippine oil is permitted to enter duty free because of the political affiliation between the two countries. Oil from other countries has paid a duty of 2 cents a pound. This gives the Philippines an advantage over all other producers of copra, and accounts for the large importation of oil into the United States. European countries import little or no oil.

In addition to coconut oil, other tropical oils, such as palm kernel and palm, are being imported into this country and Europe in constantly increasing volume. These are used principally in soap here in America, but palm kernel oil is used in European margarine very generally, and, if it were not for our special situation with regard to coconut oil, would undoubtedly be so used here. Other oils suitable for use in margarine that are imported as raw material from abroad are peanut oil and soy bean oil.

MENACE TO THE DAIRY INDUSTRY

The menace of these products to the domestic dairy industry is apparent. Butter fat is produced in this country, even under the most favorable conditions, at a cost far greater than the cost of imported vegetable oils. Probably the average cost of butter fat at present for the

country as a whole is several times the present price of coconut oil. To speak with exactness is obviously impossible in view of the great differences in productivity of dairy cows, the wide geographical area of this country, and the accompanying variations in labor, feed, and capital charges. Margarine, when made principally of animal fats, could be profitably manufactured for considerably less than butter, but the difference between vegetable-fat margarines and butter is much greater.

The American dairy industry has singled out our free trade arrangements with the Philippine Islands as the primary cause of the severity of this competition, on the theory that if Philippine coconut oil were subject to duty its consumption would be curtailed and its price advanced. The weakness of this reasoning is, firstly, that a tariff effective on coconut oil, in the absence of one on copra as well, would serve principally to protect American oil refiners, not the dairy industry. Coconut oil would continue to be available in much the same volume as at present, although the price would probably be advanced by at least a portion of the tariff rate. The difference would be that the Philippine crushing industry would cease to operate, the American industry superseding it. The present tariff rate on coconut oil is 2 cents. Even allowing for an increase in the price by the full amount of the duty, coconut oil would still be far cheaper than butter fat and appreciably lower than oleo oil.

A more radical and also a more logical position that is taken by some representatives of the dairy industry is one that contends for high tariff rates on all oil-seeds, as well as oils, whose products are suitable for margarine manufacture. These would include, at least, copra, palm kernels, soy beans, peanuts, and sesame seed. Soy beans and peanuts are already subject to import duties, but the others now enter free of tax. The difficulty here is that other powerful interests (e.g., the soap industry), whose

volume of consumption of these is far greater than that of the margarine industry, protest against such taxation, on the ground that these are desirable and essential raw materials for our domestic manufacture.

This brings us to the crux of the problem faced by those who desire special protection for butter. All fats and oils that can be made suitable for edible uses are in a sense potential competitors with butter. Butter fat provides no more calories than other fats. So long as the consumer obtains in his diet the necessary vitamins, mineral salts, and balanced proteins characteristic of milk, it appears to be a matter of indifference whether he obtains the heat energy from butter or a cheaper fat. From the point of view of consumer interest, therefore, no convincing reason can be given to oppose the importation of the cheaper fats. Also, since they are used by numerous different industries, the dairy industry faces the opposition of other powerful groups in any attempts it may make to bring them under the tariff law.

THE TARIFF AND FREE PHILIPPINE IMPORTS

A careful consideration of the coconut-oil industry indicates that the favored position of Philippine crushers in this market is not altogether responsible for the increased use of coconut oil in this country. It has undoubtedly been an important factor, since it has encouraged the planting of coconut trees, and this in turn has increased production and decreased prices.¹ But there is good reason to believe that the consumption of coconut oil would have increased rapidly after the war without this stimulus. War conditions necessitated, or at least encouraged, the use of such substitutes, and once they had been introduced it was natural that their usage should have increased. The use of coconut oil has been abnormally

¹ See Katharine Snodgrass, *Copra and Coconut Oil* (Fats and Oils Studies of the Food Research Institute, No. 2), April 1928.

stimulated, however, by the fact that the importation of many other oils was discouraged by the duties levied in the Fordney-McCumber Tariff Act of 1922. This has led to increasing usage of the duty-free oils, such as coconut, palm kernel, and palm oils, the last two not in margarine, but in soap.

It is proper to state the tariff position of American agriculture. The development of infant industries and the right to the home market, in the name of both capital and labor, have been the historical tenets of protectionism. With the growth of population, agriculture now demands the home market. This demand, from the historical standpoint, sounds no different for agricultural products than for mineral products, with steel as the conspicuous illustration. American producers of sugar and wool, through imposition of high duties, have the home market. From the standpoint of historical precedent and consistency, farmers claim the home market for fats and oils. Wool has industrial uses, sugar has food uses; fats and oils have both. Farmers are unable to see why the fact that fats and oils have industrial uses as well as food uses makes any difference in the argument for protection, the demand for the home market. We do not produce coconut oil, palm oil, or palm kernel oil in the continental United States; the farmers hold that this makes no difference in the argument for protection, since for most purposes these oils can replace other vegetable oils produced in the United States. It is the nature of the oil that counts, not the plant from which it is produced. The protection to animal fats will not be effective unless protection is accorded to vegetable oils. In short, the tariff on animal fats and vegetable oils, under a régime of high protection, must be based upon the broad fact that the fats and oils, domestic and imported, form a series of overlapping substances, in effect a homogeneous group, from the standpoint of the tariff. This summarizes the agricultural argument for protection, ap-

plied to all fats and oils, and it is difficult to see how a consistent protectionist can reject it. If the theory that the dairy industry should be protected from the competition of cheaper fats and oils, particularly those of foreign origin, were then carried to its logical conclusion, it would entail the restriction not only of coconut oil, but peanut oil, palm kernel oil, palm oil, soy bean oil, and possibly others. Not only the oils would be involved, but the seeds and nuts from which they are extracted. Those oils that are capable of edible uses as well as those customarily so used would have to be taken into consideration. Merely to state the case is sufficient to indicate the difficulties involved. There are many other industrial groups—oil refiners, soap manufacturers, varnish makers, to mention a few—as well as the consuming public contending for their interests, against the dairy industry. Legislation tending to favor one industry at the expense of others is bound to be opposed by those others.

All of these difficulties were brought to a focus in the consideration of the tariff bill in the Seventy-first Congress.¹ Representatives of dairy districts showed themselves eager to grant autonomy to the Philippine Islands in order that free trade arrangements between them and the United States might cease. They also favored high rates on all vegetable seeds and oils and on fish oils. As the bill was finally passed, however, no radical change was made in existing tariff arrangements except that palm kernel oil and sesame oil suitable for food uses were made dutiable and the rates on flaxseed and linseed oil, and soy beans were increased. Olive oil, palm kernel oil, rapeseed, sunflower, and sesame oil were left on the free list when rendered unfit for use as food. Copra and palm kernels are still admitted free, and coconut oil from the Philippines enters without the payment of duty.

¹ "Tariff Act of 1929," *Senate Document No. 21, 1929* (71st Congress, First Session).

It is undoubtedly within the power of the United States Congress to abrogate a portion or all of the existing tariff arrangements between this country and the Philippine Islands, even without granting autonomy. It could legislate in such a way that copra and coconut oil from the Philippines would be subject to duty, and thus indirectly restrict their importation, or it could restrict their importation directly by setting limits to the amounts that would be received duty free. As was pointed out by Senator Sheppard on the floor of the Senate, it is only since 1913 (the Underwood Tariff Act) that there have been no limitations on Philippine imports. "The tariff act of 1909, the Payne-Aldrich law," to quote Senator Sheppard, "established free trade between the Philippines and the United States, except as to rice, annual importations of 150,000,000 cigars, 300,000 pounds of wrapper and filler tobacco mixed, 1,000,000 pounds of fiber tobacco in addition, and of 300,000 tons of sugar."¹ A return to this system would permit the restriction of copra and oil imports. Or, as was recommended by Senator Sheppard, the same tariff rates might be applied to Philippine coconut oil that are applied to this oil from other countries (none of which comes in, but the rate is 2 cents a pound), and the proceeds then be remitted to the Philippine treasury. As was pointed out above, copra imports, too, would have to be taxed if the use of these materials was to be limited.

Although sentiment for Philippine autonomy was strong in this Congress, under the pressure of antagonism to Philippine labor in Western states and to Philippine imports in dairy and sugar-producing regions, no action looking to this was taken. As Senator Borah said:

I should like to see the Philippines given independence. I think they are fitted for independence; I think they are entitled to independence under the pledge which we made to them; but

¹ Preprint of *Congressional Record*, Vol. 72, January 28, 1930, p. 2594 (71st Congress, Second Session).

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I do not expect that is going to happen in my time; and I doubt if it will happen at all. . . . There are many elements that will be constantly fighting against Philippine independence. American capital is going in there; American property is now claiming the protection of the American flag. The Filipinos are enjoying the largest free market in the world by reason of their relation with the United States, and those influences are fighting against anything like a condition of affairs which would result in independence.¹

¹ Preprint of *Congressional Record*, Vol. 72, January 14, 1930, p. 1631 (71st Congress, Second Session).

CHAPTER XXII

THE CONDITION OF THE DAIRY INDUSTRY

It has not been our purpose to concern ourselves in this book with temporary short-time factors in the margarine or butter markets. We have been more interested in tracing long-time developments. The situation that developed in the butter market during the winter of 1929-30 was such that it cannot be passed over without brief consideration. At a time of year when dairy output is seasonally low, the price of butter declined to a level as low as, or lower than, the usual flush-season price, and cold storage stocks were from 30 to 50 million pounds more than is normal at that time of year. Naturally enough, the dairy and dairy manufacturing industries were alarmed and are seeking diligently for the causes of such a situation.

The butter industry places the blame on margarine and other butter substitutes, claiming that the demand for butter has decreased, particularly among the farm class, as a result of the low price of margarine. A decline in demand for butter is expected to react unfavorably upon all markets for dairy products. There is a tendency not to view the situation as a temporary one, but as the beginning of a period of serious depression and hard times for all connected with dairying or the manufacture and sale of milk products. There is some fear that dairying has been expanded too rapidly in recent years and that a permanent butter surplus has been created which will tend to reduce prices to the world basis. Since dairying has been the last bulwark of agriculture in the post-war period of agricultural depression, legislators and all public-spirited people interested in the welfare of the farmer feel particularly concerned over the situation.

Diagnosis of the situation is particularly difficult because of three factors. First, the statistics are not very satisfactory. Second, depression is now widespread over the field of industry and not limited to this country. Third, the low price of butter is world-wide. Under these circumstances it is difficult to say whether special conditions peculiar to the American dairy industry are primarily responsible for its predicament, or whether that industry is simply suffering in common with other industries from general, though presumably, temporary economic depression.

EXAMINATION OF STATISTICS

Before presenting our views, it will be well to examine all available statistics to see what they indicate. First, as to production, it appears that the number of milch cows in the country as a whole has been almost stationary for several years. Herds have been increased somewhat in the newer regions of the Far West and in a few of the Southern states, but in other parts of the country they are stationary or decreasing. The Bureau of Agricultural Economics estimates the number of milch cows on farms on January 1 for the five years, 1925-29, as follows:

1925	.....	22,481,000
1926	.....	22,148,000
1927	.....	21,824,000
1928	.....	21,948,000
1929	.....	21,820,000

This indicates a cow population not deviating far from 22 million during this period. A comparison over a longer period of time is not so satisfactory since methods of estimating have changed, but the following tabulation is useful for perspective:

Average 1909-13	.....	20,873,000
Average 1919-23	.....	22,052,000
Average 1925-29	.....	22,044,000

The average number of milch cows in the past five years is thus shown to be approximately the same as in the five years immediately after the war, and about 1,200,000, or 5 per cent, greater than in the five years before the war. In view of the growth in population, this appears to be a moderate rate of increase.

The estimate of cow population for January 1, 1930, is not yet available. It may indicate a considerable increase, though this seems doubtful. It is reported, however, that herds have been increased in milk sheds serving cities where prices for milk for household distribution have been particularly attractive.

Comparisons of numbers of cows are not of great value without information as to the yield per cow, and this is not known with any exactness, though it may be assumed to have increased with the more general recognition of the importance of breeding high-producing animals and improvement in methods of feeding. In certain districts, where conditions have been especially favorable, it has probably increased considerably. The only statistics that are available that throw light on this subject (namely, the estimates of milk production of the Bureau of Agricultural Economics) indicate a very marked growth in the productivity per cow for the country as a whole. They are as follows, in million pounds:

1917	84,612	1922	102,562
1918	87,906	1923	109,736
1919	90,058	1924	114,666
1920	89,657	1925	116,505
1921	98,862	1926	120,766

If the rate of increase that was estimated to have occurred between 1924 and 1926 continued from 1927 to 1929, present production of milk may be reckoned at about 127 billion pounds a year, or 5,773 pounds per cow. This

amounts to a yield per cow of about 202 pounds in terms of butter fat. These figures seem high, but are the best official estimates. It is to be kept in mind that, other things being equal, the higher the annual yield per cow, the lower the production cost per pound.

As already indicated, this volume of milk comes on the market in several different forms. In the regions of densest population the entire output is sold for household distribution as fluid whole milk. In other less densely populated districts a portion is sold for household use, but a considerable fraction goes into other commodities, such as ice cream, condensed or evaporated milk, butter, or cheese. The fraction going into the latter uses is greater in periods of flush production than in the winter when milk output is low. In still less densely populated regions the entire milk output is used for butter manufacture, and much of it is fit for that only after neutralization. Prices for milk for these various uses scale down as a rule from the highest, which is paid for raw and certified milk for household distribution, to the lowest, which is paid for sour cream to be churned into butter. The approximate ratios of the national milk supply going into these various lines were estimated by the Bureau of Agricultural Economics, in 1926, as follows:

	Per cent
Creamery butter	25.2
Farm butter	10.7
Cheese	3.5
Condensed milk	3.6
Ice cream	3.7
Other products	0.3
Household use	46.7
Fed to calves	3.3
Waste or loss	3.0
Total	100.0

ACCUMULATION OF STOCKS OF MILK PRODUCTS

The total production and consumption of butter have been steadily and rapidly increasing since the war. Production of creamery butter during 1929 was the largest on record, and consumption of both creamery and farm varieties was similarly at a maximum, though apparently the increase in consumption was not great enough to take care of the growth in production, since abnormally large stocks were built up. Stocks of butter in cold storage on January 1, 1930, were approximately 40 million pounds greater than at the same time a year earlier.

Production of cheese, on the other hand, was relatively low in 1929, while consumption was moderate, with the result that the year closed with stocks smaller than normal.

Evaporated- and condensed-milk markets closed the year 1929 in much the same position as butter. Production during the year far outran consumption, with the result that stocks at the end of the year were much above normal. Stocks of milk powder were also far larger than normal as a result of a record production during the preceding year.

Distribution of whole milk during the winter of 1929-30 is reported to have been normal in New York, but below normal in a number of cities because of unemployment. Prices of milk for household distribution were high throughout 1929, but were lowered in 1930 in some places.

The situation seems to be one in which a number of factors are operating. Milk production has apparently been expanded in certain directions about as far as it can go profitably under present circumstances. This may be particularly true of regions furnishing whole milk for distribution in the very large cities. Prices for such milk have been high for several years and farmers even at considerable distances have been attracted into this type

of operation. However, there is good reason to believe that this expansion would have been maintained if general business conditions had continued as satisfactory as they were during the earlier portion of 1929 and immediately preceding years. But with the large amount of unemployment that exists during 1930, not only in the large cities but throughout the country, consumption of such intrinsically valuable commodities as milk products has naturally declined. This has placed the dairy industry and the dairy-products industries in a very difficult position because they are equipped with plants for the expanded production and are saddled with large manufactured stocks. In short, at the close of 1929, the dairy industry had an inflated inventory.

There is nothing to indicate, however, that the industry is permanently overexpanded. In fact, in our opinion, with proper advertising, the consumption of milk can be much further increased. It may be that certain groups of the population, e.g., school children receiving milk lunches, are now drinking as much milk as they can; but there are many other groups, particularly of adult age, that are not getting as much as they should. In our opinion, there is much more likelihood, and it is also more desirable from a physiological point of view, that the per capita consumption of milk for the country be increased rather than that of butter. As the present crisis indicates, however, with milk prices at their present high level, and perhaps unavoidably so, demand may be heavily curtailed in times of business depression. Nevertheless, a continuation of the educational campaign that has so strikingly extended the use of milk in the last ten years unquestionably offers the greatest promise for the further development of the dairy industry.

The Secretary of Agriculture made the following comments on the dairy situation in his *Annual Report* for 1929:

Consumption during the year held up fairly well as compared with consumption in recent years. In the last eight years, despite a generally upward trend in dairy production, our domestic consumption of dairy products has consistently exceeded our domestic production by about 1 per cent. There is reason to believe that this close adjustment will continue. The dairy industry is very stable. It is not showing any immediate prospect of marked expansion. Continuance of the stability it has shown in recent years should help the dairy industry to continue as one of the most satisfactory branches of agriculture.

The competition of the cheaper fats and oils seems to us the most serious menace to the expansion of butter consumption. This competition may be felt both directly, through the increasing sale of margarine and other substitutes in this country, and indirectly, through the more severe pressure of foreign butter in this market that is likely to develop as a result of the greater use of margarine in Europe. The new European margarine combine does not augur well for dairy interests in any part of the world. It is almost certain to lower the prices of fats and oils and to increase their consumption. This is bound to favor vegetable oils to displace butter.

Foreign butter can be kept out of this country if tariff duties are raised sufficiently high. The tariff rate has been 12 cents, and it was increased to 14 cents in the new act. As reference to Appendix Table I will show, under the 12-cent rate imports have been small. The tariff is undoubtedly an effective means of preventing the importation of foreign butter.

The difficulties of preventing the importation of fats and oils by the same method have been commented on above. In Europe there is no effort made to limit their importation. Rather the reverse, since they provide a cheap substitute for butter, and Europe, despite agricultural distress, seeks cheap food for the industrial classes.

CHAPTER XXIII

CONCLUDING REMARKS

With use of special pleading, partisan groups might readily take the foregoing study and make a case for the dairy industry or for the margarine industry, according as their interests lay with the one or the other. If they represented the dairy group, they would point to the millions of farmers engaged in dairying; to the fact that these and their families are dependent for a large portion of their cash income on receipts from the sale of butter fat; that butter consumption is declining because of the competition of cheap tropical fats used in margarine; and consequently that butter producers should have not only the protection provided by the Oleomargarine Act and the present tariff but the further protection of a high tariff on all imported fats and oils suitable for use in margarine.

If it were the margarine industry that was represented, the case would run along the following lines: Margarine is a nutritious substitute for an almost necessary but expensive item of the diet. There are many working-class families to whom butter is almost prohibitively expensive. Margarine is cheap and consequently may be consumed freely by people of small means. There is no unfair competition between margarine and butter, because federal and state laws regulate the manufacture and sale of margarine. In addition, a heavy tax prevents the manufacture of margarine in imitation of butter. To cut off cheap raw materials by a prohibitory tax on tropical fats would be further discrimination against the industry in favor of butter producers.

There is truth in the claims of both sides. The dairy

farmer is subject to the high costs characteristic of the tariff-protected American market. At the same time he must compete with a product made from raw materials that are produced in a region where costs are probably about as low as anywhere in the world. Under these circumstances, it is unreasonable even for those who do not believe in high tariff as a matter of policy to deny the validity of the claims of the dairy interests. At the same time, the higher our tariff rates are jacked up the more serious become the problems of consumers. Their interests are almost submerged as our political system operates, and need to be constantly stressed by unbiased investigators. In our opinion, it is because margarine fills a proper consumer need that its manufacture should not be unnecessarily throttled, even to protect so important an industry as dairying. As to what would constitute a proper balance of privileges between these two industries, it is not easy to say. Yet, it is easier to indicate a theoretical position than for this to be put into practical effect. We do not live in a simple society where the rights of individual industries can be nicely adjusted in accordance with prescribed conditions. The tariff is notorious as an instrument that does not bring about the adjustments that are anticipated from it.

Let us consider, for instance, what would happen if the coconut-oil duty were made effective at 45 per cent ad valorem (the rate generally sponsored by agricultural interests in the recent tariff controversy), and rates on other oils set correspondingly. Presumably, prices of coconut oil would advance by something less than this amount; such an increase in price would be bound to affect the demand for coconut oil, causing a shift to other fats or an actual curtailment of the use of fats. This shift would tend to advance the prices of other fats and oils, so that they, as well as coconut oil, would be on a higher price level than before. With the advance in the price of its

raw materials, some advance would occur in margarine (and of course in lard substitutes and lard), though again it is impossible to say how great the advance would be. This would reduce some of the market advantage that margarine now has over butter. But that it would in consequence increase the use of butter or advance its price does not necessarily follow. It probably would to some extent, but the chances are that lard, oleo oil, and cottonseed oil or compounds would be more stimulated than butter because they are within the same price range as coconut oil. Even elevated margarine prices would still be on a distinctly lower level than butter prices, and margarine would continue to have its independent market. It seems to us, therefore, that the extent of the advantages to the dairy industry of higher duties on fats and oils are problematical. It is, however, to be kept in mind that many producers of milk produce also beef fat and hog fat and profit from higher prices of these. P. G. Wright, in his book on *The Tariff on Animal and Vegetable Oils*,¹ does not enter in detail into the question of the effect of higher tariff duties on vegetable oils on the domestic price of butter, but clearly his general analysis would not support the view that butter producers have much to expect from such duties.

The position of the dairy industry is analogous in some respects to the situation of many manufacturing industries today. By the arts of invention and manipulation, natural products are being so closely imitated in synthetic materials that consumers are shifting from the real to the artificial without any sense of deprivation. Many long-established industries are seriously demoralized because of these developments. Probably one of the most potent factors encouraging new inventions is the high cost of living brought about in greater or less part by the very high

¹ New York, Macmillan, 1928, pp. 100-01.

tariff policy which these manufacturers have shortsightedly sponsored.

The dairy industry is more fortunate than many in that its product may take several forms. We have emphasized our opinion that the market for whole milk is capable of great expansion. Another way in which the demand for dairy products might possibly be increased is by the sale of reconstituted milk. Ice cream is widely made by reconstitution from butter fat. The principal reason why more whole milk is not drunk is that it is expensive. One of the largest items of expense is that of distribution. This expense might be lowered for some regions if milk reconstituted from butter fat and skim milk powder were used. This cannot be satisfactorily done by the housewife, but might be practicable for distributors equipped with proper apparatus for mixing these ingredients with water in such a way as to produce a commodity similar to milk. These are merely indications of profitable outlets for dairy products. There is a steadily increasing realization of the value of milk in the diet. An industry producing a commodity of such essential importance may suffer some losses from the competition of tropical fats, but, in our opinion, it will not be seriously embarrassed by that competition so long as it is efficiently conducted. Dairying has as much to gain from lower costs as from higher prices.

APPENDIX

APPENDIX I

FEDERAL LEGISLATION ON MARGARINE IN THE UNITED STATES

THE ACT OF 1886¹

An act defining butter, also imposing a tax upon and regulating the manufacture, sale, importation, and exportation of oleomargarine.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That for the purposes of this act the word "butter" shall be understood to mean the food product usually known as butter, and which is made exclusively from milk or cream, or both, with or without common salt, and with or without additional coloring matter.

SEC. 2. That for the purposes of this act certain manufactured substances, certain extracts, and certain mixtures and compounds, including such mixtures and compounds with butter, shall be known and designated as "oleomargarine," namely: All substances heretofore known as oleomargarine, oleo, oleomargarine-oil, butterine, lardine, suine, and neutral; all mixtures and compounds of oleomargarine, oleo, oleomargarine-oil, butterine, lardine, suine, and neutral; all lard extracts and tallow extracts; and all mixtures and compounds of tallow, beef-fat, suet, lard, lard-oil, vegetable-oil annotto, and other coloring matter, intestinal fat, and offal fat made in imitation or semblance of butter, or, when so made, calculated or intended to be sold as butter or for butter.

SEC. 3. That special taxes are imposed as follows:

Manufacturers of oleomargarine shall pay six hundred dollars. Every person who manufactures oleomargarine for sale shall be deemed a manufacturer of oleomargarine.

Wholesale dealers in oleomargarine shall pay four hundred and eighty dollars. Every person who sells or offers for sale oleomargarine in the original manufacturer's packages shall be deemed a wholesale dealer in oleomargarine. But any manufacturer of oleo-

¹ United States Statutes at large, Forty-ninth Congress, 1885-87, Vol. 24, pp. 209-13, chap. 840, August 2, 1886.

margarine who has given the required bond and paid the required special tax, and who sells only oleomargarine of his own production, at the place of manufacture, in the original packages to which the tax-paid stamps are affixed, shall not be required to pay the special tax of a wholesale dealer in oleomargarine on account of such sales.

Retail dealers in oleomargarine shall pay forty-eight dollars. Every person who sells oleomargarine in less quantities than ten pounds at one time shall be regarded as a retail dealer in oleomargarine. And sections thirty-two hundred and thirty-two, thirty-two hundred and thirty-three, thirty-two hundred and thirty-four, thirty-two hundred and thirty-five, thirty-two hundred and thirty-six, thirty-two hundred and thirty-seven, thirty-two hundred and thirty-eight, thirty-two hundred and thirty-nine, thirty-two hundred and forty, thirty-two hundred and forty-one, and thirty-two hundred and forty-three of the Revised Statutes of the United States are, so far as applicable, made to extend to and include and apply to the special taxes imposed by this section, and to the persons upon whom they are imposed: *Provided*, That in case any manufacturer of oleomargarine commences business subsequent to the thirtieth day of June in any year, the special tax shall be reckoned from the first day of July in that year, and shall be five hundred dollars.

SEC. 4. That every person who carries on the business of a manufacturer of oleomargarine without having paid the special tax therefor, as required by law, shall, besides being liable to the payment of the tax, be fined not less than one thousand and not more than five thousand dollars; and every person who carries on the business of a wholesale dealer in oleomargarine without having paid the special tax therefor, as required by law, shall, beside being liable to the payment of the tax, be fined not less than five hundred or more than two thousand dollars; and every person who carries on the business of a retail dealer in oleomargarine without having paid the special tax therefor, as required by law, shall, besides being liable to the payment of the tax, be fined not less than fifty nor more than five hundred dollars for each and every offense.

SEC. 5. That every manufacturer of oleomargarine shall file with the collector of internal revenue of the district in which his manufactory is located such notices, inventories, and bonds, shall keep such books and render such returns of materials and products, shall put up such signs and affix such number to his factory, and conduct his business under such surveillance of officers and agents as the Commissioner of Internal Revenue, with the approval

of the Secretary of the Treasury, may, by regulation, require. But the bond required of such manufacturer shall be with sureties satisfactory to the collector of internal revenue, and in a penal sum of not less than five thousand dollars; and the sum of said bond may be increased from time to time, and additional sureties required at the discretion of the collector, or under instructions of the Commissioner of Internal Revenue.

SEC. 6. That all oleomargarine shall be packed by the manufacturer thereof in firkins, tubs, or other wooden packages not before used for that purpose, each containing not less than ten pounds, and marked, stamped, and branded as the Commissioner of Internal Revenue, with the approval of the Secretary of the Treasury, shall prescribe; and all sales made by manufacturers of oleomargarine, and wholesale dealers in oleomargarine, shall be in original stamped packages. Retail dealers in oleomargarine must sell only from original stamped packages, in quantities not exceeding ten pounds, and shall pack the oleomargarine sold by them in suitable wooden or paper packages, which shall be marked and branded as the Commissioner of Internal Revenue, with the approval of the Secretary of the Treasury, shall prescribe. Every person who knowingly sells or offers for sale, or delivers or offers to deliver, any oleomargarine in any other form than in new wooden or paper packages as above described, or who packs in any package any oleomargarine in any manner contrary to law, or who falsely brands any package or affixes a stamp on any package denoting a less amount of tax than that required by law, shall be fined for each offense not more than one thousand dollars, and be imprisoned not more than two years.

SEC. 7. That every manufacturer of oleomargarine shall securely affix, by pasting, on each package containing oleomargarine manufactured by him a label on which shall be printed, besides the number of the manufactory and the district and State in which it is situated, these words: "Notice.—The manufacturer of the oleomargarine herein contained has complied with all the requirements of law. Every person is cautioned not to use either this package again or the stamp thereon again, nor to remove the contents of this package without destroying said stamp, under the penalty provided by law in such cases." Every manufacturer of oleomargarine who neglects to affix such label to any package containing oleomargarine made by him, or sold or offered for sale by or for him, and every person who removes any such label so affixed from any such package, shall be fined fifty dollars for each package in respect to which such offense is committed.

SEC. 8. That upon oleomargarine which shall be manufactured and sold, or removed for consumption or use, there shall be assessed and collected a tax of two cents per pound, to be paid by the manufacturer thereof; and any fractional part of a pound in a package shall be taxed as a pound. The tax levied by this section shall be represented by coupon stamps; and the provisions of existing laws governing the engraving, issue, sale, accountability, effacement, and destruction of stamps relating to tobacco and snuff, as far as applicable, are hereby made to apply to stamps provided for by this section.

SEC. 9. That whenever any manufacturer of oleomargarine sells, or removes for sale or consumption, any oleomargarine upon which the tax is required to be paid by stamps, without the use of the proper stamps, it shall be the duty of the Commissioner of Internal Revenue, within a period of not more than two years after such sale or removal, upon satisfactory proof, to estimate the amount of tax which has been omitted to be paid, and to make an assessment therefor and certify the same to the collector. The tax so assessed shall be in addition to the penalties imposed by law for such sale or removal.

SEC. 10. That all oleomargarine imported from foreign countries shall, in addition to any import duty imposed on the same, pay an internal-revenue tax of fifteen cents per pound, such tax to be represented by coupon stamps as in the case of oleomargarine manufactured in the United States. The stamps shall be affixed and canceled by the owner or importer of the oleomargarine while it is in the custody of the proper customhouse officers; and the oleomargarine shall not pass out of the custody of said officers until the stamps have been so affixed and canceled, but shall be put up in wooden packages, each containing not less than ten pounds, as prescribed in this act for oleomargarine manufactured in the United States, before the stamps are affixed; and the owner or importer of such oleomargarine shall be liable to all the penal provisions of this act prescribed for manufacturers of oleomargarine manufactured in the United States. Whenever it is necessary to take any oleomargarine so imported to any place other than the public stores of the United States for the purpose of affixing and canceling such stamps, the collector of customs of the port where such oleomargarine is entered shall designate a bonded warehouse to which it shall be taken, under the control of such customs officer as such collector may direct; and every officer of customs who permits any such oleomargarine to pass out of his custody or control without compliance by the owner or importer thereof

with the provisions of this section relating thereto shall be guilty of a misdemeanor, and shall be fined not less than one thousand dollars nor more than five thousand dollars, and imprisoned not less than six months nor more than three years. Every person who sells or offers for sale any imported oleomargarine, or oleomargarine purporting or claimed to have been imported, not put up in packages and stamped as provided by this act, shall be fined not less than five hundred dollars nor more than five thousand dollars, and be imprisoned not less than six months nor more than two years.

SEC. 11. That every person who knowingly purchases or receives for sale any oleomargarine which has not been branded or stamped according to law shall be liable to a penalty of fifty dollars for each such offense.

SEC. 12. That every person who knowingly purchases or receives for sale any oleomargarine from any manufacturer who has not paid the special tax shall be liable for each offense to a penalty of one hundred dollars, and to a forfeiture of all articles so purchased or received, or of the full value thereof.

SEC. 13. That whenever any stamped package containing oleomargarine is emptied, it shall be the duty of the person in whose hands the same is, to destroy utterly the stamps thereon; and any person who wilfully neglects or refuses so to do shall for each such offense be fined not exceeding fifty dollars, and imprisoned not less than ten days nor more than six months. And any person who fraudulently gives away or accepts from another, or who sells, buys, or uses for packing oleomargarine, any such stamped package, shall for each such offense be fined not exceeding one hundred dollars, and be imprisoned not more than one year. Any revenue officer may destroy any emptied oleomargarine package upon which the tax-paid stamp is found.

SEC. 14. That there shall be in the office of the Commissioner of Internal Revenue an analytical chemist and a microscopist, who shall each be appointed by the Secretary of the Treasury, and shall each receive a salary of two thousand five hundred dollars per annum; and the Commissioner of Internal Revenue may, whenever in his judgment the necessities of the service so require, employ chemists and microscopists, to be paid such compensation as he may deem proper, not exceeding in the aggregate any appropriation made for that purpose. And such Commissioner is authorized to decide what substances, extracts, mixtures, or compounds which may be submitted for his inspection in contested cases are to be taxed under this act; and his decision in matters of taxation

under this act shall be final. The Commissioner may also decide whether any substance made in imitation or semblance of butter, and intended for human consumption, contains ingredients deleterious to the public health; but in case of doubt or contest his decisions in this class of cases may be appealed from to a board hereby constituted for the purpose, and composed of the Surgeon-General of the Army, the Surgeon-General of the Navy, and the Commissioner of Agriculture; and the decisions of this board shall be final in the premises.

SEC. 15. That all packages of oleomargarine subject to tax under this act, that shall be found without stamps or marks as herein provided, and all oleomargarine intended for human consumption which contains ingredients adjudged, as hereinbefore provided, to be deleterious to the public health, shall be forfeited to the United States. Any person who shall wilfully remove or deface the stamps, marks, or brands on packages containing oleomargarine taxed as provided herein shall be guilty of a misdemeanor, and shall be punished by a fine of not less than one hundred dollars nor more than two thousand dollars, and by imprisonment for not less than thirty days nor more than six months.

SEC. 16. That oleomargarine may be removed from the place of manufacture for export to a foreign country without payment of tax or affixing stamps thereto, under such regulations and the filing of such bonds and other security as the Commissioner of Internal Revenue, with the approval of the Secretary of the Treasury, may prescribe. Every person who shall export oleomargarine shall brand upon every tub, firkin, or other package containing such article the word "oleomargarine," in plain Roman letters not less than one-half inch square.

SEC. 17. That whenever any person engaged in carrying on the business of manufacturing oleomargarine defrauds, or attempts to defraud, the United States of the tax on the oleomargarine produced by him, or any part thereof, he shall forfeit the factory and manufacturing apparatus used by him, and all oleomargarine and all raw material for the production of oleomargarine found in the factory and on the factory premises, and shall be fined not less than five hundred dollars nor more than five thousand dollars, and be imprisoned not less than six months nor more than three years.

SEC. 18. That if any manufacturer of oleomargarine, any dealer therein, or any importer or exporter thereof shall knowingly or wilfully omit, neglect, or refuse to do, or cause to be done, any of the things required by law in the carrying on or conducting of his business, or shall do anything by this act prohibited, if there be no

specific penalty or punishment imposed by any other section of this act for the neglecting, omitting, or refusing to do, or for the doing or causing to be done, the thing required or prohibited, he shall pay a penalty of one thousand dollars; and if the person so offending be the manufacturer of or a wholesale dealer in oleomargarine, all the oleomargarine owned by him, or in which he has any interest as owner, shall be forfeited to the United States.

Sec. 19. That all fines, penalties, and forfeitures imposed by this act may be recovered in any court of competent jurisdiction.

Sec. 20. That the Commissioner of Internal Revenue, with the approval of the Secretary of the Treasury, may make all needful regulations for the carrying into effect of this act.

Sec. 21. That this act shall go into effect on the ninetieth day after its passage; and all wooden packages containing ten or more pounds of oleomargarine found on the premises of any dealer on or after the ninetieth day succeeding the date of the passage of this act shall be deemed to be taxable under section eight of this act, and shall be taxed, and shall have affixed thereto the stamps, marks, and brands required by this act or by regulations made pursuant to this act; and for the purposes of securing the affixing of the stamps, marks, and brands required by this act, the oleomargarine shall be regarded as having been manufactured and sold, or removed from the manufactory for consumption or use, on or after the day this act takes effect; and such stock on hand at the time of the taking effect of this act may be stamped, marked, and branded under special regulations of the Commissioner of Internal Revenue, approved by the Secretary of the Treasury; and the Commissioner of Internal Revenue may authorize the holder of such packages to mark and brand the same and to affix thereto the proper tax-paid stamps.

Approved, August 2, 1886.

THE ACT OF 1902¹

An act to make oleomargarine and other imitation dairy products subject to the laws of any State or Territory or the District of Columbia into which they are transported, and to change the tax on oleomargarine, and to impose a tax, provide for the inspection, and regulate the manufacture and sale of certain dairy products, and to amend an Act entitled "An Act defining butter, also imposing

¹ United States Statutes at large, Fifty-seventh Congress, 1901-03, Vol. 32, Part I, pp. 193-97, chap. 784, May 9, 1902 (Public, No. 110).

a tax upon and regulating the manufacture, sale, importation, and exportation of oleomargarine," approved August second, eighteen hundred and eighty-six.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That all articles known as oleomargarine, butterine, imitation, process, renovated, or adulterated butter, or imitation cheese, or any substance in the semblance of butter or cheese not the usual product of the dairy and not made exclusively of pure and unadulterated milk or cream, transported into any State or Territory or the District of Columbia, and remaining therein for use, consumption, sale, or storage, shall, upon the arrival within the limits of such State or Territory or the District of Columbia, be subject to the operation and effect of the laws of such State or Territory or the District of Columbia, enacted in the exercise of its police powers to the same extent and in the same manner as though such articles or substances had been produced in such State or Territory or the District of Columbia, and shall not be exempt therefrom by reason of being introduced therein in original packages or otherwise.

SEC. 2. That the first clause of section three of an Act entitled "An Act defining butter, also imposing a tax upon and regulating the manufacture, sale, importation, and exportation of oleomargarine," approved August second, eighteen hundred and eighty-six, be amended by adding thereto after the word "oleomargarine," at the end of said clause, the following words:

"And any person that sells, vends, or furnishes oleomargarine for the use and consumption of others, except to his own family table without compensation, who shall add to or mix with such oleomargarine any artificial coloration that causes it to look like butter of any shade of yellow shall also be held to be a manufacturer of oleomargarine within the meaning of said Act, and subject to the provisions thereof."

Section three of said Act is hereby amended by adding thereto the following: "*Provided further,* That wholesale dealers who vend no other oleomargarine or butterine except that upon which a tax of one-fourth of one cent per pound is imposed by this Act, as amended, shall pay two hundred dollars; and such retail dealers as vend no other oleomargarine or butterine except that upon which is imposed by this Act, as amended, a tax of one-fourth of one cent per pound shall pay six dollars."

SEC. 3. That section eight of an Act entitled "An Act defining butter, also imposing a tax upon and regulating the manufacture, sale, importation, and exportation of oleomargarine," approved

August second, eighteen hundred and eighty-six, be, and the same is hereby, amended so as to read as follows:

"SEC. 8. That upon oleomargarine which shall be manufactured and sold, or removed for consumption or use, there shall be assessed and collected a tax of ten cents per pound, to be paid by the manufacturer thereof; and any fractional part of a pound in a package shall be taxed as a pound: *Provided*, When oleomargarine is free from artificial coloration that causes it to look like butter of any shade of yellow, said tax shall be one-fourth of one cent per pound. The tax levied by this section shall be represented by coupon stamps; and the provisions of existing laws governing the engraving, issue, sale, accountability, effacement, and destruction of stamps relating to tobacco and snuff, as far as applicable, are hereby made to apply to stamps provided for by this section."

SEC. 4. That for the purpose of this Act "butter" is hereby defined to mean an article of food as defined in "An Act defining butter, also imposing a tax upon and regulating the manufacture, sale, importation, and exportation of oleomargarine," approved August second, eighteen hundred and eighty-six; that "adulterated butter" is hereby defined to mean a grade of butter produced by mixing, reworking, rechurning in milk or cream, refining, or in any way producing a uniform, purified, or improved product from different lots or parcels of melted or unmelted butter or butter fat, in which any acid, alkali, chemical, or any substance whatever is introduced or used for the purpose or with the effect of deodorizing or removing therefrom rancidity, or any butter or butter fat with which there is mixed any substance foreign to butter as herein defined, with intent or effect of cheapening in cost the product or any butter in the manufacture or manipulation of which any process or material is used with intent or effect of causing the absorption of abnormal quantities of water, milk, or cream; that "process butter" or "renovated butter" is hereby defined to mean butter which has been subjected to any process by which it is melted, clarified, or refined and made to resemble genuine butter, always excepting "adulterated butter" as defined by this Act.

That special taxes are imposed as follows:

Manufacturers of process or renovated butter shall pay fifty dollars per year and manufacturers of adulterated butter shall pay six hundred dollars per year. Every person who engages in the production of process or renovated butter or adulterated butter as a business shall be considered to be a manufacturer thereof.

Wholesale dealers in adulterated butter shall pay a tax of four hundred and eighty dollars per annum, and retail dealers in adul-

terated butter shall pay a tax of forty-eight dollars per annum. Every person who sells adulterated butter in less quantities than ten pounds at one time shall be regarded as a retail dealer in adulterated butter.

Every person who sells adulterated butter shall be regarded as a dealer in adulterated butter. And sections thirty-two hundred and thirty-two, thirty-two hundred and thirty-three, thirty-two hundred and thirty-four, thirty-two hundred and thirty-five, thirty-two hundred and thirty-six, thirty-two hundred and thirty-seven, thirty-two hundred and thirty-eight, thirty-two hundred and thirty-nine, thirty-two hundred and forty, thirty-two hundred and forty-one, and thirty-two hundred and forty-three of the Revised Statutes of the United States are, so far as applicable, made to extend to and include and apply to the special taxes imposed by this section and to the person upon whom they are imposed.

That every person who carries on the business of a manufacturer of process or renovated butter or adulterated butter without having paid the special tax therefor, as required by law, shall, besides being liable to the payment of the tax, be fined not less than one thousand and not more than five thousand dollars; and every person who carries on the business of a dealer in adulterated butter without having paid the special tax therefor, as required by law, shall, besides being liable to the payment of the tax, be fined not less than fifty nor more than five hundred dollars for each offense.

That every manufacturer of process or renovated butter or adulterated butter shall file with the collector of internal revenue of the district in which his manufactory is located such notices, inventories, and bonds, shall keep such books and render such returns of material and products, shall put up such signs and affix such number of his factory, and conduct his business under such surveillance of officers and agents as the Commissioner of Internal Revenue, with the approval of the Secretary of the Treasury, may by regulation require. But the bond required of such manufacturer shall be with sureties satisfactory to the collector of internal revenue, and in a penal sum of not less than five hundred dollars; and the sum of said bond may be increased from time to time and additional sureties required at the discretion of the collector or under instructions of the Commissioner of Internal Revenue.

That all adulterated butter shall be packed by the manufacturer thereof in firkins, tubs, or other wooden packages not before used for that purpose, each containing not less than ten pounds, and marked, stamped, and branded as the Commissioner of Internal Revenue, with the approval of the Secretary of the Treasury, shall

prescribe; and all sales made by manufacturers of adulterated butter shall be in original stamped packages.

Dealers in adulterated butter must sell only original or from original stamped packages, and when such original stamped packages are broken the adulterated butter sold from same shall be placed in suitable wooden or paper packages, which shall be marked and branded as the Commissioner of Internal Revenue, with the approval of the Secretary of the Treasury, shall prescribe. Every person who knowingly sells or offers for sale, or delivers or offers to deliver, any adulterated butter in any other form than in new wooden or paper packages as above described, or who packs in any package any adulterated butter in any manner contrary to law, or who falsely brands any package or affixes a stamp on any package denoting a less amount of tax than that required by law, shall be fined for each offense not more than one thousand dollars and be imprisoned not more than two years.

That every manufacturer of adulterated butter shall securely affix, by pasting, on each package containing adulterated butter manufactured by him a label on which shall be printed, besides the number of the manufactory and the district and State in which it is situated, these words: "Notice.—That the manufacturer of the adulterated butter herein contained has complied with all the requirements of law. Every person is cautioned not to use either this package again or the stamp thereon, nor to remove the contents of this package without destroying said stamp, under the penalty provided by law in such cases." Every manufacturer of adulterated butter who neglects to affix such label to any package containing adulterated butter made by him, or sold or offered for sale for or by him, and every person who removes any such label so affixed from any such package shall be fined fifty dollars for each package in respect to which such offense is committed.

That upon adulterated butter, when manufactured or sold or removed for consumption or use, there shall be assessed and collected a tax of ten cents per pound, to be paid by the manufacturer thereof, and any fractional part of a pound shall be taxed as a pound, and that upon process or renovated butter, when manufactured or sold or removed for consumption or use, there shall be assessed and collected a tax of one-fourth of one cent per pound, to be paid by the manufacturer thereof, and any fractional part of a pound shall be taxed as a pound. The tax to be levied by this section shall be represented by coupon stamps, and the provisions of existing laws governing engraving, issuing, sale, accountability, effacement, and destruction of stamps relating to tobacco and

snuff, as far as applicable, are hereby made to apply to the stamps provided by this section.

That the provisions of sections nine, ten, eleven, twelve, thirteen, fourteen, fifteen, sixteen, seventeen, eighteen, nineteen, twenty, and twenty-one of "An Act defining butter, also imposing a tax upon and regulating the manufacture, sale, importation, and exportation of oleomargarine," approved August second, eighteen hundred and eighty-six, shall apply to manufacturers of "adulterated butter" to an extent necessary to enforce the marking, branding, identification, and regulation of the exportation and importation of adulterated butter.

Sec. 5. All parts of an Act providing for an inspection of meats for exportation, approved August thirtieth, eighteen hundred and ninety, and of an Act to provide for the inspection of live cattle, hogs, and the carcasses and products thereof which are the subjects of interstate commerce, approved March third, eighteen hundred and ninety-one, and of amendment thereto approved March second, eighteen hundred and ninety-five, which are applicable to the subjects and purposes described in this section shall apply to process or renovated butter. And the Secretary of Agriculture is hereby authorized and required to cause a rigid sanitary inspection to be made, at such times as he may deem proper or necessary, of all factories and storehouses where process or renovated butter is manufactured, packed, or prepared for market, and of the products thereof and materials going into the manufacture of the same. All process or renovated butter and the packages containing the same shall be marked with the words "Renovated Butter" or "Process Butter" and by such other marks, labels, or brands and in such manner as may be prescribed by the Secretary of Agriculture, and no process or renovated butter shall be shipped or transported from its place of manufacture into any other State or Territory or the District of Columbia, or to any foreign country, until it has been marked as provided in this section. The Secretary of Agriculture shall make all needful regulations for carrying this section into effect, and shall cause to be ascertained and reported from time to time the quantity and quality of process or renovated butter manufactured, and the character and the condition of the material from which it is made. And he shall also have power to ascertain whether or not materials used in the manufacture of said process or renovated butter are deleterious to health or unwholesome in the finished product, and in case such deleterious or unwholesome materials are found to be used in product intended for exportation or shipment into other States or

in course of exportation or shipment he shall have power to confiscate the same. Any person, firm, or corporation violating any of the provisions of this section shall be deemed guilty of a misdemeanor and on conviction thereof shall be punished by a fine of not less than fifty dollars nor more than five hundred dollars or by imprisonment not less than one month nor more than six months, or by both said punishments, in the discretion of the court.

SEC. 6. That wholesale dealers in oleomargarine, process, renovated, or adulterated butter shall keep such books and render such returns in relation thereto as the Commissioner of Internal Revenue, with the approval of the Secretary of the Treasury, may, by regulation, require; and such books shall be open at all times to the inspection of any internal-revenue officer or agent. And any person who wilfully violates any of the provisions of this section shall for each such offense be fined not less than fifty dollars and not exceeding five hundred dollars, and imprisoned not less than thirty days nor more than six months.

SEC. 7. This Act shall take effect on the first day of July, nineteen hundred and two.

Approved, May 9, 1902.

APPENDIX II

SUMMARY OF STATE LEGISLATION ON MARGARINE IN THE UNITED STATES

In the following pages an analysis is made of the margarine laws now on the statute books of the various states. The method pursued in this analysis has been to quote the California law verbatim and then relate the laws of the other states to this. The California law was chosen as the basis of comparison because it is more inclusive than most. Few states have laws containing provisions which the California law does not include. The provisions of the other state laws are usually not in exactly the same words as those of the California law, but the same intent and meaning is frequently conveyed in slightly different phrases. The laws of a number of states, on the other hand, include only a few of the provisions of the California law, and many of these are different in intent and meaning. As a rule, where no provision similar to that of the California law appears in the law of another state, no mention is made of that state in the analysis. It is therefore to be assumed by the reader that the omission of the name of a state indicates that that state has no such provision.

With this brief introduction, the California law¹ is presented in detail. Following each provision of the law is a summary of the status of that provision in other state laws.

"b) *Oleomargarines*.—For the purposes of this act certain manufactured substances, certain extracts, and certain mixtures and compounds, including such mixtures and compounds with butter, milk or cream, shall be known and designated as 'oleomargarine,' namely: All substances heretofore known as oleomargarine, oleo, oleomargarine-oil, butterine, lardine, suine, and neutral; all mixtures and compounds of oleomargarine, oleo, oleomargarine-oil, butterine, lardine, suine and neutral; all lard extracts and tallow extracts; and all mixtures and compounds of tallow, beef-fat, suet, lard, lard-oil, cocoanut oil, peanut oil, intestinal fat, and offal fat made in imitation or semblance of butter, or when so made, calculated or intended to be sold as butter or for

¹ General Dairy Law, 1923, Act 1945, Section 12, Parts b-p, inclusive, from Deering, *General Laws of California, 1923*, Part 1, Chronological Table, Acts 1-5546, pp. 645-50.

butter; or butter substitute; and for the purpose of this act, every article, substance or compound, other than that produced from pure milk, or cream from the same, made in the semblance of cheese, and designed to be used as a substitute for cheese made from pure milk or cream, is hereby declared to be imitation cheese; provided, that the use of salt, rennet and a harmless coloring matter for coloring the product of pure milk or cream, shall not be construed to render such product an imitation; and provided, that nothing in this section shall prevent the use of pure skim milk in the manufacture of cheese."

States having provisions of similar meaning to Section *b* of the California law are:

Colorado	Massachusetts	New York
Connecticut	Michigan	North Carolina
Indiana	Mississippi	Utah
Kansas	Missouri	Vermont
Maine	New Jersey	Washington

States defining "imitation butter" instead of "oleomargarine" are:

Alabama	Iowa	South Carolina
Illinois	Nebraska	Wyoming

Ohio defines margarine as "any substance . . . made as a substitute for, in imitation of, or to be used as butter."

Several of the states do not specifically define either oleomargarine or imitation butter; nevertheless, an implied definition, similar to the one above, is present. States included in this group are:

Arkansas	Montana	Rhode Island
Delaware	Nevada	Tennessee
Idaho	North Dakota	Virginia
Kentucky	Oregon	West Virginia
Maryland	Pennsylvania	Wisconsin
Minnesota		

"*c*) *Imitation butter or cheese.*—No person, by himself, or his agents or servants, shall render, manufacture, sell, offer for sale, expose for sale, or have in his possession with intent to sell or to use or to serve to patrons, guests, boarders, or inmates in any hotel, eating house, restaurant, public conveyance or boarding house or public or private hospital, asylum or eleemosynary or penal institution, any article, product or compound made wholly

or partly out of any fat, oil, or oleaginous substance or compound thereof, not produced directly and at the time of manufacture from unadulterated milk or cream from the same, which article, product or compound shall be colored in imitation of butter or cheese produced from unadulterated milk or cream, or be made to resemble yellow butter in color, by whatever means the coloring is accomplished; provided, that nothing in this section shall be construed to prohibit the manufacture or sale, under the regulations hereinafter provided, of substances or compounds, designed to be used as an imitation or as a substitute for butter or cheese made from the pure milk or cream from the same, in a separate and distinct form not resembling butter or cheese, and in such a manner as will advise the purchaser and consumer of its real character, free from coloration or ingredients that cause it to look like butter or cheese made from pure milk or cream, a product of the dairy."

States prohibiting the use of coloring matter in margarine are:

Alabama	Michigan	Oregon
Colorado	Minnesota	Pennsylvania
Connecticut	Missouri	South Carolina
Delaware	Montana	South Dakota
Idaho	New Hampshire	Tennessee
Illinois	New Jersey	Vermont
Iowa	New York	Washington
Maine	North Dakota	Wisconsin
Massachusetts	Ohio	Wyoming
Maryland		

"d) *Labeling oleomargarines and butter and cheese substitutes.*—Each person, who by himself or another, lawfully manufactures any oleomargarine or any substance designed to be used as a substitute for butter or cheese, shall mark the same by branding, stamping or stenciling upon the top and sides of each tub, firkin, box or other package in which such article or substance shall be kept, and in which it shall be removed from the place where it is produced or put up, in a clear and durable manner, in the English language, the words, 'oleomargarine,' or 'substitute for butter,' or 'substitute for cheese,' as the case may be, in printed letters in plain roman type, each of which shall not be less than one inch in height by one-half inch in width, and in addition to the above shall prepare a statement, printed in plain roman type, of a size not smaller than pica, stating in the English language

its name, and the name and address of the manufacturer, the name of the place where manufactured or put up, and also the names and actual percentages of the various ingredients used in the manufacture of such oleomargarine, imitation butter or imitation cheese; and shall place a copy of said statement within and upon the contents of each tub, firkin, box or other package, and next to that portion of each tub, firkin, box or other package as is commonly and most conveniently opened, and shall label the top and sides of each tub, firkin, box or other package by affixing thereto a copy of said statement, in such manner, however, as not to cover the whole or any part of said mark of, 'oleomargarine,' 'substitute for butter,' or 'substitute for cheese.' The absence of the markings and labelings specified in this paragraph, shall always be construed as representation that the contents of substance in question is butter, or cheese as the case may be."

There are wide differences among the several states as to the details of the labeling provisions; nevertheless, the majority of them agree in requiring that margarine be marketed in a manner that will inform the purchaser that the substance is not butter. The following states incorporate such provisions:

Alabama	Massachusetts	Ohio
Arkansas	Maryland	Oregon*
Colorado	Michigan	Pennsylvania
Connecticut	Minnesota	Rhode Island
Delaware	Mississippi	South Carolina
Georgia	Missouri	South Dakota
Idaho	Montana	Tennessee
Illinois	Nebraska	Utah
Indiana	Nevada	Vermont
Kansas	New Hampshire	Virginia
Iowa	New Jersey	Washington*
Kentucky*	New York	West Virginia
Louisiana ^b	North Carolina	Wisconsin
Maine	North Dakota	Wyoming

* The word "oleomargarine" or the words "imitation butter" are not mentioned, but the law requires that such imitation substances be labeled in a manner that will disclose their true character.

^b "The sale of all substances, such as oleomargarine, butterine or bogus butter or other material, either separately or in combination with any substance other than the product of the cow, as butter, is hereby prohibited."

* Not included in Charles Wesley Dunn's *Food and Drug Laws, Federal and State Annotated, 1928.*

^d Dairy terms prohibited.

Among this group of states the following require manufacturers to enclose with the package a description of the product, together with the name and address of the manufacturer:

Colorado ^a	Missouri	North Carolina ^b
Connecticut ^a	Montana ^a	Vermont
Indiana ^a	New Jersey ^a	West Virginia
Michigan ^a	New York	Wyoming
Minnesota		

^a Name and address shall be affixed to the outside of the package.

^b Chemical ingredients and the proportions thereof shall be printed on the outside of the package.

In the following states retailers of margarine are required to furnish similar descriptions and conspicuously labeled wrappers:

Arkansas	New Hampshire	Utah
Maine ^a	New Jersey	Vermont
Maryland	Pennsylvania	Virginia ^a
Massachusetts	Rhode Island	West Virginia
Minnesota	Tennessee ^b	

^a When sold from a tub or box or broken package.

^b Wrapper branded with the word "Oleomargarine."

^c Name of the product and weight of the package.

The use of dairy terms is prohibited in several of the states under the labeling requirements, but in order to avoid repetition these provisions will be included later in the analysis.

"e) *Unlawful to ship.*—No person, by himself or another, shall knowingly ship, consign, or forward by any common carrier, whether public or private, any oleomargarine or any substance designed to be used as a substitute for butter or cheese, unless the same be marked and contain a copy of the statement, and be labeled as provided in paragraph (d) of this section; and no carrier shall knowingly receive the same for the purpose of forwarding or transporting unless it shall be manufactured, marked and labeled as hereinbefore provided, and unless it is consigned and by the carrier receipted for by its true name; provided, that this act shall not apply to any goods in transit between foreign states across the state of California."

Specific mention of shipping regulations is made in the following states:

Alabama	Missouri	South Dakota
Illinois	Nebraska	Virginia
Maine	Ohio	Wisconsin
Minnesota		

"f) Unlawful to possess or control.—No person or his agent shall knowingly have in his possession or under his control any oleomargarine, or any substance designed to be used as a substitute for butter or cheese, unless the tub, firkin, box or other package containing the same shall be clearly and durably marked and labeled as provided by paragraph (d) of this section, and also contain a copy of the statement required by said paragraph (d) of this section; and if the tub, firkin, box or other package be opened, then a copy of the statement described in said paragraph (d) of this section, shall be kept with its face up, upon the exposed contents of said tub, firkin, box or other package; provided, that this section shall not be deemed to apply to persons who have the same in their possession for the actual consumption of themselves or family, and for no other purpose."

States specifically mentioning this provision are:

Illinois	Missouri	South Carolina
Maine	Montana	South Dakota
Michigan	New Hampshire	Virginia
Minnesota	New York	

"g) Unlawful to sell, take orders, etc.—No person, by himself or another, shall sell, or offer for sale, or take orders for the future delivery of any oleomargarine, or any substance designed to be used as a substitute for butter or cheese, under the name of butter, or under the pretense that the same is butter or cheese; and no person, by himself or another, shall sell any substance designed to be used as a substitute for butter or cheese, unless he shall inform the purchaser distinctly, at the time of the sale, of its true name and character, and that the same is a substitute for butter or cheese, as the case may be, and shall deliver to the purchaser at the time of the sale, a separate and distinct copy of the statement described in paragraph (d) of this section; and no person shall use in any way in connection or association with the sale, or exposure for sale, or advertisement of any oleomargarine

or any substance designed to be used as a substitute for butter or cheese, the words, 'butterine,' 'creamery,' or 'dairy' or the representation of a cow or any breed of dairy cattle, or any combination of such words and representations, or any other words or symbols, or combinations thereof, commonly used by the dairy industry, except only the labeling requirements described in paragraph (d) of this section."

States requiring that notice be given to the purchaser of margarine at the time of the sale either verbally, or by printed statements, or by signs on the walls are:

Alabama	Michigan	New Jersey
Connecticut	Minnesota	Ohio
Florida	Missouri	Pennsylvania
Idaho	Montana	South Dakota
Illinois	Nebraska	Utah
Indiana	Nevada	Virginia
Maryland	New Hampshire	Wisconsin
Massachusetts		

The use of dairy terms in connection with the advertisement or sale of margarine is prohibited in the following states:

Alabama	Massachusetts	Ohio
Connecticut	Michigan	Oregon
Delaware	Minnesota	Pennsylvania
Idaho	Montana	South Dakota
Illinois	Nebraska	Vermont
Indiana	New Hampshire	Washington
Iowa	New Jersey	Wisconsin
Maine	New York	Wyoming

"h) *Unlawful use in eating places.*—No keeper or proprietor of any bakery, hotel, boarding-house, restaurant, saloon, lunch counter, or other place of public entertainment, and no person having charge thereof or employed thereat, and no person furnishing board, for others than members of his own family, and no employee where such board is furnished as the compensation or as a part of the compensation of any employee, shall place before any patron or employee, for use as food, any oleomargarine, or any substance designed to be used as a substitute for butter or cheese, unless the same be accompanied by a copy of the

statement described in paragraph (d) of this section, and by a verbal notification to said patron that such substance is a substitute for butter or cheese."

States requiring some restrictions on the use of margarine in hotels, restaurants, or eating places are:

Alabama	Massachusetts	Ohio
Arkansas	Michigan	Oregon
Connecticut	Minnesota	Pennsylvania
Florida	Mississippi	South Carolina
Georgia	Missouri	South Dakota
Idaho	Montana	Utah
Indiana	Nebraska	Virginia
Iowa	New Hampshire	Washington
Kansas	New York	Wisconsin
Maine	North Carolina	Wyoming
Maryland	North Dakota	

The majority of this group merely require that the patron be notified either by notices on the wall, signs opposite each table, by verbal statement, or by a printed statement on the bill-of-fare. Arkansas and Missouri, however, require that the dishes be labeled.

"i) *Violation bars certain actions.*—No action can be maintained on account of any sale or other contract made in violation of, or with intent to violate, this act, by or through any person, who was knowingly a party to such wrongful sale or other contract. Every person having possession or control of any oleo-margarine, or any substance designed to be used as a substitute for butter or cheese, which is not marked as required by the provisions of this act, shall be presumed to have known, during the time of such possession or control, that the same was imitation butter, or imitation cheese, as the case may be."

The provisions of this section are not specifically mentioned in any state other than California.

"j) *Tampering with labels.*—No person shall efface, erase, cancel or remove any mark, statement or label required by this act, with intent to mislead, deceive, or with intent to violate any of the provisions of this act."

South Dakota, Illinois, and Missouri are the only states other than California that make it a misdemeanor to tamper with the labels.

"k) *Possession with intent to violate law.*—Whoever shall have possession or control of any imitation butter or imitation cheese or any oleomargarine, or any substance designed to be used as a substitute for butter or cheese, or any renovated butter, contrary to the provisions of this act, shall be construed to have possession of property with intent to use it as a means of committing a public offense, within the meaning of chapter three, of title twelve, or part two, of an act to establish a Penal Code; provided, that it shall be the duty of the officer who serves a bench warrant issued for imitation butter or imitation cheese, or oleomargarine, or any substance designed to be used as a substitute for butter or cheese, or any renovated butter, to deliver to the agent or inspector of the department of agriculture of the state of California, or to any person by such department of agriculture authorized in writing to receive the same, a perfect sample of each article seized by virtue of such warrant, for the purpose of having the same analyzed and forthwith to return to the person from whom it was taken the remainder of each article seized as aforesaid. If any sample be found to be imitation butter or imitation cheese, or oleomargarine, or a substance designed to be used as a substitute for butter or cheese, or renovated butter, it shall be returned to and retained by the magistrate as for the purpose contemplated by section one thousand five hundred thirty-six of an act to establish a Penal Code; but if any sample be found not to be imitation butter or imitation cheese, or oleomargarine, and not a substance designed to be used as a substitute for butter or cheese, or renovated butter, it shall be returned forthwith to the person from whom it was taken."

The provisions of this section appear only in the California law.

"l) *Sale of oleomargarine or renovated butter.*—No person, firm or corporation, by themselves, or their agents or employees, shall sell, offer for sale, or expose for sale, or have in his, its, or their possession for sale, any oleomargarine or any renovated butter, unless the same shall have printed upon each and every package, roll, print, square, and upon any container of such renovated butter, or oleomargarine, the words, 'renovated butter,' or the word, 'oleomargarine,' as the case may be, in letters not less than one-half inch in height, and who shall not have secured from the said department of agriculture a license as provided hereinafter."

The provisions of this section as applied to oleomargarine,

with the exception of the license requirement, are treated under the labeling provisions. The following states, however, specifically include similar provisions, except for license requirements, for renovated butter:

Alabama	Kansas	Montana
Arkansas	Maine	New York
Colorado	Maryland	Ohio
Connecticut	Massachusetts	Pennsylvania
Florida	Michigan	Rhode Island
Illinois	Minnesota	Virginia
Indiana	Missouri	Wisconsin
Iowa		

States in this group that require signs or notices to be posted are:

Connecticut	Michigan	Pennsylvania
Maryland	Minnesota	Wisconsin
Massachusetts*	Montana	

* Notices posted in room.

Colorado and Maine merely prohibit the use of color. Iowa and Kansas prohibit the use of fictitious names, and the Florida law is drawn up primarily to prevent fraud.

"*m) Renovated butter.*—Renovated butter is the product made from impure or rancid butter reduced, for the purpose of cleansing and renovating, to a liquid state by melting and draining off the liquid milk fat and afterwards churning or otherwise manipulating it in connection with milk or any product thereof. Butter made from assembled cream made from pure milk fat (made from nonrancid butter) combined with other wholesome milk products, under special permit from the department of agriculture of the state of California, which otherwise conforms to the standards for butter required by this act, shall not be construed to be renovated butter."

A similar provision is incorporated in the statutes of the following states:

Alabama	Minnesota	Ohio
Connecticut	Mississippi	Rhode Island
Indiana	Missouri	Washington
Maine	Montana	Wisconsin
Massachusetts		

"n) *License to sell, etc.*—No person, firm or corporation, shall engage in the business or occupation of manufacturing, selling, dealing in, or furnishing renovated butter, oleomargarine, or any substance designed to be used as a substitute for butter, without first having applied for and obtained a license so to do, as hereinafter provided. Any person, firm or corporation, desiring to engage in the business or occupation of manufacturing, selling, dealing in or furnishing to his, its or their patrons, oleomargarine or any substance designed to be used as a substitute for butter, or imitation butter, or adulterated butter, or renovated butter, as in this section defined, shall first make application each year to the said department of agriculture for a license, and upon payment of a license fee of the amount mentioned herein to the said department of agriculture, said department of agriculture shall issue to the applicant a license. All such licenses shall contain the following proviso; provided, that this license does not authorize the holder thereof to manufacture, sell, deal in or furnish any oleomargarine, or similar substances designed to be used as a substitute for butter, which contain any coloring matter or which resemble yellow butter in appearance.

"Expiration of license. All said licenses shall expire on the thirtieth of June of each year, and may be issued in periods of one year, or less than one year, upon payment of a proportionate part of the license fee.

"Fees for license. The fees for issuing said licenses are hereby fixed at the amounts named below annually. The fee for issuing said license to manufacturers of any said substances within this state shall be one hundred dollars, and if issued to wholesale dealers in, or importers or agents for importers of any of said substances the fee shall be fifty dollars, and if issued to retail dealers in any of said substances the fee shall be five dollars, and if issued to the keeper of any hotel, restaurant, boarding-house or other place where meals are served and payment is received therefore, either immediately or by the day, week or month, the fee shall be two dollars.

"The term wholesale dealer as used in this section includes all persons, firms or corporations, who sell any of said substances in quantities of ten pounds or more at a time or in the same transaction.

"The term retail dealer includes all persons who sell only in quantities of less than ten pounds.

"All licenses, while in force, shall be kept conspicuously dis-

played in the place of business of the party or parties to whom they have been issued.

“Failure to obtain license. It shall be unlawful for any person, firm or corporation, to manufacture, buy, sell, deal in, or furnish to his, its or their patrons, or to have in possession, for any purpose whatsoever other than for consumption in his own family, or for transportation in case of a boat or railroad company, or for the purpose of storage in case of a warehouse or cold storage company, any oleomargarine, or similar substance designed to be used as a substitute for butter, or any substance resembling butter, but not made wholly from pure milk or cream, or renovated butter as in this section defined, without first having applied for and obtained from the department of agriculture of the state of California the license herein required.”

Other states requiring licenses to handle margarine are:

State	Issuing office	Amount of license
Connecticut	Dairy and Food Commissioner	Manufacturer\$ 100.00
		Wholesale dealer.... 50.00
		Retail dealer..... 6.00
		Hotel, restaurant, etc. 3.00
Florida		Wholesale dealer.... 20.00
Idaho*	Department of Agriculture	Wholesale dealer.... 200.00
		Retail dealer..... 50.00
Kentucky		Wholesale dealer.... 5.00
		Retail dealer..... 10.00
Massachusetts	City officials	Peddlers and store-keepers ..... .50
Mississippi		Wholesale dealer.... 100.00
		Retail dealer..... 5.00
Montana*	State Depart- ment of Agri- culture, Labor and Industry	Wholesale dealer.... 1,000.00
		Retail dealer..... 300.00
Nebraska	Department of Agriculture	Manufacturer 100.00
		Wholesale dealer.... 25.00
		Retail dealer..... 1.00

* Semi-annual payments for a retail dealer shall be \$27.50.

† To be paid in quarterly amounts of \$250.00 and \$75.00.

State	Issuing office	Amount of license	
Pennsylvania	..Department of Agriculture, Dairy and Food Commissioner	Manufacturer	1,000.00
		Wholesale dealer.	500.00
		Retail dealer.	100.00
		Hotel, restaurant, etc.	50.00
		Boarding house.	10.00
Vermont	Secretary of State	To sell.	25.00
Utah*	Local authorities	To sell.	5.00

* Taxed at the time of retail sale: (1) Margarine not artificially colored—five cents per pound. (2) Margarine artificially colored—ten cents per pound.

"o) *Records of sales, shipments, etc.*—Every person, firm or corporation, who is required by the provisions of paragraph (n) of this section to obtain and hold a manufacturer's or wholesaler's or importer's license shall keep a correct record in a form separate from all other business, in which every sale and purchase of renovated butter, imitation butter, oleomargarine, or any substitute for butter or substance designed to be used as a substitute for butter, or resembling butter, which substance is not made wholly from pure milk or cream, or any imitation cheese or any imitation dairy products of any kind, shall be recorded at the time of the transaction, giving in detail the quantity sold or purchased, the name and location of the buyer or seller, the date, and the place to which it was shipped or delivered, and by whom the order or sale was put up and delivered.

"Every warehouse, cold storage company, boat, railroad or other transportation company shall keep a correct record of all oleomargarine, imitation butter, renovated butter, substitute for butter, imitation cheese, or other imitation dairy products, which at any time may be in their possession, or which may be transported or stored by them, showing the owner, the quantity and kind of goods, the date when stored, and when removed, in case of warehouses and cold storage companies, and showing the character of goods billed, the quantity, the name and address of consignor and consignee, and the date of transportation, in case of boats and railroad companies.

"Records open to inspection. All said records herein required to be kept shall, at all times during business hours, be open to the inspection of the agents and inspectors of said department of agriculture and of any officer of any city or county board of health, and of any peace officer of any city or county of the state.

"A failure to keep any of the records herein required to be kept or to permit the inspection of such records, by any inspector or agent of the said department of agriculture or of any city or county board of health, or by any peace officer of any city or county, as herein required, is hereby declared to be a misdemeanor and punishable as provided herein."

Oregon requires that records of sales to hotels, restaurants, eating houses, etc., be kept. Pennsylvania requires that manufacturers and wholesalers keep records of all purchases, sales, and shipments and that retailers keep records of all purchases. Utah requires dealers in margarine to keep records of purchases as prescribed by the Treasurer. In Colorado, manufacturers are required to furnish a \$5,000 bond and to keep such records as prescribed from time to time.

"p) *Use in state institution.*—No imitation milk or cheese, and no oleomargarine shall be used in any of the charitable or penal institutions that receive assistance from the state."

States specifically including similar provisions are:

Alabama	Michigan	Pennsylvania
Colorado	Minnesota	Washington
Idaho	New York	Wisconsin
Iowa	Ohio	

Colorado and Idaho, however, merely prohibit the use of colored margarine in these institutions. Michigan prohibits the use of margarine of both types in state institutions other than penal institutions.

Although the officer in charge of the enforcement of these provisions is not mentioned in this citation of the California law, this provision is given in other places; therefore a classification of the states by departments, commissioner, or officers in charge of the enforcement of these provisions will indicate to some extent the intent behind the law. States not included in the following classification make no special mention of the enforcement of these provisions:

Dairy and Food Commissioner:

Connecticut	Oregon	Virginia
Iowa	Pennsylvania	Washington
Minnesota	Utah (and Treas- urer)	Wisconsin
Ohio ^a		Wyoming ^b

Commissioner of Agriculture:

Alabama ^c	Maine	Montana ^d
Georgia	Michigan	Tennessee

State Board of Health:

Indiana	New Jersey	Oklahoma ^e
Kentucky	Vermont ^f	

Department of Agriculture:

California	Illinois ^g	Nebraska
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State Board of Agriculture:

Missouri	New Hampshire
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Commissioner, Department of Foods and Drugs:

Nevada	Rhode Island
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State Dairy Commissioner:

Colorado

Department of Public Welfare:

Idaho

Commissioner, Department of Farms and Markets:

New York

Division of Dairy and Animal Industry, Department of Agriculture, and the State Board of Health:

Massachusetts

- ^a Division of Foods and Dairies.
- ^b The State Dairy, Food and Oil Commissioner.
- ^c Commissioner of Agriculture and Industries.
- ^d Commissioner of Agriculture, Labor and Industries.
- ^e State Board of Health and Secretary of State.
- ^f Regulations of Board of Health.
- ^g Division of Foods and Dairies.

APPENDIX TABLE I.—PRODUCTION, FOREIGN TRADE, AND CONSUMPTION OF BUTTER IN THE UNITED STATES, 1849-1929*

(Thousand pounds)

Calendar Years	Production			Imports*	Exports and re-exports*	Consumption	Consumption per capita	Consumption of butter and margarine per capita
	Farm	Factory	Total					
1849.....	313,345	.....	313,345	.....	.....	313,345	13.9	....
1859.....	459,681	.....	459,681	25	4,572	455,134	14.9	....
1869.....	514,093	.....	514,093	.....	1,324	512,769	13.6	....
1870.....	540,409	.....	540,409	.....	2,019	538,390	14.0	....
1871.....	566,725	.....	566,725	.....	3,965	562,760	14.2	....
1872.....	593,041	.....	593,041	.....	7,746	585,295	14.4	....
1873.....	619,357	.....	619,357	.....	4,519	614,838	14.8	....
1874.....	645,672	.....	645,672	.....	4,368	641,304	15.0	....
1875.....	671,988	.....	671,988	.....	6,361	665,627	15.1	....
1876.....	698,304	.....	698,304	.....	4,645	693,659	15.4	....
1877.....	724,619	.....	724,619	.....	21,527	703,092	15.2	....
1878.....	750,934	.....	750,934	.....	21,837	729,097	15.3	....
1879.....	777,250	29,422	806,672	.....	38,248	768,424	15.7	....
1880.....	801,947	44,608	846,555	.....	39,237	807,318	16.1	....
1881.....	826,644	59,794	886,438	.....	31,560	854,878	16.7	....
1882.....	851,341	74,980	926,321	.....	14,794	911,527	17.4	....
1883.....	876,038	90,166	966,204	.....	12,349	953,855	17.8	....

* Production figures for 1849-1914 are compiled from *Census Reports*; 1917-27 from *Dairy Statistics* (U.S. Department of Agriculture, Statistical Bulletin 25), February 1929, p. 80. Intercensal years are interpolated by straight line of trend. Imports and exports are from *Foreign Commerce and Navigation of the United States*. Consumption figures are obtained by subtracting net exports from production. Dots (. . .) indicate that data are not available.

* Fiscal years, 1849-1916; following that, calendar years. Includes butter and butter substitutes.

APPENDIX TABLE I.—Continued

Calendar Years	Production			Imports ^a	Exports and re-exports ^a	Consumption	Consumption per capita	Consumption of butter and margarine per capita
	Farm	Factory	Total					
1884.....	900,736	105,352	1,006,088	374	20,653	985,809	18.0	....
1885.....	925,434	120,538	1,045,972	187	21,716	1,024,443	18.2	....
1886.....	950,132	135,725	1,085,857	179	18,954	1,067,082	18.6	....
1887.....	974,829	150,912	1,125,741	236	12,531	1,113,446	19.0	19.4
1888.....	999,526	166,099	1,165,625	143	10,456	1,155,312	19.3	19.8
1889.....	1,024,223	181,285	1,205,508	179	15,510	1,190,177	19.4	20.0
1890.....	1,028,975	205,169	1,234,144	76	29,749	1,204,471	19.1	19.6
1891.....	1,033,727	229,053	1,262,780	381	15,218	1,247,943	19.5	20.2
1892.....	1,038,479	252,937	1,291,416	114	15,050	1,276,480	19.6	20.3
1893.....	1,043,231	276,821	1,320,052	73	8,921	1,311,204	19.8	20.8
1894.....	1,047,983	300,705	1,348,688	144	11,813	1,337,019	19.8	20.8
1895.....	1,052,736	324,589	1,377,325	72	5,600	1,371,797	19.9	20.6
1896.....	1,057,489	348,473	1,405,962	52	19,375	1,386,639	19.7	20.3
1897.....	1,062,241	372,357	1,434,598	38	31,407	1,403,229	19.6	20.2
1898.....	1,066,993	396,242	1,463,235	32	25,693	1,437,574	19.7	20.4
1899.....	1,071,745	420,127	1,491,872	24	20,250	1,471,646	19.8	20.9
1900.....	1,064,036	442,397	1,506,433	50	18,271	1,488,212	19.6	21.0
1901.....	1,056,327	464,667	1,520,994	94	23,250	1,497,838	19.3	20.6
1902.....	1,048,617	486,937	1,535,554	454	16,008	1,520,000	19.2	20.7
1903.....	1,040,908	509,208	1,550,116	207	8,899	1,541,424	19.1	19.9
1904.....	1,033,198	531,478	1,564,676	154	10,721	1,554,109	18.8	19.3
1905.....	1,025,489	550,612	1,576,101	593	10,087	1,566,607	18.6	19.1
1906.....	1,017,779	569,746	1,587,525	197	27,362	1,560,360	18.2	18.7

^a Fiscal years, 1849-1916; following that, calendar years. Includes butter and butter substitutes.

APPENDIX TABLE I.—*Concluded*

Calendar Years	Production			Imports ^a	Exports and re-exports ^a	Consumption	Consumption per capita .	Consumption of butter and margarine per capita
	Farm	Factory	Total					
1907.....	1,010,070	588,880	1,598,950	442	12,547	1,586,845	18.2	19.0
1908.....	1,002,361	608,013	1,610,374	781	6,465	1,604,690	18.0	18.9
1909.....	994,651	627,146	1,621,797	646	5,994	1,616,449	17.9	18.9
1910.....	965,957	657,785	1,623,742	1,360	3,151	1,621,951	17.5	19.0
1911.....	937,258	688,424	1,625,682	1,008	4,887	1,621,803	17.3	18.6
1912.....	908,559	719,063	1,627,622	1,026	6,132	1,622,516	17.0	18.3
1913.....	879,860	749,702	1,629,562	1,162	3,589	1,627,135	16.8	18.3
1914.....	851,161	780,343	1,631,504	7,842	3,746	1,635,600	16.5	17.9
1915.....	822,462	.....	822,462	3,828	10,000	.....	.....	.....
1916.....	793,763	.....	793,763	713	13,508	.....	.....	.....
1917.....	765,064	759,511	1,524,575	1,308	7,194	1,518,689	14.7	16.9
1918.....	736,365	793,275	1,529,650	1,655	26,194	1,505,111	14.4	17.5
1919.....	707,666 ^b	894,994	1,557,660	9,519	34,578	1,532,601	14.6	17.9
1920.....	675,000	863,577	1,538,577	37,454	17,652	1,558,379	14.6	18.1
1921.....	650,000	1,054,938	1,704,938	18,558	9,415	1,714,081	15.8	18.4
1922.....	625,000	1,153,515	1,778,515	6,957	11,075	1,774,397	16.2	17.9
1923.....	610,000	1,242,214	1,862,214	23,741	6,867	1,879,088	16.9	18.8
1924.....	600,000	1,356,080	1,956,080	19,405	9,397	1,966,088	17.3	19.4
1925.....	590,000	1,361,526	1,951,526	7,212	5,625	1,953,113	17.0	18.9
1926.....	615,000	1,451,756	2,066,800	8,029	6,109	2,068,720	17.8	19.9
1927.....	600,000	1,496,495	2,096,495	8,460	4,508	2,100,447	17.8	20.0
1928.....	590,000	1,487,049	2,077,049	4,659	4,355	2,077,353	17.4	19.9
1929.....	580,000	1,513,580	2,093,580	2,773	3,724	2,092,629	17.3	20.1

^a Fiscal years, 1849-1916; following that, calendar years. Includes butter and butter substitutes.

^b Census figure.

APPENDIX TABLE II.—PRODUCTION, EXPORTS, AND CONSUMPTION OF MARGARINE IN THE UNITED STATES, FISCAL YEARS, 1884-1929*

(Thousand pounds)

Fiscal years	Production	Exports	Consumption	Consumption per capita
1884.....	.....	1,538	.....	...
1885.....	.....	762	.....	...
1886.....	181	928	.....	...
1887.....	21,513	835	20,678	.4
1888.....	34,326	1,729	32,597	.5
1889.....	35,664	2,192	33,472	.6
1890.....	32,324	2,536	29,788	.5
1891.....	44,392	1,987	42,405	.7
1892.....	48,364	1,611	46,753	.7
1893.....	67,224	3,479	63,745	1.0
1894.....	69,622	3,899	65,723	1.0
1895.....	56,958	10,101	46,857	.7
1896.....	50,853	6,064	44,789	.6
1897.....	45,531	4,864	40,667	.6
1898.....	57,516	4,329	53,187	.7
1899.....	83,130	5,549	77,581	1.1
1900.....	107,045	4,256	102,789	1.4
1901.....	104,944	4,991	99,953	1.3
1902.....	126,316	5,721	120,595	1.5
1903.....	73,286	7,646	65,640	.8
1904.....	50,204	6,137	44,067	.5
1905.....	52,012	7,863	44,149	.5
1906.....	55,436	11,794	43,642	.5
1907.....	71,364	5,398	65,966	.8
1908.....	81,626	2,938	78,688	.9
1909.....	92,283	2,889	89,394	1.0
1910.....	141,863	3,419	138,444	1.5
1911.....	121,160	3,795	117,365	1.3
1912.....	128,603	3,627	124,976	1.3
1913.....	145,227	2,968	142,259	1.5
1914.....	144,021	2,533	141,488	1.4
1915.....	145,810	5,252	140,558	1.4
1916.....	152,510	5,426	147,084	1.5
1917.....	233,170	5,651	227,519	2.2

* Production figures are from *Annual Reports of the Commissioner of Internal Revenue*; exports from *Foreign Commerce and Navigation of the United States*; imports are reported with butter. Consumption figures are obtained by subtracting net exports from production. Dots (. . .) indicate that data are not available.

APPENDIX TABLE II.—Continued

Fiscal years	Production	Exports	Consumption	Consumption per capita
1918.....	326,539	6,810	320,229	3.1
1919.....	359,217	18,570	340,647	3.3
1920.....	391,283	20,952	370,331	3.5
1921.....	281,081	6,219	274,862	2.6
1922.....	190,950	2,143	188,807	1.7
1923.....	209,183	3,764	205,419	1.9
1924.....	239,698	1,395	238,303	2.1
1925.....	215,402	887	214,515	1.9
1926.....	248,046	1,256	246,790	2.1
1927.....	257,157	942	256,215	2.2
1928.....	294,699	734	293,965	2.5
1929.....	333,121	1,009	332,112	2.8

APPENDIX TABLE III.—MILCH COWS IN THE UNITED STATES, BY STATES, JANUARY 1, 1900, 1910, 1920, AND 1929*

(Thousand cows)

States	1900	1910	1920	1929*
Maine.....	204	175	176	139
New Hampshire.....	135	122	98	75
Vermont.....	269	285	292	286
Massachusetts.....	182	192	150	134
Rhode Island.....	25	26	22	21
Connecticut.....	145	137	114	109
New York.....	1,487	1,771	1,499	1,330
New Jersey.....	223	190	131	122
Pennsylvania.....	970	1,140	893	855
Ohio.....	781	947	918	908
Indiana.....	606	687	659	693
Illinois.....	1,021	1,232	1,047	949
Michigan.....	464	936	824	841
Wisconsin.....	1,003	1,506	1,832	1,935

* Data for 1900 from *Yearbook of Agriculture, 1899*, for 1910 from same document for 1909; data for 1920 from U.S. Department of Agriculture, *Illinois Crop and Live Stock Statistics* (Circular 349), 1926; and data for 1929 from *Yearbook of Agriculture, 1928*. Estimates for 1920, 1929, and the total for 1910 were made by the Bureau of Agricultural Economics.

* Preliminary figures.

APPENDIX TABLE III.—Continued

States	1900	1910	1920	1929*
Minnesota	673	1,125	1,359	1,483
Iowa	1,263	1,570	1,120	1,314
Missouri	660	925	800	810
North Dakota	176	247	430	454
South Dakota	398	656	467	523
Nebraska	685	879	535	613
Kansas	708	737	695	701
Delaware	36	38	33	37
Maryland	155	160	166	187
Virginia	242	297	377	382
West Virginia.....	167	247	193	219
North Carolina.....	243	297	300	294
South Carolina.....	123	140	195	145
Georgia	285	314	408	343
Florida	113	95	73	74
Kentucky	236	394	455	493
Tennessee	239	321	445	447
Alabama	232	289	420	354
Mississippi	244	320	475	390
Arkansas	189	361	450	382
Louisiana	123	200	220	208
Oklahoma	41	355	564	610
Texas	694	1,137	930	955
Montana	45	80	148	177
Idaho	33	81	118	172
Wyoming	18	27	55	72
Colorado	93	161	202	244
New Mexico.....	20	29	58	65
Arizona	19	25	35	36
Utah	57	88	72	97
Nevada	18	19	14	20
Washington	122	205	245	280
Oregon	115	174	200	216
California	309	452	515	626
Total	16,292	21,801 ^b	21,427	21,820

* Preliminary figures.

^b Total revised by Bureau of Agricultural Economics, which is responsible for state as well as total estimates for 1920 and 1929, to 20,625.

APPENDIX TABLE IV.—PRODUCTION OF ANIMAL AND VEGETABLE MARGARINE IN THE UNITED STATES, ANNUALLY, 1921-28*

(Million pounds)

Year	Uncolored: made of		Colored: made of	
	Animal and vegetable oils	Exclusively vegetable oils	Animal and vegetable oils	Exclusively vegetable oils
1921.....	104	99	6	2
1922.....	104	74	5	1
1923.....	121	94	7	3
1924.....	120	98	8	3
1925.....	110	108	8	4
1926.....	109	116	9	5
1927.....	109	149	10	5
1928.....	102	191	10	6

* Data from *Agriculture Yearbook*, 1926, p. 1086, and mimeographed reports of margarine production of the Division of Dairy and Poultry Products of the Bureau of Agricultural Economics, 1927 and 1928.

APPENDIX TABLE V A.—MATERIALS USED IN THE MANUFACTURE OF MARGARINE IN THE UNITED STATES,
FISCAL YEARS ENDING JUNE 30, 1916-29*

(Thousand pounds)

Fat or oil	1916	1917	1918	1919	1920	1921	1922	1923	1924	1925	1926	1927	1928	1929
<i>Animal fats and oils</i>	128,351	172,367	218,729	225,717	219,093	167,315	129,800	144,761	168,562	141,763	156,071	157,299	163,451	175,891
Milk and butter	23,483	27,713	65,976	73,680	82,845	81,215	55,046	61,411	70,990	68,433	74,992	75,770	85,599	97,368
Milk	21,331	24,410	61,123	68,000	76,000	79,716	53,989	59,835	69,090	61,924	72,662	73,700	83,115	94,752
Butter	2,152	3,303	4,853	5,680	6,845	1,499	1,107	1,576	1,900	1,509	2,330	2,070	2,484	2,611
<i>Packing-house fats and oils</i>	104,868	145,154	153,047	152,037	136,243	85,100	74,754	83,350	92,572	78,320	81,079	81,529	77,352	78,523
Neutral lard	33,446	42,401	45,702	45,764	33,456	29,268	27,057	29,568	32,210	25,674	25,172	24,372	25,036	24,189
Oleo oil	69,989	96,652	96,379	97,464	89,842	49,676	40,980	46,645	52,265	44,102	47,413	48,741	45,477	47,185
Oleo stearin	2,033	2,494	3,427	2,456	2,132	4,368	4,574	4,815	5,817	5,250	5,314	5,145	5,532	5,834
<i>Vegetable fats and oils</i> ..	56,005	94,772	119,380	146,290	166,615	146,033	84,439	91,385	110,224	105,659	180,695	137,005	172,479	207,573
Nut fats and oils	5,898	30,281	33,366	108,404	129,130	119,444	69,019	72,573	88,741	84,188	104,693	118,165	147,543	179,393
Coconut	563	19,733	61,773	69,640	80,784	103,112	57,394	65,656	83,059	79,449	98,307	107,654	141,000	171,412
Peanut	5,335	10,499	21,593	38,764	48,346	16,332	11,625	6,922	5,656	4,392	5,257	4,372	5,459	6,617
From seeds	50,107	64,511	36,514	37,896	39,485	20,030	15,420	13,757	21,483	21,467	26,002	23,771	24,935	23,135
Cottonseed	49,960	63,652	36,454	37,346	39,450	13,533	15,420	13,757	20,640	20,966	25,608	23,372	24,301	23,173
<i>Total fats and oils</i>	184,356	267,639	333,908	372,007	387,708	316,565	217,656	239,014	273,786	247,412	286,766	294,304	335,929	338,469
<i>Production of margarine</i>	152,510	233,170	326,529	359,217	391,280	281,031	190,950	209,133	239,693	215,402	248,046	257,157	294,699	333,121

* Data for the years 1916-20 from U.S. *Agriculture Yearbook*, 1923, p. 929; for the years 1921 ff. from *Annual Reports of the Commissioner of Internal Revenue*.

APPENDIX TABLE V B.—MATERIALS USED IN THE MANUFACTURE OF MARGARINE IN THE UNITED STATES,
FISCAL YEARS ENDING JUNE 30, 1916-29*

(Percentages of total materials used)

Fat or oil	1916	1917	1918	1919	1920	1921	1922	1923	1924	1925	1926	1927	1928	1929
<i>Animal fats and oils....</i>	68.1	68.1	61.8	57.4	58.1	48.9	55.5	56.8	55.6	58.2	50.8	49.8	45.8	42.8
Milk and butter	12.4	10.1	18.4	18.7	20.1	23.7	23.5	23.9	24.1	23.8	24.4	24.0	23.7	23.7
Milk	11.8	8.9	17.1	17.8	18.4	23.3	23.0	23.3	23.5	23.2	23.0	23.8	23.0	23.1
Butter	1.1	1.2	1.3	1.4	1.7	0.4	0.5	0.6	0.6	0.6	0.8	0.7	0.7	0.6
<i>Packing-house fats and oils</i>	55.7	53.0	42.9	38.6	33.0	25.2	32.0	32.4	31.5	29.4	26.4	25.8	21.6	19.1
Neutral lard	17.8	15.5	12.8	11.6	9.8	8.6	11.6	11.5	11.0	9.6	8.3	7.9	6.9	5.9
Oleo oil	36.6	35.3	27.0	24.8	21.8	14.5	17.5	18.1	17.8	16.6	15.5	15.4	12.7	11.5
Oleo stearin	1.1	0.9	1.0	0.6	0.5	1.4	2.0	1.9	1.8	2.0	1.7	1.6	1.6	1.4
<i>Vegetable fats and oils..</i>	29.7	34.6	38.6	37.2	40.9	42.7	36.1	35.5	37.4	39.7	42.5	43.3	47.8	50.5
Nut fats and oils.....	8.1	11.1	23.4	27.6	31.3	34.9	29.5	28.2	30.1	31.6	34.1	35.8	40.9	43.6
Coconut	0.3	7.2	17.8	17.7	19.6	30.1	24.5	25.5	23.2	29.8	32.0	34.1	39.0	41.7
Peanut	2.8	8.9	6.1	9.9	11.7	4.8	5.0	2.7	1.9	1.7	1.7	1.5	1.6	1.6
From seeds.....	26.6	23.6	10.2	9.6	9.6	5.8	6.6	7.8	7.8	8.1	8.5	7.5	6.9	6.9
Cottonseed	26.5	23.3	10.2	9.6	9.6	5.4	6.6	7.8	7.0	7.9	8.3	7.4	6.9	6.9
<i>Total fats and oils.....</i>	97.8	97.8	94.9	94.6	94.0	92.6	98.0	98.0	98.0	92.9	96.3	93.1	98.0	98.3

* Data from Annual Reports of the Commissioner of Internal Revenue.

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APPENDIX TABLE VI.—NET FOREIGN TRADE IN MARGARINE OF PRINCIPAL IMPORTING AND EXPORTING COUNTRIES, 1920-23*

(Thousand pounds)

Country	NET IMPORTS								
	1920	1921	1922	1923	1924	1925	1926	1927	1928
United Kingdom.	90,796	113,827	107,926	134,558	142,522	150,303 ^a	144,559	126,284	119,993
Germany .....	.....	.....	.....	58,086	37,319	12,703	22,911	1,516	23,686 ^a
Norway	2,045	1,792	1,022	1,028	2,736	1,215	370	.....	.....
Sweden	1,594 ^b	433 ^b	1,046	2,749	3,974	3,456	2,549	3,572	4,957
Denmark	880	4,746	4,070	5,638	871	3,520	4,150	3,963	1,124
	NET EXPORTS								
Netherlands	204,025	152,690	130,120	167,213	208,057	200,453	206,473	203,025	195,124
United States....	16,558	3,329	2,177	3,538	901	774	1,452	796	656

* Data for the years 1916-20 from U.S. *Agriculture Yearbook from Foreign Crops and Markets*, May 21, 1923, XVI, 761, and May 27, 1929, XVIII, 789. Dots (. . .) indicate that no data are available.

^a According to the Imperial Economic Committee, imports for 1925 were 62,200 tons. *Loc. cit.*, p. 117.

^b Net exports.

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