

**THE GERMAN FAT PLAN
AND ITS ECONOMIC SETTING**

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FATS AND OILS STUDIES

No. 6 , , , , September 1938

**THE GERMAN FAT PLAN
AND ITS ECONOMIC SETTING**

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**FOOD RESEARCH INSTITUTE
STANFORD UNIVERSITY, CALIFORNIA**

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DIRECTOR'S PREFACE

Growing governmental interposition in agriculture, and in the commerce in animal and vegetable fats and oils, has greatly modified world trade in these important foodstuffs; and it is profoundly altering the general character of farming in a number of countries. Of these countries Germany seems to offer the most instructive case for study, because control has perhaps gone farther there than elsewhere, both socially and economically. From it, certainly, there emerge a large number of highly significant facts and lessons to be learned.

To analyze the German situation in fats and oils, the measures embodied in the so-called "Fat Plan" and the outlook, however, demanded a far more intimate acquaintance with German agriculture and German policy than any regular member of the Food Research Institute staff possessed or could readily achieve. Accordingly, while I still enjoyed the active collaboration of my two co-directors, Drs. Alonzo E. Taylor and Carl L. Alsberg, we arranged with Dr. Karl Brandt to produce this work under a temporary appointment, since replaced by a permanent one. His own foreword, and the book as a whole, adequately indicate his peculiar fitness for the task.

The scope and significance of the work are much wider than a brief title can suggest. The first half not merely provides the essential background for discussion of the far-reaching fat plan of recent years; it also constitutes an illuminating treatise on the whole economy of fats and oils in Germany prior to the new regime, with special emphasis on the dairy industry, the oil-mill and margarine industries, and the marketing system through to the consumer. This complex part of modern economic

life is so little understood, for any country, that so competent a presentation is to be welcomed for itself. It gains in weight as the author proceeds to show how the control measures evolved, how they are working, and whither they are leading.

JOSEPH S. DAVIS

March 15, 1938

FOREWORD

The peculiar nexus between the markets for different fats, and between the markets for fats and those for other agricultural commodities, constitutes an important international problem which has commanded my interest from the time when German grain stabilization began (1928). When the first great shifts caused by that stabilization became apparent, I began to investigate the basic causes of the plight of the dairy industry, the cattle industry at large, and the hog industry, in Germany. The interplay of economic factors which are responsible for the price level of domestic animal fats was hidden, because no one had undertaken to study these factors in a comprehensive manner.

In August and September 1932 I discussed the supply-demand and price factors, and the all-embracing competition among all the interchangeable fats, in two articles in an economic journal, *Der deutsche Volkswirt*. At that time the extension of the network of interlocked agricultural commodity markets into the field of fats, and its implications for the dairy industry, were not yet recognized. The German fat plan has been built—largely contrary to my intentions—directly upon my analysis, which had dealt with possible policies and their shortcomings.

The dairy and fat expert of the Reichs- und Preussisches Ministerium für Ernährung und Landwirtschaft, Ministerialrat Dr. Wegener, after reviewing the competition of fats in the world market, stated correctly:

In spite of this situation, until 1933 we in Germany were exclusively concerned with dairy economics as such, with reference to milk, butter, and cheese prices, which in turn were influenced by the low world prices and from which we tried to sever the domestic production by butter and cheese tariffs or through im-

port quotas. But after having discovered for the first time the coherence between dairy economics and the fat economy, we began to tackle the problem at its root¹

In the autumn of 1933 I left Germany, but I have followed the fat plan with a keen interest ever since. The unique resources of the economic division of the public library in New York City have enabled me to keep my observations up to date. Many of my former pupils and my friends have most generously supplied me with the current literature. Nevertheless, the present book suffers from certain handicaps.

In spite of the four years that have elapsed since it was launched, the nation-wide experiment is still in the making. Even in many of its practical details, the policy to be pursued is still being shaped and reshaped. Many desirable conclusions cannot be drawn as yet or be founded on material evidence, simply because everything is still too new. There is, moreover, a conspicuous lack of critical literature on the plan, its operation, and its achievements. This can be explained only in part by the extraordinary restraint of scientific research and critical information of the public under a regime of the undebatable leadership principle. Those in charge of the administration of the plan have neither the time nor the desire to evaluate and weigh the policy pursued. And if they had both, they would probably not be especially fit for such a task because scientific investigation, critical mind, and aloofness from actual events seldom coincide with the capacity of even the ablest administrators.

Under such circumstances it was so much the more valuable to have the benefit of critical comments on my manuscript.

For numerous suggestions and critical comments I am especially obliged to Dr. Hans von der Decken, Berlin

¹ Wegener, "Ordnung der deutschen Milch- und Fettwirtschaft," *Deutsche Molkerzeitung*, Kempen, Festnummer, May 30, 1937, LVIII, 26.

(Institut für Konjunkturforschung), Staatssekretär a. D. Dr. Hans Krüger, Berlin (formerly Preussisches Ministerium für Landwirtschaft, Domänen und Forsten); to Dr. Leland Spencer, Professor of Marketing at Cornell University; and to Dr. Roy Ballinger, Professor of Agricultural Economics at Louisiana State University.

My profoundest indebtedness, however, is to the directors of the Food Research Institute, Drs. Joseph S. Davis and Carl L. Alsberg (now director of the Giannini Foundation of Agricultural Economics). Both have not only read the manuscript repeatedly in its various stages but cooperated with me by contributing the most fertile and searching criticism. I am also indebted to Dr. Davis for the organization of the charts and tables, to Mr. P. Stanley King for his competent draftsmanship, to Dr. M. K. Bennett for suggestions on the final draft, and to Elizabeth Brand Taylor for invaluable assistance on the manuscript and the proof. For reading the galley proof and for many fruitful suggestions I am grateful to Dr. Alonzo E. Taylor.

KARL BRANDT

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UNITS OF WEIGHT, MEASURE, AND MONEY

1 gram = 15.432 grains

1 kilogram (1000 grams) = 2.2 pounds

1 metric ton (1000 kg.) = 2,204.6 pounds

1 hectare = 2.471 acres; 1 acre = 0.405 hectare

1 liter = 1.0567 quarts; 1 quart = 0.9463 liter

1 hectoliter (100 liters) = 26.42 gallons

**1 mark, to April 18, 1933 = \$0.24; \$1.00 = 4.20 marks,
thereafter slowly changing to the new level**

**1 mark, from February 24, 1934 = \$0.40; \$1.00 = 2.50
marks**

THE GERMAN FAT PLAN AND ITS ECONOMIC SETTING

CHAPTER I

INTRODUCTION

As long as man has toiled with brain and brawn to conquer nature and to harness its forces to avail himself of more abundant means for supplying his wants with less effort, his endeavor has unintentionally led to a struggle between different sources of the same or interchangeable materials. As a German proverb puts it, the better is the enemy of the good. In some cases this struggle has developed into the dimensions of a vicious world-wide combat between groups of raw materials and their producers. The epic of these combats has frequently attracted authors who wrote the story of a commodity and its plight.¹

We know about the highly dramatic history of the combat between the textile raw materials—flax, cotton, silk, rayon, wool, and recently synthetic wool made of casein. This struggle has extended over several centuries and will probably continue for several more. The desire to conquer the best resources or the best markets for one or several of these raw materials has frequently served as one of the principal motives behind the foreign policy of great powers, and has not yet ceased to influence foreign affairs. We know about the gigantic struggle

¹ For instance, Anton Zischka, *Der Kampf um die Weltmacht Baumwolle* (Bern, Leipzig, Vienna, 1935); Howard and Ralph Wolf, *Rubber, a Story of Glory and Greed* (New York, 1936).

between copper, aluminum, and magnesium, and about the doom of Chilean saltpeter under the attack of the fixation of atmospheric nitrogen. A similar struggle has been going on for decades in a field that cannot but affect agriculture in almost every country of the world; but the character and the scope of this competition has been discovered only very recently, and in many countries that are directly concerned it is not yet recognized.¹

This field covers the entire economy of fats and embraces all sorts of animal and vegetable fats. It is related to the combat of fibers because cotton, flax, and hemp yield fats as by-products. As is usual in such cases, the severe competition is caused by differences in the costs of production due to more favorable location or to more efficient management and technique of production. Within the realm of fat economy, the sciences of physics, chemistry, and biology have succeeded in making practically every one of the fats from different sources interchangeable and substitutable. This broad statement remains true, despite the fact that certain fats contain particular components peculiarly adapted to special uses. As a result, the competition between fats of all origins and types has become perfect. To use a very broad and simplifying metaphor for what happens in the field of fats, we may say that dairy cows, meat cattle, and hogs are on the defensive against fat-yielding plants, marine animals, and even coal and mineral oils.

In many countries the dairy industry is the greatest single industry. This holds true for the United States as well as for Germany or Denmark, Holland, and Switzerland. In each of these countries the dairy, cattle, and hog

¹ A. E. Taylor treated one special aspect of it in his book, *Corn and Hog Surplus of the Corn Belt* (Food Research Institute, Miscellaneous Publication 6, Stanford University, California, 1932). E. W. Zimmermann treats the subject in a chapter on animal and vegetable oils and the problem of substitutability in his book, *World Resources and Industries* (New York, 1933).

industries are more or less identical with the most important part of agriculture. As soon as industries which are so much interwoven with the entire economic and social texture of a country begin to suffer severely, they call for aid by the state, and begin to press for legislation that will improve their chances for survival in the competitive process, if not permanently then at least for a period that permits them to reduce costs and to reorganize.

It is the aim of this study to throw some light upon a certain phase of this struggle of the dairy industry by discussing the attempt made by the German government during the last seven years to stabilize the domestic markets for milk, dairy products, and edible oils and fats.

England and Germany are the two largest importers of butter, cheese, and casein. In 1929 England bought 320,000 tons of butter and Germany 135,000 tons out of world total butter exports of 490,000 tons. All other importers divided the remaining 35,000 tons among themselves. Since then England has absorbed an increasing share while German imports have fallen off. The production of butter is increasing steadily, and more butter from South American states, New Zealand, and Australia is pressing into European markets—from 1929 to 1934 alone an addition of 100,000 tons.

Yet the production of vegetable and marine oils is increasing still faster. From 1909-14 to 1936 the world's output of vegetable oils increased from about 2 million tons to 3 million. In 1918-19 the world production of whale oil amounted to 60,000 tons; in 1933-36 the output averaged 400,000 tons annually. In recent years prices of vegetable oils fell to approximately one-half of the pre-war level, while whale-oil prices dropped from £60 sterling per ton in 1920 to £25 in 1925 and £10 in 1933. Out of a margarine production of 1.5 million tons in 1932 Germany's share was about 500,000 tons. This placed her in the lead of all margarine-producing countries. Den-

mark is next with 200,000 to 250,000 tons, and Holland third with an output of only 100,000 to 150,000 tons.¹

Although partial attempts at intervention in the fat markets have been made in many countries, the German program for the stabilization of the national fat market is the only example of a complete cartelization and price control of dairy products and fats ever made on so elaborate and intensive a scale and totalitarian in scope. In every other country where policies have been adopted in order to regulate prices of agricultural commodities, such plans were at most applied to certain groups of several commodities—in the United States, for example, to the so-called “basic commodities.” But usually even then the methods and means of price enhancement were based on single-commodity conditions. It is a unique feature of the German fat-control plan that it is the capstone completing an all-around price-control system for every one of the agricultural commodities and their by-products, and that it comprises regulations for every one of the numerous types of fats under a monopolistic governmental administration.

A glance at the diagram on page 7 makes obvious how intricately the net of interlocking relations is woven. Every branch of the fat economy must be affected as soon as any single component is touched. All the controversies inherent in the competition between fats are being dealt with under a comprehensive plan, operated by one of the most efficient and honest civil-service systems existing anywhere. Such an experiment on a nation-wide scale deserves critical study, regardless of one's attitude toward experiments in compulsory planning.

Because of the uniqueness of the plan and its totalitarian scope and administrative efficiency, we venture

¹ Wegener, “Ordnung der deutschen Milch- und Fettwirtschaft,” *Deutsche Molkereizeitung*, Kempten, Festnummer, May 30, 1937, LVIII, 36-38.

to deal with an unusually wide and diversified agglomeration of problems instead of concentrating on a smaller subject and arriving at a more intensive and perhaps more satisfactory analysis in detail. Since the plan is comprehensive in its conception, and since it is imbedded in a universal system of a state-controlled economy for agriculture, industry, and commerce, it would have been insufficient to analyze parts of it only. Indeed, no combination of a number of such detailed studies could clearly portray the physiognomy of the plan as a whole, and they would therefore even distort the detail. The strategic features of the entirety are more important than many interesting but by no means unique parts.

For the reader's convenience, the term "fat" will be used herein to denote oils as well as fats. This is permissible because the two types of commodities, though differing in their aggregate condition at normal temperatures (oils being fluid and fats solid), are so closely related to each other that chemistry converts one into the other through the process of hydrogenation.¹

Within the food supply of a nation, foods comprised mainly of fats are a third essential group along with the two other important types of food commodities, carbohydrates and proteins. The nutritive value of a food ration depends largely upon the ratio between these three groups of energy carriers, provided we omit the essentially qualitative components, minerals and vitamins, which are required in minute quantities. Within each group the different food commodities are interchangeable; and to a large extent, though not in all cases, they can be substituted for one another. Legumes, meat, cheese, eggs, and fish meat can be substituted for each other,

¹ Cf. C. L. Alaberg and A. E. Taylor, *The Fats and Oils: A General View* (Food Research Institute, Fats and Oils Studies 1, Stanford University, California, 1928).

since they are all more or less carriers of high-quality protein. Cereals, potatoes, and sugar can be substituted within the ration as carbohydrate carriers. So can all the fats be interchanged also. The technique of converting and processing food commodities has considerably widened the range of materials which may be substituted for one another and yet produce the same effects. Nowhere is this more true than for fats. This quality of substitutability, however, is mainly responsible for the very problem of competition between various fats and the economic consequences of the struggle.

Chart 1 shows in diagrammatic form how the different fats are related to the primary materials, to the converting agencies, to the primary by-products, and to each other.

Among the sources of fats we find several land animals, one group of marine mammals (whales and porpoises), several species of fish (herring, sardines, menhaden, and sharks), and dozens of plants. From living domesticated land animals, especially dairy cattle but also goats and sheep, we obtain butterfat which is consumed in the form of milk, butter, or cheese. Slaughtered cattle, sheep, and goats furnish tallow, while hogs give lard, fat pork, and bacon. Poultry is a source of a special type of fat, and the yolk of eggs contains a high proportion of fat. Whales are a source of large quantities of high-grade fats. In many countries, as in Norway, Japan, and the United States, fish are used as fat-yielding material as well. Among the fat-carrying plants we find a wide range of annuals, perennials, and trees, mainly cultivated, that serve as a major source of fats.

Fats may be divided into several groups, according to the way they are consumed:

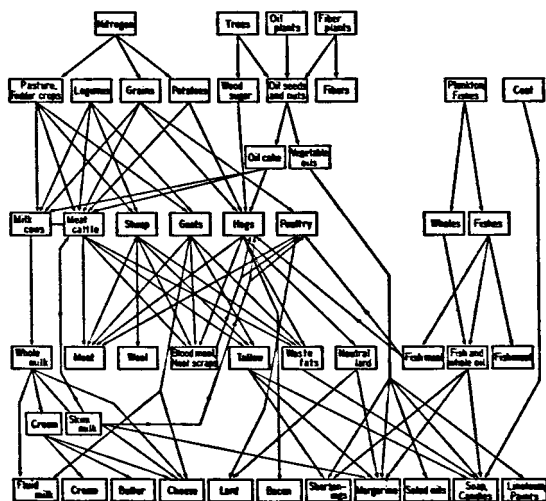
1. Fats eaten as such during meals.
2. Fats used in the preparation of meals and in processed foods.

3. Fats contained in meat and other animal products.

4. Fats contained in cereals, legumes, fruits, nuts, and vegetables.

Butter, cheese, bacon, and lard belong to the first group, and oleomargarine also. This butter substitute is

CHART 1.—DIAGRAM SHOWING HOW THE PRODUCTION AND CONVERSION OF FATS ARE INTERLOCKED



usually a mixture of several different fats; it may theoretically comprise every one of the known fats, although in fact it usually consists of only a certain collection of them. Cheese is in a special subgroup because it contains,

in addition to a fat content that may range from 8 to 60 per cent of the dry substance, a varying proportion of milk protein (casein); thus it might be grouped with fat cuts of pork or beef.

Fats which fall into the second group comprise practically all of the varieties known, since the particular qualities of the individual varieties may be utilized to advantage in the many techniques of preparing food and according to the choice of particular types of dishes. Nevertheless, some fats within this group are outstanding. Such are lard and its substitutes, called lard compounds or vegetable shortenings; and pure vegetable oils or pure hard fats like coconut fat, hardened whale oil, or hardened cottonseed oil.

Fats of the third group are relatively important as a complementary supply, but they are not consciously reckoned as "fats" either in the diet of the individual consumer or in the national food supply. They have a special significance for our problem because a certain proportion of these fats may be separated from meat and other animal products and may then appear in the form of fats of the first or second group.

The fourth group of fats—those contained in cereals, legumes, fruits, nuts, and a few vegetables—may be neglected in this study on Germany. At least in European countries, these fats are not usually recognized and evaluated as such by the consumer in the different food materials; they do not directly compete with other fats, nor are they separated as such; and in general they are unimportant. Even the German consumption of nuts, which have the highest fat content within this group, can therefore be disregarded. In a country like Japan, with its wide use of soy beans as an equivalent for the milk, butter, cheese, meat, or cereals used by the white races, the role of this fat would require an entirely different treatment.

With these lines of demarcation drawn—though in many instances they are not sharp or fixed—we are in a position to outline the importance of edible fats to the various interested groups in Germany. These are notably agriculture, the fat-converting industries, distributors, and consumers. This will serve to show the true proportions of these groups in the national economy, in their relation to edible fats, and thus to place the fat-control plan in its setting of social and economic facts.

CHAPTER II

GERMAN AGRICULTURE AS A FAT-PRODUCING INDUSTRY

From time to time there are reports, especially from Germany, that chemists have succeeded in transforming hydrocarbons into edible fats. Thus far, however, all attempts to produce such fats synthetically from coal, mineral oils, or other carbon compounds have been futile, at least commercially. The supply of edible fats, therefore, remains dependent on agriculture, whaling, and fishing.¹ For Germany, this has meant primarily agriculture, including animal husbandry.

THE AGRICULTURAL BASIS

For many centuries German farming has adapted itself most closely to the natural conditions and the national food requirements which found their expression in price relationships between food commodities. With a land area of 181,714 square miles, Germany extends over 7.5° of latitude (from the 47.5th to the 55th parallel) and 16° of longitude. The climate, which means the available amount and seasonal distribution of moisture as well as active solar radiation and temperature, is the dominant factor in agricultural production, and considerably more important than the soils. It can perhaps be best grasped by looking at the vegetation of the country, because the aboriginal flora expresses much more eloquently than any statistics the ecological adaptation of plants to the climate.

¹ In addition, small commercial amounts are derived from wild tropical nuts and seeds. Examples are shea butter, ilipe, babassu nut oil, coixnut oil, and some so-called vegetable tallow (not the Chinese).

This native cover represents predominantly the climate and not the soils, although the character of the soils also depends to a certain extent on the climate. The major part of the German landscape had a natural cover of forests.¹ Only some of the small regions now used principally for producing sugar beets, wheat, and brewing barley, the river bottom lands, and the sea marshes had no forest cover.

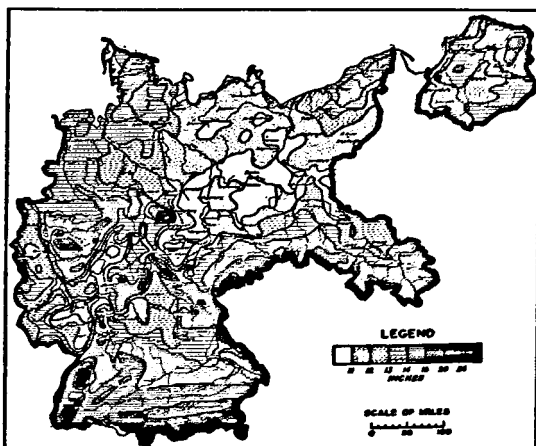
The average annual precipitation of the country as a whole is 24 inches. In some restricted territory east of the Harz Mountains and in the lower Oder valley the precipitation ranges between 15 and 20 inches, while in the environment of the mountain districts it varies from 30 to 40 inches, and on mountain tops from 40 to 80 inches. To compare this with the climate of the two leading dairy states of the United States it may be mentioned that the average annual precipitation of Wisconsin varies around 30 inches and that of Minnesota around 27 inches. A somewhat more significant index, showing the average precipitation during the main vegetation period extending from May 1 to September 30, is shown in the map designated Chart 2. Significant topographic features are shown in Chart 3.

Without considering other more refined measurements of climate, these few clues make it obvious that, with a few regional exceptions, the northern lowlands of Germany belong to the North European dairy belt which extends over a broad stretch south of the Channel, the North Sea, and the Baltic Sea, and includes the British Isles and Scandinavia. Germany's southern mountainous district belongs to the second distinctive dairy belt which surrounds the Alpine, Sudeten, and Carpathian mountain

¹ See Statistisches Reichsamt, *Deutscher Landwirtschafts Atlas* (Berlin, 1934); A. Penck, "Deutschlands geographische Gestalt," *Deutschland: die natürlichen Grundlagen seiner Kultur* (Leipzig, 1928); Heinrich Niehaus, "Agricultural Conditions and Regions in Germany," *Geographical Review*, January 1933, XXIII, 23-47.

chain. Grass is not the only crop that can be grown with profit in these belts, but dairying fits almost everywhere into the general climatic characteristics of the country, because good grasses grow very well and make rich

CHART 2.—AVERAGE RAINFALL IN GERMANY IN MAY-SEPTEMBER*



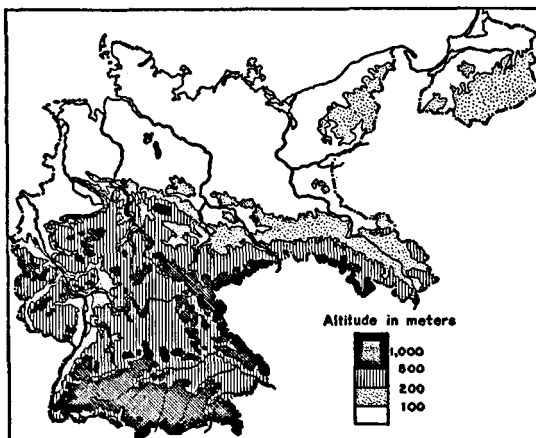
* Reproduced, with slight modifications, from Max Sering, *Die deutsche Landwirtschaft unter volks- und weltwirtschaftlichen Gesichtspunkten* (Berlin, 1932), p. 223, there credited to Preussisches Meteorologisches Institut.

meadows for hay and good pastures. The distribution of the rainfall, the cloudiness, and the water-retaining capacity of the soils favor natural grass growth, while the moderate temperatures in summer provide for the comfort of dairy cows on pasture.

Since the European continent differs in many respects

from North America in its geological history and geographical framework, the climatic features are also different. Westerly winds prevail throughout the year. Coming from the Atlantic, they carry most of the moisture

CHART 3.—TOPOGRAPHY OF GERMANY*



* Based on chart in Max Sering, *Deutsche Agrarpolitik auf geschichtlicher und landeskundlicher Grundlage* (Leipzig, 1934), p. 2a.

that makes for rainfall. But since a number of mountains stretch from north to south, the rainfall accumulates on their western slopes, while it tapers off along their eastern ridges. In the mountainous districts the topography calls for a permanent grass cover of all the gentle slopes as a means of soil conservation, while the steep slopes are devoted to tree culture. In the lowlands the natural drain-

age is rather poor. This is characteristic of almost all the northern half of the country. In many places there is no other choice than to leave such lands in permanent meadow or summer pasture. Dry eastern winds in May draw a good deal of valuable moisture from the arable land. But on pasture land real shortage of moisture occurs in July and August, when the growth of grass is already slowing down under the influence of its vegetative period.

The course of temperatures during the year is determined in its major characteristics by the influence of the ocean or the neighborhood of great land areas. The Northwest of the country has a more balanced maritime climate with some benefit from the Gulf Stream, while the East and Southeast show signs of a more continental climate. The South, protected by mountain barriers on the south, west, and east, has a warm climate in the valleys and at lower elevations.

The best brief survey of the prevailing temperatures may be given by data on plant zones. Only the valleys of the Rhine and of some of its tributaries permit the cultivation of good vineyards and the growth of chestnut or almond trees. Maize as a grain crop grows only in these valleys, although it should be noted that newly bred early-maturing varieties are expanding the zone somewhat. At higher elevations winter wheat is not safe, and winter oats cannot be cultivated at all outside of the viticultural belt.

The average annual temperature of the largest part of Germany is between 42° and 50° Fahrenheit, while only in some remote districts of the East or at high elevations does the average fall below 40°. But the average temperature might be an average between extreme heat in summer and extreme cold in winter. That this is not the case may be seen from the two isotherms¹ representative of

¹ An isotherm is a line joining points having the same temperature at a given time.

winter and summer. The January 32° isotherm cuts from north to south through the middle of the country. On the one side, East Prussia has an average January temperature of 25°, while the Rhineland and Lower Saxony have 32° to 36° on the other. The July 68° isotherm runs from east to west through the country, and the average temperature of the mountain districts, except for the highest altitudes, is 61° to 70°.¹

The number of frost-free days varies between 305 in the lowlands of the maritime Northwest and 220 days in the continental East. This does not mean that a period of from 305 to 220 days, respectively, is free from frost. In fact, the really frost-free season falls in the East or at higher elevations to 120 days or even less. The apple-blossom season begins four weeks earlier in the upper Rhine valley than it does in the Baltic provinces or at elevations above 1,680 feet.

With respect to the direct production of fats through plants, it is the solar radiation that counts most. The number of days without sunshine averages between 70 and 80, leaving from 295 to 285 days with sunshine. During these days the average period of bright sunshine varies from 4.2 to 4.7 hours. Compared with the theoretically possible duration of sunshine, the actual full radiation reaches on the average of only 32 to 38 per cent.²

If we consider, moreover, that the solar radiation can be utilized by plants only during the growing season, it becomes apparent that the opportunities for plants with a high sunshine requirement are relatively small in Germany as compared with southern and subtropical cli-

¹ Cf. E. A. Andree, *Allgemeiner Handatlas* (3d ed., Bielefeld and Leipzig, 1924), and *Statistisches Jahrbuch für das Deutsche Reich*, 1934, p. 4.

² Without venturing to discuss the question of the difference in the quality of rays in different climates, one may suggest that a brighter and less humid climate may permit an entirely different composition of rays to penetrate the troposphere. It might follow that the efficiency of the general radiation would be strongly affected and would change the agricultural possibilities.

mates.¹ That the country enjoys only one-third of the sunshine which falls upon its troposphere² is another vivid illustration of the cloudiness and humidity so typical of a genuine primeval forest belt and of its successor, the dairy belt.

The fact that most of the country was heavily wooded by nature gives a clear hint about the character of the soils. Compared with the fact that most of the soils were originally forest land, the geologists' explanation that the country consists mainly of two glacial plains, one extending from the Alps northward and the other from the Baltic Sea southward, loses its significance. The farmer is almost exclusively interested in the topsoil and a relatively narrow layer of the subsoil. German forest soils normally show a rust or brown color which indicates a more or less advanced stage of leaching. The major portion of German soils is light and sandy. Diluvial loam extends all over northern Germany, but on almost every farm the quality of the topsoil changes with the amount of sand deposited by glacial currents on top of the loam or with the admixture of sand to the loam. The topography of the country and the geological origin are largely responsible for the overwhelming variegation of soils. Aside from these factors, the antiquity of plow culture has left its traces. Soils which have been tilled for centuries show a richer and deeper topsoil, while land from which the forest was removed only some decades ago shows a much poorer topsoil than the natural composition might suggest.

All these features of Germany's soils have an important bearing upon the possibilities of, and the limitations

¹ G. Hellmann, "Die Sonnenscheindauer in Deutschland," *Sitzungsberichte der preussischen Akademie der Wissenschaften*, July 26, 1922, pp. 266-83.

² Troposphere is the layer of the atmosphere around the globe which causes the changes of weather, carries the clouds, contains enough oxygen for man to breathe, and is surrounded by the stratosphere.

upon, farming. Since the soils have been leached or podsolized from prehistoric times, from the beginning farmers have had to rely on methods of soil conservation and replenishment or enrichment of natural fertility. This means that a part of the soil has to be kept under grass or fodder crops and that the humus content of the soil must be preserved and built up. German agriculture has operated for centuries on the principle of an increasing revolving capital of plant nutriment on the farm. Animal manure has always been the most important basis of crop cultivation in Germany. Sheep and cattle are the main manure sources, and in former times they were valued essentially as such. All of the immense crops of grass, clover, hay, silage, fodder crops, and roots have to pass through the intestinal tract of ruminants, and their waste—combined with all the straw of the grain crops—is transformed into the annual plant nutriment supply. Artificial fertilizers and imported feed also contribute to an increase in the volume of manure by enlarging the crops of straw, roughage, and fodder in general. It is no exaggeration to say that without the utilization of all the grass and fodder crops through cattle, and without the supply and intensive utilization of manure, German agriculture with all its poverty in natural soil resources would be desperately upset.

CATTLE HUSBANDRY

Out of a total of 3,046,226 farms with any land in agricultural use 2,423,844 have meadows and 817,967 have permanent pastures, while cattle are kept on 2,493,707, or 81 per cent of the total.¹ In 1933 there were 19,275,918 cattle, of which 9,951,688 were cows.² These cows produced approximately 24 billion liters of milk; assuming an average butterfat content of 3.05 per cent, this means a

¹ *Statistisches Jahrbuch, 1936, p. 76.*

² *Ibid., p. 104.*

total of 732,000 metric tons of butterfat. Only 51 per cent (1934) of the total output is manufactured into butter.³ Yet the butter production in 1933 represented 431,000 tons, which was more than the average annual world net exports of butter during the period 1924-28.³ In the same year Germany's cattle industry supplied the nation with 877,000 tons of beef, 190,000 tons of veal, and some 60,000 tons of tallow.⁴ This represents almost the total supply of beef and veal for the nation of 67 million people. These few figures give some hint of the size of the cattle industry and the importance of the farmers' interests at stake when the profitability of the butterfat industry is under fire.

Even if we reduce the total output in butterfat by the amount required for raising calves (9.3 per cent of the gross yield of milk), the remaining volume of butterfat, 650,000 tons, plus the tallow production of some 60,000 tons, shows clearly that within a national fat production from all sources totaling 1,043,000 tons in 1933⁴ the cattle industry ranks first with its share of 69 per cent. A calculation based on value instead of volume would reduce considerably further the share of the other fat-producing industries. This predominance of fat production through the medium of cattle is the result of a highly refined adaptation of agricultural production to the climate, the soils, the topography, the relative scarcity of land in comparison with the population, and finally the competitive situation in the market.

In 1935, out of a total area of 28,753,577 hectares used for agricultural purposes, 19,404,563 were used for tillage, 5,658,841 as meadows, and 2,909,887 as pastures. The geographical distribution is shown roughly in Chart 4.

³ Hans von der Decken, *Deutschlands Versorgung mit landwirtschaftlichen Erzeugnissen* (Berichte über Landwirtschaft, N.F., Sonderheft 115, Berlin, 1926), pp. 35-37.

⁴ *International Yearbook of Agricultural Statistics, 1932-1933* (Rome, 1933), p. 533.

⁵ Von der Decken, *op. cit.*, pp. 36, 75.

⁶ *Ibid.*, p. 75.

Tillage predominates in the agricultural use of unshaded areas. In both groups of shaded areas, over 50 per cent of the area in agricultural use is in pastures and meadows. The farm land in areas shown in black is assessed at over 1,800 marks per hectare (\$288.88 per acre, taking \$1 = RM 2.50).

On the average, for the whole country, 29 per cent of the land put to agricultural use is devoted to permanent grass. In fact, there are large sections of the country with more than 50 per cent of the land in agricultural use under permanent grass. These have been called the green-farming belts. As Chart 4 indicates, two such areas are the northwestern and the southern green-farming belts. Smaller patches cover the mountain areas of medium elevation.

Chart 5, which shows the geographic distribution of cattle, points to the fact that over and above the permanent green lands cattle have an additional feed base in fodder grown on arable land. Some 2,490,850 hectares or 12 per cent of the crop land is used for clover, alfalfa, grasses, and similar fodder crops. Besides this, 1,107,339 hectares or 5 per cent of the crop land carry mangolds, turnips, or feed carrots.

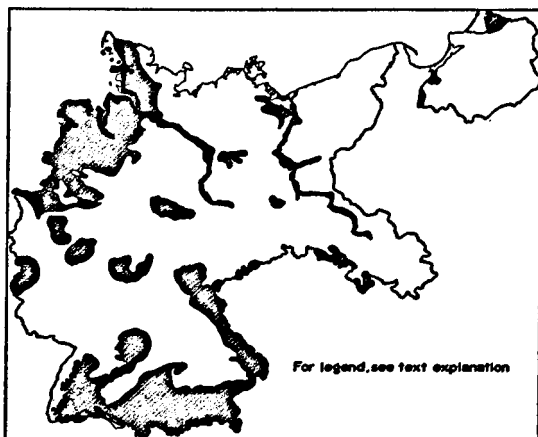
The 17 per cent of the arable area in fodder crops does not represent all of the feed base. Through their crop of tops and leaves¹ and through the extracted beet chips, a total of 388,609 hectares of sugar beets serve as a high-grade fodder crop.² This adds another 2 per cent of the crop land. Finally, that part of the potato acreage which supplies the raw material for the distillation of potato spirit furnishes a fodder supply for cattle, because the slops are fed to cattle and represent on such farms a direct

¹ Besides being fed in the green state, tops and leaves are washed and dried in large quantities and are an excellent commercial feed.

² In addition, parts of crop surpluses are used to produce unextracted beet chips containing the full sugar content.

substitute for a certain number of acres in meadow or pasture. This would add roughly another half of one per cent to the total crop area.¹

CHART 4.—“GREEN-FARMING” BELTS*



* Based on supplementary maps VIII and VIIIa, by Heinrich Niehaus, in Max Sering, *Die deutsche Landwirtschaft*

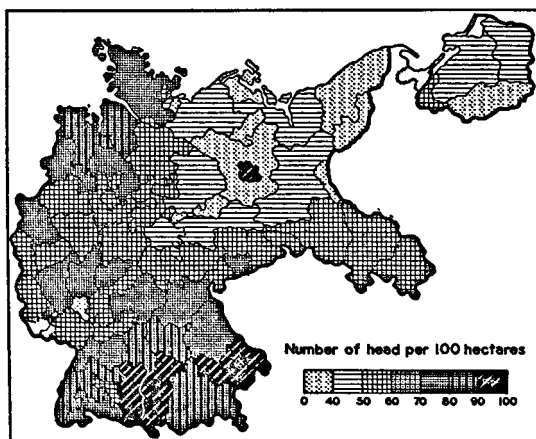
Meadows, pastures, and fodder crops (including sugar-beet and potato-spirit equivalent) constitute 42.4 per cent of the total area in agricultural use.² From the pastures

¹ According to von der Decken, *op. cit.*, p. 29, 2 million tons of potatoes were distilled in 1933-34. One ton of potatoes yields a value in pulp which equals the price of approximately .2 ton of hay. On the assumption of an average hay yield of 4 tons per hectare on German meadows and a price of 40 marks per ton, the pulp of 2 million tons of distilled potatoes would be the equivalent of 100,000 hectares of meadows.

² *Statistisches Jahrbuch, 1936*, p. 87.

and meadows we must make allowance for horses, of which Germany counted 3,390,000 in 1935. If we deduct 208,000 foals under one year of age, there remain 3,182,000

CHART 5.—GEOGRAPHIC DISTRIBUTION OF CATTLE IN GERMANY, DECEMBER 1, 1929*



* From *Wirtschaft und Statistik*, Mar. 1, 1930, p. 181. The Reich average was 61.3.

horses. A consumption of 1 ton per horse in 210 winter-feeding days would absorb approximately 12 per cent of the hay crop of the five-year average of 1931-35, and this must be deducted from the meadow area available for the cattle herd. We must also deduct 15 per cent of the pasture area in order to calculate the area available for cattle. The correction for meadows and pastures requires the deduction of 3.9 per cent from the total area in agri-

cultural use, so that only 38.5 per cent, instead of 42.4 per cent, are in meadows, pastures, or fodder crops available for cattle.

It should also be noted that on some of this land feed is a joint product, so that the same acreage appears on the balance sheet of crops as well as for use by cattle. This is true of the sugar-beet land where the main product is beets. It is also true of that part of the potato area from which the crop is converted into alcohol as the main product. In fact, the feed-base acreage is larger still because a good deal of the grain crop can also be considered a supplementary feed supply. Oats, or a mixture of grains and legumes, are fed directly to cattle, and the bran is fed after the extraction of flour from grain. It is hard to arrive at a reliable estimate of the amount of grain thus fed to cattle and sheep, because it changes with the price relation to other feed materials, the availability of concentrates, the size of the crops of hay and other fodder, and the ratio of flour extraction.¹

For the sake of completeness, two small supplementary items must be mentioned. Goats—called in Germany the “cows of the little man”—also contribute some 37,000 tons of butterfat. In East Friesland, farmers and small holders keep milk sheep. For the total national account, however, these items may be ignored.

HOG HUSBANDRY

The second large source of domestic edible fats is hog husbandry. Herbivores are the typical converters of juicy feed materials rich in cellulose (at least as their main feed base), which is decomposed and converted after thorough and repeated fermentation in the ruminant's intestinal tract. But the omnivorous hog, with a much shorter gut,

¹ Cf. H. L. Fensch, *Die Verwertung der deutschen Getreideernte* (Berlin, 1930).

has the notable ability to convert concentrated carbohydrate feed plus protein into body fat and meat. It is true that breeding sows are also excellent milk producers, while they are nursing their litters, but this capacity counts only as part of the process of raising pigs.

By reason of the simple fact that hogs are mainly efficient as converters of concentrated carbohydrate feeds, the hog industry has no such primary location as the cattle industry.¹ Hogs are located in Germany wherever there is an abundant supply either of carbohydrates or of waste protein. This is why we find the production of hogs combined with the production of grain or potatoes, and combined with dairying where whey is available in the cheese districts or an abundance of skim milk in the butter districts. In the latter case, a part of the necessary supply of carbohydrate feeds often has to be shipped from other regions or imported from abroad, while in the grain- and potato-surplus districts a good deal of the necessary protein is brought from some distance. Besides potatoes (which in feed use are almost strictly hog feed because hogs are the most efficient converters), winter and spring barley, and a certain proportion of rye and rye bran, are used for feeding hogs. Since 81 per cent of all German farms have dairy cattle and some grain or potatoes, both factors favoring hog production exist generally.

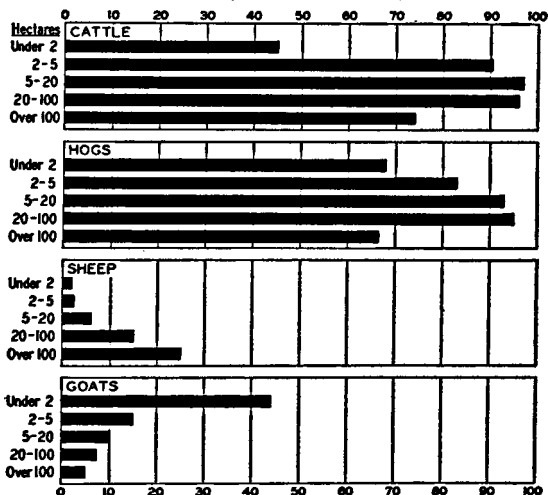
The distribution by size groups of farms having various types of livestock is shown in Chart 6. In 1933 no less than 2,577,018 farms with more than 0.5 hectare of land each, or 84 per cent of the total of 3,046,226 farms, raised hogs. These farms had 18,175,728 out of the total national stock of 23,890,397 hogs.² Thus the small holdings with under

¹ Hog raising might have a primary location in vast beech and oak forests, where the hogs could live mainly on roots, insects, worms, beechnuts, and acorns. But this extensive type of hog production has no place in a country like Germany with its intensive system of agriculture, although breeding sows and young lean pigs are frequently at large in the forests.

² *Statistisches Jahrbuch*, 1936, p. 104.

0.5 hectare each held the remaining 5,714,669 hogs, which depended largely on purchased feed.

CHART 6.—PERCENTAGE OF FARMS IN DIFFERENT SIZE GROUPS HAVING CATTLE, HOGS, SHEEP, GOATS, 1933*



* Based on chart in *Wirtschaft und Statistik*, Feb. 1, 1935, p. 82.

Hogs have the greatest fecundity among farm mammals, hence up to two litters of 8 to 10 pigs each can be reared in a single year. This peculiarity, combined with the hog's rapid growth to maturity, makes for a remarkably rapid adjustment of hog production in response to the ratio between hog prices and feed prices.¹ The well-

¹ See Arthur Hansa, *Die Prognose der Schweinepreise* (Vierteljahrshefte zur Konjunkturforschung, Sonderheft 2, Berlin, 1927).

known, sharply marked, cyclical fluctuation of German hog production, with 36 months' average duration of one whole cycle, was responsible for the fact that the total hog stock of the country fluctuated, for instance, from 18.6 million animals in March 1930 to 25.3 million in September 1931.

Also, hogs are much more efficient than cattle in conversion of nutrients into edible tissue. This higher ratio of recovery of feeding stuffs is important in all countries with intensive agriculture; but it means less than feeding data would indicate because cattle require less feed raised by cropping than do hogs.

The total crop of fat supplied by the hog producers in 1933, in the form of bacon and lard, has been estimated by von der Decken in his food balance sheet at 308,000 tons or 29 per cent of the total national fat production.¹ Since the normal feed ratio for hogs calls for 4 units of grain or its equivalent in other carbohydrates, e.g., 20 units of potatoes, for the production of 1 unit deadweight² of hogs, the domestic pork supply of 2,045,000 tons³ represented in 1933 approximately 10,000,000 tons of converted grain. In the same year the entire supply of fat from domestic oil seeds was only 3,000 tons, practically negligible.

OTHER AGRICULTURAL SOURCES OF FATS

Other agricultural sources of fats should be mentioned, although they have long since lost their former importance in Germany.

Sheep might be used as a source of fat. In practice, their fat is either consumed with the meat, or is of inferior quality and used as inedible tallow and grease.

¹ Von der Decken, *op. cit.*, p. 75.

² Deadweight, in German usage, means the weight of the slaughtered hog without the blood and the intestines. The difference between liveweight and deadweight for hogs varies from 18 to 25 per cent according to the age, weight, and quality of the animal.

³ Von der Decken, *op. cit.*, p. 39.

However, large-scale production throughout the nation might contribute such quantities that sheep fat could likewise be utilized for direct consumption after refining and converting. Sheep as ruminants have an ability much greater than cattle to digest and convert materials very rich in cellulose, even in a dry state. They can utilize juicy fodder, and they can also convert concentrated feeds into wool, meat, and fat. But they have to compete with cattle or with hogs; and in both cases they lose, unless special conditions give them an opportunity to yield a better return. The German type of cattle—"lowland cattle" as well as mountain cattle—is, by historical origin and influence of breeding, typically adapted to hygrophilous flora, while most of the German breeds of sheep still possess certain capacities inherited from denizens of semiarid regions with a xerophilous type of vegetation, which enable them for example to live on straw for a long while.¹

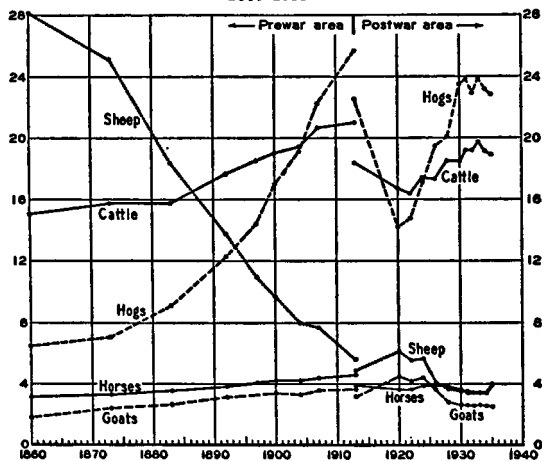
With the disappearance of fallow in the course of intensive crop rotations, the main pasturing land for sheep disappeared. The decline in their number is the most striking feature of Chart 7. Today sheep are kept only in the mountain ranges too poor to feed cattle, in the marshes, as additional stock on fat pastures in order to utilize grass left over by cattle and horses, or in the sugar-beet districts as converters of a part of the top and leaf crop of beets. In 1933 only 168,409 farms had any sheep at all, and the total sheep flock of Germany numbered 3,919,000.² The cash return from sheep in 1928-29 did not amount to more than one per cent of the total cash returns of German agriculture. Forty per cent of the sheep returns was represented by wool, the rest by meat. Therefore, we may omit this item from our consideration. It may be added that

¹ Hygrophilous plants are especially adapted to a humid climate, while xerophilous plants thrive in dry conditions.

² *Statistisches Jahrbuch, 1936, p. 104.*

even if the trend of sheep raising should be changed artificially, it would result mainly from efforts to raise more domestic wool; and the enlarged output of mutton would create fresh problems in the meat markets.

CHART 7.—LIVESTOCK POPULATION IN GERMANY IN SPECIFIED YEARS, 1860-1935*



* Adapted from similar chart in I. G. Farben-Industrie, *Statistische Zusammenstellungen*, 1936, pp. vi, 1.

Still another item, though an extremely small one, must be reported in a survey of farmers' interests in the fat problem. Fat can be and always has been produced in Germany on farms without animals to convert carbohydrates into fat. The plants used for fat production are rape, flax, hemp, poppy, and mustard.

Flax and hemp are primarily fiber plants which yield oil seeds as a by-product in so far as they are not used for seed. Both plants have to meet severe competition from foreign fibers such as cotton, flax, hemp, jute, and sisal. With an unfavorable relation of their prices to those of other farm products, both plants had become almost extinct on German farms. In 1878 prewar Germany grew 133,000 hectares of flax and 21,000 of hemp. In 1927, the acreage in postwar Germany was down to 15,000 hectares of flax and 1,000 of hemp.

Winter rape (*Brassica napus oleifera*) and mustard (*Brassica rapa oleifera*) as a spring variety are the most important oil seeds for German conditions.¹ They require the best soil in the best state of fertilization and yield oil seed as their only product. In 1878 (prewar area) an acreage of 179,000 hectares was under rape and another 2,100 under mustard. In 1927 (postwar area) the acreages were 28,000 and 2,400 hectares, respectively.

The extractable oil content of hemp seed and mustard seed is 25 per cent, that of linseed 32 per cent, while rape seed yields 36 per cent of oil. Linseed cake has a remarkably high feed value for any type of animals, because of certain dietary qualities not to be found in other cakes.²

The average yield of rape and mustard seed for the years 1928-32 was 1.3 tons per hectare and the yield of linseed for the years 1934 and 1935 was 0.68 ton per hectare. This means that the extractable oil content for rape was 0.47 ton per hectare and for linseed 0.17 ton per hectare. The importance of these figures will be discussed in chapter xiii. Here it is enough to point out that in 1927 the domestic production of oil seeds contributed only 2.4 per

¹ Though winter rape is sometimes pastured in order to reduce too exuberant growth, it is never grown for winter grazing as in some parts of the United States. Only a negligible proportion of the mustard crop is used as condiment.

² Ausschuss zur Untersuchung der Erzeugungs- und Absatzbedingungen der deutschen Wirtschaft, *Die deutsche Ölmalzindustrie* (Berlin, 1936), p. 9.

cent of the total consumption of oil seeds, while in 1932 this share had dropped to 0.4 per cent.¹

The third type of oil plant is the poppy. It too is a plant yielding oil seed as its only product, because the production of the milky sap containing opium is not practiced in Germany. From 6,300 hectares in 1878 the acreage under poppy cultivation declined to 1,800 in 1913, with a revival up to 5,700 hectares during the war (1917). In 1927, 3,200 hectares were registered in the statistics. However, poppy can be ignored as a source of fat, because the crop of poppy seed is almost exclusively used directly in bakeries.

All the oil-seed plants combined occupied in 1927 only 0.2 per cent of the acreage of arable land. Compared with the animal-fat industry they may be neglected so far as concerns the predominant interests of the German farmer as they existed up to 1932. Only in discussing the problem of attaining a larger supply of domestic fats need we come back to this potential fat resource.

In summary, the German farmer has a vital interest in the production of edible fats. His interests are, first, in a maximum volume of production, provided that no domestic surplus arises; and, second, in a price for fats high enough to make production of fats profitable. This interest finds its statistical expression in the fact that in the crop year 1928-29 the total cash returns of German farmers of 10,228 million marks contained no less than 1,927 million for milk, 1,497 million for cattle and calves, and 2,509 million for hogs. In other words, 5,933 million marks, or 58 per cent of the cash returns, were derived from two branches of production which are directly linked with the fat problem, while only 3,752 million were yielded by various crops, 380 million by eggs, and 163 million by wool, mutton, poultry, and honey.²

¹ Von der Decken, *op. cit.*, p. 98.

² *Statistisches Jahrbuch*, 1936, p. 509.

CHAPTER III

THE FAT-CONVERTING INDUSTRIES

Next to the original producers of edible fats, the processors have vital interests in the fat market. The farmers, though fiercely competing among themselves, have almost identical interests at stake in that market. The converting industries, on the other hand, include five different groups with remarkable differences in aims and interests:

1. Dairy plants, creameries, cheese manufacturing plants, and milk processing plants.
2. Lard-rendering plants.
3. Oil mills and refineries.
4. Margarine factories.
5. Soap factories.

DAIRY PLANTS

If we use turnover as a measuring rod, the first group constitutes the largest single industry of the entire country. Through private initiative in the building of more and more local creameries and cheese plants, the dairy converting industry has had a rapid growth since the invention of the first useful cream separator by Gustav de Laval in 1878. In 1933 Germany had 9,697 dairy plants,¹ 3,253 of which were organized co-operatively.² In 1927 about 26.6 per cent of the total output of milk was delivered to creameries. Of all the milk delivered to creameries, 53 per cent was manufactured into butter and 8 per

¹ The German term "Molkerei," translated here "dairy plant," is a collective name for any kind of plant that processes or manufactures milk. It embraces pasteurizing plants as well as creameries and cheese, condensed-milk, and milk-powder plants.

² *Statistisches Jahrbuch, 1936, p. 113.*

cent into cheese, while the rest was chilled or pasteurized and sold as fluid milk.

Within the creamery industry the plants are of all sizes ranging from less than 500 liters daily delivery upward to more than 200,000 liters, with the investment per plant ranging from several thousand marks to several million marks. The cheese-manufacturing plants are densest in East Prussia and in Southern Bavaria, while the districts with the highest output of creamery butter are to be found in the northwestern and north-central corner of the country, and also, in recent times, in Württemberg. Outside these distinctive localities with special agglomerations of the same type of plants for milk utilization, buttermaking plants are scattered all over the country.¹

The creamery industry is not the only converter of cream into butter. In 1931 only 210,000 tons of butter were produced in creameries. The rest, estimated at 183,000 tons, was still made on farms.² Here we have two competing groups: the churning farmers, who do the work with a little separator and a churning keg or churning machine, and the specialized creameries with improved mechanical equipment. The latter group tends to absorb an increasing proportion of the milk and cream utilized in buttermaking, because the specialized creameries are more efficient in the separation of cream and turn out a superior quality of butter. There is relatively more farm butter in Germany than in the United States.

Besides the country creamery plants, the industry embraces an increasing number of city milk plants which pasteurize, bottle, and distribute fluid milk. These plants are large-scale industrial enterprises, often larger than the greatest breweries and representing enormous invest-

¹ See Charts 12 and 13, pp. 78 and 79.

² *Statistisches Jahrbuch*, 1936, p. 111.

ments of capital. In 1935 the sale of fluid milk through dairy plants for direct consumption accounted for 3.4 billion liters, or 50 per cent of the total consumption of fluid milk; while all creamery-manufactured milk amounted to 8.7 billion liters. The city milk plants have organized their supplies by setting up extensive systems of collecting stations throughout the milkshed. For this reason they represent more powerful industrial units than the majority of cheese and butter plants, although the latter include some enterprises of similar magnitude.

The retail value (taking retail prices for Berlin as representative) of the total output of creamery butter in 1932 was approximately 580 million marks, while that of the creamery and dairy-plant output of fluid milk and cream was about 825 million marks. The combined value almost equals the entire value of the combined output of the coal- and lignite-mining industries during the same year.

The second group of converting industries, consisting mainly of the suet-rendering plants, is far smaller. In 1928 a total of 91 plants processed 27,474 tons of all sorts of fat, with a value of 2,266,000 marks.¹ The tallow renderers employed only 383 persons. These figures indicate that the industry is of slight importance. It ranks only as the utilizing branch for a by-product of the slaughterhouses, and in the broad field of the fat markets it need not be taken into account.

This condition is due mainly to the fact that, in Germany, rendering tallow or suet as well as lard is completely decentralized, and is done either by small butchers or by housewives who add certain spicy ingredients. In summer, such a rendered lard,² which tastes like roast

¹ *Statistisches Jahrbuch, 1936, p. 128.*

² The process of rendering or curing lard that is common in Germany is practically unknown in the United States. It consists of melting the leaf lard out to small cubes in a pan or pot with the addition of apple slices, sliced onions, and some herbs. Small crumbs of cracklings remain in the lard thus

drippings, putrefies rapidly. The pronounced preference of German consumers for this type of lard is perhaps one of the chief reasons why a concentrated rendering industry has not developed. Another is that there is no concentrated packing industry in Germany. This in turn is partly due to common municipal requirements, based on health and sanitary considerations, that slaughtering be done in municipal abattoirs. No distinction is made in Germany between intrastate and interstate trade.

OIL MILLS AND REFINERIES

The three remaining groups of converting industries—the oil mills, the margarine industry, and the soap industry—were, until 1932, mainly dependent on foreign materials, as they still are in somewhat lesser degree. Since they convert the largest volume of edible fats, and are at the same time a well-organized modern industry with many international relations, they constitute the weighty counterpart of dairy husbandry.

In 1928 Germany had 554 oil mills operating, 44 of which were equipped with refineries or hydrogenation plants. Besides these, 21 refineries were operated as separate enterprises. These oil mills worked up 2,445,000 tons of oil seeds, of which only 13,000 tons were domestic produce. The end-products of the operations of this industry were 802,900 tons of fats plus 1,594,700 tons of oil cake. The value of the raw materials of the industry represented 825 million marks, and the end-products 576 million marks' worth of oils and 332 million of oil cake, or a total of 908 million marks. About 80 per cent of the output of fats was subjected to refining processes. Twenty-three oil mills had an annual output of fats above 20,000 tons while 531 produced less per mill. All oil mills and refineries together had 11,373 persons on their pay-

seasoned. In this form lard is consumed especially as a spread on pumpernickel bread and with cheese.

rolls, and the value added by manufacture was 83 million marks.¹

The technical process performed in this industry embraces the following oil-mill procedures: sifting, winnowing, decortication, crushing, grinding, heating, pressing, regrinding, repressing, and extraction with gasoline, benzol, or organic chlorides; distillation of the crude oil to separate and regain the solvent; and drying of the extracted material. The process of "refining" consists of filtering, elimination of fatty acids, washing, drying, deodorizing, and bleaching; it may finally also continue the processing by the hydrogenation process which was invented in Germany in 1902.²

This is a highly developed industry in Germany; and since from the beginning it has competed in the international market, it has been a leader in technical equipment and efficiency. Since 1927 it has been brought partly under the rule of the powerful international margarine trust discussed below (pp. 40-44). In 1927, 48 per cent of the oil production and 37 per cent of the oil-cake production came from mills owned by the trust, which also owned the larger part of the hydrogenation plants. In 1929 the trust accounted for 71 per cent of all the value added to all raw materials in the oil-mill and margarine industry. Outside of the mills owned and operated by the margarine trust there remain two groups of oil mills: the large and medium-sized plants at the ports or on main inland waterways, and the majority of small inland mills.

In 1875 Germany still had 2,869 oil mills in operation, while in 1925 the number had shrunk to 674. This is the

¹ All figures from *Statistisches Jahrbuch, 1933*, pp. 124-25.

² For details see Alaberg and Taylor, *The Fats and Oils: A General View*; G. M. Weber and C. L. Alaberg, *The American Vegetable-Shortening Industry: Its Origin and Development* (Food Research Institute, Fats and Oils Studies 6, Stanford University, California, 1934), Appendix B; and the expert report by Benk in *Anschluss zur Untersuchung . . . , Die deutsche Ölmühlindustrie*, pp. 86-106.

consequence of the disappearance of German oil-seed production and the concentration of large-capacity plants at the main harbors for working imported oil seeds. The number of persons employed rose from 8,933 in 1875 to 13,057 in 1925.

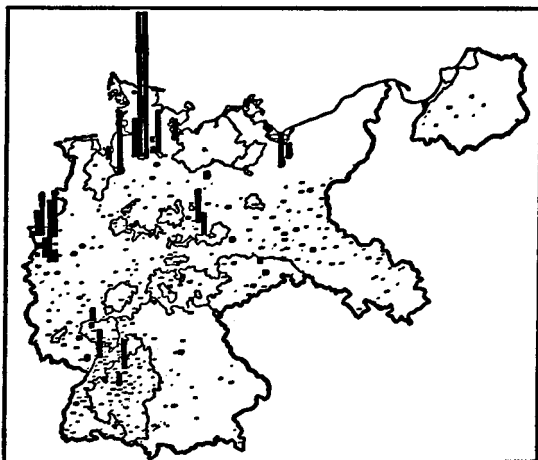
The geographical distribution of the oil-seed industry, with reference to the number of persons employed, is shown in Chart 8. In 1928 the mills at Harburg-Wilhelmsburg, near Hamburg, processed 50 per cent of all oil-containing raw materials (see the double bar near the top of the map-chart). The mills at the lower Rhine harbors processed 26 per cent; those at Stettin, 10 per cent; and those at Bremen, 7 per cent. Another 3 per cent was processed in factories at the inland Elbe harbors of Magdeburg, Wittenberg, and Riesa, while 2 per cent was milled at Buddenheim and Heilbronn.

The remaining 2 per cent of the output is the share of the small mills scattered over the country. These have a trade of a character entirely different from that of the larger mills. Their business is based partly on domestic oil seeds, on the crushing of special oils such as edible linseed oil, on direct sale of oil cake to the farmer—including their own and purchased cake—and, finally, on the local sale of their various oil products in the environment of the mill.

The large and medium-sized mills live on the import of oil seeds instead of oils. They are, therefore, continually engaged in a hard struggle against foreign oil mills. Some of them, in the most preferential export locations such as Harburg-Wilhelmsburg, Bremen, and Stettin, export oils; or, if members of the margarine trust, they produce on order for oil consumers abroad. How completely the industry reconquered the foreign market which it had entirely lost during the war, and how equally well it defended the domestic oil market, can be seen from the fact that the share of imported oils in total German

consumption was reduced from 13.5 per cent in 1913 to 12 per cent in 1929, and that the percentage of exported oil to the total amount processed rose from 20 in 1913 to 24 in 1929.

CHART 8.—GEOGRAPHICAL DISTRIBUTION OF THE GERMAN OIL-SEED INDUSTRY IN 1925, ACCORDING TO THE NUMBER OF PERSONS EMPLOYED*



* From *Blätter für landwirtschaftliche Marktforschung*, December 1922, III, 325. The bars are so drawn that the base indicates location and that a height equal to the base represents 50 persons employed.

The oil-seed industry uses a number of raw materials widely varying in oil content and, no matter what kind of raw material is used, has an output of two products. These may be called main product and by-product, but their relative values vary over a wide range. For example,

an oil mill in 1927 showed the following percentages of total return derived respectively from oil and oil cake:¹

Raw material	Oil	Cake
Soy beans	41.1	58.9
Cottonseed	53.0	47.0
Linseed	62.5	37.5
Rapeseed	75.2	23.4
Peanuts	76.6	23.4
Palm kernels	83.8	16.2
Copra	90.8	9.2

If the industry operated exclusively on copra as raw material, the question of how to dispose of the oil cake would be immaterial. If it had to operate exclusively on soy beans, the sale of cake would be the more important part of the business. Most varieties of oil cakes are very rich in protein, and find their best use as feed for cattle to supplement the necessary base of good roughage and juicy feed found in grass, clover, silage, and mangolds. In the decades before the World War, German dairy production was built up under the lavish use of such additional protein supply. This created the demand for oil cakes, which enables the German oil-seed industry to operate at full capacity and even to export oil without worrying about disposal of the by-product.

In 1927 the German oil output of oil mills was 4.1 per cent higher than in 1913, while the oil-cake output was 17 per cent in excess of that of 1913. This indicates that considerable changes in the composition of raw materials must have taken place, for extraction of oil from the raw material increased in efficiency during the period. Table 1 shows what happened. One can observe certain striking changes, notably the sharp increases in the crushing of peanuts and soy beans, and the sharp decrease in the crushing of linseed.

¹ Compiled from Ausschuss zur Untersuchung . . . , *Die deutsche Ölmühlenindustrie*, p. 12.

In 1928 the oil-seed industry sold 50 per cent of its oil output (exclusive of linseed oil) to the margarine industry, 18 per cent to the salad-oil industry and trade, and 10 per

TABLE 1.—PRODUCTION OF PLANT-SEED OILS IN GERMANY, 1913 AND 1929*

Raw material	Oil yield (per cent)	Oil production in thousand metric tons		Percentage of total oil production	
		1913	1929	1913	1929
Peanuts	40	39.2	260	6.1	30.9
Soy beans	15	15.9	165	2.5	20.0
Copra	62	121.5	154	18.9	18.0
Palm kernels	45	106.2	138	16.5	16.0
Linseed	32	177.9	100	27.6	12.0
Sesame seed	48	55.7	7	8.6	.9
Rapeseed	36	53.4	5	8.3	.6
Poppy seed	38	6.8	2	1.0	.2
Babassu nuts	60	...	2	...	.2
Cottonseed	17	37.2	1	5.8	.1
Hempseed	25	1.8	1	.3	.1
Mustard seed	24	1.8	1	.3	.1
Sunflower seed	28	.0	1	.0	.1
Mowrah seed	40	7.9	..	1.2	.0
"Leindotter" ^b	27	.7	..	.1	.0
Total from foreign raw materials .....	..	626.0	837	97.2	99.2
Total from domestic raw materials .....	..	18.0	7	2.8	.8

* Data from Ausschuss zur Untersuchung der Erzeugungs- und Absatzbedingungen der deutschen Wirtschaft, *Die deutsche Ölmühlenindustrie*, p. 7.

^b *Camelina sativa* Crantz.

cent to the soap industry; 18 per cent was exported and 2 per cent used for technical and other purposes.¹

THE MARGARINE AND SOAP INDUSTRIES

Next in the group of fat extractors is the margarine industry. In 1928 it embraced only 88 factories but had

¹ Ausschuss zur Untersuchung , *Die deutsche Ölmühlenindustrie*, p. 209.

9,000 people on its payroll, with an output of 436,769 tons of margarine and 49,866 tons of shortening and other edible fats, having a total value of 541 million marks.¹ In 1928 the industry bought some 419,000 tons of raw materials. Of this total, 24,000 tons comprised various fats from domesticated animals, another 66,000 tons were whale oil, and the remaining 328,674 tons were vegetable fats from imported oil seeds. In addition, some 80 million liters of skim milk were used. The total value of the raw materials was 384 million marks. The value added by manufacture was 156 million marks, or nearly twice that added in the oil mills.

This industry has the most startling historical record of all groups active in the German market for edible fats. From its outset in the early 1870's its output rose from 15,000 tons to 200,000-220,000 tons in 1913, and to 480,000 tons in 1922, an output maintained until 1929. According to the definitions of the "margarine law" of June 15, 1897, regulating the trade in butter, cheese, and lard and their substitutes, its products are margarine, artificial edible fats (*Kunstspeisefette*), pure or unmixed edible fats (*Reine Speisefette*).² "Margarine" is defined as including all processed commodities similar to butter or molten butter whose fat content is not derived exclusively from milk. "Artificial edible fats" are processed commodities similar to lard, whose fat does not consist exclusively of lard. Like butter, margarine contains 15 per cent water, while artificial edible fat must not contain more than 0.5 per cent water. "Pure edible fats" are unmixed refined fats or hardened oils.

In 1928, 92 per cent of the total output of the industry consisted of margarine, 2 per cent of artificial edible fats,

¹ All figures on the margarine industry from *Statistisches Jahrbuch*, 1932, p. 125.

² Ausschuss zur Untersuchung . . . , *Die deutsche Margarine Industrie* (Berlin, 1930), p. 2.

and 6 per cent of pure edible fats. Margarine has not only been substituted for butter, but it has also supplemented the fats which can be spread on bread for consumption. It could do so because it made the cheapest types of fat available for that purpose, and thereby increased the purchasing power of the German consumer for fats.

The margarine industry has greatly simplified its productive apparatus, thereby increasing its efficiency and lowering the cost of production. While in 1922 the industry still consisted of 180 factories, the number had shrunk to but 67 in 1929.

During the same period the powerful margarine trust was formed.¹ It grew out of the violent struggle between two Dutch corporations. Both had begun as butter merchants in the Dutch town, Oss. Both had promptly obtained the patent rights from the French chemist, Mège-Mouriez, who in 1869, upon the order of Napoleon III, had begun to search for a cheap butter substitute for the underprivileged and had invented the margarine process. They immediately founded the first factories and developed foreign outlets for margarine, especially in the neighboring industrial districts of the lower Rhineland with their large laboring masses. Very soon both companies built margarine factories in Germany, at Goch and Cleve. This made it unnecessary to export margarine to Germany in the face of import duties or other restrictions. After a fierce, unremitting, embittered struggle, these two corporations, Jurgens and Van den Bergh, finally merged in 1927 and simultaneously formed the "Dutch-German Margarine Unie NV" and the "British Margarine Union, Ltd."

The margarine factories of the trust lie densely concentrated in two clusters, one at Hamburg-Altona-Harburg, the other in the lower Rhine valley near the Dutch

¹ See Katharine Snodgrass, *Margarine as a Butter Substitute* (Food Research Institute, Fats and Oils Studies 4, Stanford University, California, 1930), pp. 121-30.

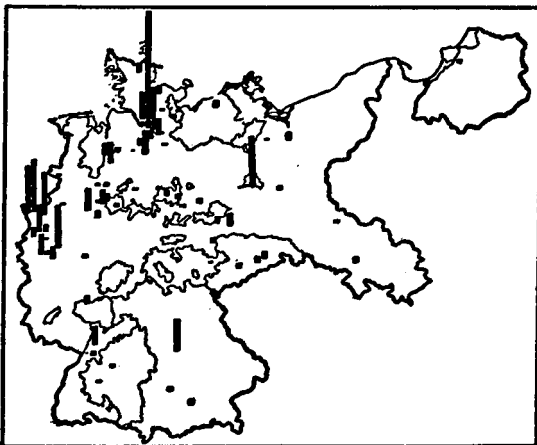
border at Cleve, Neuss, Goch, and Emmerich. In 1928 the trust factories manufactured 62 per cent of the German margarine production. The other 38 per cent was produced by independent factories, some of which are located near the trust plants but most of which are scattered over the country. While the oil mills are located adjacent to the best transportation facilities for raw materials and close to the feed market, the margarine factories tend to localize in either of two ways: close to the oil supply and the supply of skim milk, or close to the best consumption centers. The geographical distribution shown in Chart 9, indicating magnitudes according to the number of persons employed, may be compared with that shown for the oilseed industry in Chart 8 (p. 36).

The Unie Trust has tended to develop into a "vertical" combination of oil mills and margarine factories, although until 1930 this did not go far beyond a financial and administrative combination. The alleged aim of a complete technical integration was not realized. Only in one case has technical unity been achieved. At Wilhelmsburg an oil mill, an oil refinery, a shortening factory, and a soap factory have been co-ordinated in one technical unit. Nevertheless, the trust has at its command the resources necessary to perfect this plan, as very few other industries have. Of a total consumption of oils of 234,000 tons in 1928, 204,900 tons were supplied by the trust's own oil mills and only 29,500 tons had to be bought from the independent mills. That the trust had obtained a higher degree of mechanization in its plants is indicated by the fact that, according to the hearings before the Enquête Committee, the production per capita of employed laborers was 95.3 tons per annum in the trust factories, while it amounted to only 61.0 tons per annum in the independent factories.¹ Moreover, the trust had built a wide

¹ Ausschuss zur Untersuchung , *Die deutsche Margarine Industrie*.

system of subsidiary plants, such as box factories, cooperages, print shops, and creameries, which were attached to the oil mills and margarine plants. With a share in the total production of 62 per cent in 1929, the trust's share in the value added in the industry was 71 per cent.

CHART 9.—GEOGRAPHICAL DISTRIBUTION OF GERMAN MARGARINE PRODUCTION IN 1925, ACCORDING TO THE NUMBER OF PERSONS EMPLOYED*



* Source and note as for Chart 8.

In 1929, the Dutch-German Margarine Unie NV, having absorbed a third corporation (Hovema) and the British Margarine Union, Ltd., merged with the most influential soap trust of the world, the British Lever Bros., Ltd. Both groups, the Unie-Union and Lever Brothers, had been

members of the whale-oil purchasing cartel; and the Lever group not only had great interests in the international palm-kernel market, but had long since become the largest single oil producer of the world with huge coconut palm plantations on the Solomon Islands, in the Belgian Congo, and in West Africa. In 1928, Unie formed a combine with the G. Schicht Corporation; this was the leading owner of Austrian, Czechoslovakian, Hungarian, Polish, Yugoslavian, Rumanian, and Swiss oil mills, margarine factories, and soap factories, and an owner of a number of chocolate factories. In 1929 Unie was joined by the Swedish Paensson group, which operates the main oil and soap factories on the Balkan peninsula.

The dominating interest behind the formation of the international monopolistic combine was the desire to control the world's markets for raw materials in the oil industry, and thereby the raw materials of the margarine and soap industries. The Unie-Lever Trust and Holding Corporation have united in a London office all their purchases of raw materials and their sales of crude, refined, and hydrogenated oils. Aside from the elimination of previous competition among the now united members, the aggregate purchasing capacity represents a most formidable influence in the international market for fats of all sorts.

The immense trust has the reputation of being one of the most solidly built and best-managed international industrial combines. It passed through the last depression with ever-increasing returns and improved its equities. In some countries the demand for margarine increased with decreasing purchasing power of the masses,¹ while prices of its raw materials decreased more than those of agricultural commodities in general. In addition, the trust

¹ This was by no means generally the case, for in some countries prices of butter fell so much that consumption of the preferred spread increased at the expense of margarine. This has been true in England.

succeeded in expanding its soap business right through the depression. Further structural strength lies in the fact that the trust has all the advantages resultant from the old policy of all its members to nationalize both production and trade, because the tariffs and other foreign trade restrictions adopted during the depression did not hurt the national subsidiaries.¹

The last of the fat-converting industries to be briefly considered is the soap industry. It is by nature a competitor of the margarine industry because it buys the same raw materials. This is why drastic concentration has wiped out the great mass of smaller plants and why it is also largely organized in combines, the largest of which are directly related to the trusts in the oil-mill and margarine industries. Since William Hesketh Lever, the first Lord Leverhulme, began in 1885 to standardize and advertise soap under the "Sunlight" brand, this policy has forced the industry to fall in line. In 1928 a total of 625 German soap factories employed some 13,000 persons and bought 207,000 tons of fats for 153 million marks.² In comparison, all the factories of the Unie-Lever Trust sold in 1933 in all the world no less than 2.1 million tons of soap. This gives a hint of the trust's power in this field also. Other raw materials, mainly chemicals, brought the total requirement of raw materials up to 183 million marks, while the finished products represented 213 million marks of value added. This remarkably high proportion of value added indicates that this industry has all the characteristics of a finished-goods industry. While usually the manufacturing process reduces the weight of the basic materials, the finished product of the soap industry weighs more than twice as much as did the raw materials, because of the added content of water. In some

¹ Cf. C. H. Haynes, "Der Unilever Konzern," *Der deutsche Volkswirt*, June 8, 29, July 26, 1934.

² *Statistisches Jahrbuch*, 1933, p. 126.

respects this resembles the bread-baking industry, where also water is added to the initial materials.

COMPARATIVE INFLUENCE OF THE CONVERTING INDUSTRIES

In spite of the considerably larger amount of fats supplied by either the oil mills or the margarine and soap industries together, many important reasons weigh so heavily in favor of the dairy industry that, from the national standpoint, the dairy industry always ranks first in Germany whenever a dispute arises among the various fat industries. In 1928 the creamery-butter output of 210,000 tons represented a wholesale value of 754 million marks.¹ The output of the margarine industry of 487,000 tons was worth 541 million marks and that of the soap industry of 457,000 tons was 396 million marks; the two combined used 537 million marks worth of fats, which was only 69 per cent of the value of the domestically produced creamery butter. If we compare the oil-mill industry with the creamery industry, we find that the fat output of the oil mills was nearly three and a half times that of creamery butter, but that the value was only 74 per cent that of creamery butter. The creamery industry employed some 40,000 persons while the oil mills, margarine factories, and soap industry together employed approximately 33,000.

All these figures fail to indicate the comparative weakness of these latter industries with respect to influence on economic policies and the backing by the public or the state. First we must consider that the creamery industry can count upon the potential output of butter which will be slowly transferred to them from the home-separating and home-churning farms. The American development

¹ Here the butter output is taken from the 1931 statistics because no reliable figures are available for 1928; it is assumed that the output in 1928 was almost the same as in 1931. Prices applied are wholesale prices for 1928.

toward farmer deliveries of home-separated cream has no equivalent in Germany. Farmers deliver milk to the creamery or to a separating station, or an ambulant separating unit in a closed truck comes to the farm. The shift of home-churned milk to the creameries means a potential increase of 183,000 tons, or 657 million marks on the basis of 1928 prices. Such an increase would bring the total value of output up to 1,141 million marks, exceeding the combined output of the margarine and oil-mill industries.

The weakest point of the three non-agricultural industries, however, is their dependence on foreign raw materials, while their competitor, the dairy-plant industry, is an integrated and vital part of the great basic industry of the country which gives a livelihood to 21 per cent of the nation (1933).¹ Any other measurement which might be applied, as for instance the amount of investment represented by the competing groups—this, unfortunately, is not available—would never outweigh this basic difference.

The differing interests of the groups can easily be outlined. Within the dairy-plant industry, the attitude must logically be similar to that of the milk-producing farmer. The dairy plants will struggle for an increasing share of domestic production in the national fat supply, because this means an increasing output for them. They will acclaim any hindrance imposed upon the margarine industry, and perhaps upon the oil mills also, although they have an interest in the latter as being the important source of oil cake used to produce more butterfat. Even the privately owned creameries, to say nothing of the co-operatives, will always cheer high prices of butter and butterfat as long as these do not cause a decline in consumption. Since the total domestic output of butter is always too short, they are also hostile to imported butter as depress-

¹ *Statistisches Jahrbuch, 1936, p. 18.*

ing the domestic price. In general, we may assume that the dairy-plant industry will pull with the dairy farmer.

As long as free competition among the various fat industries exists, the margarine and soap industries are exclusively interested in low prices for their raw materials. The lower the fat prices they have to pay, the stronger is their competing power in the world and domestic markets, and the more fat consumption can be enlarged, thus adding to their business. Changes in this attitude, however, may occur whenever freedom of private initiative begins to dwindle or restraint is placed upon competition. It may well be that the major interest of the margarine industry centers upon securing a profit margin which will yield larger revenues with a smaller output, no matter whether the monopoly situation is the result of private initiative or is caused by state intervention. It has already been mentioned that the dairy-plant industry has the superior strength of being interlocked with agriculture at large. The margarine industry will probably consider the backing of the consumer masses as a counterpoise which has the advantage of greater numerical count. How well founded such a calculation may be, we undertake to consider below (pp. 168-72).

So far, it has been obvious which side most of the competing groups of converting industries will take in major disputes. This is not so with respect to the oil mills. They are directly bound to the national dairy industry by their production of oil cake, the value of which amounted in 1928 to more than 36 per cent of their total return.

In Germany oil cake is not used as fertilizer as it is in China and Japan. With the existing relation between the prices of oil cake, other protein feeds, and artificial nitrogen fertilizer, it pays better to use for fertilizer only the plant nutrients remaining after the cake has been decomposed and extracted by the intestinal tract of the ruminants. Indeed, Germany imports oil cake from coun-

tries which use for fertilizer the cake from crushing hulls, and extracts such cake with gasoline in order to use it for feed.

An even more important link with agriculture is the fact that the oil mills can also thrive by processing domestic oil seeds. The replacement of foreign oil seeds by domestic produce may be welcome to this industry.

The oil mills have but one sensitive point of interest. They are actively opposed to the import of fats in general, and still more opposed to imports of refined or hydrogenated fats. They are also opposed to the import of oil cake as soon as this decreases their cake returns. Some of the largest oil mills own ultramodern refineries and hydrogenation plants, which enable them profitably to process imported crude oils. But in a country with an abundant supply of labor at relatively low wages, and a heavy investment in huge processing equipment, it pays better to buy crude raw material than to buy semi-finished raw materials.

Such a generalization does not, however, hold true for all parts of the industry. The Unie-Lever Trust, with its combination of oil mills, margarine factories, and soap factories, has a point of view different from that of the independent oil mills. For the trust, it may be better business, at least temporarily, to leave some of their mills idle in order to supply their margarine plants with cheaper raw materials and thereby increase the net yield of the whole trust. The trust calculates with a joint-cost account. If the net profit of the whole enterprise increases thereby, one or several mills may be closed while crude oil is imported.

Even within the sector of the independent mills we find certain opposed interests. The position is analogous to that of the flour-milling industry, which until recently had a similar setup. Up to 1928 Germany produced its flour in 23,000 flour mills. Of these, a very small number with

large capacity were located at the main import harbors and along the main rivers, while the vast majority of the small plants lay scattered all over the country. While the big import mills depended largely on foreign grain, the small country mills operated with domestic grain. Any policy that cuts off the imports of raw materials, and thereby increases domestic production, tends to improve the business of the local mills and to curtail that of the big mills, to the extent that the big mills cannot maintain their share by higher efficiency in milling domestic grain subject to high transport charges.¹ State intervention can, of course, prevent such consequences by imposing milling allotments upon the whole industry.

The 554 oil mills face very similar conditions. Any increase in the domestic production of oil seeds will most likely increase the business of the small country mills. On the other hand, small oil mills are usually equipped only for crushing and not for extraction. Moreover, higher prices of oil seeds make it possible for the raw material to bear freight charges and to travel toward the big mills. This tends to some extent to curtail the advantage of the small mills.

RECOVERY OF WASTE FATS

For the sake of completeness, one other industry belonging to the group of fat converters must also be mentioned. It does not deal with any virgin fats but recovers waste fats. German laws for the control of pests and contagious diseases provide that every county has to maintain a knacker's yard, and that every animal that dies must be turned over to the knacker. The farmer can avoid this only by slaughtering the animal, if he happens to observe that it is going to die. If, following the compulsory meat inspection, such meat is found unobjectionable, the farmer

¹ See Naum Jasny, "Wheat Problems and Policies in Germany," *Wheat Studies of the Food Research Institute*, November 1936, XIII, 100-61.

has avoided practically total loss, for the knacker usually pays only a token in exchange for the carcass.

This institution goes far back into the Middle Ages. The knacker's business was that of "untouchables" or social outcasts, and carried something like a taboo. The stench persisting in and around the place, the flies, and the danger of spreading pestilence, always forced the yards into locations remote from human settlements. Today this business has developed into an efficient modern industry, which applies every chemical and physical process appropriate to achieve an exhaustive utilization of the total material turned over to it.¹ With heat and pressure, the carcasses are processed and the resulting materials selected and separated. Besides glue, gelatine, bone meal, fertilizers, horns, hides, and hair, mainly two materials are singled out: meat meal with high protein content, and fats. The fats are shipped to refineries which prepare them for technical purposes, especially for soap production. The perfect sterilization, and later the chemical purification, eliminate any possible objection to this form of recovery of inedible waste fats. Ordinarily the amount of fat which is recovered in this way does not amount to very much. The annual yield may swell considerably in cases of severe epidemics, like the foot-and-mouth disease, such as have swept Germany several times since the war and struck down thousands of cattle. The same is true of the more frequent hog epidemics.

This minor source is not without interest, because it shows how intensively the German economic system operates and how practically no waste is permitted.² This goes so far that during the war the city sewage systems recov-

¹ Cf. L. B. Zapoleon, *Inedible Animal Fats in the United States . . .* (Food Research Institute, Fats and Oils Studies 2, Stanford University, California, 1929), pp. 30, 178, 181, 215.

² There is no recovery of grease from garbage. German housewives and food stores are incomparably thrifter than those of the United States, and garbage in Germany contains practically no fats to speak of.

ered a good deal of the fat contained in the sink-water from the kitchens and in the soapy suds in general. In the large clarifying basins where the sewage deposited the solid substances, special devices were built to catch the fat deposits. Such fat was subjected to a refining process and used in industry. This process, however, is generally unprofitable and can be resorted to only in extreme emergency.

If it were possible to regain a major part of the enormous volume of fat that is used in the form of soap and lost, it would certainly be worth while to attempt recovery of those waste fats. But the watery solution of soap carries its fat components in such a low concentration and makes the watery fat and dirt emulsion so soluble, that the largest part of fat continues to flow and disappears with the water. City sewage systems, moreover, usually pass all the rain water that falls in the city area into the same pipes and canals that carry the sewage from households and industries. The floods of water decrease the concentration to such an extent that recovery of the fats becomes impossible.

The endeavor to save fat in the soap consumption must begin with the use of less soap. This is done on a large scale by the use of soda and other chemical compounds containing no fat. So far, however, soap based on fats is still the essential supply for all household consumption. Perhaps detergents made from higher alcohols secured from petroleum may come to replace soaps extensively.

CHAPTER IV

DISTRIBUTORS, CONSUMERS, AND OTHER INTERESTS

DISTRIBUTOR INTERESTS

In Germany at least, distributors are in general weaker in defending their special interests than are the producers or the consumers. Two divergent groups must be distinguished: the import and the domestic wholesale trades, and the retail trade.

In 1932 Germany consumed 1,526,000 tons of pure fat. This included 407,000 tons of butter, 442,000 tons of margarine, 252,000 tons of lard, 165,000 tons of bacon, 240,000 tons of vegetable oils, and 20,000 tons of tallow. In addition to the domestic production, the total included 44 per cent of imported fats, comprising 14 per cent of the butter, 99 per cent of the margarine raw materials, 41 per cent of the lard, 10 per cent of the bacon, and 99 per cent of the vegetable oils. If we omit the imports of oil seeds, which have already been mentioned, there remains the considerable import of 221,000 tons of animal fats and whale oil, 109,000 tons of lard, 19,000 tons of bacon, and 59,000 tons of butter. These large amounts of fats are of considerable significance in the import trade. But the import trade is mostly identical with the wholesale trade in domestic fats; this is especially true of the butter, lard, and bacon trades.

In the retail distribution of fats no special interest attaches to the origin of the fats, unless the quality and its reliability should cause discrimination in respect to origin. The retail trader is concerned only with the qual-

ity, the price, the volume of trade, and the dealer's margin.

A specialized retail trade in fats does not exist except in some parts of the retail-milk business. Most of the milk-retailing chains, organized as independent trade companies or as mixed-capital corporations (*Milch-Höfe*), and to some extent the small independent milk retail stores, carry an extremely limited assortment of foods. Besides milk, cream, butter, and cheese, this assortment sometimes also includes eggs, bread in loaves, rolls, and margarine. It is hard to make any summary statement because there is so much variety. From a purely dairy assortment strictly limited to milk, cream, butter, and cheese, to a general assortment with almost any variety of provisions, we find all intermediate stages. Margarine and butter may be bought in any delicatessen or general food store, while margarine is sold also in butcher shops. Butchers sell bacon and the more usual form of fat-back, also lard and tallow. The creameries of high repute of one of the country's leading butter regions, Schleswig-Holstein, which has developed its agriculture along much the same lines as Denmark, have built up a remarkably prosperous parcel-post butter trade direct to the consumer during the last decades. The Postmaster-General has provided a most efficient special service.

The largest wholesale-purchasing capacities of the retail trade are organized in three different groups. A central co-operative association of creameries in the Northeast (*Verkaufs-Verband Norddeutscher Molkereien*) operates a chain of more than 150 retail stores, mainly for dairy products. This outlet system was organized primarily for the purpose of selling the butter manufactured by the member creameries. The department stores constitute another similar group. Until recently, however, by far the most important and dominating group consisted of the German consumers' co-operative associations

and their two huge combines for centralized purchasing. In 1931 these associations operated 13,540 retail stores with a turnover of 1.3 billion marks. In some parts of the country their membership included up to 70 per cent of all the families. The total membership of all consumer co-operative associations was three million, almost exclusively families. The two central purchasing and producing combines had a wholesale turnover of approximately half a billion marks.

The department stores maintained their food departments more for publicity and general service, featuring "leaders" as a "bait and lure" for the consumer; often they did not calculate commercially correct prices but intentionally sold at cost or even at a loss. In all the other groups mentioned the principles of retail food store management, and of reducing overhead costs per unit sold, have slowly but surely compelled the distributors to diversify their stock of goods and to offer a comprehensive assortment of provisions.

The same problem has been solved in another way by co-operation of specialized food distributors, the general food markets. Modern methods of ready-for-sale packing have accentuated that process. So long as milk had to be dipped by the milk retailer from an open store tank into pitchers brought in by the customers, and so long as butter had to be dug out from an open keg, weighed, and wrapped, and so long as slices of bacon, ham, or sausage had to be dealt with by skilful hands, all such procedures tended to maintain specialized types of retail stores. But when all these products, including milk, come ready-packed and sealed from wholesale sources to the retail stores, it becomes feasible to enlarge the assortment and to put the formerly delicate dairy products and fats in the same class as cartons, cans, and cellophane bags containing standardized food.

Another factor which induces the food stores to en-

large their assortment is the density of the settlement and the willingness of the consumer to walk to the store. The more thinly people are scattered in a residential district and the more they insist on having a store near by, the better the chances will be for a general food store, even if the stores enlarge their customer district by delivering to the houses. One of the pronounced changes in dwellings in Germany has been the rapid expansion of city areas, with a transition to suburban types of housing and a decreasing density of population per square kilometer.

All these developments have distributed the retail trade of the edible fats most widely over the majority of all food stores. In consequence, fats represent only a small item in the total turnover of such stores. This is why the food retail trade takes no particular interest in the fat policy of the government. Cutthroat competition in the food retail trade during the deflationary depression had aroused, among the more conservative men in the trade, a good deal of sympathy with restrictions upon free competition in the market. Many of them insisted that department stores be forbidden to sell food.

The consumers' co-operative stores, which also suffered losses from the depreciation of commodity stocks as prices declined, were not eager to aggravate the struggle for every customer and every purchase. So far as fats were concerned, their hope centered on reducing their own retail prices of fats below the level of their competitors. The new margarine factory which they undertook to build at Hamburg was supposed to cut the wholesale price of margarine to a level beyond reach of competition. It is easy to understand the resentment of the independent retail storekeepers against the consumer co-operative organization in general. Unlike the development in Switzerland and Denmark, where consumers' co-operatives have always made common cause with the rural and urban middle class and labor, the German consumers' co-opera-

tives represented almost exclusively the socialist industrial labor unions and were their backbone and pride. Upon the rise of the totalitarian state, with its strong middle-class and guild philosophy, and the consequent doom of all labor unions and the labor party, the consumers' co-operatives lost their influence and began to decay. They lost mainly because of their left-wing political leaning. From 1931 to 1936 they lost about 44 per cent of their members, while their turnover was cut down by 62 per cent.

The diverging and in part radically antagonistic interests in the independent retail trade in food—the department stores, the great food retail chain systems, and the consumers' co-operatives—split the entire retail trade into several hostile camps and thereby indirectly strengthened the producer and converter groups. In general, however, the influence and interest of the distributors in the entire field of fats are almost negligible. The case of the ill-fated projected margarine factory of the leading central consumers' co-operative association, which was under construction when the Fat Monopoly Administration began its work, is a rare exception discussed below (p. 170). Perhaps another exception must be admitted in the case of the retail store chains owned by farmers' co-operative creameries, because there the retail trade is identical with the farmer or the creameries.

CONSUMER INTERESTS

The consumer's interest in the fat market must next be traced. In 1932 consumers disbursed probably at least 2,360 million marks in purchases of fats: 1,160 million for butter, 400 million for margarine, 280 million for vegetable oils and shortenings, 230 million for lard, and 290 million for bacon. Since, in the same year, all wages and salaries totaled 25,711 million marks, the weight of the fat item in

the food budget is easily recognized.¹ If we add to this the retail value of the produce of the soap industry in 1933, 262 million marks, we arrive at a total expenditure for fats equaling exactly 10 per cent of the labor income of the population, without considering at all the large expenditure for milk and for fat meats. The total expenditure for food in 1932 may be roughly estimated at some 16 billion marks, so that approximately 14.7 per cent of the food bill of the nation is covered by the item fats. If we include the 6.7 billion liters of fluid milk consumed, the value rises by 1,742 million marks, and the total share of fats plus milk totals 25 per cent.

The caloric value affords a rather crude method of evaluating food materials, but at least it gives us an idea of the importance of fats in the energy account. As von der Decken has calculated, the German consumption of food in 1932 amounted to some 66.5 trillion calories. The consumption of fats represented about 14.2 trillion, or 21 per cent of the total. But the fluid milk consumed in 1932 adds another 4.1 trillion calories, raising the entire figure to about 27 per cent of the total calories consumed.

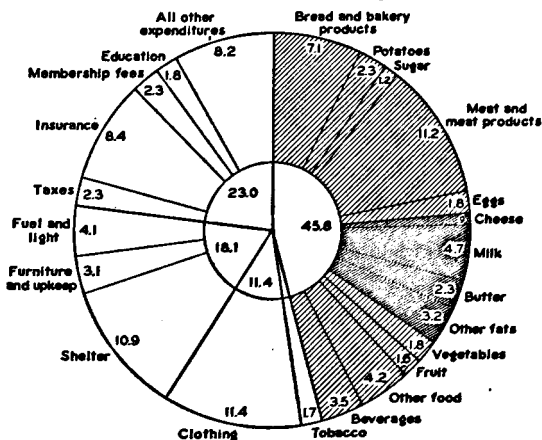
Perhaps the best illustration of the importance of fats to the consumer is to be derived from the bookkeeping records of 2,000 laborers' households in 1927-28. Laborers' households with an income of 220 marks a month distributed their expenditures as shown in Chart 10.

The expenditure of 11.1 per cent of the total for fats (including milk and cheese) represents no less than 26 per cent of the total food expenditure. Together with meat, fats account for the largest single item in the food budget of the laborer's family. If we remember how closely the item meat is related to fat, the enormous economic and social significance of the fat problem for the consumer is evident. With the German climate, and dietary habits,

¹ *Statistisches Jahrbuch, 1936, p. 502.*

fats have major significance in the diet as the guarantor of a satisfactory supply of reserve energy. Fats balance the diet in a way which helps to resist tuberculosis and similar disease germs, which flourish when unsatisfactory energy supplies render the body susceptible. This

CHART 10.—PERCENTAGE DISTRIBUTION OF EXPENDITURES, 1927-28, IN GERMAN LABORERS' HOUSEHOLDS WITH AN AVERAGE MONTHLY INCOME OF 220 MARKS PER ADULT EQUIVALENT*



* Adapted from similar chart in Statistisches Reichsamt, *Deutsche Wirtschaftskunde* (2d ed., Berlin, 1933), p. 277.

holds especially for growing children and aged or convalescent persons. The pitiful war-time experience has proved to what extent the health of the population rests upon adequate supplies of fats.

All these reasons strengthen the consumer's interest

in a maximum supply of the preferred varieties of fats at a minimum cost, in other words, in having a high purchasing power for fats. The consumer can hardly be expected to be in accord with the farmer or the butter-manufacturing industry. His standpoint, as well as that of the margarine industry, will always be opposed to that of producers of domestic fats when it comes to protectionist policies for the latter, since such policies mean a curtailment of the consumer's purchasing power while they bring greater profit to the producer.

The strongest potential representation of the interest of the consumers formerly consisted of the consumers' co-operative movement. But the vast expansion of that organization led finally to a point where it was largely dominated by its own business interests. Especially during the depression, it became more concerned with struggling to survive terrific economic pressure than with fighting for the consumers against the trades.

The other center of consumer policy was, by nature, the labor party. But it too had outgrown the stage of development where it could operate on a purely oppositionist strategy and fight independently for consumers' rights. With its rise to power and responsibility as the key party in the government, its party leaders identified themselves more and more with the national economy as a whole. They tried to solve the national problem of agriculture as well as that of industry and labor. If we keep this in mind, it will help in understanding the later trend of events. In Germany, as elsewhere in Europe, farmer-labor political association has alternated with conflict between farmers and urban labor.

OTHER INTERESTS

Beyond the groups thus far mentioned as primarily interested there are other interests directly involved in the fat market. The machinery-manufacturing industry sup-

plies the converting industries with their technical equipment, with spare parts, and, in the process of scrapping and remodeling, with new outfits. Nearly 10,000 dairy plants, some of which have technical equipment worth more than a million marks per plant, represent by far the largest opportunity for sound permanent investment. In this respect the oil-mill, margarine, and soap industries combined can hardly compete with the dairy plants.

Other interested groups are those handling transportation and storage. The major part of foreign raw materials for fats, such as oil seeds, are a welcome return cargo for German merchant ships, such as those going to the Far East. The raw material for butter, either milk or in its more concentrated form of cream, is an important item in domestic transportation. Butter is one of the essential food products of importance in the German cold-storage business, while most of the other fats do not require refrigeration. Margarine in Germany is much more perishable than butter, but its production and distribution are organized accordingly, thus rendering refrigeration unnecessary.

Finally, the state, as the collector of import duties and tax revenues, must not be overlooked. In some cases the budget demand has been so strong as to outweigh any other influence. The sugar excise tax and the slaughtering tax are examples. In 1932 fats contributed 6 per cent to the Reich's import-duty revenues (butter 4.3 per cent, lard and margarine .8 per cent, and vegetable oils and fats .1 per cent). Oil seeds and oil cake were free of duty. No special taxes were imposed on the fat-converting or -processing industries, unless we count the Prussian slaughter tax of 1932 which affected prices of lard and bacon. In the fat-marketing scheme of later years, the state used its taxing power to a considerable extent, and found the fats industry a welcome new source of revenue.

CHAPTER V

DAIRY MARKETS BEFORE GOVERNMENT REGULATION

As we have pointed out, the axis of the edible-fat problem in Germany lies in the dairy industry. In order to understand the state intervention of 1933 and later years, we must first consider some of the characteristics of the competitive price economy within the dairy industry. With respect to the method of regional cartels later chosen for the regulation of markets, it is essential to understand the factors affecting the location of various types of dairy industries and their competition in the same markets. This digression will serve to make clear the economic environment in which the cartel idea grew.

OUTLETS FOR MILK AND ITS PRODUCTS

Milk as a fluid, perishable commodity has a comparatively low value per unit of weight or volume. This means that it can stand only relatively low freight charges, or be shipped only for short distances if the business is to be profitable. Additional costs are due to the necessity of shipping the cans or tanks back to the producer; this reduces the distance over which milk can be shipped as such. If costs of milk production decline with increasing distance from the market, the margin may add to the capacity of the commodity to pay freight charges, or it may move the borderline of profitable fluid-milk production a certain distance farther away from the market. Decreasing costs of transportation (as with the use of large tanks) will have such an effect. Increasing severity of sanitary regulations for fluid milk, on the other hand, adds costs

and thereby shortens the distance over which milk can move. Aside from these cost influences, limitations upon the demand for fluid milk tend to restrict the extension of the fluid-milk zone also.

The usual method of increasing the transportability of commodities is to add to their value per unit of weight or volume, or to convert them into more concentrated goods. With milk, this has been done since antiquity. The first method of concentrating it is to separate the cream. Cream may contain from about 12 to 45 per cent of butterfat, according to the degree of separation. One quart of cream may, therefore, contain the butterfat of 3 to 11 quarts of milk with 4 per cent fat content. This conversion splits milk into its components: butterfat in the form of cream as the main product; and proteins, plus whey, in the form of skim milk as the important by-product. But cream is still a perishable food and a liquid commodity. If shipping costs are equal for cream and fluid milk, cream can be shipped much farther than fluid milk, especially since the costs of separation are almost negligible.

To go one step farther, milk may be converted into butter. This leaves nine-tenths of the weight in the form of skim milk and 6 per cent of the weight in the form of buttermilk as a by-product. One pound of butter may contain the butterfat equivalent of from 17 to 28 pounds of milk, according to the fat test of the milk used, which may vary between 3 and 5 per cent. This conversion into butter produces a solid staple commodity of such value per unit of weight and volume that it can be shipped over almost unlimited distances. But the making of storable, high-grade butter requires an industrial equipment for separating, pasteurizing, and souring sterile cream with pure-bred culture under controlled conditions; for churning, working, and packing the butter; for heating, and for cooling and storing.

The resulting costs of producing butter cause deduc-

tions from the obtainable price of milk for butter production, or a margin between milk or cream prices for manufacturing and for fluid-milk consumption. This margin may be increased by higher costs of producing a gallon of milk for fluid than for butter purposes as a consequence of higher hygienic and quality requirements. The cost of buttermaking reduces the distance over which milk may be transported. Another limitation upon the distance of transport originates from the fact that the by-products, skim milk and buttermilk, have to be utilized. The smaller the returns from these by-products, the less freight cost butter can bear.

But there are other possibilities for the disposal of whole milk: making cheese, feeding milk to animals, and producing condensed, evaporated, or dried milk. All these methods allow for more or less complete conversion with only small amounts of by-products remaining, or none at all. All render milk storable and transportable over long distances. Cheese making permits separation of most of the protein (casein) and all or most of the butterfat from the whey, thereby increasing the value per unit of weight or volume and permitting the product to bear higher freight charges.

Cheese production differs greatly from butter manufacture. Butter is throughout the world a fairly standardized commodity consisting chiefly of butterfat. Cheese, on the contrary, represents a large group of types of commodities with casein in various stages of fermentation, with butterfat in varying proportions, and containing different types of bacteria and mould ("virgin cheese") or, in its final condition after sterilization, no viable bacteria or mould ("processed cheese"). The long list of cheese varieties begins with some containing much whey and all the butterfat that was in the milk, and proceeds toward types with an increasing content of dry substance and a declining content of the original amount of butter-

fat. This cheese catalogue also shows a longer ripening period for the harder cheeses, beginning with no ripening time at all and ending with two years of ripening for the most expensive types. Examples are given in the accompanying tabulation. The last variety has the highest degree of condensation. To make one small cartwheel of Swiss cheese usually requires 1,360 quarts of milk.

Type of cheese	Units of milk per unit of cheese*	Ripening period
Cottage cheese, Gervais.....	6	None
Camembert	9-11	14 days
Brie	9-11	3 weeks
Bel paese	9-11	4 weeks
Romadour (Liederkrantz)	9-11	4 weeks
Roquefort, Gorgonzola	10-11	2-3 months
Gouda (Edam, Tilsit, Tillamook)..	8-12	3 months and more
Swiss (Gruyère, Emmenthaler)....	8-12	6 to 18 months

* Data from associates of L. A. Rogers, *Fundamentals of Dairy Science* (New York, 1928).

The ratios of condensation indicate that cheese making, among the various methods of milk disposal, will find its competitive position different at different distances from the market. Undoubtedly the farthest location possible is that of Swiss-cheese production of the Alpine chalets. In this connection "farthest distance" means economic distance; it may therefore reflect technical difficulties of transport as well as mileage. But before we can say anything definite about the probable location of the utilization of milk for cheese making, we must touch upon other phases. Cheese factories require almost no machinery except the kettles for warming the milk, but they do require much space in which to store the maturing and matured cheeses; and the longer the maturing process lasts, the more space is required. They also require capital for financing the stored milk "crop."

The remaining opportunities for milk disposal are the feeding of milk to calves and the production of condensed or powdered milk. Feeding butterfat to calves is possible only if a premium price for veal or live calves is obtainable. Since calves cannot stand long periods in transit without adverse effects upon the quality of the veal, and since to feed calves whole milk beyond the first ninety days seldom pays even when such veal commands a premium price, this conversion is confined to a zone rather near the market. A high price for calves may be obtained if they are raised for high-bred pedigree bulls. Such production might be located anywhere; in fact, however, it is limited to cattle-breeding regions. This in turn is determined by low absolute costs of cattle feed and limited to a zone distant from markets. The market for milk-fed veal and for expensive breeding bulls is relatively limited; hence both these types of conversion remain in moderate proportions in Germany.

The conversion of whole milk into condensed milk or into powder yields staple commodities that are highly transportable. Hence, we might expect such industries to be located in the same range as the cheese industries. A prime obstacle to the spreading of this type of processing, however, lies in the huge investment required for either powdered-milk or condensed-milk plants. This restricts such plants to locations where a vast supply of milk at low prices can be safely counted upon during the greater part of the year. Therefore, the evaporated-milk plants often function as supplementary sources of fluid-milk supplies, and are located in the outer zones of milksheds of larger cities. Evaporated milk is more bulky than butter and requires a superior quality of milk, so that its transportability is limited. Such plants can also convert skim milk into either evaporated or dried products, whereby they become potentially a subsidiary equipment in the buttermaking zones as well. According to location, con-

densed milk may be the principal product or the by-product.

Table 2 shows that, among the several dairy products, the relative bulk of butter is the smallest; that fluid cream, milk powder, and certain types of cheese come next; and that the order proceeds toward ice cream, evaporated milk, and finally fluid milk. It also shows the differences in the perishability, with storage limits varying from 2 to 200 days. So far as the investment in the plants is concerned, a wide range appears. Of course, all items in the table are subject to great variation. The figures merely indicate the relative standing of the products, as found in some parts of the state of New York. These relations do not necessarily hold for Germany or elsewhere.

TABLE 2.—VARIOUS COMPARISONS OF IMPORTANT DAIRY PRODUCTS*

Product	Rank in distance from market	Pounds produced per 100 pounds of milk	Index of bulk	Storage limit (days)	Supply area for receiving plants (radius in miles)	Investment in receiving plant
Ice cream	1	35	7	4	20	\$ 25,000
Fluid milk	2	100	21	2	20	50,000
Fluid cream	3	10	2	4	20	100,000
Evaporated milk..	4	40	10	200	20	200,000
Cheese	5	10	2	200	5	7,500
Butter	6	5	1	200	10*	10,000*
Milk powder	7	12	2	200	20	200,000*

* Based on data for New York State.

* For local creamery; for centralizer creamery, 300 miles or more.

* For local creamery; for centralizer creamery, \$50,000 up.

* For spray powder; for roller powder, about \$125,000.

Table 3 gives a striking illustration of how the freight rates affect the milk equivalent in the various products when shipped from various distances to New York City. Butter shipped from Duluth, Minnesota, to New York has to bear only 6 cents per 100 pounds of milk equivalent,

while shipments of fluid milk from Reedsburg, Wisconsin, would involve a freight charge of \$1.64 per 100 pounds. Of course, such relations do not hold in a country of lesser distances, like Germany.

TABLE 3.—RAILROAD FREIGHT RATES ON DAIRY PRODUCTS TO NEW YORK CITY*

Product and point of origin	Wholesale price per 100 lbs., New York City	Freight rates		
		Per 100 lbs. product	Percentage of value	Per 100 lbs. milk equivalent
Butter:				
Watertown, New York.....	\$35.00	\$.58	1.7	\$.03
Duluth, Minnesota	35.00	1.27	3.6	.06
Cheese:				
Lowville, New York.....	18.00	.48	2.7	.05
Plymouth, Wisconsin	18.00	.86	4.8	.09
Fresh cream:				
200-mile zone	19.25	.57*	3.0	.05
Reedsburg, Wisconsin	19.25	2.10*	10.9	.18
Evaporated milk:				
Canton, New York.....	6.90	.30	4.3	.14
Middleton, Wisconsin	6.90	.52	7.5	.24
Fluid milk:				
200-mile zone	3.15	.36*	11.6	.36
Reedsburg, Wisconsin	3.15	1.64*	52.1	1.64

* The author owes these figures to the courtesy of Dr. Leland Spencer, professor of marketing at Cornell University, Ithaca, New York.

* In less than carload lots. * In carload lots.

After this survey of the possibilities of utilizing whole milk in different ways, the secondary utilization of the main by-product, skim milk, also requires some explanation. It must be disposed of in the most economical manner wherever cream is separated from whole milk, either for direct consumption or for buttermaking. The more efficiently this disposal can be achieved, the higher will be the returns from milk, or the lower the price of cream or butter may drop. Skim milk obtained with modern

separators does not contain more than .10 or .15 per cent of butterfat, but it contains 3.4 to 4.0 per cent of protein and some 4.9 per cent of carbohydrates. One liter of skim milk has a nutritive value equivalent to 150 grams of beef plus 250 grams of potatoes. Skim milk can therefore be used in many ways, and some of them show a marked tendency toward certain locations relative to the main market centers. As with whole milk, the preferred utilization, *ceteris paribus*, will be that which does not require special equipment or techniques for conversion. Direct consumption for food, and use as feed for animals, fall into this category. We therefore find this use at varying distances from the central market, especially on the farms.

German farm diets in buttermaking districts are based upon a large and regionally diversified bill-of-fare of skim-milk dishes. Besides sweet and sour skim-milk dishes, farm housewives make certain types of skim-milk cheeses, from skim-milk cottage cheese to varieties of soft cheeses. Skim milk is also used in baking, a custom being adopted more and more by commercial bakeries because it makes crisper bread, rolls, or cake, and the products tend to maintain their crispness and freshness longer than if they are made without skim milk. The use of skim milk also yields more loaves per barrel of flour. Because of the relative cheapness of skim milk and the technical obstacles to keeping it sweet in summertime, skim-milk powder has been substituted for the milk itself in the bakeries of big cities.

In the central market area and around it, mainly in summer, there is a fairly good market for skim-milk cottage cheese, which is often blended with a little cream. In the next zone, in addition to the predominant use for human consumption on farms and especially for feeding to animals, we find the production of sour-milk soft cheese. At a greater distance from the central market, a rather

wide zone shows a prevailing production of rennet skim-milk cheese¹ and, competing with it, the conversion of the skim milk into condensed skim milk or skim-milk powder. Where margarine factories exist, they also absorb large quantities of skim milk. Besides these commercial uses, the extent to which farms consume skim milk increases in this main buttermaking zone.

In the conversion by feeding to animals, there are also certain dominant animals at various distances from the market. Near the market, the specialized poultry farms for fresh eggs absorb the major part. Next to them, the farms raising poultry for meat compete with the calf-feeders. Still farther away, the pig farms are the main users. At the outer rim of the utilization zones, we find the casein industry, which converts the rennet cheese into a dry product.

TYPICAL ZONES OF MILK DISPOSAL

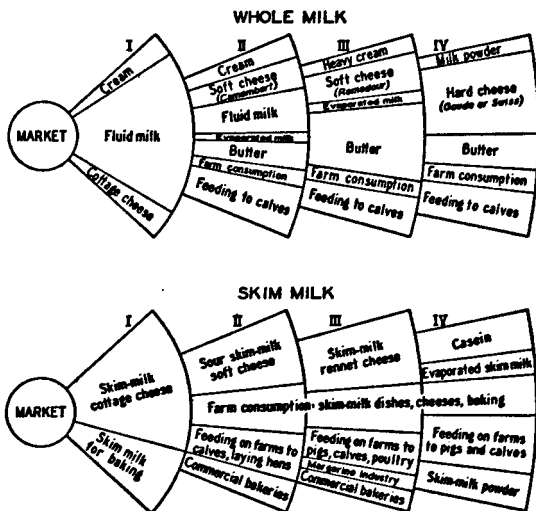
If we assume, in the manner of Heinrich von Thünen's "Isolated State," that a large territory with equally favorable conditions for dairying throughout has its center in one large city as *the* market, we may infer the location for various types of milk disposal. For the sake of simplicity, it will at first be assumed that butterfat has the same price in the central market, no matter in which form it may be offered, and that transportation costs rise at an equal rate with each additional mile from the market. On these assumptions we should find certain characteristic zones for the utilization of whole milk as indicated in the upper section of Chart 11.

Closest to the market we find a first zone where sales

¹In certain parts of the United States the manufacture of skim-milk cheeses is specifically prohibited by state law. It will be shown in chapter x how the use of skim milk is now controlled in Germany; but there is no prohibition against making cheeses from skim milk.

of fluid milk predominate. Geographically interspersed in it, but perhaps more seasonally interspersed, are the uses of milk for shipping cream or cottage cheese into the market. The cream is essentially used as coffee cream and

CHART 11.—HYPOTHETICAL ZONES OF UTILIZATION OF WHOLE MILK AND SKIM MILK



has a low fat content, while the cottage cheese is more or less for summer use only. This first fluid-milk zone has a common feature in that the farms sell an unusually high percentage of their total milk output and reduce their own consumption and calf-feeding to the minimum. They may even buy their butter and cheese from more remote zones.

The next zone still has fluid-milk shipments as the largest single utilization, but with increasing distance from the market buttermaking absorbs an increasing amount of milk. In this zone we also find a considerable spread of other forms of utilization. The separation of cream for shipment to the market stretches out farther from the first fluid-milk zone and proceeds to higher and higher concentration of the fat content. This cream is used for whipped cream and ice cream. To these forms of disposal, which gain strength in passing from the first zone to the second but are in principle to be found in the first zone, are added the finest types of soft cheeses with a short period of ripening. Among these we find especially Gervais and Camembert cheeses. As a supplement to the making of butter and cheese, production of evaporated milk may be found. This absorbs the seasonal surplus which results either from a supply exceeding the capacity of the cheese-storage space and of the butter-making plants, or exceeding the seasonal demand. However, the range of types of milk utilization in this zone is still broader. The farmer uses milk extensively for his own purposes, frequently covering his wants for butter or cheese; moreover, in the remotest parts of this zone the price of milk on the farm drops so low that feeding milk to calves competes with the other outlets.

In a third zone, butter manufacturing gains the upper hand as far as concerns the production of merchantable goods. Together with churning, the conversion of milk into many varieties of soft cheeses with an increasing ripening period takes the bulk. Shipments of heavy cream reach into this zone, at least in certain seasons, while surplus milk is also manufactured into evaporated milk. As in the second zone, the farms consume a good deal of milk and convert another portion by raising calves, with an increasing period of milk feeding. The essential difference as compared with the second zone is the predominance of

buttermaking and the appearance of soft-cheese production, of types like Romadour, Liederkranz, beer cheese, and similar "winter cheeses" that decompose rapidly in summertime and have a penetrating odor.

In the most remote zone, as Chart 11 (p. 70) suggests, production of hard cheese predominates and some butter-making remains. This zone is also a main location for milk-powder plants. Consumption on the farm in any form is a typical feature of this zone, and feeding milk lavishly to calves for an extensive raising of cattle for sale is another indicator of the relatively low prices obtainable for milk on the farm.

The lower section of Chart 11 indicates the corresponding zones of skim-milk utilization, with the several zones covering much the same area as the utilization zones for whole milk, or at least parts of them. Skim milk is the essential by-product of selling cream or making butter. Wherever we find in the whole-milk utilization zones the sale of cream or of butter, the skim-milk utilization zones emerge.

If we divide the predominant locations again into four hypothetical zones, in a first zone near the market such scarce amounts of skim milk as appear at all are used for making skim-milk cottage cheese (sometimes blended with a small amount of cream), and for supplying the bakeries with sweet skim milk for the finest pastries.

The second zone, which has considerable amounts of skim milk available, supplies the bakeries in the market with increasing amounts of skim milk; and in increasing amounts, with growing distance from the market, it produces sour skim-milk soft cheese. The farther we proceed toward the outer boundary of this zone, the more does direct utilization of skim milk on the farm gain in importance. Farmers introduce the milk protein into their diet and utilize it for all kinds of dishes as well as for making cheese and for baking. In the use of skim milk as

a feed, laying hens and the best types of milk-fed veal calves compete most strongly.

The third zone has a similar composition of types of utilization, though there are distinct differences. In cheese making, the curd is obtained by the use of rennet, and large quantities of cheese are produced as a raw material for other cheese factories. Commercial bakeries still absorb small amounts locally, but the margarine industry also appears as a consumer of skim milk in commercial quantities. The bulk of the skim milk is used on farms about as in the second zone, with the differences that in addition to feeding calves up to a much higher weight, poultry for sale for meat and laying stock displace egg-producing hens, and young pigs begin to receive skim milk as a regular feed.

In the most remote zone, casein production replaces the skim-milk cheese factories, while plants for skim-milk powder and evaporated skim-milk production absorb other parts of the supply. Farmers use skim milk freely for human nutrition, and feed pigs and calves with the remainder.

As a consequence of the difference in the importance of cream separation and butter manufacturing in the whole-milk zones, it is obvious that the third skim-milk zone has the largest supply, the second and fourth less, and the first a minimum.

In broad outline, this hypothetical grouping of locations is of some significance in actual developments, in spite of the extremely simplified and overstressed assumptions of our hypothesis. To approach nearer to reality, we must abandon some of the assumptions.

First, costs of milk production in such an isolated dairy region are not uniform. Usually they are higher the nearer we approach the central market, because of higher taxes and higher wages. This leads to adjustments in production such that some zones of intensive dairy

production are combined with zones of milk utilization. From the most intensive form of production with high-grade milch cows, the highest ratios of concentrated feeds, and no raising of calves at the center of the fluid-milk belt, to summer grazing, scanty winter feeding of roughage only, and the rearing of all calves in the hard-cheese belt, we find intermediate grades of varying intensity.

Second, transportation costs vary widely, not only because of differences in railway tariffs for different commodities and of declining charges with increasing mileage, but also as a consequence of the quality of roads, the type of vehicles used, the frequency of shipments, the size of each shipment, the need for refrigeration, and the like. Deviations from our hypothesis in production and transportation costs tend to enable types of utilization of the inner zones to move farther from the center, and on the other hand enable the industries of peripheral zones to move nearer to the central market.

Third, many other deviations in fact occur because the operating costs of the utilizing or converting industries for whole milk and for skim milk ultimately affect the possible location of dairy plants as well as any one of the cost factors. The same is true of marketing costs. The more efficiently a plant making butter or Camembert cheese operates, the farther it will be able to move into the fluid-milk zone, especially if it finds there a periodical surplus of milk. Moreover, the size or capacity of a plant, its type of equipment, the efficiency of its management, and its business capacity influence production costs and thereby the potential location.

Fourth, as soon as health ordinances make pasteurization of fluid milk compulsory, a new deviation from the hypothetical order of locations begins to appear. If pasteurization is exclusively performed in the cities, this deviation may remain negligible. If it is permitted to pasteurize fluid milk anywhere in the country districts,

this offers opportunities to combine other types of milk utilization with pasteurizing. Butter and cheese making may reduce the overhead costs of a pasteurizing plant, and they may thus invade the fluid-milk zone.

Fifth, certain situations may introduce elements of a technical monopoly and thereby interfere with the hypothetical equilibrium between the different zones of milk utilization. If, for instance, a small group of people who have the exclusive skill to make a good Swiss cheese selects a specific area as its location for a cheese-manufacturing industry, their arbitrary choice may upset other factors of location. If the superior skill of this group results in such low costs that it has a virtual monopoly, and if in addition after some while the initial investment has been fully amortized, the economic advantage thus established may outweigh other "natural" location factors—the more so if the market shows a preference for a dairy product of this particular origin.

There remains still another decisive group of influences to disturb our simplified theory of the location of the various types of industries that utilize milk. Instead of a uniform demand and, therefore, equal prices for all forms of butterfat—assumed in our hypothesis—various dairy commodities show different demand characteristics. We know, for example, that in 1930 the total human consumption of milk in Germany consisted approximately of 30 per cent in fluid form, 10 per cent in the form of cheese, and 60 per cent in the form of butter.¹ These proportions, however, indicate only the specific volume of the demand according to the then existing price relations. These price relations indicate clearly that the perishable character and certain sanitary requirements, as well as the type of service combined with the sale of milk and the uniqueness of milk as a high-grade food, create a premium for fluid milk. The second highest price is received for

¹ Von der Decken, *op. cit.*, pp. 35, 59.

butterfat in the form of sweet cream, the third highest price for butter, and the lowest price for cheese, except for small amounts of luxury types. The consumer's taste and his preference for a certain amount of milk induce him to pay that price. A good deal of the price structure rests on the evaluation of the specific commodities by the consumer. Transferred into our hypothetical-zone picture of the isolated dairy state, this would probably mean that the fluid-milk zone can be expanded farther, the higher the premium on fluid milk goes relative to the premium on butter. In the United States the popularity of ice cream creates a different set of relations.

Besides the intensity of the demand, it is the volume which counts. The proportions of the consumption of various milk and dairy products in Germany indicate that, ultimately, butter determines what the return from milk sales will be—with a certain margin allowing for independent improvement of returns from fluid milk or a disproportionate disadvantage for cheese. Perhaps the most important fact in the entire dairy economy is that the prices of all dairy products are ultimately, though indirectly, determined by the price of butter, provided we have a system of free competition. This does not, however, prevent the price of butter from being influenced also by the price of other dairy products, although to a lesser extent because the amount of butter sold is so much larger.

Even with all these corrections, our general deductions regarding certain locations for types of milk utilization would remain valid, though materially modified and with many deviations. New problems are not introduced by the fact that a large dairy region usually has, instead of a single central market, a number of fluid-milk markets spotted in the whole map of zones, with consequent adaptations within the zones. After a certain distance from the dominant fluid-milk market has been covered, average transportation costs must absorb such an amount of the

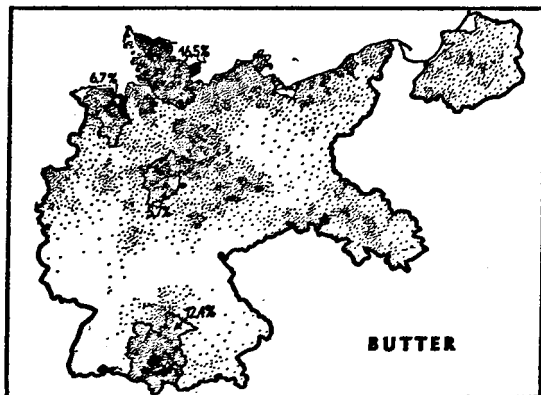
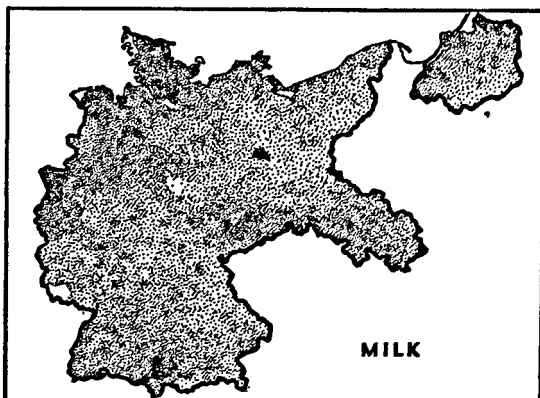
relatively high fluid-milk prices that it would pay to begin converting whole milk into cream and butter. Similarly, after passing a further distance, a higher milk return would be obtained if the milk were made into hard cheese.

As the upper section of Chart 12 indicates, the German production of milk is fairly well spread over the whole country, although some areas show a greater density of milk output. The lower section of the same chart displays the location of the two dominant types of milk utilization, as fluid milk and for butter. The white areas show the fluid-milk zones which supply the towns and cities. The dotted areas mark the main butter-making zones. In fact, the location of butter-making is much more dispersed than the chart indicates, because it covers only creamery butter. There is a widely dispersed production of farm butter besides. Yet the concentration of creamery-butter output is so distinct that, even with due consideration of the farm butter, the division of labor between fluid-milk zones and butter belts remains apparent. Schleswig-Holstein and Friesland produced 23.2 per cent, the "Allgäu" 12.4 per cent, and the area around Hildesheim and Brunswick 5.7 per cent. In other words, 41.3 per cent of the data shown are for 1928. In 1937 the picture had become still much more pronounced, because of the displacement of farm butter by creamery butter and the absolute expansion of butter production.

Chart 13 illustrates the location of the cheese belts, which are even more distinct than the butter belts. The "Allgäu" cheese belt coincides with the butter belt there. It represented in 1927 no less than 78 per cent of the soft-cheese production and 31 per cent of the hard-cheese output. East Prussia turned out 52 per cent of Germany's hard-cheese "crop."

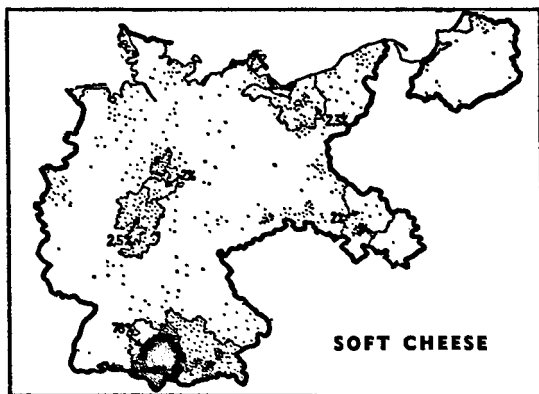
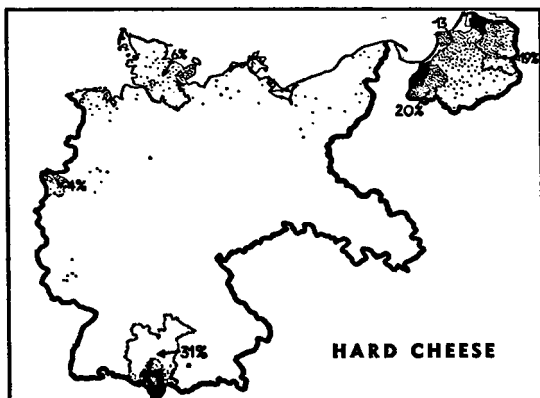
While the butter zones are determined as surplus areas with comparatively higher costs of transport than the

CHART 12.—GEOGRAPHICAL DISTRIBUTION OF PRODUCTION OF MILK
AND CREAMERY BUTTER, 1928*



* Reproduced, with slight modifications, from *Bilder für landwirtschaftliche Marktforschung*, June 1932, III, 34. Each dot represents annual production of 2 million liters, for milk, and 25 tons, for creamery butter.

CHART 13.—GEOGRAPHICAL DISTRIBUTION OF PRODUCTION OF SOFT AND HARD CHEESE, 1927*



* Reproduced, with slight modifications, from *Blätter für landwirtschaftliche Marktforschung*, June 1932, III, 35. Each dot represents an annual production of 25 metric tons.

fluid-milk zones, the German cheese zones grew historically as a result of low costs of milk production and the technical impossibility of frequent transportation. In East Prussia the moors were temporarily inaccessible. In Bavaria, as in Switzerland, the Alpine mountain ranges made it necessary to store the milk in the form of Emmenthaler cheese and to move the cartwheels downhill on the backs of pack horses.

Investigations in various countries, into the conditions in large dairy regions with dominating markets only at one edge, show that this sort of broad division of labor in the disposal of milk through various types of product outlet is generally to be found. But between these naturally erected zones we find conditions which cause great dissatisfaction among dairy farmers in all countries. These will now be considered.

OTHER FACTORS AFFECTING LOCALIZATION

So far, all the assumptions made and the conclusions drawn have touched only a small number of rational factors—albeit important ones—that influence the localization of certain predominant types in the utilization of milk. It is well known, however, that, besides purely economic factors, many others affect the localization and growth of plants in the dairy industry.

To begin with, plants are planned and established through private initiative on the part either of individual entrepreneurs or of groups of farmers in the form of co-operative associations. Since this involves a good deal of risk and requires a strong incentive to carry out the risky plan, dairy plants are not the automatic and immediate result of a local milk supply. There are many examples of remote dairy areas where for many years no independent creameries appeared, and where farmers also lacked the initiative to organize co-operative creameries.

Creameries and cheese factories crop up rather ir-

regularly. In the majority of cases, the size of the plant is not determined by considerations of optimum economy even under the standards of the industry at the time of building. Rather the size is adapted to the accidental group of farmers who join the co-operative dairy or to the equally accidental size of the capital resources of a private plant-builder, including such advances as he can secure from banks. Moreover, the type of utilization chosen often depends on the scantiest knowledge of market conditions.

Other irrational influences are connected with the fact that nowhere more than in the dairy industry does a transfer of empirical knowledge frequently count as a propelling or retarding force. This is well seen in the various branches of the cheese-manufacturing industry. Once a few men have acquired the knowledge and the experience, their success will impel the growth of similar plants in the neighborhood. Practical examples and their imitation are largely an irrational factor, yet they are one of the powerful forces in the extension of agricultural technical progress. Another factor in dislocation of plants, as mapped at any time, is pricing arrangements and agreements of large-scale organizations, e.g., zone price differentials for milk utilized in different forms, established by agreements between farmers' co-operative bargaining associations and large milk dealers. Such differentials may be arranged to permit poorly located condenseries to continue in operation when free competition would quickly drive them out. Losses resulting from improper location of one or several such plants are then pooled over the entire membership of the co-operative association. As soon as such monopoly situations arise, the economic forces that make for location of plants are modified.

All such influences, which are responsible for deviations from the economic norm and for differentiation in the efficiency and the costs of conversion, have a most im-

portant bearing upon the farmer's dairy returns. Supposing that the same utilization of milk takes place and that the same price for the finished product will be obtained, then the price paid to the farmer will vary according to the operating costs of the individual dairy plant—if we ignore the matter of varying net profits to the plant owner. If two dairy plants have widely differing costs, the associated farmers will also receive greatly differing prices for their milk. Since usually the capacity of such plants is limited and competition imperfect, it takes a long time to bring about changes. The construction of new plants does not always solve the problem, since in that event the amortized older plants begin a price war to get their supply. If the utilization differs in the various plants, and if the prices received for their finished products differ for only one out of a large number of possible reasons, the difference in the price paid to the farmer must be accentuated.

As a matter of fact, one of the striking features of the German dairy market was that the whole country had been split into very small local farm-milk-price districts, although the converted finished products have a largely uniform price level. Frequently two neighboring farmers received widely different prices for milk of identical quality, simply because they were under firm contracts to two different creameries. In other words, through the deduction of operating costs from the market price of the finished product, the dairy farmers have to maintain the local dairy plant which happens to be the exclusive outlet for their milk production. The destiny of the dairy farm rests on the efficiency or inefficiency of the dairy plant. Therefore one may consider the dairy plant, no matter who owns it, as supplementary equipment of the farm. If the farm derives its major income from milk, the efficiency of the dairy plant to a certain extent determines not only the possible farm revenues to be derived, but also the

value of the farm as well. This is one of the reasons why agriculture takes a vital interest in the standards of technical equipment and management and in the organization and functioning of the dairy-plant industry at large, and sooner or later tries to gain influence over it.

SEASONAL VARIATIONS IN MILK PRODUCTION

If we now assume that the total dairy-plant industry, including all the various types of utilization, is already in existence and in operation, we have to face one of the problems of milk production and the management of dairy plants.

Except eggs, milk is the only result of flow-production in agriculture; yet it shows strong seasonal variations in the volume produced. Several factors are responsible for the unequal distribution of the milk yield of a dairy herd. Among these the feed supply ranks as most important. Since the cheapest feed convertible into milk is pasture grass and the next cheapest green juicy fodder which has been called "absolute cattle fodder," and since, under German climatic conditions, this type of feed is abundant only during a short period in spring and early summer, it is only logical that milk production should rise at that season to its all-year peak. Milk is produced in spring and early summer at minimum cost. If the seasonal fluctuation of milk production is to be equalized, the advantages gained thereby must at least make up for the increased production costs.

In regions with great fertile pasture resources and a relatively long grazing season, the dairy regions par excellence, dairy farming has been adapted to the period of lowest production costs. The farmer organizes the mating of cows in such a way that the majority of calves are born when the grass-growing season begins. Abundant fodder supply (at that time also rich in protein), and the occurrence of the lactation period, both operate cumulatively.

No wonder that in such districts the milk yield and the deliveries of milk to creameries show violent fluctuations. In the extreme case, as in Lower Saxony,¹ the May output of milk is ten times as high as that of December. East Prussia, certain districts of the Rhineland and Westphalia, Schleswig-Holstein, Mecklenburg, Pomerania, Silesia, and the Bavarian Allgäu also show marked fluctuations. The official dairy-plant statistics for 1935 show that the two extremes of the curve of the farmers' milk deliveries to dairy plants were as follows in some of the typical dairy districts, in percentage of the annual average:

Province East Prussia: November, -28; June, +52

Province Schleswig-Holstein: January, -29; June, +52

Province Hanover: January, -25; June, +40

The figures for Westphalia and Oldenburg show similar fluctuations.²

With few exceptions, most of the districts of such violent fluctuations are distant from the densely populated centers of consumption. This is no mere accident; the low farm prices for milk or dairy products, which are the result of high costs of transportation, do not permit equalized production throughout the seasons. Technically, farmers can equalize milk production perfectly, wherever or whenever prices for milk are high enough to allow for the increased costs of production. A good illustration is the milk production within the borders of the city of Berlin. Not only do cows there have the highest absolute average yield per annum, 81 per cent above the Reich average,³ but the yield of the total herd of some 20,000 cows is almost entirely balanced the year round.

Summing up, we find at the central consumers' market and in its immediate environment a perfect equalization and a minimum of seasonal fluctuation, and in the next

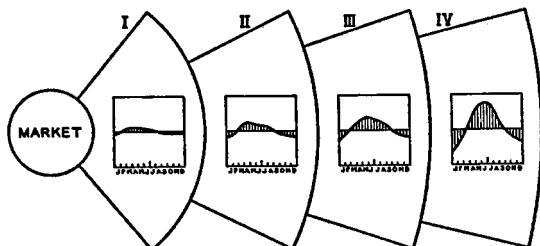
¹ Cf. F. Schweiggart's article in *Deutsche Milcherzeugung*, Mar. 21, 1936, p. 482.

² *Statistisches Jahrbuch*, 1936, p. 115.

³ *Ibid.*, p. 106.

zone a fairly balanced seasonal fluctuation; while the farther we move from the market, the more we find zones which have less and less adjustment of the output, and finally none, and therefore violent fluctuations. This is illustrated in Chart 14.

CHART 14.—SEASONAL FLUCTUATION IN MILK PRODUCTION IN TYPICAL ZONES



No seasonal fluctuation. Output equalized through most intense feeding and purchases of fresh milking cows. Cows culled when lower yield is reached. No calves raised. No bulls kept. Highest yield per cow.

Output fairly equalized through feeding and distribution of calving over the year. Purchasing of highly pregnant heifers to replace culled cows. No calf-raising except as bull for the herd. High average yield per cow.

Output equalized only through better feeding with silage or forage in winter time. Herd maintained by raising its own stock. Surplus calves sold. Medium yield per cow.

No equalization. Every female calf raised. Surplus heifers sold pregnant. Best bull calves raised also and sold when mature. Low average yield per cow.

It might be inferred that the conditions discussed would force the remote zones to stick more closely to their particular types of utilization. This would mean that the districts with excessive fluctuations would turn all their production in spring and summer into butter, cheese, or dry milk. However, this inference cannot be accepted without modification. Although the large supply of milk in spring causes a decline of farm milk prices in the butter and cheese territories, and thereby curtails the transportability of milk, the cost of production may also decline so much

as to more than make up for the decline in price. Hence butter zones, and perhaps even cheese zones, will throw milk into the fluid-milk market for several weeks or months. Moreover, when either the storage capacity of the cellars of local cheese factories has been filled or the credit facilities of cheese and butter plants have been exhausted, these plants cannot pay the farmer cash for his milk, and this factor may force farmers or dairy plants to flood the distant fluid-milk market with their milk shipments. Such attacks upon the fluid-milk markets by distant dairy regions have occurred time and again in the history of the milk supply of large German cities. They have often slashed to ruinous levels the farm prices for all milk delivered to the city, and all the farmers in the real fluid-milk zones have had to pay the bill.

There are other causes for similar invasions. With the growth of a city's population, the demand for fluid milk grows in proportion. On the one hand, the near-by zone intensifies its dairy production. But since this has certain limits in the feed supply and costs of production, the milk shed expands simultaneously. A growing number of farms and creameries participates in the fluid-milk supply. Since this expansion is a dynamic process that goes on haphazardly, under the influence of competitive groups of farmers or dairy plants, it always offers those who take their chance at the right time certain opportunities to obtain a share in the market sales. At short intervals, therefore, groups of farmers in the cream or butter belt may organize a campaign to gain a share in the fluid-milk market. This usually does not last very long, but it used to be to the advantage of the dealer and sometimes also of the consumer, because increased competition in supply permitted price reduction. Often the initiative in flooding the market with fluid milk from distant sections originated with the dealers. In the end, all the farmers paid the bill.

DISPOSAL OF FLUID MILK

As stated above, in discussing the factors affecting the localization of types of milk utilization, the distance from which fluid milk may be shipped depends on all the factors involved. Changes in any one of them may change the distance limits. Technical progress in the means of transporting milk has also caused attempts to gain a share in the market. The principle of shipping milk in glass-lined tank trucks or railway tank cars struck the imagination of all distant dairy zones, frequently started invasions, and caused grave disturbances of the price equilibrium with retaliation in near-by zones. These conditions, which in Germany were called "milk wars," have been one of the most characteristic features of the fluid-milk markets. They were also the prime cause of the first large-scale attempt to organize the milk supply of cities (see p. 93). Milk wars usually ended when one of the competing parties had exhausted its financial reserves or its energy. As a rule the distant intruders lost the war, but all farmers belonging to the same milk shed paid the bill; and even farmers beyond that area suffered, because the prices at the central market set the basis for farm prices of milk over large districts.

In prewar times, only negligible proportions of fluid milk were subjected to pasteurization. During the war, with the extreme shortage of milk, some cities made pasteurization compulsory, as a temporary measure to prevent the waste of milk in summer through souring. But after the war, pasteurization was adopted more and more as the only means of making milk hygienically safe at a reasonable price. For many years, two schools of physicians and experts in public health disputed over the best method to render the big cities' milk supply safe. One favored the development of a safe raw-milk supply; the other claimed that the requirements of this method were too expensive, and that the only way to secure the general

safety of milk was to make pasteurization compulsory for the supply of all sizable cities. As in the United States, and finally in most of the other countries that have attained a higher standard of milk-supply hygiene, the latter group was victorious, though the struggle goes on. Pasteurized-milk supplies for the main cities are still supplemented by an insignificant proportion of certified raw milk. But a safe raw milk is much more expensive. For the supply of rural communities and small country towns, uncontrolled raw milk in bulk still prevails.

When pasteurization became general, however, another alternative remained open. Should pasteurization be done in the city or in the country creamery plants? It is evident that the two types of industries were natural opponents. Technical and hygienic reasons speak plainly in favor of city pasteurization, especially in a country where the major part of the fluid milk is today still sold in bulk and not in sealed bottles, and where cooling and refrigeration are in general unsatisfactory. Pasteurization should take place as near to the consumer and in as short a time before delivery as possible. If pasteurization is done in city plants, milk can be shipped from the farm direct to the plant, while with country pasteurization the dairy plant is the shipper.

It is easy to see that the country dairy plants have strong incentives to participate in fluid-milk deliveries, even if only for temporary shipments for the purpose of equalizing the seasonal fluctuations of their supplies. Any profits derived from pasteurization and shipping fluid milk will increase their competitive strength in the cream, butter, or cheese business. Wherever a municipal administration has tried to build a semipublicly owned pasteurizing plant, the independent distributing trade has made common cause with the country dairy plants, because they believed that purchases of country-pasteurized milk would enable the trade to circumvent the city plant. In fact, con-

siderable numbers of country dairy plants did pasteurize fluid milk for cities. In 1928, for instance, the milk supply of the city of Berlin included receipts from 148 country dairy plants in 4 provinces, and an average of 35 per cent of the total receipts arrived in the form of country-pasteurized milk.¹

The competition between these two localizations of pasteurizing has prevented, or at least retarded for many years, a sound development of the fluid-milk supply of many a German city. With respect to this discussion, the struggle of the country dairy plants has been mentioned only because the desire for participation in the pasteurizing business has also led to disturbances in the fluid-milk markets.

Another important third group was active in the supply of fluid milk to the consumer. The producers within the city limits, or in the first zone beyond the suburbs, tried to evade both types of pasteurizing plants by delivering milk raw, in compliance with very loose police ordinances and a still less efficient form of hygienic control. Similar conditions existed in many city pasteurizing plants. Their modern equipment was utilized only in small proportion to its capacity, because a good deal of the consumer demand was met by milk-peddling farmers or "bootlegging" raw-milk salesmen who often lived by cutthroat competition.

Another source of avoidable losses consisted in the usual surplus supply of fluid milk in the city milk plants during the summer. The surplus quantities had to be utilized as cottage cheese, cream, or butter. Any one of these conversions meant losses to the dealers, which the dealers tried to recoup by lowering the price paid to the farmer. Very often this procedure allowed not only for compensation but even for an increase of their margin, while the

¹ Cf. Karl Brandt, *Der heutige Stand der Berliner Milchversorgung* (Berlin, 1928), p. 64.

consumer gained no advantage. If the farm price could not be lowered immediately, even higher prices would be charged to the consumer. These multiple forms of supplies were possible because the sanitary requirements in general were rather lax or, where they were not, the organization for their enforcement was lacking.

Moreover, until very recently, Germany had almost no official standards and grades for agricultural commodities, and none for milk. The bacteria-count method was not yet used officially for classifying milk as to quality. Even with respect to the fat content of fluid milk, no satisfactory rules had been established. Many cities had health regulations which set a minimum fat content. There the average fat content never rose above the permitted minimum, for it did not pay to deliver milk of a higher fat test. Therefore all methods of increasing the fat content were throttled from the beginning, not to speak of the practice of selecting the lowest-test milk for the fluid-milk supply. For many years the city of Berlin received milk containing no more than 2.7 per cent average fat content.

PROBLEMS THAT AWAITED SOLUTION

Aside from these shortcomings concerning the quality of milk for direct consumption, other purely economic problems awaited solution. As previously stated, the setup of the system of dairy plants in the country followed no rational scheme but grew haphazardly, in response to local and individual initiative. One of the many consequences was that the supply areas of the receiving plants often deviated radically from the optimum shape of such areas judged by economic standards. Often they overlapped, with the result that near-by milk had to be delivered to a more distant plant, with costs of transportation higher than necessary and returns to the farmer lower. Also resulting in high costs of operation were inappropriate capacities of plants or deliveries inadequate for the ex-

isting capacity. Many remote districts had to get along without any or with almost no plants at all.

These thoroughly unsatisfactory conditions in the dairy markets presented a series of problems.

1. The fluid-milk markets called for a form of organization which could guarantee a stable supply adjusted to the daily requirements of the consumer, and which could yet afford protection against market flooding through deliveries from the manufactured-milk area.

2. This in turn made it necessary to provide for additional shipments of fluid milk from a wider area in winter.

3. The restraint of shipments from the buttermaking zone, and the consequent protection of a better average price in the fluid-milk market, required compensation of dairy farmers in farther zones, out of the fluid-milk returns, for staying out of the market.

4. The dairy-plant industry and the total converting industry needed an intensified rationalization for the sake of better milk returns to the farmer.

Since these basic problems were intensified by the rapid growth of large cities and the ensuing increase of the distance between producer and consumer, manifold attempts to solve them were naturally made. Never-ceasing complaints of farmers about the unsatisfactory conditions in the dairy markets, and public complaints of consumers about the hectic changes in price and often unreliable quality of fluid milk, stimulated attempts at reforms.

In 1902 the dairymen of the milk shed of Berlin, under the leadership of a prominent farmer, made a heroic attempt to break down the monopolistic power of the milk dealers and to banish cutthroat competition within their own ranks by organizing a vast milk cartel. In spite of the strongly supporting sympathy of the majority of consumers, they lost their battle after several years, because of lack of effective strategy and adequate management of

the cartel, because of desertion of its members later on, and finally because of legalistic handicaps. In 1907 the doomed cartel liquidated with a stupendous debt.¹ A remainder of that cartel continued to operate for its members as a bargaining agency with milk dealers, but it was not much more than a broker and did not again attempt to carry out any reform.

Up to the World War, no other attempts were launched. The number of co-operative dairies increased rapidly, but in the markets the private initiative of the dealers was the only propelling force. During the war the dairy industry broke down because of the collapse of milk production. The government put the city milk supplies under control, but not for any basic improvements. It simply tried to attain an equitable distribution of the scarce supplies.

After the war the picture began to change. Considerable progress was made in some western and southern cities. Now the driving force was not the farmers but the municipal administrations, which tried to build up a system of organized contracting and distribution of milk in order to guarantee a permanently safe and pure supply at a reasonable price for all consumers. The dreadful collapse of the milk supply during the war was still fresh in the minds of municipal councils, and made them willing to back attempts to reorganize the milk business. Public discussion began to consider city milk supplies in the nature of a public utility. But looking back upon the entire period between 1919 and 1932, one has to state that the major progress in reorganization of milk markets was the result not of any nation-wide attack on principle; rather was it due to the most energetic initiative on the part of a few capable organizers, who were experienced dairy-plant managers and were intelligent enough to envisage the elements in a future setup of the organization of a

¹ Cf. Brandt, *op. cit.*, pp. 16-17.

modern dairy industry worthy of the name. That their creative initiative could succeed, against great odds, was due to the strong backing of their plans by some farsighted mayors or influential leaders in the municipal councils.

Mannheim was the first city to begin to tackle the problem of organizing on its own initiative the entire system of collecting milk from a few thousand of the smallest dairy farmers in the Black Forest region, cooling the milk at receiving plants, shipping it to Mannheim, and pasteurizing it in a new city-owned plant. The city finally went further and restricted the distribution of milk to a relatively small number of competent dealers. In 1932 the system, which was still one of the models of efficient organization and management, controlled a daily output of around 100,000 liters of pasteurized milk a day for the 250,000 inhabitants. The achievement was the more remarkable since no less than 10,000 individual farms in 300 rural communities contributed to the supply.¹

The cities of Nuremberg, Crefeld, and Stuttgart also succeeded in setting up similar municipal milk plants (*Milch-Höfe*) and in reorganizing entire fluid-milk sheds. Nuremberg in 1931 built the most modern and most capacious milk plant on the European continent. The Reich government granted large, long-term loans for the purpose of financing these plants, and the best architects, engineers, and dairy scientists, as well as the most experienced managers of dairy plants, co-operated in drafting the plans.

The legal form of these large-scale enterprises was usually that of a mixed-capital corporation, with a varying part (up to 51 per cent) of the stock owned by the city as the representative of the consumers, a part owned by the dairymen, and the rest owned by the dealers.

These outstanding examples were quite in contrast to the obsolete conditions in most of the other regions,

¹ Hans Mosolf, "Die Milchversorgung der Großstädte: I. Mannheim," *Blätter für landwirtschaftliche Marktforschung*, July 1932, III, 60.

especially all over the East, including the country's greatest market with a population of four million people, Berlin. In fact, the four cities proved that, with able general dairy-industry managers, with the necessary energy of municipal leaders, and with the wholehearted co-operation of the farmers, a satisfactory solution of the milk-market problem could be obtained even in spite of defective legislation, while in the majority of other cities the obsolescence of the law was used as a welcome excuse for the absence of real progress. But it was quite obvious that the dairy industry, with its history of half a century and thousands of plants of all sizes, had not produced the necessary number of qualified men to organize on a larger scale as private entrepreneurs.

The great importance of these forerunners of the future organization of dairy markets lay not only in the achievements they gained for their own territory, but perhaps more in the fact that they gathered all the necessary experience and discovered the real shortcomings and intricacies which are to be reckoned with. Moreover, in their model organizations, they began to train the men for further reforms in other regions.

With all due recognition of the impressive progress made in those cities, the following general deficiencies were characteristic of the situation before the new legislation dating back to 1931-32:¹

1. There were no national or state standards relative to the quality of milk. Most of the cities had very old police provisions which were not at all in conformity with each other, and which did not apply modern knowledge about milk-supply hygiene, but which were all directed mainly against watering milk. Those ordinances established very low minimum fat content for market milk. Besides this, they provided for excessively rigid conditions of produc-

¹ The German milk law (*Reichs-Milchgesetz*) was passed in July 1930. It began to become effective only late in 1931.

tion for baby milk (*Kindermilch*). The lack of adequately defined conceptions of milk quality kept the doors wide open for any kind of unfair competition under the pretense of "average good quality."

2. No legal right existed by which a city could enforce pasteurization of fluid milk. Cities could obtain pasteurization for the portion of the milk handled through their own semipublic mixed-stock corporation plants, but they could not insure safe pasteurization for all fluid milk.

3. With the concept of freedom of trade inherent in the constitution, the peddling of milk could not be prohibited. This left the gates open for the flooding of markets with seasonal surplus milk from the manufacturing zones.

4. Any local reform suffered because there was no legal way of setting up boundaries for fluid-milk sheds.

5. The official Chambers of Agriculture tried to reach voluntary agreements with the private and co-operative dairy plants that they would not invade anew the fluid-milk market of Berlin. But existing rights could not be touched. Other attempts, in principle more promising, also failed. An attempt was made to establish large milk pools of farmers' co-operative dairy associations. The diversity of financial standing, of technical equipment, of membership, and ultimately of profitability made it almost impossible to organize such a pool.¹

It is illustrative of the outmoded legal conditions, and the necessity for thorough legal reforms for the contemporary development of the dairy industry, that the president of the largest American dairy corporation visited Germany twice, in 1930 and 1931, with the idea of starting a city milk-supply corporation with American capital, but that he abandoned his plans, explaining that the legal status of the dairy industry would not permit an investment to the eventual advantage of the shareholders.

¹ See Werner Husmann, *Methoden der Regulierung von Milchmärkten* (Berlin, 1933).

CHAPTER VI

DEMAND CHARACTERISTICS AND THEIR IMPLICATIONS

In any attempt to organize the national market for fats, the most important preliminary questions—and perhaps the hardest to answer—are: To what extent is the particular demand for various types of fats, and to what extent is the general demand for all fats, "rigid" or "elastic," and what are the major factors affecting the demand?¹

THE PHYSIOLOGICAL OPTIMUM

How difficult it is to approach and measure the behavior of the demand for fats can perhaps be inferred from the drastic differences in per capita consumption among various nations. Pertinent also are some passages in a recent publication of the League of Nations.

The Technical Commission of the League's Health Committee states that for an adult male or female, living an ordinary everyday life in a temperate climate and not engaged in manual labor, an allowance of 2,400 calories per day is an adequate food supply. For muscular activity, from 75 to 300 calories per hour of work, according to its severity, should be added. Precise data are given for the protein intake in relation to body weight. The paragraph on fat requirements, however, simply states: "Fat must be a constituent of the normal diet, but the data at

¹ On this chapter, see C. C. Zimmerman, *Consumption and Standards of Living* (New York, 1936), pp. 56-124, and bibliographical notes; Sir John B. Orr, *Food, Health and Income* (London, 1936); Great Britain, Ministry of Health, Advisory Committee on Nutrition, *First Report* (London, 1937); H. von der Decken, "Die Ernährung in England und Deutschland," *Vierteljahrshefte zur Wirtschaftsforschung*, September 1937, XII, 177-207.

present available do not suffice to permit a precise statement of the quantity required. The high content of vitamins A and/or D in certain fats justifies their use in liberal amounts." With this statement from such an authoritative body at hand, it does not seem to be an overstatement if we say that the scientific approach toward a "physiological optimum," or even toward a minimum requirement of nutrition, does not yet offer any rules of thumb or safe bases for determining the dietary needs for fat.¹

Nevertheless, while science has not succeeded to our satisfaction in answering the question of the fat ratio, nations consume fats in characteristic ratios within their intake of food and change these ratios relatively little. An analysis of the average per capita consumption of food shows that nations living under most divergent climates, and in entirely different stages of economic development, have remarkably similar intakes of calories in spite of extremely different habits of nutrition. Rubner's summaries in Table 4 illustrate this.²

Although different nations supply themselves with very similar per capita amounts of food energy, their diets are composed of very different items. Indeed the differences are extreme. Undoubtedly, the choice of national dietaries and the slow modification of national dietary traditions rest primarily on economic factors. What seems to be a preference for certain national foods is, first of all, adaptation to the availability of food varieties which expresses itself in price. It is amazing how much intelligence the human animal has shown in the adaptation to his natural environment in developing the

¹ League of Nations, *The Problem of Nutrition*. Vol. II. *Report on the Physiological Bases of Nutrition* . . . (Geneva, 1936), p. 15. See also Committee of the Royal Society, "Fats and Fatty Acids as Foods," *Journal of Physiology*, 1919, LII, 328; and G. L. Müller, "The Influence of a Diet High in Butterfat on Growth, Blood Formation and Blood Destruction," *Journal of Clinical Investigation*, 1928, V, 521-39.

² See also Raymond Pearl, *Studies in Human Biology* (Baltimore, 1924), chap. xiv: "National Food Consumption."

production of a number of food varieties that fit specific climatic and soil conditions, and then in developing rules for the composition of his diet. From the poles to the equator, from the peaks of the world to valleys below sea level, from deserts to swamps, man supplies himself with sufficient energy from extremely different bills-of-fare. If we dig a bit deeper into the origin of such habits, we shall also find that they lead back into the dim ages of prehistoric man.¹

TABLE 4.—AVERAGE DAILY FOOD INTAKE PER CAPITA IN VARIOUS COUNTRIES*

Country	Total calories	Grams		
		Fat	Carbohydrate	Protein
Japan ^a	2,553	29	485	81
Italy	2,612	58	466	88
Czarist Russia	2,666	43	473	79
Germany	2,770	60	428	87
Prewar Austria	2,825	57	478	81
France	2,973	67	485	88
England	2,997	106	403	90
Average	2,771	60	460	85

* From M. Rubner, *Deutschlands Volksernahrung* (Berlin, 1930), p. 11.

^a For this comparison, the figures for Japan have been adjusted to allow for the lower average body weight of the Japanese people.

The poorer a nation may be—that is to say, the less it has developed its food resources in agriculture, horticulture, hunting, fishing, or the less it produces to exchange for imported food—the more it is forced to choose inexpensive types of food as a source of proteins, carbohydrates, and fats.

While one gram of carbohydrates yields four calories, one gram of fat yields nine calories. Fats are the most

¹ See the discussion of the diet of the Eskimo by V. Stefansson, "Adventures in Diet," *Harper's Magazine*, November and December 1936, January 1936.

concentrated type of supplementary energy-yielding foods, and each calorie in fat is usually more expensive than a calorie in the carbohydrate foods but less expensive than the mainly protein-carrying provisions.

Table 5, summarizing recent German conditions, demonstrates that there is a wide range of prices for the food calorie, not only for the calorie contained in one of the three major groups of carbohydrate-carriers, fat-carriers, and protein-carriers but also for the calorie within each of these groups. In 1928 the German con-

TABLE 5.—NUMBER OF CALORIES OF SPECIFIED FOODS PURCHASABLE FOR ONE GERMAN MARK, 1928, 1932, 1936*

Fats	Other foods	1928	1932	1936
	Potatoes	6,100	9,200	8,200
	Oatflakes	5,800	6,900	7,100
	Bread	5,000	6,600	7,000
	Barley	5,800	6,400	6,800
	Rice	4,900	6,600	6,700
Margarine ^b		5,500	15,400	6,700
	White beans	4,400	6,600	5,600
	Sugar	6,600	5,600	5,300
Lard		4,200	5,600	4,500
	Peas	3,300	5,900	4,000
Bacon		2,600	4,700	3,200
Milk		2,700	2,500	2,600
Butter		1,900	2,800	2,500
	Salted herring	1,600	1,900	2,200
(Pork) ^b	Pork	1,500	2,100	1,800
	Carrots	700	1,500	1,400
	Codfish	600	800	800
	White cabbage	500	1,100	800
	Eggs	600	900	700
	Beef	500	800	700
	Beer	700	600	600

* Data from *Wochenbericht des Instituts für Konjunkturforschung*, May 5, 1937, X, 92. Items are arranged in order of calories obtainable per mark in 1936.

^b Third-grade.

^c Pork is listed under fats (as well as under other foods) because of its high fat content.

sumer could buy for one mark 1,900 or 5,500 calories of fat according to his choice of butter in the first case or third-grade margarine in the second.

But Table 5 also shows that there is a still wider range of fluctuation of prices for the calorie in the same food in the course of a few years. The data are arranged in the order of diminishing amounts of calories to be bought in different foods in 1936. This arrangement throws the items for 1928 and 1932 out of order. In 1932 even the order within the groups was completely upset because margarine offered more calories per mark than any other food. This fat was a cheaper source of calories than even the cheapest carbohydrate. This, however, resulted from an exceptional situation created by a disparity of tariff protection and other more profound causes in the field of production. In general it may be assumed that carbohydrates are the cheapest source, fats come next with some overlapping, and proteins are most expensive. This holds true for the majority of countries with agricultural production of foods and indicates the relative costs of production. However, we know of conditions which upset such general rules entirely, as the nutrition of the Eskimos proves. Their food is obtained through fishing and hunting and is composed almost exclusively of proteins and fats.

In fact, the economics of food production, and habits of nutrition which are adjusted to them but also in turn influence production, keep the price relationships between the major groups of food fairly in balance. Radical changes in these relationships cause so much disturbance in the economics of production and consumption that attempts are made to arrive at a new equilibrium. This study deals with such an attempt.

The more fat a man consumes, the less volume of food he needs to eat; and since most fats require no chewing, his eating efforts are diminished as the amount of fats

consumed increases. It must not be forgotten, however, that the human body can substitute carbohydrates for fats, for like all animals man has the ability to convert carbohydrates into fats. Yet a certain minimum amount of fat is needed for the proper functioning of the intestinal glands and the process of digestion in general. "Fat enters to a considerable extent into the structure of the body. Adipose tissue, in addition to serving as a depot for reserve stores of energy, performs other functions. Among these are the insulation of the body against rapid loss of heat, which is accomplished by the subcutaneous adipose tissue, and certain mechanical functions such as supporting the eyeball in the orbit. Nutritional fat (or closely related compounds such as sterols and lecithins) enters into the composition of each cell of the body."¹ Probably fats are also necessary for certain as yet ill-understood processes of metabolism.

The question of the physiological "optimum" of fat consumption within the diet is, as already mentioned, still a mystery. Even the question of the minimum cannot be answered adequately, although there are certain indications of the point where deficiency of fat in a diet begins to affect the human body. The equally interesting question concerning the upper limits is still much more obscure. And practically nothing is known about specific reactions of the human body as to different types of fats.² Experimenters face the task of getting useful data on physiological capacities of living bodies, which are extremely flexible. The body subjected to the experiment adjusts to the new experimental conditions, thereby shifting the base continuously. Moreover, only experiments over a

¹ White House Conference on Child Health and Protection, *Growth and Development of the Child: Part III, Nutrition* (New York, 1932), pp. 105-19.

² It was assumed that the spread of xerophthalmia among the Danish population during the war was a consequence of changes in fat consumption; but this was a rare case, and the symptoms were most probably caused by lack of vitamin A.

long period, with large groups of people of average age composition and average physical constitution, can yield significant results. Previous habits of nutrition—perhaps even those of previous generations—as well as climatic conditions and the composition of the food according to different types of carbohydrate- and protein-carriers, will probably affect the observations. The only safe assumption is, therefore, that people have an unknown ability to change their intake of fats but that a whole nation changes its food intake only very slowly and within narrow limits.

Table 6 indicates the composition of the German national diet during the period 1926-30. Roughly a third of all calories was derived from animal food and two-thirds from vegetable food. The budget of calories from vegetable food contained 11 per cent contributed by fats, 9 per cent by proteins, and 80 per cent by carbohydrates. Among the calories derived from animal foods, the bulk or 73 per cent was contributed by fats, 18 per cent by proteins, and only 9 per cent by carbohydrates. The calorie ratio of protein to fats to carbohydrates in the German food budget was in 1926-30 about 1:2.6:4.7. Approximately 30 per cent of all food calories were derived from fats.

Historically, we find that as the income of a people rises, its average per capita consumption of fats increases. The German consumption of all edible fats, except milk, rose from 13.3 kilograms of pure fat per capita in 1913 to 17.4 in 1931.¹ If we consider only the per capita consumption of butter, margarine, and lard, the increase is still more noticeable. The consumption of these three fats rose from 11.3 kilograms in 1913 to 15.5 in 1929. The consumption of butter rose from 6.78 kilograms in 1913 to 7.50 in 1929; that of margarine rose very strikingly from 2.98 to 7.81; while that of lard fell slightly

¹ Ernst Storm, *Der Wettbewerb zwischen den Speisefetten* (Schriftenreihe des Instituts für landwirtschaftliche Marktforschung, 1933, Heft 14), p. 12.

TABLE 6.—AVERAGE ANNUAL PER CAPITA CONSUMPTION OF VARIOUS FOODS IN GERMANY, 1926-30*

Commodity	Kilograms			Calories			Total
	Protein	Fat	Carbohydrate	Protein	Fat	Carbohydrate	
Meat	6.02	5.24	.01	24,666	48,741	41	73,466
Edible entrails .....	.60	.58	...	2,444	5,440	...	7,860
Animal fats .....	.21	9.43	...	853	87,708	...	88,561
Milk	5.92	4.84	7.84	24,272	45,031	32,128	101,536
Butter .....	.05	5.83	.03	225	54,219	139	54,571
Cheese	1.37	.84	.12	5,629	7,831	480	13,947
Eggs .....	.84	.66	.04	3,428	6,110	148	9,679
Fish .....	.78	.38	...	3,202	3,506	...	6,743
Whale oil .....	...	1.15	...	...	10,680	...	10,680
Grain	9.41	1.28	71.25	38,589	11,904	292,109	350,558
Potatoes	3.37	.19	31.79	13,805	1,739	130,339	147,730
Sugar .....	...	...	21.76	...	...	89,216	89,216
Legumes .....	.63	.05	1.42	2,587	474	5,810	8,889
Vegetable oils .....	...	6.77	...	...	62,998	...	62,977
Vegetables	2.18	...	5.53	8,922	...	22,681	31,667
Fruits .....	.45	.38	8.21	1,767	3,506	33,681	38,994
Alcoholic drinks .....	.55	4.75	4.51	2,271	33,285	18,487	54,033
Cocoa .....	.21	.10	.33	853	967	1,345	3,172
All foods	32.55	37.72	152.83	133,513	350,854	626,604	1,154,279
Of animal origin...	15.78	28.95	8.03	64,719	269,266	32,936	367,043
Of vegetable origin	16.77	8.77	144.80	68,794	81,588	593,668	787,236

* Helmut Eisig, "Der Verbrauch von Nahrungsmitteln in Deutschland vor und nach dem Krieg," *Deutsche Agrarpolitik* (Veröffentlichungen der Friedrich List-Gesellschaft, Berlin, 1932), Band 5, Teil I, pp. 134-35. Data for honey, a very small carbohydrate item, are here excluded. Certain discrepancies in totals are left as in the original source, but it should be noted that while figures for alcohol appear in the "fat" column, these are included in the vertical summaries in the total column only.

from 3.46 to 3.28 kilograms per capita. In 1934-35, the German diet still contained 30 per cent of all calories in the form of fats.¹

¹ Cf. Ernst Storm, "Entwicklungstendenzen des deutschen Speisefettverbrauchs, 1925-1936," *Blätter für landwirtschaftliche Marktforschung*, January 1931, I, 352.

The latest data from England¹ show that the average daily per capita intake of food of the English nation in 1934-35 contained 34 per cent of all calories in the form of fat, or 1,116 calories of fat out of a total of 3,246. In 1909-13 the English people consumed² 99 grams of fat per day per capita. In 1934-35 this intake had risen to 124 grams. In spite of this remarkable change, the total place of fats within the calorie budget remains within narrow boundaries. Moreover, the diets of the two countries with all their great differences in detail show a close similarity in the proportion of fat calories compared with the total intake of calories.

INCOME AND FOOD CONSUMPTION

If first we assume that the index of all prices—the purchasing power of the currency—and the index of food prices remain the same, the increased consumption of better food can only have been the result of improved income of the masses. How much the income actually rose can be demonstrated by the fact that between 1888 and 1913 the average yearly net wages per German coal miner rose from 863 marks to 1,753 in the Ruhr valley, and from 516 to 1,053 marks in Upper Silesia,³ while the period from 1925 to 1929 brought a further increase from 1,804 to 2,339 marks, on the average, for all bituminous coal miners in Germany. During the period from 1888 to 1913, the index of agricultural prices rose from 73 to 100, or by only 27 per cent, while from 1925 to 1929 it moved from 122 to 126.⁴ But increased real wages are reflected only to a certain extent in food purchases. While

¹ Von der Decken, "Die Ernährung . . . ," p. 186.

² *Ibid.*, p. 187.

³ Storm, *Der Wettbewerb . . .*, p. 29; and *Statistisches Jahrbuch, 1933*, p. 265.

⁴ *Statistisches Jahrbuch, 1936*, p. 264; and *Ibid.*, 1933, p. 264.

the absolute amount of money spent for food may increase, the distribution of income among shelter, clothing, industrial goods, services, and pleasure also tends to change, usually with a decrease in the proportion for food.

Household budgets for 188 Belgian laborers' families in 1891 and 809 laborers' families in 1929 show that the combined consumption of bacon, lard, margarine, and butter rose from 2.004 kilograms per month per adult male worker in 1891 to 3.014 in 1929, while the per capita consumption of bread per adult laborer fell during the same period from 21.290 to 16.729 kilograms, and that of potatoes from 19.337 to 18.724 kilograms.¹

In a later stage of the industrial revolution, with increasing per capita income for the masses, the rapid growth of the population began to slow down. This brought about the transition to a stage of moderate growth of population and a declining percentage of adolescents or an increasing proportion of consuming adults. In 1910 Germany (postwar territory only) had per 1,000 people 339 persons under 15 years of age, but in 1925 only 258. During the same period, the number of men between 15 and 65—the income-earning age—increased from 17.4 million to 20.5 million.²

The change in the composition of the population with respect to different age groups has improved the per capita income and made possible an increase in expenditures for food. When an increasing percentage of women enter a business occupation, this trend is further accentuated. Increasing real income leads to increasing expenditures for food per adult, while at the same time the proportion of the total budget spent for food decreases. This has

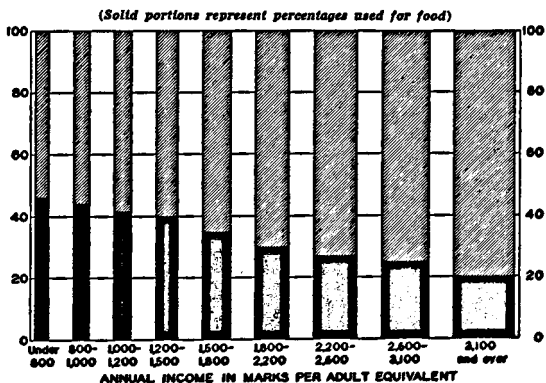
¹ Max Gottschalk, "The Purchasing Power and the Consumption of Belgian Workers at Different Periods," *International Labour Review*, June 1932, XXV, 787-805.

² Naum Jasny, *Bevölkerungsgang und Landwirtschaft* (Schriftenreihe des Instituts für landwirtschaftliche Marktforschung, 1931, Heft 2), p. 17.

been called "Engel's Law,"¹ after the statistician, Ernst Engel, who as early as 1857 pointed out that with a decreasing income the proportion to be expended for food must increase.

This is illustrated in Chart 15, based on the family household budget studies of the German Bureau of Sta-

CHART 15.—VARIATIONS IN FOOD EXPENDITURES AS PERCENTAGES OF TOTAL EXPENDITURES IN DIFFERENT INCOME GROUPS IN GERMANY, 1927-28*



* Data from *Deutsche Wirtschaftskunde*, p. 278. The width of each bar indicates the total food expenditures of the specific income group.

tistics for 1927-28. The laborer's family with more than 1,500 marks income per adult, while it spent a smaller

¹ Ernst Engel, "Die Produktions- und Consumptionsverhältnisse des Königreichs Sachsen," *Zeitschrift des Statistischen Amtes des Königlich Sächsischen Ministeriums des Innern*, Nov. 22, 1857, pp. 27-29; Ernst Engel, "Die Lebenskosten belgischer Arbeiter-Familien früher und jetzt," *Bulletin de l'Institut International de Statistique*, 1898, IX, 1-125. See also the extensive discussion in C. C. Zimmerman, *Consumption and Standards of Living*, pp. 22-134; chapters

proportion of its income for food, spent almost twice as much per adult for food as a family with less than 800 marks income per unit. The added expenditure for food represented only 30 per cent of the additional income. The budgets of the white-collar class and civil servants show corresponding increases in food expenditures between the groups with lowest and highest incomes, but still further reduced percentages compared with the additional income.

Another important factor affecting the food expenditures of the income-earner is the size of the family. It is obvious that the number of persons to be fed, clothed, and housed out of one income has marked bearing upon its distribution among various items of expenditure. This is illustrated in Table 7, based on official data gathered in

TABLE 7.—FOOD EXPENDITURES OF GERMAN LABORER FAMILIES IN ANNUAL INCOME GROUP OF 3,000-3,600 MARKS, 1927-28*

Number of children	Per family		Per adult equivalent*	
	Marks	Percentage	Marks	Percentage
0	1,050	31.7	551	31.6
1	1,244	37.8	508	35.5
2	1,326	40.6	434	36.7
3	1,453	44.5	392	39.7
4-6	1,561	47.4	354	41.0
Average	1,320	40.2	451	36.3

* Friedrich Burgdörfer, "Bevölkerungsentwicklung, Wirtschaftsstruktur und landwirtschaftlicher Absatz," *Deutsche Agrarpolitik* (Berlin, 1932), Band 8, Teil I, p. 84.

* The calculated number of adults, including the children.

1927-28. The more children a family has to rear, the more it has, *ceteris paribus*, to reduce the expenditure per

on the role of food, the laws of food, and food behavior under minimum conditions; and R. G. D. Allen and A. L. Bowley, *Family Expenditure: A Study of Its Variation* (London, 1935).

adult equivalent for expensive types of food, and to increase those for cheaper substitutes.

Again, according to the official household records of German laboring families in 1927-28, the families with 4 to 6 children had, as compared with childless families, larger expenditures per adult equivalent for three kinds of food: margarine, 72 per cent more; rye bread, 38 per cent more; and potatoes, 26 per cent more. This compensated for smaller expenditures per adult equivalent for butter, eggs, meat, meat products, fish, fruits, vegetables, wheat bread, and pastry. If the expenditures of the childless family per adult equivalent are taken as 100 for each commodity, the multi-children families spent 25 for butter, 39 for eggs, 47 for meat, 46 for vegetables, 36 for fruits, and 42 for chocolate, but 172 for margarine, 138 for rye bread, and 126 for potatoes.¹ In other words, in the childless family the adult consumed four times as much butter, but only three-fifths as much margarine, as the adult in the same income bracket but with a family of 4 to 6 children.

PRICE RATIO BETWEEN FATS AND OTHER NUTRIENTS

Besides the income, the real income, and the size of the family, another important factor affecting changes in the demand for individual types of food is their price in relation to that of other types. If radical dislocations take place in the price structure, the consumer will adapt himself to such conditions and take advantage of those commodities which become relatively less expensive. This holds true at least for the majority of the population, although the higher-income groups will show less sensitive responses to changes in price relations because they can afford to dispense with such thriftiness in food purchases. Even if we assume that only part of the house-

¹ Burgdörfer, *op. cit.*

wives are sufficiently alert and intelligent to make the adjustment, it is nevertheless true that, with a certain time lag, the population will obey the order of prices.

As Table 8 indicates, between prewar and pre-depres-

TABLE 8.—NUMBER OF CALORIES OF SPECIFIED FATS PURCHASABLE FOR ONE GERMAN MARK, 1913-14, 1928, 1932, 1936

Commodity	Calories					Calories 1928 in per- centage of 1913-14 ^a	Consumption 1928-30 in percentage of 1909-12 ^b
	1913- 14 ^a	1928 ^a	1932 ^b	1932 ^b	1936 ^b		
Butter	2,880	1,790	1,900	2,800	2,500	62	113
Margarine ..	3,900	4,900	5,500 ^c	15,400 ^c	6,100 ^c	126	297
Lard	5,590	5,150	4,200	5,800	4,500	92	104
Fat pork....	2,120	1,610	1,500	2,100	1,800	76	105
Milk	2,860	2,000	2,100	2,500	2,600	70	106

^a Eisig, *op. cit.*, p. 140. We have here multiplied Eisig's figures by 10 for proper comparison with the others.

^b *Wochenbericht des Institute für Konjunkturforschung*, May 5, 1937, X, 96.

^c Cheapest grade.

sion years, the German consumer responded to the considerable increase of his margarine purchasing power by more than doubling his consumption of margarine. But in spite of a great loss in the purchasing power of the mark for butter, he increased his butter consumption also. These few data suffice to show that other influences helped in shaping the choice of food and affected the elasticity of the demand.

Such influences originate in the general shift in type of work. With the rapid progress of industrial electrification and rationalization since the war, the severest forms of physical labor have been eliminated and transferred to power tools at a breath-taking pace. Man has accordingly adjusted his dietary habits, probably without becoming aware of the change. At the same time, rapid increases in the white-collar class and the groups of highly

skilled laborers have caused social adaptations. The passage of a family from one social group into a higher one leads it to adopt the standards of eating and drinking typical of that group. This is nowhere more true than in Germany, which has a distinct and intricate social hierarchy. To eat butter instead of margarine is still the symbol of a social gradation.

Changes in the energy requirements of the human body resulting from declining amounts of hard muscular work, and increased purchasing power, tend in general to stimulate the substitution of more refined foods, with less bulk and higher concentration, for cruder types of food. Among the various energy-carrying foods, this means substitution of sugar and fats for starchy carbohydrates. This is illustrated by Table 9, which shows

TABLE 9.—AVERAGE DAILY PER CAPITA CONSUMPTION OF PROTEIN, FAT, CARBOHYDRATE, AND ALCOHOL IN GERMANY, PREWAR AND POSTWAR*

Nutrients	Calories		Percent- age change	Percentage of total	
	1900-13	1926-30		1900-13	1926-30
Protein: Total	376	365	- 2.9	11.7	11.6
Vegetable origin	212	188	-11.3	6.6	6.0
Animal origin	164	177	+ 7.9	5.1	5.6
Fat: Total	826	961	+16.8	25.8	30.6
Vegetable origin	123	223	+81.3	3.8	7.1
Animal origin	703	738	+ 5.0	22.0	23.5
Carbohydrate: Total	1,870	1,719	- 8.1	58.8	54.8
Vegetable origin	1,784	1,626	- 8.9	55.6	51.8
Animal origin	86	93	+ 8.1	2.7	3.0
Alcohol	13½	91	-32.1	4.2	2.9
Grand total	3,206	3,136	- 2.2	100.0	100.0

* Eisig, *op. cit.*, p. 136.

the major changes in the diet of the German nation over a span of nearly twenty years.

The outstanding feature of those changes is the re-

duction of carbohydrates and their replacement by increased amounts of fats. Second, the substitution of proteins of animal origin for vegetable proteins is important. Both five-year periods used as the base of comparison in the table were periods of prosperity, and may therefore be taken as fair samples.

Considering the behavior of the demand for fats in general, we have found thus far that important factors are, first, the disposable income; second, the income available per member of the family; and, third, the purchasing power for fats relative to that for other groups of food. From the material presented, it may be concluded that the demand for fats in general is elastic, within certain limits, and that an increase in consumption of fats is offset by a decrease in consumption of carbohydrates. It may also be inferred that a basic physiological or psychological propensity to consume more fat existed, and that an increasing supply and correspondingly favorable price relations permitted this to find its expression in actual consumption.

However, a certain caution is necessary. It would be going too far to assume that this elasticity of the demand represents a universal law, operative everywhere at any time. It is safe to say only that the elasticity of the demand existed in the historical situation with given food habits, with the given habitual disbursement of income, at the particular level of nutrition then prevailing in Germany, with specific relations between the prices of fats, other foods, and all other commodities. Whether a relapse to former price relations would alone suffice to reverse the adjustment remains an open question. Whether a further gain in purchasing power over fats would have the similar result of stepping up consumption, and where the curve of increments of demand in response to relative price decline would culminate, remain equally uncertain.

If nearly every individual in a nation had sufficient income to select his diet without regard to price, or if food were available free of charge, and if there were no scarcity on the supply side, it seems probable that each would adjust his consumption within a relatively short period to something like that of the upper tenth of the present population classified according to income. What are now the more costly and refined types of food would supplant the cruder and less expensive ones. Under conditions as they are, however, consumption is influenced both by the scarcity of purchasing power of the majority of consumers and by the scarcity of the preferred types of food.

CONDITIONS IN PARTICULAR FOOD MARKETS

Beyond the relatively meager results of the previous analyses of the demand, we must inquire into the conditions prevailing in the markets for individual food commodities if we wish to learn more about the peculiarities of demand.

Let us begin with fluid milk. There is a widespread conviction in the United States that the per capita consumption can be increased with improved hygienic safety, better service, established confidence in milk, and the spreading recognition of the nutritive value of milk. Here it is doubtless true that the immense progress made in the United States since the war in urban milk supply, the prohibition period, and changed attitudes toward nutrition have considerably increased the consumption of fluid milk and definitely placed it among the essential foods and drinks for adults. However, it is rather doubtful whether the experience of the United States reflects a universal rule.

Table 10 is illuminating in this connection. In 1913 the per capita fluid-milk intake was 118 liters. During the two prosperous years of 1926 and 1927 it barely reached

this level, and then fell to a low of 100 liters at the depth of the depression in 1933. To include goat's milk is questionable, because of the unreliability of data on goat-milk

TABLE 10.—PER CAPITA CONSUMPTION OF FLUID MILK IN GERMANY, AND BERLIN PRICE OF MILK, 1913 AND ANNUALLY 1924-34*
(Liters; marks per liter)

Year	Cow milk per year	Goat milk per year	Total per day	Berlin price of loose cow milk
1913.....	118	..	...	.24
1924.....	111	29	.38	...
1925.....	116	24	.38	.31
1926.....	118	22	.38	.29
1927.....	117	20	.38	.30
1928.....	116	19	.37	.30
1929.....	116	17	.36	.30
1930.....	111	15	.35	.28
1931.....	103	15	.32	.29
1932.....	102	15	.32	.25
1933.....	100	15	.32	.24
1934.....	102	15	.32	.24

* Calculated from data in von der Decken, *Deutschlands Versorgung* , pp. 21, 35, and *Statistisches Jahrbuch, 1928, 1936*; taking population and consumption data for the area included in the Reich at the various dates.

production. The basis for the statistics of cow-milk production is still unsatisfactory, but has slowly been improved especially in recent years. Yet even the best statistics leave a considerable leeway, because fluid milk is replaced in varying degrees by evaporated whole milk and fluid and evaporated skim milk. No sufficient statistics on the per capita consumption of these substitutes for fluid milk are available. Even if the data cited are not taken at face value, there is at least no indication of an increase in the per capita consumption of fluid milk.

With respect to the price of fluid milk and the purchasing power, Table 10 shows that the price of loose

fluid milk bought at Berlin stores (a price which may be taken as representative of the average price in the Reich) fell by 20 per cent from 1929 to 1933, while the per capita consumption of milk fell only by 11 per cent. During the same period the index of the costs of food (1913 average = 100) fell from 156 in 1929 to 113 in 1933, or by 27 per cent. This indicates that milk retail prices did not fall as much as food prices in general.

An investigation by the Association of German Cities (*Deutscher Städtetag*), published in 1928, showed that the average figure for the consumption of fluid milk for the entire urban population of the Reich obscured wide variations in the per capita consumption of various cities. In 1913 the daily average per capita consumption of 79 cities varied between .09 and .58 liters, with Heidelberg ranking highest. In 1926, a year of prosperity as far as employment and income were concerned, 91 cities again showed a low of .09 liters average daily consumption, but the high was only .43 as compared with .58 in 1913. The order of per capita consumption changed considerably without revealing any principle behind the changes. The weighted average for the 79 cities in 1913 and the 91 cities in 1926 was .28 liters per day in 1913 and .26 in 1926.¹

No comparable data are available for representative rural communities, but it seems safe to assume that the variation would be still more marked in these. The farm population consumes milk or refrains from consuming it partly because of a surplus or deficit supply situation. Excessive consumption or abstinence is often the result of urgent necessity.

According to reports of the Berlin milk dealers' association, the depression brought a decline in fluid-milk consumption in the metropolis of approximately 30 per

¹ Emil Hofmann, *Die Milchversorgung der deutschen Städte* (Zur Schriftreihe des deutschen Städtetages, Heft 3, Berlin, 1928), pp. 26-32.

cent between 1929 and 1932. The household budgets of the Statistisches Reichsamt had shown that in 1927-28 the annual consumption of fluid milk per adult varied, in households of 18 different income groups with from 800 marks per adult to 2,600 marks income and up, from 110 liters to 165 in the laborer group, from 130 to 160 in the white-collar group, and from 140 to 180 in the civil-servant group, according to their income. At the same time, the number of children had very little influence upon the per capita consumption per adult-equivalent within the same income group of laborers.¹

Thus in spite of many improvements in the quality of the milk supply, and in spite of a strong national drive for an increased consumption of fluid milk, the German development has differed from that in the United States. To explain this fact it is necessary to consider economic factors and certain habits and traditions which have specific importance in Germany. There is hardly another country in which national habits of drinking are so stubbornly maintained as in Germany. Even today milk is regarded as essentially a food for babies and young children. Adults stick to coffee, beer, cider, wine, liquor, or mineral waters, with preferences for one or another determined largely by regional customs. It is true that the continuous propaganda and the more frequent offering of bottled milk at railroad stations and in other public places, and here and there in restaurants, has made some slight inroads into the market for other drinks, especially among the youth. But in general, milk is still rejected by the majority of male adults, and even by women, as a substitute for those traditional drinks which are so closely interwoven in the folklore of the various regions.

The figures in Table 11 do not include alcoholic cider, which in Württemberg and in parts of the Rhine valley

¹ Jansy, *Bevölkerung und Landwirtschaft*, p. 27.

is the popular and less expensive substitute for beer, and is consumed there in larger amounts than beer is in Bavaria. Even without this beverage, the data illustrate that the consumption of alcoholic beverages is a function

TABLE 11.—PER CAPITA CONSUMPTION OF BEER, SPIRITS, AND WINE IN GERMANY, 1913 AND ANNUALLY 1926-36*

(Liters)

Year	Beer	Sprits	Wine	Total
1913.....	98.1	2.8	3.4	104.3
1926.....	75.6	1.0	2.7	79.3
1927.....	77.7	1.3	3.8	82.8
1928.....	85.9	1.3	4.6	91.8
1929.....	88.6	1.4	4.6	94.6
1930.....	79.4	.8	5.0	85.2
1931.....	60.4	.7	5.2	66.3
1932.....	51.4	.6	4.0	56.0
1933.....	50.7	.8	3.6	55.1
1934.....	56.0	.9	4.8	61.7
1935.....	58.0	1.0	6.2	65.2
1936.....	58.7	1.0	6.7	66.4

* Data from, or computed from, *Statistisches Jahrbuch, 1936*, pp. 7, 360-61, and *ibid.*, 1937, p. 363.

* For illustrative purposes the totals are useful, with the warning that it is somewhat misleading to add the components as if the three beverages were homogeneous. The striking reduction in per capita consumption of spirits and the increase in consumption of wine call for no special comment here.

of the income of the people. At the peak of the business cycle in 1929 the total consumption came very close to the prewar level. Since then consumption has not recovered. And yet the German adult population still adheres to its traditional preferences in drinks and remains adamant in its refusal to substitute milk for beer, cider, liquor, or wine. This is in spite of the fact that the price relationship has made milk more accessible to the masses, especially since it is free of beverage taxes while radically increased excise taxes fall on all varieties of other

drinks. It is true that according to Table 11, the per capita consumption of beer, spirits, and wine has decreased from the 1913 level of 104.3 liters to 94.6 in 1929, and did not exceed 66.4 in 1936. This has its good reason in the low purchasing power of the consumer for alcoholic beverages. But the essential fact for the dairy industry is that the consumer did not consume more milk. The impoverishment of the formerly well-to-do classes through taxation and the runaway inflation has reduced their consumption of alcohol. Milk does not rank in the same category as a thirst quencher or a pleasure. Being considered as a food and basic necessity for children, it has a remarkably inelastic demand.

The relation between retail prices of beer and milk may be seen from the following comparison, in marks per liter:

Commodity	1929	1930	1931	1932	1933	1934	1935
Whole milk, sold loose.....	.30	.28	.29	.25	.24	.24	.24
Bottled beer .....	.63	.69	.76	.70	.70	.70	.70

Although 1 liter of beer, in 1929, cost more than twice as much as 1 liter of milk, consumption of milk was only about 75 per cent as large as the consumption of other beverages.

In northern Germany, beer and other alcoholic drinks are not considered as food by the consumer, but as a stimulant and a pleasant luxury. To a certain extent, therefore, they are not in competition with milk. In fact, at the depth of the depression, beer consumption dropped to one-half the prewar level and to 57 per cent of the postwar prosperity peak (Table 11).

In Bavaria, however, the case is different as far as beer is concerned. There beer ranks as "liquid bread," as it is commonly called, and the population insists on this beverage as a basic energy food—so much so that the Reich had to grant special allowances for brewing even in the period of starvation toward the end of the war.

This explains to a certain extent why, in contrast with Switzerland, the Bavarian dairy country maintains a low consumption of fluid milk. Table 5 (p. 99) shows that beer calories are priced in the neighborhood of egg or beef calories.

A remote similarity was to be found in eastern Germany in prewar times. Farm laborers then consumed hard liquor (rye- or potato-spirit) as a kind of food. The severe tax imposed upon hard liquor after the war has largely curtailed this habit. American farmers in New York state, one hundred years ago, similarly consumed liquor rather lavishly as a part of their diet.¹

In general, it seems to be the normal trend in nutritional progress that in a primitive or pioneer stage people regard alcohol as a necessity, while they tend to abandon alcohol more and more as sugar and especially fats become more abundantly available.

The data on alcoholic drinks illustrate the important fact that the German consumer is unwilling to make considerable shifts within his budget for food and beverages from one type to another. If real income shrinks—through wage curtailment, unemployment, or rising prices—the volume of consumption of certain groups of commodities is adjusted for the time being, but the tendency is to maintain the same proportions of expenditures within a group.

How far the narrow limits of purchasing power of the German population operate to prevent more marked shifts may be illustrated by the case of ice cream. During the prosperity period one of the leading milk dealers of Berlin, the C. Bolle Corporation, purchased several of the expensive American ice-cream machines. The attempt to introduce ice cream in the Berlin market on a large scale failed, however, because the average consumer could sel-

¹ For example, see I. G. Roberts, *Autobiography of a Farm Boy*, pp. 27-31.

dom afford to buy a portion of genuine "ice cream." Yet sherbets, and other cheap substitutes made with milk and other ingredients, are sold in considerable amounts.

Another example of the narrow limits of purchasing power, in combination with the solidly entrenched habits of consumption, is to be found in the slow introduction of bottled milk. In 1928 approximately 95 to 97 per cent of the total milk supply of the 4 million inhabitants of the city of Berlin was sold in bulk, while only the small remainder was sold in bottles. In some cities 20 to 30 per cent was sold bottled, but not without subsidizing bottled milk by overcharging for loose milk.

The milk drinks so important in American consumption are prohibited in Germany by their excessive cost in relation to the income available to the masses for consumption, by the temperate and moist climate, and by the preference of adults for alcoholic drinks or coffee, tea, and cocoa. The main form of milk consumption by adults is that of milk with coffee and hot chocolate.

The consumption of cream is closely bound up with the consumption of berries and fruit tarts, as well as pastry in general. In the strawberry, cherry, and raspberry season, which is confined strictly to the few summer months, the main demand for heavy cream sets in. This demand is much more flexible, and more dependent upon changes in the general income, than is the demand for milk. It closely resembles the demand for butter.

Butter is the best barometer of the income of the working people, their purchasing power, and the factors determining the distribution among various expenditures. The demand for butter is the most variable among all food commodities. Perhaps no other variety of food, even meat, shows such extreme differences in per capita intake among different social groups. From no consumption at all up to 40 kilograms per year per adult-equivalent, all intermediate stages are found.

Butter consumption varies from exclusive use for direct consumption as a spread in sandwiches, among people of scanty means, to general use for all cooking and baking purposes in addition to being used as spread for bread, among wealthier people. Since bread is still the basic source of nutrition for the German masses—besides its complementary carbohydrate, potatoes—the German custom of eating sandwiches, with a rich spread of butter mainly, is the most important factor in the ever-present demand in all classes. For reason of economy the vast majority of employed laborers, white-collar workers, and civil servants take lunch in the form of homemade sandwiches. Alongside bread, butter is so basic in nutrition that many proverbs use butter as a symbol of well-being.

Table 12 shows the price ratio between butter and margarine, or in other words the number of pounds of margarine that could be bought with one pound of butter. For the low-grade margarine, the ratio remained fairly stable until 1931. In 1932 it reached a sudden peak at 5.50, until in 1933 the artificially fixed ratio established itself at a level ranging around 2 to 2.50.

As also shown by Table 12, per capita consumption of butter rose during the post-inflation business cycle, with the consequently rising income, to above the prewar level; and it maintained the new level remarkably well through the depression. This may at first sight seem to contradict what has been said about dependence upon income. A glimpse at the price column, however, shows that the relatively stable maintenance of the average per capita consumption was possible only through radical price curtailment. In other words, price declines re-established the consumers' purchasing power for butter.

It must also be recognized that the average per capita consumption is made up of extremely different levels of consumption. While the income of the unemployed and

their dependents fell to one-third (the dole) or less, the purchasing power of the still fully employed workers—and especially of all salaried employees—remained rela-

TABLE 12.—AVERAGE RETAIL PRICES AND PER CAPITA CONSUMPTION OF BUTTER AND MARGARINE IN GERMANY, 1913 AND ANNUALLY 1924-36*

Year	Average retail prices (marks per kg.)		Range of price ratios, ^b butter to margarine	Consumption per capita (kilograms)		
	Butter (Berlin)	Margarine ^c		Butter	Margarine	Total
1913	2.70	....	1.93-2.70	6.8	2.99	9.8
1924 .....	....	....	....	4.1	5.41	9.5
1925 .....	....	....	3.20-3.87	5.7	6.49	12.2
1926 .....	....	....	2.88-3.49	6.0	7.07	13.1
1927	4.02	1.13	2.91-3.53	6.6	7.11	13.7
1928	4.13	1.14	2.99-3.62	7.1	7.45	14.5
1929	4.12	1.02	2.99-3.61	7.6	7.85	15.4
1930	3.47	.90	2.51-3.15	7.6	7.93	15.5
1931	3.10	.79	2.26-3.73	7.3	7.32	14.6
1932	2.76	.56	2.29-5.50	7.1	7.91 ^d	15.0
1933	2.73	1.32	1.24-2.07	7.4	6.7	14.1
1934	3.05	1.26	1.39-2.42	7.4	....	....
1935	3.11	1.26	1.41-2.47	7.5	6.3	13.8
1936	3.14	1.26	1.42-2.54	7.7	6.5	14.2

* Butter data for 1913 and 1925-37, and margarine data, from Storm, *Der Wettbewerb* , pp. 38-39; butter and margarine consumption data for 1924 to 1934 computed from data in von der Decken, *Deutschlands Versorgung* , p. 21, and those for 1935 and 1936 from Supplement to the *Weekly Report of the German Institute for Business Research*, Feb. 10, 1937, p. 3.

^b Data from Deutsche Bank und Diskonto Gesellschaft; prices based on lowest grade or second grade.

^c Through 1932, from Storm, *Der Wettbewerb* , p. 71; for later years calculated from *Statistisches Jahrbuch*. The ranges are wide because of large variations in the prices of different grades of margarine.

^d Mean of range 7.82-8.00.

tively high because of the drastic price decline. This was especially true of all food commodities as a consequence of the stable or increasing domestic production or the

low prices of imports. The unemployed stopped buying butter, while the gainfully employed could increase their butter consumption and thereby make up for the demand of the former.

The official household budgets for 1927-28 showed that the adult consumption per capita varied in five income groups (800-1,500 marks and up) of laborers from 10 kilograms up to 42, in six white-collar worker groups (1,000-2,200 marks and up) from 22 to 62 kilograms, and in seven civil-servant groups (1,000-2,600 marks and up) from 20 to 68 kilograms. These marked variations give a fair illustration of the peculiar social character of the butter demand. A still more distinct picture is revealed by the figures from the same source on 2,000 laborer households classified with reference to the number of children per family. If the expenditure for butter per adult-equivalent in a family with 4 to 6 children is taken as 100, the corresponding percentages for the group of 3-child families is 115, for 2-child families, 220, for 1-child families, 275, and for childless families, 400.¹

Though the spectacular elasticity of the demand for butter is explained by the keen competition of the higher income brackets for this refined and most desired food, the other half of the truth rests on the availability of margarine as a butter substitute.

In essence the demand for margarine is the same; but since butter is favored by the marked preference of people in all income brackets, it is mainly the price relation between butter and margarine that determines the volume of consumption of each in correlation with the pressure from the income side.

The per capita consumption of margarine is also shown in Table 12 (p. 121). It has been pointed out earlier that the trend toward an increasing consumption of mar-

¹ *Jasny, Bevölkerungsgang und Landwirtschaft*, p. 18.

garine was a consequence of the increase in the ratio between the price of butter and that of margarine. Margarine demand is inversely elastic in relation to income. The higher the income, and the higher the available income per adult-equivalent in a family, the more the demand for margarine declines, while the butter demand rises. People have a tendency to buy a certain amount of fats for a certain part of their food expenditure. If the price of butter rises sharply, everything else remaining equal, this desire will lead to an increased demand for margarine. This must be kept in mind in order to understand later legislative measures.

Pabst found in his investigation of the relationship of butter and margarine in the United States that, during the period 1921 through 1934, increases in the price of butter of one per cent meant an average decrease of $.10 \pm .09$ per cent in the quantity of butter consumed and an increase of $1.77 \pm .45$ per cent in the quantity of margarine consumed. Similarly an increase in the price of margarine of one per cent was associated with an increase of $.33 \pm .10$ per cent of butter consumed, and with a decrease of $.28 \pm .50$ per cent in the amount of margarine.¹

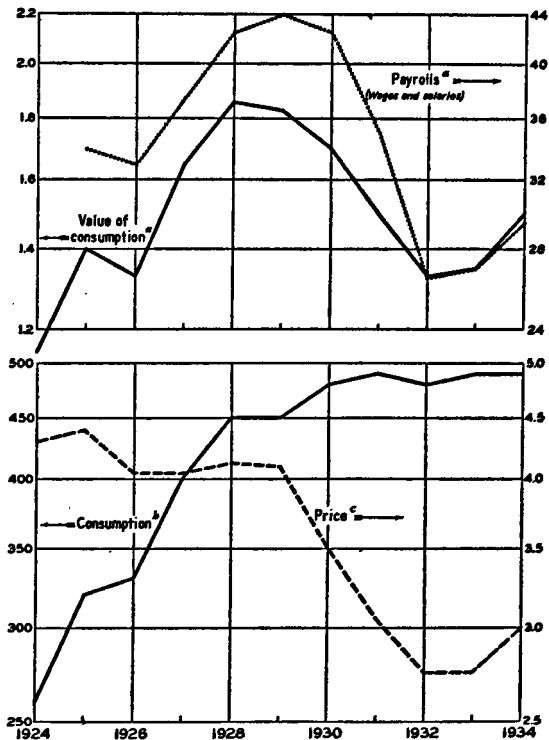
Because the supply of butter is relatively inelastic, the remarkable elasticity of demand for it—and pressure from the margarine substitute—leads to radically falling prices when the proportion of income available for fats declines. This establishes the phenomenon that the value of the total consumption of butter is in fact closely coordinated with the labor income, as Chart 16 illustrates.

After the end of the war, margarine developed an increasing spread between the prices for the different qualities, far beyond the comparable price spreads of butter grades. Consequently, margarine became available to

¹ W. R. Pabst, Jr., *Butter and Oleomargarine: An Analysis of Competing Commodities* (New York, 1937), pp. 72-73.

CHART 16.—BUTTER CONSUMPTION IN GERMANY AND ITS RELATION TO INCOME, 1924-34*

(Logarithmic vertical scale)



* Based on chart in *Wochenbericht des Instituts für Konjunkturforschung*, Berlin, Oct. 9, 1935. See also Ernst Storm, *Der Wettbewerb* . . . , p. 66.

^b In million marks.

^c In thousand metric tons.

^a In marks per kilogram.

the poorest consumer as well as to the most refined potential demand. Lard, on the other hand, has only two prices, one for each of two distinctly different quality grades. The first grade is almost exclusively confined to the German market, and consists of a lard which has been seasoned with apples and onions and has been heated on the hearth. The second grade is the ordinary lard.

To a considerable extent butter is a direct farm product, especially of small farmers who sell their butter at retail markets or peddle it to consumers. In times of economic distress, such farmers try to increase their cash income by selling part of the butter ordinarily reserved for home consumption and supplanting it with margarine. Danish farmers, the leading butter farmers of the world, discovered the profitability of this procedure during the war and have never abandoned it. In 1930 they consumed three and a half times as much margarine per capita as butter.

No figures are available for the amount of margarine consumed by German farmers and farm laborers; but information from food chain stores indicates that increasing numbers of farmers began to make use of the cheaper margarine and compounds, particularly for kitchen purposes, especially during the depression years. Butter still retained its special social prestige as the superior food, and margarine in that sense carried a stigma; but prices dictated the shift.

In prewar times lard had been the cheapest and the most general substitute for butter, and was used to a large extent as a spread on pumpernickel-type rye bread, which is widely used in Germany because of its low price compared to wheat bread. Moreover, lard was considered the best fat for cooking, roasting, and baking. However, as a bread spread it was abandoned more and more, possibly because of its peculiar tendency to cause many people to suffer temporarily from indigestion or even

eczema, particularly near the mouth.¹ Although a number of processes have been patented, none has succeeded in eliminating this defect. In all secondary uses of lard as an auxiliary material for the preparation of meals, price is much more decisive than minor preferences of the tongue. Lard compounds have supplemented lard, mainly under the influence of price relations; but such use is far less than in the United States.

The combined per capita consumption of bacon, lard, and gut-lard of hogs in postwar years has not varied greatly from the prewar. In kilograms per capita the 1913 figure was 8.1, that of 1924 was 7.5, and those of 1929 and 1933 were 8.2 and 8.1, respectively.² The per capita consumption of lard alone shows a very similar constancy for almost thirty years. As compared with a 1904 figure of 3.72 kilograms and a 1913 figure of 3.44, the range in the nine years 1924-32 was from 3.06 to 3.46, with five of the years showing a narrower range of 3.22 to 3.35.³

If we try to ascertain the reasons for changes in the demand for lard on price grounds, the best way seems to be to compute the price relations of the competing products—butter, lard, and margarine. The accompanying tabulation⁴ shows the number of kilograms of lard and margarine purchasable with the price of one kilogram of butter. It is apparent that lard consumption did not react greatly to its cheapening as compared with butter; although in postwar years the consumer could buy an increased amount of lard for the price of a unit of butter,

¹ The author has at hand no citation to the German medical literature on skin diseases to document this statement; but it is such common knowledge and experience that the German term for this particular type of eczema is *Schmalz-grießen* (lard cracklings). Albert H. Rowe in his book on *Food Allergy* (Philadelphia, 1931), pp. 378-71, mentions that people who have an idiosyncrasy against pork also cannot eat lard without having irritations of the skin.

² *Statistisches Jahrbuch, 1936*, p. 261.

³ Storm, *Der Wettbewerb* , p. 42.

⁴ Storm, *ibid.*, p. 71.

Year	Lard	Margarine
1913	1.96	1.93-2.70
1925	2.32	3.20-3.87
1926	2.17	2.88-3.49
1927	2.51	2.91-3.53
1928	2.66	2.99-3.62
1929	2.62	2.99-3.61
1930	2.38	2.51-3.15
1931	2.52	2.26-3.73
1932	3.10	2.29-5.50

lard consumption did not increase. The relatively favorable price succeeded only in preventing decline in lard consumption. It is noteworthy that similar changes in the price relation between butter and margarine caused the consumption of the latter fat to jump as indicated before. The use of lard is most economical in frying, roasting, and baking. If this persistent utility of lard did not increase its consumption during falling prices, it was due to the counterpoise of lard compounds which at still lower prices absorbed the potential increments in lard use. The other important reason for the obvious stability of lard consumption is the rigidity of the domestic supply. Whatever the output of German lard, it has to be consumed. As long as the price is flexible, it leads to this end. Imports of lard fill in the gaps left by the domestic output.

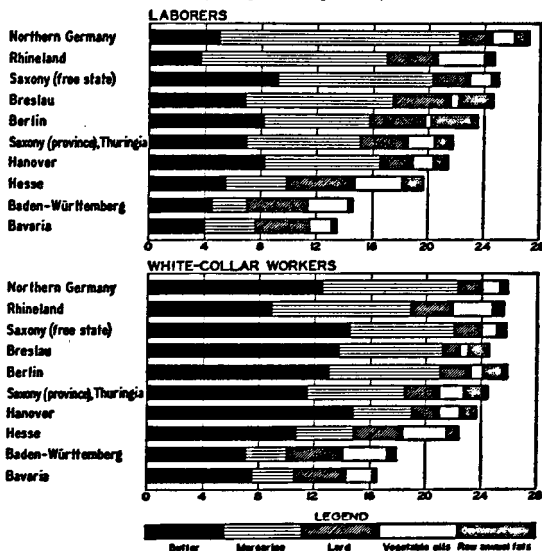
REGIONAL DIFFERENCES IN FOOD CONSUMPTION

It remains to be observed that the sharpest differences in the demand for all varieties of fats appear as soon as we focus attention on regions instead of the national average. Not merely habits and traditions of nutrition and ritual concepts as to food, but certain correlations in the consumption of different foods have an influence upon the demand for fats. The official German household accounts for 1927-28 show that the consumption of all fats is much higher in the northern part of Germany than

in parts of the Reich south of the Main River. Chart 17 and Table 13 illustrate this, the chart showing averages for all income groups, and the table averages for selected income groups. Bavarian laborers' families of the lowest-income

CHART 17.—REGIONAL VARIATIONS IN THE CONSUMPTION OF FATS IN GERMAN HOUSEHOLDS, 1927-28*

(Kilograms per adult equivalent)



* Slightly adapted from chart in Ernst Storm, *Der Wettbewerb . . .*, p. 88. The significance of the regional differences shown is reduced by the fact that the number of returns for several regions constituted an inadequate sample.

group consumed per adult equivalent 11.0 kilograms of fats as compared with 28.5 kilograms in northern Germany. Bavarian white-collar workers and civil servants in the highest-income bracket consumed 17.9 kilograms of fats per adult equivalent as compared with 29.7 kilograms in northern Germany. Other regions fall in the range between these most northern and most southern parts of the country.

TABLE 13.—REGIONAL CONSUMPTION OF FATS IN GERMAN HOUSEHOLDS OF (A) LABORERS WITH 800–1,000 MARKS ANNUAL INCOME, AND (B) WHITE-COLLAR WORKERS AND CIVIL SERVANTS WITH 1,800–2,000 MARKS ANNUAL INCOME PER ADULT EQUIVALENT, 1927–28*

(Kilograms per adult equivalent)

Region	Butter		Margarine		Lard		Oils		Bacon	
	A	B	A	B	A	B	A	B	A	B
Saxony (free state)...	6.2	17.5	13.0	6.1	2.9	1.5	1.5	1.7	1.3	1.7
Hanover	7.8	18.1	8.8	2.6	1.6	1.5	1.8	2.3	3.7	4.4
East Prussia .....	...	...	...	4.1	...	3.0	...	1.0	2.3	2.3
Berlin	6.7	15.8	10.2	5.6	3.2	2.8	.4	.8	1.8	1.9
Saxony (province),										
Thuringia	5.0	12.5	10.0	6.3	3.3	2.5	1.6	2.1	2.6	2.6
Breslau	4.8	15.7	11.7	4.7	4.2	1.1	.5	.6	3.7	3.4
Northern Germany....	4.0	15.7	17.0	7.4	2.4	1.4	1.8	2.1	3.3	3.1
Hesse	5.0	11.9	3.3	3.3	5.1	3.0	3.0	2.9	1.2	.8
Baden-Württemberg ..	3.4	8.1	2.9	3.9	4.3	4.4	2.4	2.8	.9	.9
Bavaria	2.0	9.8	4.5	2.4	2.9	4.2	1.5	1.4	.1	.2
Rhineland	2.0	11.5	14.8	8.8	4.2	2.8	3.1	2.8	5.1	4.5

* Compiled from tables in Storm, *Der Wettbewerb* , pp. 86–88.

Similar extreme regional differences are to be found for the different varieties of fats. The lowest butter consumption in all income brackets is found in the three southern German states and in the Rhineland. Margarine consumption shows much wider extremes than butter. Per adult equivalent, laborers in Bavaria, Baden, and Würt-

temberg in all income groups consumed almost equally one-sixth as much margarine as was consumed by laborers in northern Germany. But here the Rhineland laborers make up for their low butter consumption, while southern German workers likewise remain very modest in their demand for the butter substitute.

Almost nothing is known of the regional differences in the consumption of different fats among farmers and rural groups. If data were available, there can hardly be much doubt that they would reveal even more extreme variations than do the household accounts of urban people, because rural consumption adjusts itself much more to the local supply.

The phenomenon that extreme differences in the actual demand for fats exist between regions, as well as between different income groups, also makes it necessary to consider the situation which arises when fats become scarce for one reason or another. It is obvious that within the regions of low fat consumption, the classes with the lowest income will defend their share more vigorously than will the groups and areas that consume more plentifully; the former will probably try to buy the same amount, even at a higher price. On the other hand, it seems obvious that those people who have the highest consumption because of a good income will hold to their share still more stubbornly, because with them the price is not so decisive. The majority of people of small income will try to maintain their total fat consumption by shifting to the inexpensive fats. As soon as a general shortage of fats sets in, this is no longer possible, and the real fight for fats begins. While it is not possible to point out with precision what will happen—because this depends on irrational as well as on rational influences—it can be said that immediately considerable shifts begin to disturb the status quo. The marginal social groups, such as the unemployed and people living on small pensions, will be

unable to supply themselves with the necessary ratio of even the less expensive fats, because the groups at the upper end of the income scale will not cease to maintain their surplus share of consumption. This is a dangerous situation from the standpoint of public health, and such conditions used to cause social unrest and political friction. In this sense fats play a role similar to meat, the price and availability of which have always figured in the struggle of labor for better wages.

The administration of Chancellor Brüning, which lasted until the summer of 1932, consciously avoided raising prices of fats, because it had considerable respect for the correlation between the prices for meat and fat and the public health, and for the influence of food prices upon social unrest. The late Chancellor Schleicher also resisted a premature raising of fat and margarine prices before business had sufficiently recovered, because he wanted to prevent increasing economic pressure upon the unemployed who had already become radical. Only when a wholesale attack was made upon the depression, with public works and rearmament, did a policy of lifting the prices of fats no longer meet with social objection.

CHAPTER VII

COMPETING SOURCES OF SUPPLY OF FATS

DOMESTIC VERSUS IMPORTED SUPPLIES

On the supply side of the fats market, one of the major causes for the recent energetic intervention of the state is the competition between domestic and foreign supplies. With the miserable experience of starvation under the blockade of the World War still fresh in the mind of the nation twenty years later, it has been the increasing endeavor of every administration in Germany since the war to make the country independent of foreign supplies.

The largest hole in the German food basket is still, as it was during the war, the inadequate supply of fats. The country not only imports large amounts of fats; it also imports vast quantities of feed materials which are used for producing domestic fats. How much the import of feedstuffs for conversion into food changes the total aspect of the national balance sheet of food resources may be seen from Table 14. The column headed A shows the percentages of animal calories produced in Germany as calculated without regard to the source of the feed used. The percentages shown in column B are arrived at after deducting that portion of animal calories domestically produced by means of imported feedstuffs. The last column represents correspondingly reduced percentages for vegetable and animal calories combined.

Within the national fat economy, as shown in Table 15, approximately one-half of the total fat supply (including fats for industrial purposes) is directly imported, in the form of oil seeds for crushing or of various other fats; and another 9 to 15 per cent of the total supply,

TABLE 14.—PERCENTAGE OF GERMAN FOOD CALORIES DOMESTICALLY PRODUCED, PREWAR AND ANNUALLY 1924-34*

Year	Vegetable calories	Animal calories		Total calories (B)
		A	B	
1909-13 average	92	86	54	80
1924.....	77	82	70	75
1925.....	79	81	62	74
1926.....	71	81	55	66
1927.....	71	82	50	65
1928.....	77	83	56	70
1929.....	80	81	55	72
1930.....	83	81	61	76
1931.....	85	84	62	77
1932.....	84	81	57	75
1933.....	88	85	66	81
1934.....	84	88	71	80

* Based on von der Decken, *Deutschlands Versorgung* , p. 54. For explanations of A and B, see accompanying text.

though produced at home, depends on feed imports. The "net" percentage domestically produced was as low as 34 per cent in 1929 and as high as 43 per cent in 1934.

TABLE 15.—GERMAN SUPPLIES OF ALL FATS, ANNUALLY, 1928-34*

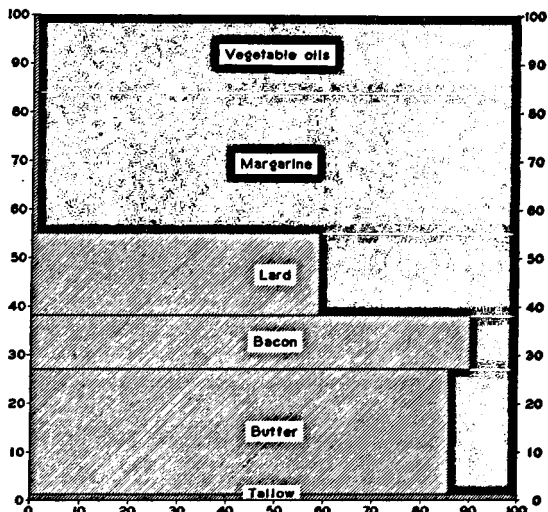
Year	Thousand tons of pure fat			Percentage domestically produced	Thousand tons of pure fat produced with imported feed			Net percentage domestically produced
	Domestic production	Net imports	Total supply		Butterfat	Lard	Total	
1928 ...	1,008	1,050	2,058	49	207	83	290	35
1929 ...	974	1,067	2,041	48	213	57	270	34
1930 ...	1,004	1,073	2,077	48	160	51	211	38
1931 ...	1,050	1,037	2,087	50	185	46	231	39
1932 ...	1,043	1,173	2,216	47	215	48	263	35
1933 ...	1,074	1,015	2,089	51	187	16	203	42
1934 ...	1,101	1,008	2,109	52	153	36	189	43

* Data from von der Decken, *Deutschlands Versorgung* , pp. 76-77. Fats for industrial use are here included.

Chart 18 shows the approximate proportions of domestically produced and imported fats of the principal types, as they stood in 1932. Here the solid portions in-

CHART 18.—PERCENTAGE DISTRIBUTION OF FAT CONSUMPTION IN GERMANY, 1932, SUBDIVIDED INTO DOMESTIC AND IMPORTED SUPPLIES*

(Solid portions represent percentages imported)



* Based on data from *Statistisches Jahrbuch, 1933.*

clude not only imports of the product itself but also the portion produced from imported materials (important in the case of margarine) and the portions produced with

imported feedstuffs. The chart correctly reveals the issue in the fat market as that of foreign vegetable fats versus domestic animal fats.

In 1932, in addition to 23.5 billion liters of milk domestically produced, the equivalent of 2.6 billion liters was imported in the form of cream, butter, cheese, and condensed products. Out of the total, approximately 90 per cent was produced at home. Within the domestic quota another 7 billion liters were exclusively the result of feeding imported bran and oil cake, either imported directly or the by-product of imported oil seeds. This raises to 9.6 billion liters the amount of milk directly and indirectly imported, and reduces the proportion of purely domestic production to 63 per cent.¹

Similar conditions prevail in the supply of fats derived from hogs. Von der Decken has made an elaborate estimate of the amount of bacon and lard produced with imports of grain, flour-mill by-products, legumes, fish meal, and meat meal.² Applying conversion ratios of 3:1 for fish and meat meal with respect to hogs (live weight), 4.5:1 for grain feeds to hogs, and up to 7:1 for mill products to hogs, he estimated the amount of live weight of hogs produced. By a deduction of 20 per cent he arrived at the approximate dead weight, which he divided into 80 per cent meat and 20 per cent crude fat. Another deduction of 25 per cent³ for rendering loss from the latter gives the estimated amount of pure fat.

¹ Von der Decken, the agricultural expert of the Institut für Konjunkturforschung, has conservatively calculated the milk-equivalent of oil cake by assuming that 1 kilogram of oil cake produces only 3 liters of milk instead of the 6 or 7 theoretically possible. Although this estimate may be too low, it has merit in consideration of many "leaks" in the utilization of oil cakes by millions of farmers. Inefficiency in the composition of feed ratios, feeding cake to many inefficient converters among cows, and neglect of diminishing returns with increasing amounts of cake fed per cow—these are some of the causes of such leaks.

² *Deutschlands Versorgung . . .*, p. 61.

³ This assumed loss is probably too high.

While Germany imported net amounts of hog feed rising from 910,000 tons in 1924 to a peak of 4,328,000 in 1927, and declining again to 587,000 tons in 1933, it produced 25,000 tons of pure hog fat in 1924, 112,000 in 1927, and 16,000 in 1933. The degree of dependence of lard supplies on imports is shown by the accompanying tabulation, in which column A represents total gross domestic production, and column B represents net domestic production based on domestic feed only, both expressed

Year	A	B	Year	A	B
1924	44	33	1929	61	37
1925	55	31	1930	66	44
1926	53	24	1931	67	48
1927	61	14	1932	59	40
1928	65	31	1933	68	61

in percentages of total lard consumption. The marked increase in the proportion of entirely domestic lard is, on the one hand, a consequence of the decisive growth of the German output of grain and, to a minor degree, of good potato crops; on the other hand, it is due to the stable demand for lard and, from 1930 on, to the effective tariff protection.

Table 16 indicates the changes in domestic output and in net imports of fats. During the years from 1928 through 1933, domestic butter succeeded in displacing foreign butter. Imported lard and bacon held their own until 1932, to fall off sharply from then on; but enormous quantities of foreign vegetable fats and whale oil dominated the field through all the years.

The main feature of the edible fats market, on the supply side, was that domestic production moved within narrow bounds fixed by natural limitations of production, while the world's fat reservoirs had an abundance of available supplies. Increases in German production were based largely on foreign raw materials. Nevertheless, all

the tables indicate also that strong forces were operating toward increased domestic production of the expensive types of fats and their utilization in the domestic market.

TABLE 16.—GERMAN SUPPLIES OF VARIOUS FATS, DOMESTIC AND IMPORTED, ANNUALLY, 1928-34*

(Thousand tons of pure fat; italics indicate imports)

Year	Butterfat equivalent of		Cheese	Lard, bacon*	Tallow (sheep and cattle)	Waste fats	Vegetable fats*	Whale oil	Total
	Cow milk	Goat milk							
1928.....	{564	44	..	314	58	17	...	...	997
	{107	..	20	98	28	..	707	90	1,050
1929.....	{555	41	..	288	64	16	...	...	964
	{114	..	21	107	18	..	693	114	1,067
1930.....	{583	37	..	300	61	15	...	...	996
	{113	..	20	91	16	..	674	159	1,073
1931.....	{613	37	..	320	60	14	...	...	1,044
	{85	..	17	98	14	..	687	136	1,037
1932.....	{631	37	..	296	62	14	...	...	1,040
	{59	..	16	126	23	..	728	221	1,173
1933.....	{650	37	..	308	61	15	...	...	1,071
	{51	..	13	86	27	..	662	176	1,015
1934.....	{641	37	..	324	68	15	...	...	1,085
	{53	..	11	53	21	..	718	152	1,008

* Data from von der Decken, *Deutschlands Versorgung* , pp. 75-76.

* Imports include oleo oil, but exclude linseed and rapeseed oils, which are included in Table 15.

Table 17 indicates that until 1930 the prices of fats on the German market closely followed price movements in the world market. After 1930, raw materials for margarine continued to follow world prices, but the prices of butter and lard diverged from the world level. How the separation was accomplished will be shown later (pp. 144-50, 161-82). It was a logical result of the departure from a foreign-trade policy which had tried to keep domestic prices in line with prices abroad. Such a decision had already been made in 1928 for the carbohydrates market.

TABLE 17.—WHOLESALE PRICES OF SPECIFIED FATS IN GERMANY AND ABROAD, 1913 AND ANNUALLY 1927-32*

(Marks per 100 kilograms)

Year	Butter		Lard		Danish bacon, London	Peanut oil, re- fined, Hamburg	Soy-bean oil, re- fined, London	Marga- rines, Germany
	Berlin	Copen- hagen	Berlin ^a	New York ^b				
1913 ...	249.30	....	....	103.40	....	74.00	....	128.00
1927 ...	346.42	339.12	154.23	118.43	182.96	91.02	82.65	132.00
1928 ...	359.17	352.87	147.94	112.96	183.97	85.24	80.46	132.00
1929 ...	343.75	340.73	151.47	110.37	220.16	77.16	79.88	132.00
1930 ...	279.02	276.64	139.84	103.33	183.77	67.40	72.38	131.34
1931 ...	250.18	220.52	116.88	78.06	116.13	54.49	49.17	110.34
1932 ...	222.68	141.82	95.24	47.50	82.90	52.16	41.64	95.16

* Data from *Statistisches Jahrbuch, 1933*, pp. 126*, 127*; *Ibid.*, 1936, pp. 286, 167*, 169* (starred numbers refer to pages in section on foreign statistics).

^a *Bratenschmalz*.

^b Prime western.

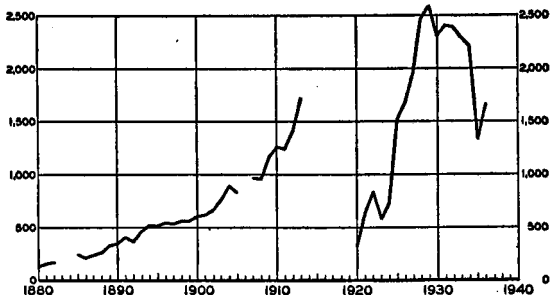
INTER-COMMODITY COMPETITION

Until the step toward dissociating the German fat markets from the world market was taken, the competition between fats turned out to be mainly a struggle between butter and its substitute, margarine. For the time, the outcome was largely determined by circumstances that operated decisively in the margarine industry. It was able to draw on the rapidly increasing world resources of vegetable fats in the tropics and the Far East. Chart 19 shows broadly that it did so. It could, moreover, shift to less expensive types of fats and utilize the hydrogenation process.

Alongside the large group of raw materials of vegetable origin, whale oil rose rapidly in importance. After purification, deodorizing, and decoloring, it is valuable as a frying and baking fat and as a substitute for lard. Hydrogenation makes it hard, so that it can be sold in prints or cubes. But its great advantage as a raw material for margarine is that it produces, even if used almost pure,

CHART 19.—GERMAN NET IMPORTS OF OIL SEEDS IN SPECIFIED YEARS, 1880-1935*

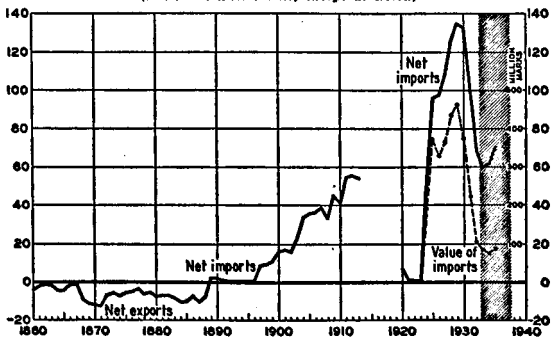
(Thousand metric tons)



* Compiled from *Statistisches Jahrbuch*, 1882 to 1937.

CHART 20.—GERMAN NET TRADE IN BUTTER, 1860-1935*

(Thousand metric tons, except as noted)



* Data from Ernst Storm, *Der Wettbewerb* . . . p. 15, and various issues of *Statistisches Jahrbuch*. The era of the fat-control plan, into 1938, is indicated by shading. See also below, pp. 269-70.

a very butter-like spread for bread, which melts on the tongue like butter. Moreover, according to margarine specialists, it can be converted into margarine by churning with skim milk in an ordinary butter machine, provided the right mixture, temperature, and other technical details are observed.

From a total world output of 80,000 tons in 1920-21, whale-oil production rose steadily to 624,000 tons in 1930-31. In 1931-32, the production fell to 155,000 tons. In the following year it rose to 440,000 tons, and this level was maintained for nearly two years more by international agreements on whale protection.¹ There seems to be considerable difference in technical opinion as to the level of outturn which can be maintained by rate of reproduction. At the same time, it is clear that improvements in the processing of fish oils may perfect them as partial substitutes for whale oil. German imports of whale oil were as follows:²

Year	Thousand tons	Million marks
1927	75	45
1928	94	54
1929	115	65
1930	157	86
1931	132	49
1932	217	55

Thus in 1932 Germany obtained approximately 2.3 times as much whale oil for the same amount of money as in 1928. At the end of this period the mark bought 2.2 times as much imported butter as at the beginning, and 2.6 times as much imported lard.

The margarine industry profited in other directions also. The limited number of some 85 plants, with modern equipment and an output beyond that of the competing

¹ *Statistisches Jahrbuch, 1932, annex, p. 44; Ibid., 1936, p. 88.*

² *Von der Decken, Deutschlands Versorgung , pp. 116-17.*

10,000 creameries, could operate more efficiently and with more planned direction. The margarine factories organized a speedy, efficient truck service to guarantee their distributors fresh supplies at all times. In quality, perfect standardization within the different brands was early obtained.

A radically different situation prevailed in the butter industry. A few leading butter plants had introduced certain standards which were later protected by the chambers of agriculture; but apart from a small quantity of this peak quality, there was a wide range of all sorts of creamery butter, down to the sour-cream butter churned in the small farmer's tub. This left butter in the group of commodities that are bought on sampling by taste. Foreign butter, largely Danish, had a strictly standardized quality, and therefore brought the highest prices paid by the consumer. Danish butter was sold out of tubs with the state brand on one side, which had the effect of a modest but successful advertisement. Margarine made the most lavish use of advertising all over the country, with new brands appearing from time to time. Under the prevailing conditions relative to quality, German butter could not be advertised. Moreover, no attempts were made to advertise it, because there was always a demand for the scanty supply, although prices were low for poorer grades. The farmers and farm representatives displayed little antagonism toward the margarine industry. The butter industry also refrained from any attack upon the margarine industry. Only when some margarine factories advertised brand names which suggested a relation to butterfat, or the use of cream, did the leading creameries answer with suits for unfair competition which they usually won. Swiss dairy leagues advertised their butter by saying: "Do not eat fat mixtures you do not know! Eat pure butterfat!" Nothing of that sort was tried in Germany, although the consumer might have resented very much

that he always bought something different under the name of margarine, such as an increasing proportion of whale oil.

In 1929 another substitute made its appearance on the German fat market. Patents which were held by the notorious Swedish match king, Ivar Kreuger, permitted the production of a substitute for heavy cream from any margarine raw material with the additional use of some skim milk.¹ It was introduced under the name of "Gradin" by a corporation of the same name. Gradin had the same taste, appearance, and nutritive value as genuine cream, and sold for 30 or 40 per cent of the price of cream. It was manufactured in three different plants. It sold rapidly and was used especially by bakeries and restaurants, and in pastry shops for whipping cream.

South German farmers opposed the Gradin propaganda—which called it a valuable dairy product, using the employment of skim milk in the process as the subterfuge. The German Department of Health decided that this was a food adulteration not allowed by law,² and the factories had to close down immediately. No serious attempt was made to win legal permission for the new substitute, although labor, with 153 out of 495 representatives in the Diet, was still the most powerful party and had something at stake as representing the largest consumer group.

This incident of the early stamping out of a new synthetic food stands out in sharp contrast to the long political and legal history of margarine. The technique and even the raw materials were almost the same. But dairymen were vigilant observers and immediately understood what the new product meant. They realized that it was only a short step from the artificially compounded fat-emulsion cream to an artificially compounded fat-emulsion milk.

¹ Such "filled cream" or "filled milk" is prohibited in the United States.

² The new Reich Milk Law of July 31, 1930 called it illegal.

They foresaw that with the price reduction following the broadside attack of foreign vegetable oils or whale oil, the dairy industry might soon be bankrupt. German labor leaders, who were then supporting a farm-relief policy, accepted this viewpoint and advocated the legal doom of more dairy substitutes, excepting only margarine and vegetable shortenings.

In fact, it is due to the amazing achievements in the handling of edible fats that all fats, including watery emulsions such as milk, cream, and butter, can be artificially compounded and thereby substituted for one another. Here we speak only of the commercial side of the technical progress. Of course an immense difference between an artificial substitute for milk and genuine milk remains, even if chemical tests demonstrate an equal content of fat and protein and even if the protein is derived from milk. Milk is a liquid tissue produced by the mammary glands from blood, and with plasma as the carrying liquid for fat and proteins as well as minerals. Many of the serum reactions of blood can also be found in milk. Milk is such a miraculous liquid that when converted into cheese often after six months it proclaims the sins of the farmer who put too much fertilizer on the pasture, or who fed silage or other types of feed that influence milk quality. This is merely mentioned as an example of the refined biological and microchemical qualities of milk. Some consequences of the fact that at least butter and cream can be commercially replaced by vegetable fats will be discussed in the concluding chapter.

The struggle between butter and margarine, or its raw materials, and the struggle between lard and lard compounds or vegetable shortenings has some similarity to the competition between silk and rayon. Rayon could not fully satisfy the demand for silk, but it forced silk prices down. The same is true of butter and margarine. So far, consumers still invariably prefer butter to margarine,

just as they prefer pure silk to rayon. Margarine keeps butter prices in check, and affords the consumer escape from high prices. It also expands the diet for low-income classes.

PROTECTIVE TARIFFS AND THE FAT MARKET

In prewar years, from the turn of the century on, German agriculture was protected by a system of moderate tariffs which were established by laws approved by the Parliament over a long period of years. The tariff provided both for an "autonomous" duty, and for another lower "treaty" duty for countries that had signed or would sign a trade treaty. With the extension of the system of most-favored-nation treaties, the latter duties came almost exclusively into force.

After the war, the Versailles Treaty prohibited the restoration of tariffs through 1924; when Germany in 1925 regained her sovereignty in foreign trade, she re-established the tariff law of 1902. Up to 1928 a policy of moderate protection was pursued, with an underlying liberal concept of foreign trade. In 1928 another era of vigorous intervention began. The new aim of agricultural policy was to separate prices of some commodities from the world market level, which had collapsed, by resort to drastic duties up to a prohibitive level. This latter period was also marked by a change from the most-favored-nation principle toward reciprocal bilateral treaties, and by the adoption of quotas and other limitations on the volume of goods to be imported. A third period began in 1933 with the transition to a planned economy, with more extensive resort to import monopolies and quotas.

The foreign trade policy must be interpreted from two aspects, that of Germany's balance of payments and that of agricultural or industrial policy. With the political burden of the "Dawes Plan" the country had to force a favorable balance of trade in order to keep her balance

of payments in shape. But this necessity ideally coincided with the desires to re-establish the profitability of agriculture from the price side, and to foster domestic food production whereby foreign exchange might be saved for purchases of industrial raw materials.¹

With respect to the fat markets, Table 18 and Chart 21 are illuminating. The 1925 tariff sought to promote the converting branches of agriculture by putting a fostering duty on the finished goods and letting the raw materials enter free of duty or with only a moderate duty. Thus milk, cream, and butter were protected, while oil cake as the raw material remained duty-free. The same was true for lard and bacon, although the duty was reduced considerably below the prewar rate, and the duty on feed barley was soon raised somewhat.

By a decree of July 3, 1929, the autonomous duty on butter was raised to 50 marks per 100 kilograms and, by a decree of April 15, 1930, the duty on cream was raised to two-thirds of the butter rate, but these duties came into force only a year later when the trade treaty with Finland could be changed. Under a complementary treaty, Finland lost the privilege of the 27.50-mark butter duty, but received a quota of 5,000 tons of butter to be imported at a rate of 50 marks until 1933, and thereafter a duty of 40 marks. On November 27, 1930, the last treaty duty vanished. A law of March 31, 1931 empowered the government to change the duties and import requirements for agricultural products by negotiations and reciprocal agreements. Lard and bacon still had a lower duty than in 1931, but butter prices were protected by a duty of 250 per cent of the prewar rate. In 1931, this butter tariff represented approximately 23 per cent ad valorem. The 1931 tariff also established a milk duty which was practically prohibitive.

¹ Karl Brandt, "German Agricultural Policy—Some Selected Lessons," *Journal of Farm Economics*, February 1937, XIX, 287-99.

TABLE 18.—GERMAN TARIFF DUTIES ON CERTAIN PRODUCTS, PREWAR AND POSTWAR*

(Marks per 100 kilograms)

Commodity	1906-14	Aug. 17, 1926	Changes 1920-26
Bacon	36.00	14.00	<i>20.00</i> July 1, 1932 <i>60.00</i> July 14, 1933 <i>100.00</i> July 14, 1933
Tallow	2.50	2.50	20.00 Apr. 15, 1930 50.00 Feb. 18, 1933 100.00 July 14, 1933
Lard	12.50 <i>10.00</i>	6.00	50.00 July 1, 1932 75.00 May 6, 1933 100.00 July 14, 1933
Fluid milk .....	....	5.00	10.00 Apr. 15, 1930
Sterilized milk .....	....	5.00	<i>8.50</i> Apr. 15, 1930 17.00 Apr. 15, 1930
Cream .....	....	20.00	2/3 of butter duty Apr. 15, 1930
Butter	30.00 <i>20.00</i>	22.50	50.00 July 8, 1929 <i>27.50</i> Aug. 28, 1930 100.00 Jan. 19, 1932 <i>136.00</i> Jan. 19, 1932* <i>170.00</i> Jan. 19, 1932* <i>75.00</i> Oct. 22, 1932*

* Compiled from A. Walter, *Die landwirtschaftlichen Zölle* (Berichte über Landwirtschaft, N.F., Sonderheft 106, Berlin, 1935), pp. 65, 72-74. Treaty duties shown in italics, autonomous duties in roman type.

* Argentina, New Zealand, Australia, Denmark, Sweden, Norway, and Finland.

* For Canada and Poland.

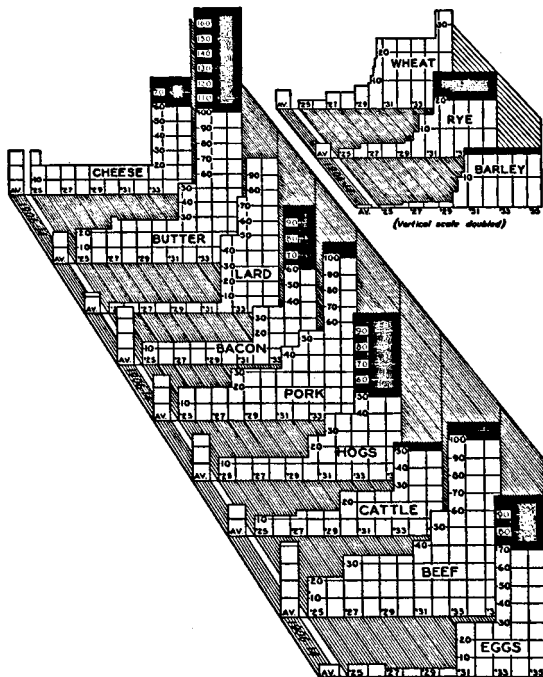
* For other unspecified countries.

On January 19, 1932, the duty on butter was revised by grouping the exporting countries into three different categories.¹ (1) Butter from countries with a trade treaty

¹ *Blätter für landwirtschaftliche Marktforschung*, January-February 1932, II, 8-9, 415-32.

CHART 21.—GERMAN TARIFF DUTIES ON VARIOUS AGRICULTURAL PRODUCTS, PREWAR AND 1925-35*

(Marks per 100 kilograms)



* Data from A. Walter, *Die landwirtschaftlichen Zölle*, pp. 20-23, 62-65, 72-76. Solid black areas indicate super-tariffs applicable to imports from countries having no trade treaty with Germany.

with Germany and no devaluation of currency was subject to a treaty duty of 100 marks per 100 kilograms, but 5,000 tons might be imported at the previous duty of 50 marks.

(2) For countries with a trade treaty and devalued currency, the treaty duty was 136 marks per 100 kilograms, or 86 marks for a limited quota. (3) For countries without a trade treaty the autonomous duty was raised to 170 marks. On November 15, 1932, the total import, which had been 133,000 tons in 1930 and 100,000 tons in 1931, was limited by quotas to 55,000 tons, while the duty was lowered to 75 marks for all countries with trade treaties.¹

Chart 21 shows how the tariff wall was built up at first by moderate steps, finally with steep ones, to the prohibitive heights of the "super-tariff." In 1935 the duties represented the following percentages of those in force in 1913:

Bacon	278*	Lard	800*
Tallow	4,000*	Butter	680*

* Autonomous duty.

¹ Treaty duty for the group of major importing countries.

The policy toward the oil mills, the margarine industry, and the soap industry in 1925-28 was similar to that toward domestic producers of butterfat, lard, and bacon. The object was to protect and develop all three domestic industries against the import of their finished products, but to permit them to use raw materials imported at a low rate of duty or none. Oil seeds and oil cake, which in 1913 were either free or carried a small duty, were left entirely free of duty. This was the decisive factor in the development of margarine consumption. The consumer, the oil mills, and the margarine industry had the benefit of duty-free imports of oil seeds, while the dairy farmer enjoyed low prices for oil cake. Margarine was protected by an autonomous duty of 30 marks per 100 kilograms and a

¹ *Blätter für landwirtschaftliche Marktforschung*, October 1932, III, 218-19.

treaty duty of 20 marks. The same duties applied to hardened vegetable oils in the form of shortenings. The margarine industry was permitted to use imported vegetable tallow at a duty of only 1.25 marks.

The pertinent details of tariff duties on multifarious oil seeds and nuts, and on animal and vegetable oils and fats, are too numerous and complex to be presented here.¹ It must be noted, however, that even in 1934 every fat remained free of duty in so far as it was to be used as a raw material for the soap industry; in such case, the fat must be denatured and an import permit must be obtained. By this old provision the German soap industry is enabled to compete on the world market, especially with the French and English industries. This international competition is much restrained through the big margarine-soap combine. Nevertheless, the duty exemption for the raw materials of soap prevents the loss of the German share in the world market as agreed upon by the combine.

As long as the import of oil seeds and of whale oil remained free of duty, the domestic supply of edible fats could not run short and prices were kept in close touch with the world market. But when, under new policies, the attempt was made to separate domestic prices for butter-fat and lard from the world price level, it was only a matter of time before the entire connection with the world market came under fire. The tariff policy of this new era radically departs from all the traditions of almost a century preceding the World War. At the turn of the century the attempt to raise the grain tariff to one-fifth of that adopted in 1929 created a cabinet crisis, and the struggle lasted for several years. Now the German Diet has granted the administration the right to change the tariff arbitrarily and consented to duties of prohibitive heights. More or less the world over is to be observed a trend

¹ They can be found in A. Walter, *op. cit.*, pp. 27-28, 72-74, 82-85, 98-99.

toward transfer of tariff rates and regulations to the executive.

Three selections from the extensive German import-duty legislation include the most important changes.

1. An ordinance by the Reichspräsident of January 18, 1932 granted power to the government (a) to impose additional equalization fees upon imported foods originating in countries which have devalued currencies; and (b) to stipulate higher tariff duties for goods originating in countries which have no trade treaty with Germany or which treat German goods less favorably than those from a third country.

2. Another ordinance of February 29, 1932 established a super-tariff, by way of retaliation against countries discriminating against German goods, whether or not they have a trade treaty with Germany. The countries to which the super-tariff is to be applied have to be named in a special published ordinance.

3. A decree by the Reichspräsident of March 9, 1932 granted power to the government (a) to arrange import duties independent of existing ordinances; (b) to introduce export duties; and (c) to enter reciprocal trade agreements with other nations.¹

If any evidence is needed that the whole economic philosophy of the country was at a turning point, this brief glance at tariff developments will serve to provide it. These developments, it is to be observed, preceded the National Socialist government.

Charts 19 and 20 (p. 139) demonstrate how the new tariff legislation succeeded in forcing a culmination of the postwar development of fat imports and in reversing the trend in imports of oilseeds and butter. These diagrams closely relate to the general picture of Germany's trade intercourse with the world. In 1928-29 a new era began.

¹ A. Walter, *op. cit.*, pp. 16-17.

CHAPTER VIII

EXPERIENCE IN GRAIN-MARKET STABILIZATION

Before we analyze the system of stabilizing the German market for fats and dairy products in its intricate technique and manifold aspects, we must briefly survey the measures preceding the new national market policy in agriculture.¹ The stabilization program was not only adapted to the market situation created by the existing machinery of intervention, but it also used the elaborate technique of intervention in detail.²

THE NEW STABILIZATION POLICY

From 1924 to 1927 the prewar attitude toward agricultural markets prevailed. All the energy of the government and of the farmers was concentrated on the immense task of reconstructing productive capacity, so heavily undermined by the war. From 1928 to 1933 the government carried out a policy of energetic farm relief, based on the principle of manipulating domestic prices of agricultural commodities to a level considered sufficient to insure the majority of farmers moderate net profits. When farm prices began to decline under the influence of the breakdown on the world market, the traditional method of raising tariffs was first used. Then

¹ See five papers by the present author: "German Agricultural Policy—Some Selected Lessons," *Journal of Farm Economics*, February 1937, XIX, 287-90; "Farm Relief in Germany," *Social Research*, February 1934, I, 185-96; "Recent Agrarian Policies in Germany and the United States," *Ibid.*, May 1936, III, 167-201; "Das Roggenproblem," *Der deutsche Volkswirt*, Sept. 26, 1936, pp. 1768-71; "Der deutsche Agrarmarkt morgen und übermorgen," *Ibid.*, July 29, 1933, pp. 1451-54.

² Max Sering, *Die deutsche Landwirtschaft unter volks- und weltwirtschaftlichen Gesichtspunkten* (Berichte über Landwirtschaft, N.F., Sonderheft 56, Berlin, 1933), pp. 870-902.

fixed tariffs were supplanted by flexible emergency tariffs at the discretion of the administration. The legislature limited its power of decision to the establishment of the "normal price" of agricultural commodities, to be brought about by adjustable tariffs. Beyond that the government was empowered to embark on various types of intervention, including methods of open-market policy.

The initial break in the traditional attitude of statesmen and politicians toward claims of the farmers for drastic relief from price depression was made in 1928, when the sensational decline of the world price of sugar threatened to undermine the German sugar-beet growers' existence. The duty of 15 marks per 100 kilograms of white sugar was considered insufficient to protect the German producer, because foreign countries like Czechoslovakia began to dump into the German market and because the world market price was lower than the mere processing costs of German sugar mills, so that any German export involved a net loss. In December 1928 the German Diet raised the sugar duty from 15 marks to the prohibitive level of 25 marks per 100 kilograms. As a sugar coating of the pill for the German consumer, the legislature empowered the Secretary of Finance to reduce the duty to 10 marks whenever the domestic price should exceed 42 marks. At that time the world price fluctuated around 22 marks, only to decline to 12 marks during the following years.

The results of the prohibitive tariff with its "consumer protection clause" were the complete separation of the German sugar price from the world market, the stabilization of the price around the maximum mark, and the re-establishment of profits for the sugar-beet grower and the sugar industry. In fact, the new profit margin was so exceptional compared with all other farm commodities that sugar-beet acreage and yield jumped at an alarming rate, and Germany began to dump increasing amounts of

sugar into the overfed world market. Though the dumping export meant a net loss to the exporter, it had to be carried out, financed by the whole industry, in order to prevent the collapse of domestic prices behind the tariff wall. The more the total national output grew, the more these export losses threatened to lower the total revenue from sugar. At the same time, the relatively low per capita consumption of sugar stopped rising.

In order to stop the further growth of sugar-beet cultivation, the government issued in December 1928 an emergency decree providing for a compulsory quota system for processing sugar beets into sugar. In March 1931 the quota was established and enforced. After forcing all the sugar mills and refineries into a compulsory cartel, it was easy to direct the whole industry from one central point. The quota became an allotment to all those who had grown sugar beets before. Thereby it froze the location of sugar-beet production, and distributed the benefits among a privileged group of farmers. A new development toward the widespread participation of small farmers in the West and South in sugar-beet cultivation was drastically cut off, although these small farms had lower costs of production. In brief, the quota system revealed all its typical economic and social shortcomings and its attractive administrative features.

Sugar-beet production is an important industry. Yet with 4.7 per cent of the total cash income from all farm produce, or 13.0 per cent of the cash income from all crops, it is a relatively small item in the national farm income. Moreover, it affects only a particular group of large-scale farm entrepreneurs. The considerable evils of the policy adopted were neither conspicuous nor politically important enough to shake the conviction of the parties which endorsed this trial of a new course. At the same time, the achievement of saving the German beet-sugar industry from supposedly certain ruin was played

up by the advocates of planned economy, and by those who tried to sell the old protectionist ideology to the nation under the new brand of food autarchy. This was done so effectively that questions of alternatives—as to a sounder policy, a more reasonable and flexible degree of protection, or a socially more just distribution of quotas—were not even raised.¹ The policy and price of sugar remained fixed, perhaps for years to come.

Because foreign price pressure continued mainly upon grain, measures of farm relief on a nation-wide scale began with supporting grain prices. No comprehensive plan determined that grain should come first; the exigencies of the situation enforced it. This is important in view of later consequences. Tariffs were raised as follows, in marks per 100 kilograms: wheat, from 5.50 to 25; rye, from 5 to 20; feed barley, from 13 to 18; and oats, from 5 to 16.² But soon it was discovered that the tariff alone would not suffice to raise prices.

Several reasons were responsible for the ultimate ineffectiveness of the tariffs. Germany had a surplus of rye and of oats, and a deficit in wheat, barley, and maize. The raising of the tariff seemed to make rather expensive the application of the import certificates, which permitted duty-free import of an amount of grain equal to that exported; at least, so the government argued. Therefore, this method of export subsidy was abolished. Consequently the rye market, with its surplus, did not react to the duty. Even with wheat, the almost prohibitive duty did not raise prices correspondingly because Canadian wheat, with its high gluten content, ranked as a different commodity from German white wheat. The main weakness lay in the fact that all the grains to some extent compete among themselves as, indeed, all carbohydrates

¹ See Hans Wilbrundt, "Die Problematik der deutschen Zuckerpolitik," *Deutsche Agrarpolitik* (Berlin, 1932), Band 5, Teil I, pp. 206-12.

² See Chart 21, p. 147.

do. Feed grains influence the price of bread grains, and all grain prices in Germany are influenced in some degree by potato prices.

The earlier grain policy was based on the principle of protecting the bread-grain varieties, wheat and rye, and of leaving the feed grains, oats, barley, and maize, either free of duty or with a very low one. It was formerly the idea to strengthen domestic animal production by allowing cheap feed-grain imports, but to keep bread-grain production profitable. When it was discovered that the emancipation of the German grain-price level from that of the world market could not be reconciled with that policy, the government began to make the domestic market watertight against foreign influences by establishing a maize-import monopoly and raising the price of imported feed barley by a prohibitive duty.

Co-ordinated with these steps were open-market operations, such as sale of denatured rye to hog-feeders, at a subsidized price, in combination with sales of maize by the monopoly administration. Huge public granaries were filled with rye to relieve the market from supply pressure and raise rye prices. Twice the stabilization campaign collapsed, causing huge losses to the state grain administration, which operated as the central agency. The machinery was overhauled and methods readjusted. A new device considerably improved its efficiency. This consisted of quantitative restrictions in the form of domestic milling quotas, which specified the amount of domestic wheat that had to be used in the flour mills together with each unit of imported wheat. These could be changed at any time. They functioned like import quotas, although they did not appear as such. Finally, the government succeeded in getting the entire grain market under perfect control.

One of the last parts of the stabilization machine to be assembled was the stabilization of the potato market.

With potato crops of some 40 to 50 million tons, the amount which had to be fed to hogs (some 16 to 24 million tons) was the equivalent of 4 to 6 million tons of feed grain. The government subsidized schemes to convert a large part of the crop into ensilage and to produce potato flakes (*Kartoffelflocken*) as a grain substitute. At the same time the potato-flake and the potato-starch industries were compelled to organize in a cartel and to keep prices for their products steady at the command of the state grain trust.

With sugar, sugar beets and beet residue (*Rübenschnitzel*), all grain varieties, and potatoes under strict control, the first part of a new agrarian policy with respect to the market had been established. What were the achievements, and what are their bearings upon this study of the edible fat markets?

BEARINGS OF EARLY STABILIZATION MEASURES ON THE FATS POLICY

The first and most obvious result was the radical separation of prices for carbohydrates from the world market level. Wheat and rye prices were 150 per cent, sugar prices 250 per cent, and feed grains 100 to 200 per cent, above the outside level. Such price levels made the production of carbohydrates more profitable. Farmers adjusted their cultivation to the new price relations. The sugar-stabilization plan restricted the beet acreage indirectly, by imposing a quota on production of sugar for domestic human consumption, and by restricting exports. But farmers increased their grain acreage until in 1932-33 the net deficit (6 million tons in 1927) disappeared.

While grain and sugar prices were pegged at almost pre-depression levels, the income of the population shrank during the depression. German income from wages and salaries had risen from 34 billion marks in 1925 to 44.5 billion in 1929, and then fell to 25.7 billion in 1932. In

such an economic environment the price stabilization of carbohydrates forced upon the consumer a drastic shift in his purchasing power, in spite of the partly successful endeavor of the government to curtail the margins of grain and flour dealers and bakers. Bread prices could not but reflect the separation of the grain prices from the general price level.

Changes in the cash income of farmers under the grain-price stabilization are illuminating. Farm cash income ordinarily shows a remarkably close correlation with industrial payrolls. While the index of payrolls moved from 100 in 1925 to its peak of 130.8 in 1929, and its low of 75.5 in 1932, the index of farm cash income moved from 100 in 1924-25 up to 131.3 in 1928-29 and down to 86.6 in 1932-33. The last figure indicates that farm cash income did not follow the course of payrolls all the way down. During the depression, unemployment relief contributed an additional element of income for the industrial population.

In general it is true, unless radical measures interfere, that farm gross income corresponds closely with the volume of industrial output, which again is reflected in total disbursements for wages and salaries. The curve of the index of farm income makes it apparent that with returns from grain and potatoes fairly well maintained, farm income still was bound to the volume of industrial payrolls and salaries. Its sharp decline revealed the immense power of this correlation. While the returns from rye and wheat together declined by only 9 per cent from 1929-30 to 1932-33, and returns from all vegetable products by 27 per cent, the reduction in cash returns from all animal products amounted to practically 40 per cent. Returns from the group of stabilized commodities suffered a decline of 21 per cent, while those for non-stabilized commodities declined by 40 per cent, as shown in greater detail in Table 19.

TABLE 19.—CASH RETURNS OF GERMAN AGRICULTURE, 1929-30 AND 1932-33*

(Million marks)

Commodity	1929-30	1932-33	Change (%)
Rye	657	481	-26.8
Wheat	580	640	+10.3
Barley	250	166	-33.6
Oats	282	90	-68.1
Four grains	1,769	1,377	-22.2
Potatoes	476	381	-20.0
Sugar beets	512	429	-16.2
All stabilized commodities	2,757	2,187	-20.7
Vegetables	268	137	-48.9
Fruits	314	168	-46.5
All other crops	225	153	-32.0
Hogs	2,405	1,243	-48.3
Cattle	1,214	593	-51.2
Calves	390	182	-53.3
Sheep	85	39	-54.1
Milk	1,690	1,371	-18.9
Eggs	362	268	-26.0
Poultry	51	35	-31.4
Wool	31	11	-64.5
Honey	16	18	+12.5
All non-stabilized commodities	7,051	4,218	-40.2
Grand total	9,808	6,405	-34.7
All vegetable products	3,564	2,645	-26.8
All animal products	6,244	3,760	-39.8

* Data from *Statistisches Jahrbuch, 1937, p. 541.*

Since the total volume of money spent by consumers for food is closely bound up with industrial payrolls, and since the payrolls declined radically, the total expenditure for food declined also. That during this period the domestic output rose, by supplanting parts of former imports,

did not change the picture with reference to prices, though it added to the farm income through additional volume. What carbohydrate stabilization really achieved was a shift within the limits of the total income of agriculture. While it stiffened the returns from carbohydrates, it depressed the returns from non-stabilized products.

The theoretical explanation lies in the difference in demand. While carbohydrates have a typically inelastic demand or, as in the cases of potatoes and dark bread, a demand which increases when carbohydrate prices all rise, the majority of other vegetable food commodities and animal products have a typically elastic demand. Of course, the elasticity varies for each of them. On the assumption of a rigid supply, all commodities with a flexible demand will tend to show disproportionately more marked changes in price. As soon as the burden of expenditures for commodities with a rigid demand is artificially increased, the consumer tends to respond by refraining from buying such goods as high-quality proteins, fats, fruits, and vegetables. Unfortunately, there is no possibility of proving the nexus between cause and consequence in the course of state intervention. We can only speculate on the probable course if no intervention had taken place. But in this case all the available evidence makes it highly probable that the conclusion regarding an added depressive effect of carbohydrate stabilization is correct, and there is no evidence that contradicts the conclusion.

If this is correct, it has a most important consequence. Farmers who depended mainly on sales of the non-stabilized commodities would suffer, and be impelled to demand aid similar to what their grain-producing colleagues received. This is just what happened. The vast majority of German farmers depended on animal and refined vegetable products. It was inevitable that this majority should begin to act as a strong pressure group urging stabilization

for their products as well. The best evidence of the profitability of the production of animal products is the fluctuation of savings-bank deposits in districts where farmers depend almost exclusively on the sales of such products. The deposits of the credit unions in these districts of the country began to shrink as soon as grain stabilization became successful in raising grain prices. The disproportionately grave depression of prices of animal products, combined with the direct effect of high feed-grain prices, severely pinched the small family farms in the West and South. For the salvation of these farms there was no alternative but to abandon stabilization of prices altogether or to stabilize their products as well.

When the stabilization campaign started, it began modestly with one commodity, sugar. Rye came next, then wheat. Very soon the commodities in distress took command, and forced the government step by step into a permanent expansion of this policy.

These experiences with the carbohydrate campaign were a necessary prerequisite to the fat-control plan in another sense. The staff of civil servants engaged in the experiment gained experience in the routine of handling market affairs on a large scale, and became acquainted with the legal, social, and economic problems involved. After years of slips and failures, they felt reassured when technical success finally was achieved. This will be shown by the entirely different attitude in the attack upon the fat market.

CHAPTER IX

STABILIZATION OF THE BUTTER AND LARD MARKETS

In 1932 the government had used its arsenal of foreign trade restriction in the form of quotas and tariffs to such an extent that domestic prices of butter and lard had been detached from the world market level. The German butter price stood about 80 to 90 marks per 100 kilograms above the price of imported butter c.i.f. Hamburg. On June 5, 1932, the tariffs for lard were raised from 6 to 12 marks per 100 kilograms and those for bacon from 14 to 20 marks. At the same time, the league of German farmers (*Reichslandbund*) called for high tariffs on oil seeds and whale oil. The whole debate on agricultural policy and farm relief had turned to the problem of prices for milk, cattle, and hogs.

EARLY STABILIZATION MEASURES

When the government began to contemplate other methods of stabilizing the domestic fat markets, there were several reasons. At that time the depression was at its worst, as we can see now; but nobody then knew whether the business cycle would turn or not. The utmost pessimism prevailed throughout the country, nowhere more than among farmers. Six million unemployed and their families suffered from lack of accustomed income, and had to live on a dole approximately one-third of a normal laboring income.

It was to be foreseen that the low purchasing power of the masses would cause striking consumption adjustments to the new fat prices brought about by quotas and tariffs.

All those who could not afford butter at higher prices would shift to margarine or lard compounds. Such shifts on a large scale would unavoidably force butter and lard prices down after a time, even though Germany still had to import a certain proportion of both commodities, though at a rapidly decreasing rate, and therefore had not to fear a surplus situation. It was obvious to every student of the fat problem that the margarine industry would sooner or later become the focus of the attention of the farmers and the Department of Agriculture.

Some foreign developments pointed directly to the possibilities of state intervention in favor of the dairy and hog farmer. In 1931 and 1932, three butter-exporting countries introduced measures to stabilize their domestic butter markets, which suffered from unexportable surpluses.¹ Norway and Sweden introduced a compulsory admixture of 30 per cent butter to margarine. This led to an increase in the domestic demand for butter and, at the same time, raised the price of butter substitute.

Holland acted in a similar but more elaborate way. Its margarine industry was permitted to use 25 per cent butter in margarine; this removed a clause of the food law prohibiting butter adulteration. In addition, the Dutch government introduced a differential package excise stamp tax for butter, butter-margarine, and pure margarine. This tax was designed to "guide" the consumer through prices in such a way as to insure absorption of all the butter surplus. In the summer of 1932 the price, including the tax, was 42 cents a pound for butter, 35 cents for pure margarine, and only 15 cents for butter-margarine. The revenues from the excise stamp-tax were earmarked for bonus payments to all dairy farmers in pro-

¹ See three articles by the present author in *Der deutsche Volkswirt*: "Die deutsche Speisefettversorgung," Aug. 26, 1932, pp. 1577-80; "Stabilisierung der Speisefettpreise" Sept. 2, 1932, pp. 1600-12; "Fettmonopol," Apr. 12, 1933, pp. 763-66.

portion to their milk deliveries. This plan succeeded in pegging butter prices at a higher level, absorbing the butter surplus, and reducing margarine consumption.

These plans encouraged the German government to consider similar methods under the very different circumstances of a market which had a deficit in butter and lard, but suffered from high costs of production in agriculture and generally depressed purchasing power at the end of a period of deflation. Before more drastic steps were undertaken, the government tried some measures of open-market policy. The Secretary of Agriculture financed purchases of soft fat cheese in the Bavarian area in order to eliminate temporary surpluses. This cheese was stored in refrigerated warehouses, and gradually distributed among the unemployed in small packages at reduced prices. The same was done with butter, when it was considered a temporary or local "surplus"; but the scope and duration of the campaign were too limited for it to have any far-reaching effect.

Attempts to raise fluid-milk prices under the power granted by the Reich Milk Law, to be described in the next chapter, also had only very limited results. Consumption of fluid milk began to recede further; but in any event German farm income consisted to only a small extent of returns from fluid milk. As pointed out in chapter ii, it is the price of butter which in the end determines directly and indirectly the amount of returns from milk, even if the fluid-milk markets seem to be organized independently.

The butter price, therefore, was the key to the whole price problem for all dairy products and for lard also. The more the weight of the grain and carbohydrate stabilization made itself felt upon the markets for dairy products, and the more the shortage of purchasing power forced the consumer to make substitutions as soon as farm-relief methods were applied, the more it was rec-

ognized that the instrument for drastic changes lay ultimately in the margarine industry. It is interesting to notice how, as in the evolution of the grain-stabilization scheme, the trend of thought developed slowly but insistently toward the fat monopoly, regardless of changes in the political machinery.

THE FAT-STABILIZATION PROGRAM

In retrospect, we may summarize the program as it finally took shape in the following measures:

1. A government fat monopoly will control the entire market for edible fats, including dairy products, and establish the desired prices for all kinds of fats.

2. The margarine industry and the oil mills will be placed under strict government control in every phase of their business, and subjected to production quotas.

3. The government will reduce the output of margarine considerably and discriminate against margarine by imposing an excise tax on it, by forcing the industry to use domestic butterfat, lard, and tallow, and by various other methods designed to stimulate the demand for butter and lard.

The strategy of these measures was directly derived from the grain-stabilization campaign. It assumed that, within a market that has been made "watertight," the available supply of produce can ultimately be curtailed to such an extent that the price must rise to the level decided by those who control the market. It was also assumed that, by forcing the commodity at certain strategic points in the market through "locks" under government control, it would be possible to check any undesirable movement on the side of the producer, the distributor, or the consumer.

The choice of such a plan was made easier by other forces behind the agrarian policy. From the moment of

the run of foreign creditors upon the German banks which led on July 13, 1931 to the bank moratorium, and the consequent default on loans due and the unavoidably radical control of foreign exchange, the Reichsbank desperately tried to defend the German currency against another breakdown by restricting imports and fostering exports. This policy gave a great deal of support to the farm-relief policy and all of the attempts to raise prices of farm products. Creating scarcity in the domestic food market and restricting imports became virtues in the struggle to save foreign exchange. The German export industries fought back vigorously, because they foresaw the loss of their foreign markets as a natural consequence of the abandonment of purchases of agricultural commodities in those countries which had an unfavorable trade balance with Germany, like France, Holland, Denmark, and the Scandinavian countries. As usual, however, such protests were in vain.

The drive for self-sufficiency went ahead at full speed, last but not least under the auspices of national defense and power policy. In a first ordinance issued by the Reichspräsident late in 1932, the old margarine law of 1897 was amended.¹ This ordinance empowered the government to require any factory producing margarine or lard compounds to use as raw materials certain amounts of butter, lard, or tallow and their derivatives, and also to require that the same admixture be applied to imported margarine or lard compounds. It authorized the government to regulate the production, processing, quality, packing, and declaration of such domestic animal fats as must be used as additional raw materials, and to require said materials to be bought from specified sources. It was left to the government to change the proportion of required ad-

¹ "Verordnung des Reichspräsidenten zur Förderung der Verwendung inländischer tierischer Fette und inländischer Futtermittel," Dec. 23, 1932, *Reichsgesetzblatt*, I, 576.

mixture from time to time, according to the available supplies. The most important provision, however, granted the right to set quotas for the production of margarine, lard compounds, vegetable shortenings, salad oil, and hardened whale oil. Another provision permitted the government to fix quotas of domestic oil seeds to be used by the oil mills, pro rata with imported oil seeds. This is the device much used under the grain stabilization in flour milling. Finally, the government received the power to control, investigate, and supervise the entire activity of any margarine factories or oil mills, to penalize any violations of its decrees up to 100,000 marks fine in each case, and to prosecute cases of unfair advertisements by the margarine industry with penalties up to six months in jail.

This ordinance of the Reichspräsident was a substitute for legislation, this because the Parliament had already been suspended and the country ruled under the dictatorial powers conferred by Paragraph 48 of the Weimar Constitution. But although this legal ordinance supplanted in startling fashion the old margarine law of 1897, several months elapsed before any action was taken under it.

In March 1933 another similar ordinance followed.¹ This was not the result of relatively vague ideas about what might be done in the future. It was based upon an outright plan to organize the entire fat economy of the country, in analogy to the Stabilization Administration already operating with technical perfection in the carbohydrate markets. The new ordinance established a Reich Fat Monopoly Administration. This was exclusively authorized to pass edible fats, domestic or imported, into a cartelized distribution. All such fats, including those for converting or manufacturing purposes, had to be of-

¹ "Zweite Verordnung des Reichspräsidenten zur Förderung der Verwendung inländischer tierischer Fette und Futtermittel," Mar. 23, 1933, *Reichsgesetzblatt*, I, 143.

ferred to the monopoly. The monopoly was not bound to buy, but fats offered to and rejected by it were not permitted to enter the market. The ordinance extended the first ordinance concerning the margarine industry to cover the soap and candle industries also, and thereby completed the control over all the national fat-converting industries. The government was authorized to require the soap and candle industries to use certain proportions of domestic tallow.

On July 6, 1934,¹ the government merged the last part of the fat economy into the control plan by a decision that oils and fats for technical purposes were to be subject to a special control board. The decree represented a part of the regulation of supply and consumption of industrial raw materials and semi-finished products which embraced fats for technical use—in addition to wool, animal hair, hides and skins, cotton, bast fibers, and nonprecious metals. In order to prevent an overlapping of authority, the control board for technical fats was established as a branch of the general Fat Monopoly Administration. From one-fourth to one-third of the oil output of the oil mills was used in the linoleum and paint industries.

In practice the entire regulation of these industrial oils is operated by granting foreign exchange for imports of oil seeds or oils, and the fixing of prices at levels which are maintained in the desired relation to those of all domestic fats. It is the aim of the government to keep in good shape the industries which use the oils and to prevent a shortage of raw materials; but it is also the policy to keep prices high enough to prevent undesired shifts, to and fro, between the raw materials for these industries and the other parts of the fat economy.

Another provision of the ordinance of March 1933 gave the government the right to pass many discriminatory

¹ Wegner, *Nationale Fettwirtschaft* (Kempten, 1934), Part IV, pp. 42-43.

decrees against margarine; for example, to regulate the use of synthetic butter-flavor ingredients, dyes, or chemical preservatives.¹ Requirements as to declaration, marking, and packaging of margarine could be officially prescribed, although the old margarine law had sufficiently required a special cube form for small packages, a broad red band for margarine kegs, and bold-faced-type legends showing the word "margarine" in large block letters in whatever form it might be offered.

Other features of this second ordinance were even more important. It was common practice in the margarine industry to introduce new brands from time to time and to promote these by advertising campaigns. The industry had also adopted the policy of offering at least four different grades in order to tap all the potential demand. The government now obtained the right to eliminate the freedom of the margarine industry to supply the market at will with types and qualities. It could now decide that only certain qualities of margarine should be produced and sold. It could also set quotas for the production of each of the permitted varieties, to prevent the margarine industry from improving its qualities to the highest similarity with butter in order to maintain its volume and returns. Beyond such quotas for certain grades, the government could fix wholesale and retail prices for the qualities under quota, and could force the industry to supply the poorer population with fixed amounts of low-priced margarine.

In order to raise the price of margarine immediately, and thereby to curtail its competitive ability, the ordinance gave the Secretary of Finance the power to impose

¹ Previously the German margarine industry had the unequivocal right to add butter color, butter flavor, and certain preserving chemicals other than salt. These privileges were largely responsible for the success of the margarine industry in producing qualities which the best experts in the field could not distinguish from creamery butter by taste, smell, appearance, or touch.

equalization taxes on margarine, oils, fats, and whale oil, and to adjust tax rates to the ratio of domestic fats used.

Still another provision closed a leak in the markets for dairy products, where imported vegetable oils had already begun to undermine the price structure for domestic animal fats. It prohibited the production or sale of so-called "margarine cheese." Manufacturers of skim-milk cheese had discovered that their product could easily be moved into a much higher price group by adding fat in the form of margarine. At little additional cost this could shift a relatively cheap cheese into the group of most favored cheeses that are imported, like the "Bel paese." Exactly as in the case of "Gradin" (p. 142), imported vegetable oils thus found their way into the dairy-products market. Although the processors correctly called their product "margarine cheese,"¹ the consumer did not resent the margarine content, probably because the product tasted good and was low priced.

After half a century of amazing development and ever increasing financial success, at the peak of its technical achievements and organization, the margarine industry thus had to surrender to the competitor which it had long since passed in terms of volume. With intelligent industrial captains at the helm and with the best lawyers in its employ, the industry accepted the new legislation in silence, not only because there was no legal recourse but also for good economic reasons.

The dominant position of the margarine trust had caused the strongest resentment on the part of organized consumers. As an expression of that feeling, the central purchasing and production plant of the largest union of consumers' co-operative associations, the "GEG"² of Ham-

¹ In the United States this type of cheese made from skim milk and a foreign fat, known as "filled cheese," is effectually prohibited by an internal revenue tax imposed under the Spanish War Revenue Act.

² Gross-Einkaufs-Genossenschaft Deutscher Konsumvereine.

burg, was building a single margarine factory with an initial capacity of more than 200,000 tons annual output, or 40 per cent of the total German consumption. The factory building was finished before the restrictive legislation was adopted, and within a few months the plant would have started operations. This might have meant wholesale losses to the entire margarine industry, including the trust's plants. From another side also, more competition became a nuisance to existing plants; new small independent factories sprang up in the West and made wholesale contracts with department stores and chain stores, supplying them with the product much below any other wholesale price. Their product was made almost wholly of whale oil and skim milk. Competition became cutthroat both internally and externally.

Against the GEG, with many millions of organized laborers as its loyal customers, with a capacity of production beyond comparison, and with the most modern equipment, the advantage of efficient large-scale purchases of raw materials gave insufficient protection. Between the consumer co-operative factory of paramount capacity and the small trust-free factories, the trust and the majority of the other existing factories decided that it was a minor evil to be put under a quota system, reduced sales, and rigid state control. Quota systems stop the competitive struggle for shares in the market and, instead, establish allotments which become the basis for a stable business. Moreover, the quota system and price stabilization seemed to offer opportunities to stabilize a favorable profit rate which would in general make up for increased overhead cost and the loss of production volume. It must not be forgotten that for a long time the margarine trust would have liked to organize the whole industry as a cartel but saw no chance to do it. Now, "Father State" did it.

There remained the question of how to deal with the market for oil seeds and oil cake. Since it was not advis-

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able to put feed materials into the hands of the Fat Monopoly Administration, the ordinance delegated the task of handling the entire import and domestic trade for oil seeds, oil cake, and fat-containing by-products of corn-starch extraction to the Maize Monopoly Administration.

These two ordinances, which together established the new legal standing of the margarine industry, leave one dominant impression upon the unbiased reader. The authors of those laws must have been convinced that the margarine industry was the most dangerous enemy of agriculture, and an economic power such that only its complete subjugation to detailed control and gag-rule could bar the possibility that the diabolic giant might get loose again. In consequence, the powerful and up-to-date margarine industry found itself enclosed within a limited and probably shrinking space, while domestic producers of fats gained more scope in the market for expansion of their production, as well as for better prices.

Within a year sixteen further ordinances followed, regulating the administrative details of the new margarine and fat policy.¹ Only a few of the important decisions

¹ The list follows, with references to *Reichsgesetzblatt*:

1. "Verordnung über die gewerbmässige Herstellung von Erzeugnissen der Margarinefabriken und Ölmöhlen," Mar. 23, 1933, I, 145.
2. "Verordnung über die Einrichtung einer Reichsstelle für Öle und Fette," Apr. 4, 1933, I, 166.
3. "Verordnung über den Verkehr mit Ölen und Fetten," Apr. 4, 1933, I, 167.
4. "Verordnung über den Verkehr mit Erzeugnissen der Margarinefabriken und Ölmöhlen," Apr. 13, 1933, I, 201.
5. "Verordnung über die Erhebung einer Ausgleichs-Abgabe auf Fette," Apr. 13, 1933, I, 204.
6. "Zweite Verordnung über den Verkehr mit Erzeugnissen der Margarinefabriken und Ölmöhlen," May 1, 1933, I, 256.
7. "Zweite Verordnung zur Änderung der Verordnung über die Erhebung einer Ausgleichs-Abgabe auf Fette," Aug. 18, 1933, I, 595.
8. "Fett-Nachsteuer Verordnung," Apr. 19, 1933, I, 207.
9. "Dritte Verordnung über die gewerbmässige Herstellung von Erzeugnissen der Margarinefabriken und Ölmöhlen," Sept. 23, 1933, I, 652.
10. "Verordnung über Verwendung ausländischen neutralen Schwefelsäure

contained in these administrative ordinances need be mentioned here.

The quota for the total production of margarine and lard compounds was set at 60 per cent of the production in the preceding year, 1932. Technically the monopoly distributed an outright basic quota of 50 per cent and held the other 10 per cent as a reserve accessible only to factories which complied with the ordinances on the distribution of cheap margarine to the unemployed.

The equalization excise tax was fixed at 50 marks per 100 kilograms of fats of any kind except lard, bacon, and butter. For all oils the excise tax was collected on oil seeds according to their specific extractable oil content. The compulsory admixture of domestic neutral lard to margarine and lard compounds was fixed at 5 per cent of the total production quota. To give an incentive to use lard, taxes were abated to the extent of 60 marks for margarine and 50 marks for lard compounds per 100 kilograms of domestic neutral lard and other refined animal fats used.

On January 1, 1934, the fat monopoly was extended over all dairy products, and from February 18, 1934, it also covered lard, bacon, tallow, and other animal fats. Thereby the fat monopoly became all embracing for any commodity that deserved consideration as a factor in the domestic fat market. Excepted as commodities considered unimportant from an administrative standpoint were

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- bei der Herstellung von Margarine und Kunstspeisefett," Sept. 23, 1933, I, 665.
11. "Dritte Verordnung über Änderung der Verordnung über die Erhebung einer Ausgleichs-Abgabe auf Fette," Oct. 16, 1933, I, 743.
 12. "Verordnung über den Verkehr mit Milchserzeugnissen," Dec. 21, 1933, I, 1109.
 13. "Verordnung über Übernahme-Scheine für die im Januar 1934 einzuführenden Milchserzeugnisse und Eier," Dec. 22, 1933, I, 1104, 1106.
 14. "Verordnung zur Änderung der Verordnung über den Verkehr mit Milchserzeugnissen," Jan. 31, 1934, I, 78.
 15. "Verordnung über Anschaffung der Fettbewirtschaftung auf Speck, Schmalz und andere tierische Fette," Feb. 18, 1934, I, 112.
 16. "Verordnung über den Verkehr mit Ölen und Fetten," Feb. 18, 1934, I, 112.

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unsmoked imported bacon, wood oil, castor oil, and other unusual varieties of oils not usually produced in Germany. Domestic bacon, lard, and tallow were also exempted, inasmuch as they were produced by butchers for direct sale to consumers. These fats did not have to be offered to the monopoly.

The Monopoly Administration forced the margarine industry to produce only two types of margarine—average household quality and a choice grade—instead of four different grades as formerly. As the statistical yearbook mentions in a footnote, the ratio of the volume of production of “household grade” and “choice grade” has actually been 2 to 1. In respect of prices there happened to be three varieties, because on part of the household grade no tax was levied and the price was reduced considerably. This tax-free variety was available only on cards to people on relief and with a special permit. This procedure applied from November 1, 1933. Thereafter this margarine was taxed like the other, but the monopoly paid a refund of the tax for all the “fat cards” collected from people on relief and delivered at its office. The fat card permitted the purchase of one kilogram of fat at a reduction of 50 pfennigs. In the autumn of 1937 approximately 30 million people participated in the privilege of being provided with a limited quantity of margarine at a reduced price.

EFFECTS OF THE NEW POLICY

Some preliminary conclusions from the obvious effects of the operation of the fat monopoly may now be drawn. Most important, perhaps, was the abrupt cessation of the previous sharp competition between tariff-protected butter, lard, and bacon on the one hand, and the duty-free foreign vegetable fats on the other. The restriction of imports of oil seeds, vegetable oils, and whale oil created an artificial vacuum in the domestic market, which the excise taxes accentuated still further in terms of prices. Various

forms of unwelcome reactions and shifts in adjustment to state intervention, such as for years had played havoc with the grain-stabilization program, had been carefully anticipated and checked by specific devices.

If all of the potential dynamics were not leashed, it was partly because certain shifts were counted upon. The consumer had to give up a part of his former fat consumption, at least temporarily. Within the limits set by the monopoly, a competition for the remaining fats could take place. On the other hand, prices no longer depended on the automatic operation of supply-demand relations. They were fixed by decree.

From the side of the producer, the perspectives were different. When supplies of foreign butter, bacon, lard, vegetable fats, and whale oil became fixed on a smaller scale, domestic fats were given all the opportunities to expand up to the capacity of the market. To what extent the German farmer was able to utilize that opportunity, we shall consider in a later chapter (p. 244). The condition created by the fat-control plan for the German producer of fats was much the same as exists under an effective protective tariff for a special industry. With respect to the price level of the fats, it was considerably better, for the machinery of market control built under the monopoly was so efficient and so prepared for any emergency that, as a matter of fact, prices could technically be fixed arbitrarily at any level. More than that, the monopoly had the facilities for numerous forms of discriminatory marketing without disturbing the price structure. Politically there existed some checks, in spite of the dictatorial system, as the granting of tax-free margarine quotas indicates.

As the best evidence of the changed situations we may take two sorts of data: first, the supply figures and, second, the price quotations.

Table 20 indicates that from 1932, the last pre-monop-

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oly year, until 1934, the first year of the full effect of the Monopoly Administration, the consumption of all fats except cheese and milk declined from 1,708,000 tons to 1,563,000, a decline of 8.5 per cent. In supplies of fats used as a spread on bread (butter, lard, and margarine) the reduction totaled 147,000 tons, or 11.7 per cent. On the other hand, if we omit cheese and milk, the total supply was almost precisely as high in 1934 as it was in 1929. It is true that the population increased from 1929 to 1934 by 1,645,000,¹ or 2.6 per cent, so that the average per capita supply of these provisions declined correspondingly. By and large, the fat-monopoly restrictions deprived the German population of the gain in fat supplies that it had acquired during the depression years under the influence of decreasing prices for imported fats.

Table 20 also shows that the domestic output of butter, lard, and bacon did not respond immediately as expected. The following figures give the annual increase or decrease in domestic production, in percentages of output in the year preceding:

Commodity	1925	1926	1927	1928	1929	1930	1931	1932	1933	1934
Butter .	10.1	2.6	26.5	8.4	-3.4	11.3	13.9	4.3	5.1	-13.9
Lard ..	13.8	3.5	21.8	8.3	-8.3	4.2	6.6	7.5	4.0	5.2
Bacon .	13.8	3.5	21.8	8.3	-8.3	4.2	6.6	7.5	4.0	5.2

The butter output declined from 1933 to 1934 by nearly 14 per cent, while outputs of pork and lard both rose by 5.2 per cent.

The reduction in the domestic output of butterfat can easily be explained as a secondary consequence of the fat-monopoly plan. Through the restriction of imports of oil seeds and oil cake, the available supply of protein for dairy production declined. Within the feeding ratio based on roughage of all sorts, the prominent fact is the defi-

¹ For the territory under German sovereignty, *La.*, exclusive of the Saar.

THE GERMAN FAT PLAN

TABLE 20.—GERMAN CONSUMPTION, DOMESTIC SUPPLIES, AND IMPORTS OF FATS, CHEESE, AND MILK, ANNUALLY, 1929-36*

(Thousand metric tons)^a

Commodity	Free market				Monopoly regime			
	1929 | 1930	1931 | 1932	1933	1934	1935 | 1936	1936 | 1936	1936 | 1936	
CONSUMPTION								
Table oils	120	120	125	120	140	140	145	125
Pure vegetable fats.....	60	70	70	60	70	60	80	60
Margarine	477	479	477	498	425	415	415	448
Bacon, lard	411	410	427	428	409	300	400	429
Edible tallow	17	15	19	20	20	25	25	25
Butter	420	518	505	420	505	514	522	572
Cheese ^b	228	221	243	225	245	224	225	279
Total	1,208	1,246	1,271	1,248	1,288	1,267	1,280	1,244
Fluid milk from cows ^c	7,500	7,300	7,000	6,900	6,800	7,000	7,300	7,000
Fluid milk from goats ^c	1,100	1,000	1,000	1,000	1,000	1,000	1,000	1,000
DOMESTIC SUPPLIES								
Table oils	5	4	3	2	2	6	15	23
Margarine ^d	3	2	2	3	12	27	15	20
Bacon, lard	213	225	229	214	225	245	261	265
Edible tallow	17	15	19	20	20	25	25	25
Butter	245	285	405	420	440	422	422	497
Cheese ^e	224	221	227	225	227	221	229	261
Total	617	608	1,028	1,046	1,128	1,191	1,182	1,311
IMPORTS								
Table oils	115	128	122	146	120	122	129	115
Pure vegetable fats.....	60	70	70	60	70	60	60	60
Margarine ^d	474	477	474	504	423	390	397	425
Bacon, lard	95	92	95	119	91	91	39	46
Butter	125	128	100	60	60	62	71	75
Cheese	64	60	51	47	20	20	20	20
Total	948	948	905	907	819	685	714	728

* Data obtained through the courtesy of the Institut für Konsumturforschung in April 1938, based on revised statistics and therefore not directly compatible with other tables.

^b The figures for lard, tallow, and bacon are those for pure fat, while all the others represent simply the weight of the commodity.

^c Cheese is listed among the fats, although it consists only partly of fat, be-

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ciency in protein, which had been made up by increasing amounts of cake derived mainly from imported oil seeds. The heavy use of oil cake also had secondary beneficial effects upon the fodder crop and its quality, because everything in the cake that is not retained in the animal body or used for heat and mechanical energy appears in the form of available urine and manure. The extent to which the latter factor is responsible for the high crop yields in Germany was demonstrated during the war, when the supply of foreign protein feeds suddenly stopped.

Table 21 shows the effect of the fat-monopoly policy upon the supply of feed proteins. The net-imported feed protein fell from 1932 to 1934 by 26 per cent. The 1935 data for oil-cake imports, the predominant item, show a further radical decline. At the same time, the available amount of domestically produced bran and by-product millfeed became unusually low, since the flour extraction ratio was increased under the grain and bread regulations. With a reduced total supply of grain, and more bran baked into bread, a very considerable shrinkage of the share of protein for animals inevitably occurred.

Table 22, supplemented by Chart 22, shows to what extent the monopoly succeeded in dissociating the domestic price level for the principal fats from that outside of the tariff borders. It also indicates how the preceding tariffs and quotas had already begun to drive a wedge between the two price levels. The table does not show anything about the comparative situation of hog farmers in

cause the imported varieties are mainly cheese with high fat content (40-50 per cent).

* Based in part on estimates on milk production, of which those for cow milk are based on elaborate statistics of creameries and other fairly good evidence, while those for goat milk are a "lump sum guess," based partly on the estimated number of goats.

* Margarine is recorded as domestic only to the extent to which domestic raw materials were used; this involves duplication to the extent that these are covered in the lard output. Most margarine is figured as "imported" because the raw materials were imported.

the different countries; and changes in currency parities, government interventions (as in the United States in 1933 and 1934), disasters to feed crops, and foreign trade regu-

TABLE 21.—GERMAN NET IMPORTS OF FEEDSTUFFS AND THEIR PROTEIN CONTENT, ANNUALLY, 1929-36*

(Thousand metric tons)

Year	Oil cake ^a	Bran ^b	Fish meal	Meat meal	Feed legumes	Total
1929.....	1,768	844	118	22	88	2,790
1930.....	1,496	384	104	15	41	2,040
1931.....	1,861	234	75	14	43	2,227
1932.....	2,290	226 ^c	79	12	24	2,631
1933.....	2,045	79 ^c	101	15	27	2,267
1934.....	1,553	138 ^c	132	15	64	1,902
1935.....	1,169	181 ^c	126 ^d	..	84	1,560
1936.....	1,079	40 ^e	79 ^d	..	62	1,260
PROTEIN CONTENT						
1929.....	575	87	49	10	8	729
1930.....	482	40	44	7	8	581
1931.....	616	24	31	6	9	686
1932.....	756	24 ^c	33	6	5	824
1933.....	687	8 ^c	42	7	5	749
1934.....	522	15 ^c	55	7	13	612
1935.....	373	20 ^c	53 ^{d,e}	..	17 ^c	463 ^c
1936.....	345 ^c	4 ^c	34 ^{d,e}	..	12 ^c	395 ^c

* Data mainly from von der Decken, *Deutschlands Versorgung* . . . , pp. 82, 83.

^a Including oil seeds calculated in oil cakes.

^b Including bran contained in imported bread grain.

^c Data from Supplement to the *Weekly Report of the German Institute for Business Research*, Feb. 10, 1937, p. 2.

^d Including meat meal.

^e Estimated by the author.

lations prevent any other significant use of the table. The only safe conclusion to be derived from these figures is that the foreign price levels for fats were much lower and that the German policy succeeded in removing foreign price pressure upon the domestic fat market.

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These data show that the stabilization separated the Berlin wholesale price for butter, which in 1930 had been almost on a par with that at Copenhagen, by the following percentages in the succeeding years: 13.4, 57.2, 102.5, 177.1, 142.4, and 121.2. A comparison between the New York price for prime western and that for roast-dripping lard at Berlin demonstrates that the stabilization went

TABLE 22.—WHOLESALE PRICES OF BUTTER, LARD, AND HOGS IN GERMANY AND ABROAD, ANNUALLY, 1929-36*

(Marks per 100 kilograms)

Year	Butter		Lard		Hogs	
	Berlin ^a	Copenhagen ^a	Berlin ^b	New York ^c	Berlin ^d	Warsaw ^e
1929.....	343.75	340.73	151.47	110.37	158.20	104.10
1930.....	279.02	276.64	139.84	103.33	130.80	87.55
1931.....	250.18	220.52	116.88	78.06	93.00	60.74
1932.....	222.88	141.82	95.24	47.50	76.20	50.86
1933.....	217.78	107.55	148.08	44.35	75.60	51.80
1934.....	251.34	90.70	191.94	46.67	82.60	37.20
1935.....	254.00	104.77	185.40	78.80	93.00	36.26
1936.....	254.00	114.83	185.11	61.48	97.00	41.87

* Data mainly from *Statistisches Jahrbuch*, 1932, pp. 263, 125*, 127*; *ibid.*, 1936, pp. 285, 290, 165*, 167*; *ibid.*, 1937, pp. 301, 306, 175*.

^a Fine creamery grade including keg, f.o.b. producer's station.

^b Roast dripping in keg delivered to retailer.

^c Prime western.

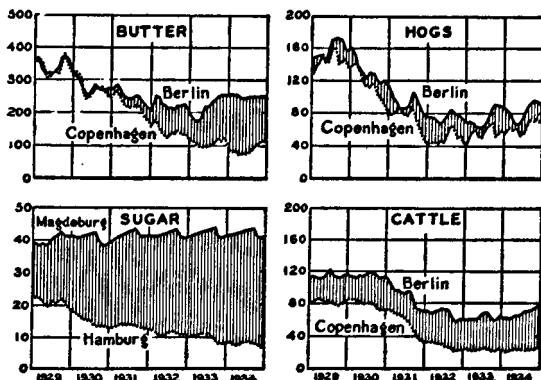
^d Live weight 80-100 kg. For 1929 and 1930, Polish data are for Posnan.

much further than with butter. The Berlin price stood 35.3 per cent above the New York price in 1930; in the following years the percentages were 49.7, 100.5, 233.9, 311.3, and 135.3. A disparity of from 9 to 12 per cent seems to be normal on account of freight and other shipping charges, while another 20 per cent may be traced to the difference in quality and the preference of the German consumer for the seasoned type of roast-dripping lard. The rest of the spread between the New York and the

Berlin price must be attributed to the influence of the tariff and to the measures of the Monopoly Administration.

CHART 22.—GERMAN AND FOREIGN PRICES OF BUTTER, SUGAR, HOGS, AND CATTLE, MONTHLY, 1929-34*

(Marks per 100 kilograms)



* Based on chart in *Vierteljahrshefte zur Konjunkturforschung*, 1935, N.F., Vol. X, Part B, p. 30.

The course of retail prices reflects, as would be expected, the same influence of the monopoly control. This is shown by the annual average retail prices given in Table 23. If we compare 1934 prices with those reached at the depth of the depression in 1932, it is striking how relatively little the price of butter increased in comparison with the rise in prices of other fats, especially the third and fourth grades of margarine. Butter prices rose by 10 per cent, bacon 25 per cent, domestic lard 35 per

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cent, and imported lard 100 per cent, while third-grade margarine in 1934 was 125 per cent higher than fourth-grade in 1932 and 31 per cent higher than third-grade in 1932. Animal fats found a new price level considerably lower than before the depression, while margarine has risen above the pre-depression level.

TABLE 23.—RETAIL PRICES OF FATS AT BERLIN STORES, ANNUALLY, 1929-36*

(Marks per 100 kilograms)

Year	Smoked domestic bacon	Lard		Creamery butter	Margarine				
		Domestic	Imported		Grade I	Grade II	Grade III	Grade IV	Grade V
1929..	284	237	157	412	...	...	...	...	...
1930..	259	223	146	347	216	176	136	96	...
1931..	195	184	125	310	200	160	136	96	...
1932..	172	159	91	276	160	136	96	56	...
1933..	187	181	142	273	220	196	168	132	.76*
1934..	216	215	182	305	220	196	126	...	...
1935..	218	205	186	311	220	196	126	...	...
1936..	218	206	...	314	220	196	126	...	...

* Data for bacon, lard, and butter from *Statistisches Jahrbuch*, 1936, p. 297; *ibid.*, 1937, p. 313; for margarine grades I and II through the courtesy of Verkaufs Verband Norddeutscher Molkereien (Berlin); and for grades III and IV through the courtesy of Deutsche Bank und Diskonto Gesellschaft (Berlin).

* Tax-free variety for the needy obtainable on cards.

Summarizing the results of the campaign toward the stabilization of the prices for bacon, lard, and butterfat, we may say that the government succeeded in achieving its aims almost at one stroke. The grain stabilization had to experiment for several years, suffered severe setbacks, a repeated collapse of its open-market policy, and consequent investigations by the Parliament. All these experiences, and a more thorough knowledge of the intricacies and shifts of the market in all its branches, were utilized in the preparation of the fat-stabilization plan. With the

complete kit of foreign-trade restrictions and contrivances for making the tariffs effective and in addition the pleni-potentiary monopoly administration, the fat market became "watertight," while the persisting deficit situation still made it easy to manipulate the price by means of the suction exerted by scarcity.

This dictatorial rule over the domestic price is, however, nothing basically new. In spite of all the new details, it is in essence nothing but carrying a protective-tariff mechanism to the extreme. The real difference from a mere tariff situation lies in the fact that a tariff sets objective conditions under which trade and private initiative may act, while the establishment of the monopoly administration introduces the intervening state as a fourth party alongside producers, consumers, and distributors. Instead of objective conditions we have now subjective or political interference. As we shall see, the government did not content itself with successful manipulation of the domestic price level of fats and adjustment and control of the price relations between fats. It began to reorganize the entire structure of the market itself.

CHAPTER X

COMPULSORY ORGANIZATION OF THE DAIRY INDUSTRY AND ITS MARKETS

GOVERNMENT REGULATION PRIOR TO 1928

Up to the World War, the milk trade was subjected to certain requirements designed to prevent adulteration and to guarantee a square deal for the consumer. The legal basis consisted either in the Reich Food Law of May 14, 1879, or in various police laws or ordinances of the states, some of which dated back to the early part of the last century. Prussia revised its police ordinances by a decree for the milk trade issued jointly by the Secretaries of Agriculture, Interior, and Commerce in 1912. Aside from tracking down milk adulteration, the state in general kept fairly aloof from the entire field of the dairy markets.

During the war, beginning in 1916, the Reich government regulated the distribution of the shrinking milk supply in the course of the planned "fortress-economy" which finally embraced all agricultural commodities and industrial raw materials. All these emergency measures were of a temporary character, and were not intended to supplant the free price and market economy if and when, after the return of peace, it should again come into operation.

After the runaway inflation, the government again began to deal with the trade in milk. By an ordinance of June 6, 1924,¹ and another of July 4, 1925,² and finally by a Reich law of December 23, 1926,³ adopting the identical

¹ Reichsgesetzblatt, I, 643.

² *Ibid.*, I, 960.

³ *Ibid.*, I, 522.

text of the latter, local governments were granted certain rights to license the trade in milk, margarine, and cream. Of 91 cities, 69 had introduced such licensing in 1927.¹ In fact, the ordinance meant little, because the license could hardly be denied if the applicant could answer a few simple questions concerning milk, unless he had been repeatedly convicted for milk adulteration or had, at the time of the application, an unusually dirty place, or unless he could not give some evidence that he would comply with the required minimum of daily turnover.

This last provision absolutely failed to exert any restrictive influence, especially at a time when it ought to have acquired some importance for the reform of the dairy market. From the end of 1929, when industrial unemployment increased rapidly and wholesale rationalization began to set labor in banking and commercial business free at an unprecedented rate, small retail trade was chosen as a preferred refuge by many who had lost their jobs but received a small compensation from their former employers. The retail cigar trade and various types of retail food trade began to expand. When people applied for licenses for retailing milk, the only legal obstacle was the necessary minimum requirement of daily sales. In case of denial of the license, applicants could appeal to the governor of the district. Usually the appeal was successful because the applicants proved their destitute situation and that of their family; they also gave evidence that, in case of final denial of the license, they would fall back on the dole and become a public burden, while they would be able to pay their taxes and make an independent living if they could enter the milk trade. These social considerations could not be ignored by the governor, and he usually chose the minor evil of granting the license, arguing that it did not do much harm to the public welfare if some

¹ Cf. Hofmann, *Die Milchversorgung der deutschen Städte*, p. 71.

milk dealers had to share their income with some destitute people. Some cities, like Mannheim, had restricted the minimum daily sale to 400 liters, while Berlin had a limit of 80 liters. In fact, Mannheim maintained a much higher actual daily turnover per retail store, while in Berlin many hundreds of retail stores were far below that level.

Until 1928, therefore, *laissez faire* prevailed in most of the German dairy markets, with the few exceptions mentioned above. In the meantime, the campaign for organization of the German markets for grain, sugar, and potatoes gave many incentives to consider the dairy markets also. Large subsidies granted by the Reich government for building co-operative creameries or for remodeling worn-out plants, as well as similar grants of credits by some of the big banks, set in motion a good deal of research on the possibilities of improving the efficiency of the dairy industry through better organization and management.

In prewar literature, interest was mainly concentrated on problems of production and costs rather than on marketing, as was a common feature of agricultural economic literature in general in that period. After the inflation, however, the analogy of industrial organization and the progress in industrial and commercial research, as well as the frictions within the markets themselves, began to give hints at a new dimension in agricultural economics. Dissertations in agricultural colleges began to deal with marketing problems, and economic journals carried articles on them.

Early in 1928 the German Chamber of Agriculture, as the official political and administrative representative of farmers, industrialists, and some of the main banks, invited an American Expert Committee headed by Professor G. F. Warren of Cornell University, and composed of nine members four of whom were dairy experts, to

investigate German agricultural markets and to make suggestions as to how to improve the efficiency in the interest of the farmer. In the fall of 1928, this committee submitted its report after four months of intensive work.¹ During the same year, the Prussian state decided to found the first German Institute of Agricultural Market Research and the first chair of marketing at the College of Agriculture at Berlin. In 1929 the federal government established a second institute for market studies.

These activities are mentioned simply because they indicate that it was not until 1927 that the entire group of problems of agricultural markets came thoroughly to the consciousness of the interested public, or even of the few men in charge of agrarian policies. In 1928, as a result of more concentrated efforts, at least the outlines of the major groups of intricate economic and technical subjects began to appear more clearly. Inventory was taken of dairy production, its regional distribution, the dairy plants and their milk sheds, the city supplies and plants, the transport routes, and the influx of foreign produce. Very soon, interest was focused on deficiencies in technical equipment, in the training and knowledge of the personnel, and in the quality of the products.

Within a few more years, the former lack of data and of basic knowledge was overcome. The previous condition is well reflected in the fact that, in spite of the existence of the minutest statistics on population, industries, foreign trade, employment, and dozens of other subjects, German statistics on the greatest single basic industry, dairying, were so obsolete and neglected that even the amount of milk produced was unknown, to say nothing of its utilization for various purposes or its distribution among the dairy plants or the enterprises of the milk

¹ G. F. Warren and associates, *Die Erzeugung- und Absatzverhältnisse der deutschen Vieh- und Milchwirtschaft: Bericht einer amerikanischen Studien-Kommission* (Berlin, 1929).

trade. This condition was overcome only after 1928, and then only slowly. With rapidly improving information and intensified discussion, it was only natural that the agricultural civil service, the state officials, and the members of Parliament became aware of inactive, unexploited resources in the field of market organization.

EVOLUTION OF THE MILK LAW

Toward the end of 1928 the drive for improved legal provisions for the dairy markets had already crystallized into a first draft of the German milk law (*Reichs-Milch-Gesetz*). In essence, this draft sought to establish a legal status sufficient to enable the public authorities to safeguard milk and develop higher quality standards for it. After excluding all kinds of unclean, polluted, or adulterated milk from the market, it also excluded any potential danger from the production and distribution of milk through bacteria-carriers, and established standards and grades for quality. The draft went on to grant public authorities the right to license the trade in milk and to enforce compulsory pasteurization of milk for human consumption.

The authors of the draft did not include any provision suggesting any further attempt to organize the dairy market as such. The ideology was still that of a market operating freely under the influence of supply, demand, and price, and policed by the state only in order to prevent practices unfair to the consumer. The officer of the Department of Agriculture who was responsible for the dairy markets, and who was one of the authors of the first draft, said in his commentary that its underlying idea was that the surest way to attain good milk would always be through the voluntary and sensible co-operation of all interested groups. "Improvement of the milk quality means increasing sales. Co-operation strengthens

the common interest of all groups of dairy people. Legal intervention can only succeed in so far as it does not interfere with, but fosters, these voluntary tendencies."¹ This interpretation is a valuable historical statement, because it clearly indicates that, in the spring of 1929, the trend of official thought in Germany's Department of Agriculture had not yet arrived at anything like a concept of planned economy or greater state interference with the private business of dairying.

After intensive work and discussion on all sides, and energetic pressure from the progressive southern dairy states, another draft of the law contained a remarkable insertion. This gave public authorities the power to organize milk producers and milk processors compulsorily, to force them to join existing organizations, and to force existing associations to accept farmers. This insertion met strong opposition in the various Ministries of Justice of the States and the Reich, because the Constitution of the Weimar Republic was built on the principle that freedom of trade for all citizens was an inalienable right. It was quite obvious that to suspend free competition and arrest individual activity in the markets would violate the Constitution.

On the other hand, the Secretaries of Justice and the Supreme Court had a relatively weak position because other laws had already partly abolished that freedom of trade. A law of March 23, 1919 subjected the coal trade to compulsory organization. A law of April 24, 1919, did the same for the potash industry. Moreover, the attitude of the state as a whole was lenient toward price rigidities in the economic system resulting from monopolistic tendencies, thus largely ignoring the principle of freedom of trade. Compulsory wage codes, and labor unionization,

¹ R. E. Bose, "Der Entwurf eines Reichs-Milch-Gesetzes," *Süddeutsche Motorenzeitung* (Kempten im Allgäu), Mar. 21, 1929, p. 11.

trusts, and cartels in industry and trade, indicated that the state did not wish to defend the freedom of trade; instead, it was slowly turning in the opposite direction, toward increase of controlled rigidities with the ultimate aim to co-ordinate them.

The German Supreme Court, on the other hand, has never contested the right of Parliament, and consequently of the government, to depart from the Constitution. This is in contrast to the traditional position of the United States Supreme Court, which has repeatedly left to the Congress no way out but that of amendment to the Constitution.

In spite of the cautious attitude of the legal advisers of the various states, the final form of the Reich Milk Law, as passed by Parliament on July 31, 1930, bestowed upon public authorities the power to organize the dairy markets by compulsion. The famous Paragraph 38 of the law is the axis of the entire legal instrument, and has had the most drastic effect upon the German dairy industry as a whole. But its importance transcends the dairy field, for it definitely became the model for the later reorganization of the entire sphere of German agricultural markets.

The paragraph has been subjected to changes which considerably expanded the powers granted, and which also changed the guarantees. The first change was made by the supplementary law of May 11, 1933, another by a supplementary law of July 20, 1933. With these changes, Paragraph 38 now reads as follows:¹

1. The secretary of food supplies and agriculture can unite dairy farms and plants which process or handle milk or dairy products, as well as enterprises which handle milk or dairy products, for the purpose of regulating the utilization and marketing of milk and dairy products.

¹ Translated from *Gesetze und Verordnungen über die Milchwirtschaft. Eine Sammlung der zum Neuaufbau der deutschen Milchwirtschaft erlassenen Gesetze und Verordnungen* (4th ed., published by *Elldesheimer Molkerlei Zeitung*, 1935), p. 52.

2. In doing so he must have in view a maximum of economy and prevention of injury to the national economy and to the common good.

3. The secretary of food supplies and agriculture can especially:

- a) stipulate by statute the rights and duties of the members and the other legal conditions of the unions, and can decree that the unions have legal status;
- b) decide that penalties may be imposed upon members who violate the statutes or the by-laws of the union;
- c) Merge farms or plants into already existing unions of similar enterprises, and change the rights and duties laid down in the contracts of said unions.

4. The secretary of food supplies and agriculture can furthermore unite unions which have been organized for the regulation of marketing and utilization of milk or dairy products. The provisions of 2 and 3 are to be applied correspondingly.

5. Before deciding on final measures, the secretary may issue preliminary decrees to the same end.

6. He may delegate his powers according to 1-5 to deputies.

7. In so far as the secretary does not make use of his powers according to 1-6, the administrations of the states may use them.

8. If the unions organized according to 1-4 undertake to fix prices or dealers' margins for milk or dairy products, price committees must be formed which must co-operate in the fixing of prices and dealers' margins that are economically justified. In the composition of the price committees, producers, processors, the trade in milk and dairy products, and the consumers are fairly to be considered.

9. No compensation for damages caused by procedures according to 1-7 will be granted by the Reich or a State.

This paragraph in fact granted the state full power to reorganize the entire dairy industry of the country from top to bottom. In the first wording of the original Reich Milk Law of July 31, 1930, it was the governments of the states that were empowered to act, and then only after having heard the legally representative bodies of the various groups affected. The first supplementary law of May 11, 1933 shifted all the power to the Secretary of Agriculture and eliminated the requirement of any pre-

liminary hearings or similar retarding or conciliatory preparations.

EARLY LIMITED APPLICATION OF THE LAW

Although the law was passed in the summer of 1930, and although so much power had been granted to the states, not much happened after the long public discussion and struggle. The independent creameries began to fight desperately against the application of Paragraph 38.¹ They claimed that any sort of planning would only create monopoly situations for the farmer; that prices would be pegged at a level that would reduce consumption; and, moreover, that the dairy industry had done its duty in the past without such bureaucratic interference and would continue to do so in the future. The co-operative dairies, which were continually struggling against the private butter and cheese plants, had backed the introduction of the paragraph and now called for its application, of course hoping that such measures would help their cause. The chambers of commerce and industry, as the official representatives of the independent creameries and cheese manufacturers, tried to prevent any hasty decisions based on Paragraph 38.

In consequence, the secretaries of agriculture in the various states maintained a cautious and hesitant attitude, the more so since all the legal advisers were uncertain whether the future compulsory dairy unions would not be liable to pay damages for mergers or forced memberships. The financial and legal status of the unions was still under discussion. It was not yet decided whether the unions would need permanent revenues large enough to build up strong reserves to cover damage claims, or whether they would function only as organized clearing-

¹ H. Laessig, *Reichsverband deutscher Molkerei- und Käseerzeuger und -pächter e. V. Kurze Denkschrift zur Aufklärung über die Bedeutung der Privatmolkereien, insbesondere zur Abwehr des Paragraphen 38 des Milchgesetzes* (Berlin, 1932).

houses. It was equally uncertain whether they would be private corporations or fall under the group of corporations of public law. This condition prevailed through the years 1931 and 1932.

Apart from the more technical problems involved, the obvious conflict of the new law with the underlying philosophy of the German economic system was disturbing the minds of a large number of those who had to deal with the subject. In spite of all the experiments in state intervention and in state or public enterprise, the economy of the Weimar Republic still rested essentially on the principle of freedom of trade and the liberal tendency toward a free price economy. It was quite clear to everybody who had any basic economic knowledge that any real application of Paragraph 38 must lead straight into a planned economy with all its consequences.

Here and there, first trials of the new powers were made. The progressive dairy organizations in the South and West used Paragraph 38 to legalize their former restrictions; these had not yet been contested in the courts, but legally stood on drifting sand. Prussia tried to set up a first compulsory union for dairy farmers in the East. For the Province of Brandenburg, a state commissioner for the compulsory unionization of dairy farmers was appointed, and the drive started. His activity resulted in the formation of a dairymen's league of all the farmers who shipped milk to the city of Berlin. The league then allocated quotas to its members, whereby the total sale was pooled according to a composite formula based on average deliveries of the three preceding years and the acreage of the farm. This quota system solved the problem of adjusting supply and demand. It served to equalize the price paid to farmers c.i.f. Berlin. But it also demonstrated the immense difficulty of fitting the quotas to individual needs of farms without being unfair to the majority.

The market quota apparently had only a small effect, sometimes no immediate effect, on the market itself. To the individual farm, however, it meant everything in the difference in management and organization. Formerly, the rotation of crops, the division between tillage and grassland, the size of the dairy herd and the intensity of its management, the utilization of the milk, and the flow of cash returns, all had to be adapted to the changing opportunities in the market, to the special resources of the farm, and still more to the special skill of the farmer. Now, under the quota system, the paramount duty is to adapt every factor to make the best use of the fixed quota.

The farmer still has a large margin for his private initiative, but it is obvious that the remaining margin of freedom depends on the organization of the farm. A farmer who has 70 per cent of his acreage under grass, and who receives perhaps 80 per cent of his income from sales of milk, will lose most of his freedom of action, while a neighbor whose milk sales account for only 20 per cent of his returns may be better off than before. Such an injury may be mitigated through the distribution of compensatory additional quotas, but it is simply impossible to find a formula that fits all conditions equally well. This is the crucial alternative. No formula, however ingeniously devised, will ever attain the flexibility that exists without it. A strait jacket will still be a strait jacket, even when tailor-made of rubber, though it may not seem to hurt so badly if everybody has to wear one.

During the years between the passage of the Reich dairy law and the energetic reorganization of the whole dairy industry—from the summer of 1930 to the end of 1932—the situation of the dairy farmer became more and more unsatisfactory, as we have seen, because of the disproportionate reduction of the returns from non-stabilized commodities as a consequence of grain stabilization (pp. 151-56). The demand of dairy farmers for effective

relief measures for their products gained strength. At the same time, the general political situation of the country was such that a deadlock prevailed between the departments of the Reich and those of the states. The uncertainty created in the twilight of the parliamentary machine, and its consequences, also hampered the reform of the dairy market. Under normal circumstances, a slow but steady progress might have been expected. This period of gestation makes it easier to understand the later sequence of events.

After the establishment of the dictatorial regime in March 1933, the laws supplementary to the Reich Milk Law were issued in May and July. With the totalitarian state in operation, any delay or hindrance to the activity of the sovereign secretaries of the Reich government was eliminated. Laws are no longer passed through Parliament, but issued by the Secretary with the approving signature of the Chancellor.

The final shaping of Paragraph 38 of the Reich Milk Law did not start activity immediately. Before such steps were taken, the whole realm of agriculture was reorganized. For that vast reform the dairy law to a certain extent provided the model.

THE REICHSNÄHRSTAND, 1933-34

On September 13, 1933, the Chancellor and the Secretary of Agriculture issued a "law providing for the preliminary organization of the Reich Food Estate and for measures to regulate the markets and prices for agricultural commodities."¹ The Reichsnährstand is a compulsory cartel embracing the economic sectors of agriculture, forestry, horticulture, fisheries, and game resources. Within these sectors, it includes producers, processors and converters, all the agricultural co-operative associations, and finally the entire wholesale and retail trade in

¹ *Gesetze und Verordnungen über die Milchwirtschaft*, pp. 75-76.

agricultural commodities and food in general. Every member of the farm population in the widest sense belongs compulsorily to the group of producers, no matter whether he is a farm owner, a farm laborer, a tenant, a landlord, a renter of a strip of land, or a family member of one of these.

The concept of the Reichsnährstand, like many other institutions reinstated under National Socialism, is directly derived from the social organization of the Middle Ages and from the political philosophy of the corporative state of Italian fascism. It is a mixture of the guild idea with that of the three basic "estates" or groups of society—the food realm, the armsbearers' realm, and the educative realm which embraces the church and institutions of learning. At the same time, the new Reich has assimilated many elements of the modern cartel structure.

For our present purposes, it is convenient to regard the institution economically and legally as an all-embracing, compulsory cartel under public control and management. Its ultimate purpose is to abolish the free price economy in the markets, and to replace it by a system of strictly controlled supplies, prices, and trading. It aims at establishing stable prices for long periods and at equal prices to all producers at the market. But it goes much further. It seeks to do away with price competition in the market. The only competition left is in the service of waiting on the customer, and in the cleanliness and appearance of personnel and store. Competition is curtailed in the field of wholesale trade as well. Futures trading has been abolished as unethical speculation. The merchant is to be transformed into a distributor who does his duty according to quotas and who may not compete with his fellow-merchants for a share of their business.

Under the three ordinances supplementary to the law,¹ the Reichsnährstand has the legal status of a self-govern-

¹ Issued Dec. 8, 1933, and Jan. 15 and Feb. 16, 1934, in *Ibid.*, pp. 83, 97-101.

ing body at public law. It has the duty of seeing that the unwritten "code of honor" of the Estate-of-the-Food-Realm is not violated. This code of honor sets the standards of fairness, and authorizes prosecution and punishment of all those who deal unfairly. The Reichsnährstand is the legal successor to the body that formerly was the official representative of German farmers, namely the chambers of agriculture of all the provinces or states, and their overhead organizations. The law creating it empowers the Secretary of Agriculture to join together any persons or groups of persons belonging to the Reich Food Estate, to set up new organizations and dissolve existing ones, and to force some to join with others or accept more members. This is the precise parallel to Paragraph 38 of the Reich Milk Law and is directly and avowedly derived from it.

This extraordinary power is the cornerstone of the entire law. It permits the Secretary of Agriculture to scrap any existent corporation or other association of men or enterprises, and to set up an entirely new structure of the whole market from top to bottom, according to his own design. *And this has been done.* The law also empowers the Secretary of Agriculture to exert any control or to interfere with the business of individuals, co-operative associations, or other corporations whenever he considers it necessary, or to delegate such power to his deputies. Compensations for the consequences of any such activities are prohibited. Finally, the Secretary of Agriculture has full power to impose fines up to 100,000 marks, or corresponding jail terms, for any acts in resistance to his decisions. In addition, he may terminate such enterprises as soon as the penalty has become legally effective.

It is already obvious that the dictatorial principle prevails throughout. The net has been made still tighter by the co-ordination of the office of the Secretary of Agriculture, the chief of the Reichsnährstand, and the chief

of the League of the German Yeomanry (*Reichs-Bauern-Führer*). All three offices are held by the same person, who is appointed by the Chancellor.

The all-embracing cartel is composed of regional units coinciding with the regional units of the yeomanry, which is composed of all owners of entailed hereditary home-
stead farms. The cartel levies contributions which are taken in by the collectors of state revenues and are precisely equivalent to an earmarked tax. In addition, the cartel is permitted to charge fees for the use of its manifold institutions and services. The cartel drafts a preliminary budget for the following year. The budget has to be signed by the Secretary of Agriculture, who is the sole auditor of the financial affairs of the cartel. This breaks with the traditional principle that the Supreme Auditing Chamber is solely responsible for auditing all state or public expenditures. Other control functions of the state and the disciplinary power over the cartel are exclusively vested in the Secretary of Agriculture. This *de jure* makes impossible any interference on the part of the other departments, such as the Departments of Commerce or Economics, in protecting interests of trades or industries.

In the second ordinance supplementary to the law, the cartel was granted the additional power to establish courts of honor for the maintenance of the code of honor among the members. It is expressly stated that such courts may deprive officers of co-operative associations, members of the managing board, or members of the board of directors of such associations, of the ability to exercise any of the functions of such offices.

REORGANIZATION UNDER THE REICHSNÄHRSTAND

Under the third supplementing ordinance the cartel is divided into ten different branches:

Crops and vegetable products
Livestock

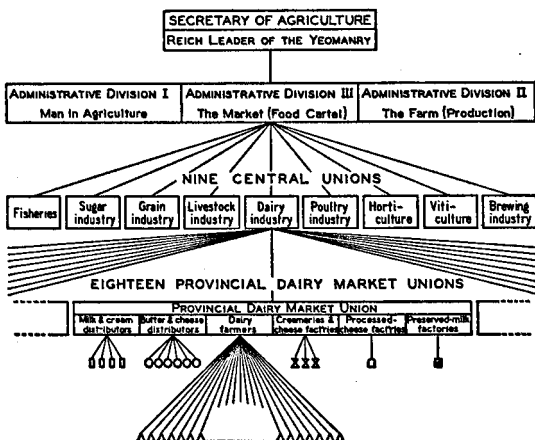
Brewing industry
Sugar industry
Starch and spirits
Fisheries
Fats, milk, and dairy products
Provisions and luxury foods
Timber and wood markets
Food retail trade, in so far as it is not included in the other groups

Every person or enterprise engaged in the production, collection, processing, converting, or distributing of milk, fats, and dairy products is, by law, a member of Branch No. 7 of the Food Cartel and belongs to its regional unit. The setup of the cartel is so extremely elaborate that it lies beyond the scope of this brief discussion to explain it in full detail, but Chart 23 shows its general outline. The whole concept of the new market order is based upon, and all the technical details are derived from, the military system of organization. This is nowhere truer than in the sphere of agricultural markets, for which vast charts, prepared with the utmost pains and precision, have provided for every conceivable task or emergency. The traditional system of groupings and organizations that had grown up was deliberately scrapped. The functioning of the total market has been switched from these to a new mammoth cartel which receives its orders from the headquarters in Berlin via the provincial offices down to the county offices. Thus has been achieved the so-called "co-ordination" (*Gleich-Schaltung*), which means the perfect synchronization and standardization of action and will between the high command and the rank and file.

On March 27, 1934, a few weeks after the issue of the third ordinance concerning the formation of the *Reichsnährstand*, an ordinance for the compulsory organization

of the German dairy industry was issued.¹ Under Paragraph 38 of the Reich Milk Law it forced every dairy farm into a local group of milk producers, every creamery or

CHART 23.—SET-UP OF THE ADMINISTRATION FOR FATS, MILK, AND DAIRY PRODUCTS WITHIN THE REICHSNÄHRSTAND, 1937-38*



* Based on H. Reischle and W. Saure, *Der Reichsnährstand, Aufbau, Aufgaben und Bedeutung* (2d ed., Berlin, 1936), pp. 26, 27, 215.

dairy plant into another group of milk processors or converters, and all milk dealers into a group of a third type. These three groups were combined into a Milk Supply Union (*Milch-Versorgungs-Verbände*), each of which cov-

¹ "Verordnung über den Zusammenschluss der deutschen Milchwirtschaft," Mar. 27, 1934, *Reichsgesetzblatt*, I, 259, and *Gesetze und Verordnungen über die Milchwirtschaft*, pp. 136-42.

ers one or more counties (*Landkreise*). Several milk supply unions were combined into a provincial Dairy Market Union (*Milch-Wirtschafts-Verbände*). Finally, the ordinance created, as the overhead association of all dairy market unions, the Central Union of the German Dairy Industry (*Deutsche Milchwirtschaftliche Vereinigung*, abbreviated as *Hauptvereinigung*). To this vertical organization from local units up to the Central Union, three other groups were joined by the decree but attached directly to the Central Union. These were the union of processed-cheese factories; the union of milk- and cream-preserving factories (comprising the producers of condensed milk, sterilized milk, dried milk, dried cream, etc.); and the union of butter and cheese wholesalers and brokers.

To make this new organization effective, the ordinance dissolved all unions which had previously been organized under Paragraph 38, and transferred their rights and duties to the milk supply unions. To insure perfect control through the new organization, the establishment of any new creameries required the obtaining of a special permit from the president of the Central Union of the German Dairy Industry at Berlin.

To avoid any disorder within the cartel machinery, the ordinance provided that the Central Union should give orders only to the dairy market unions, that these should give orders only to the milk supply unions, and that the latter should give orders only to the groups of producers, converters, and distributors. This established the typical military or bureaucratic sequence, in contrast with the previous commercial arrangement that had practically no hierarchy. To prevent the affairs of the milk cartel and its subsidiary institutions from breaking into the ordinary courts, and thereby casting doubts on the full power of the cartel, special courts of arbitration were set up composed of one nominee by each party and one

arbiter. The court of arbitration formed at the Central Union is the court of last instance.

The ordinance did not leave it to the future or to further research to draw demarcation lines between the local and larger unions, but completely subdivided the entire territory of the Reich among 79 milk supply unions and 18 dairy market unions. The latter cover almost exactly the territory of the Provincial Yeomanry Unions (*Landesbauernschaften*). In general this division, shown in Chart 23 (p. 199), follows the boundaries of the milk sheds as they had developed historically, but within these general lines large territories were reorganized.

Before we can discuss the actual consequences of the reorganization for the farmer, the other groups involved, and ultimately the market itself, some features in the framework of the cartels and their functions remain to be pointed out. The milk supply unions, as well as the dairy market unions, are not allowed to do any business of their own or to participate in any business transactions. Their duty consists merely in "regulating supply and demand and in stabilizing business."

Each milk supply union has three organs. A president is appointed for a term of two years by the president of the superior dairy market union, in agreement with the provincial leader of the yeomanry. Besides the president, there is a board of directors and an assembly of deputies.

The most important function of the milk supply unions is the fixing of producer prices for milk and of the margin down to the consumer. They do not fix prices of butter, cheese, and preserved products; these are fixed by the president of the Central Union for the whole Reich. The president of the milk supply union fixes retail prices for fluid milk and farm prices for milk, with the aid of a consulting price board, composed of 5 representatives of the group of milk producers, 3 representatives of the group of creameries and dairy plants, 3 representatives of

the milk distributors, and 2 representatives of the group of consumers. The representatives of the first three groups are appointed by the president of the superior dairy market union in agreement with the leader of the yeomanry; and the representatives of the last group are also appointed by the president, but in agreement with the leader of the Women's League. It is obvious that the composition of the boards is such that the milk producers have the heaviest weight, unless a majority of the creamery representatives vote with those of the distributors and the consumers. Even then, the whole board has only advisory powers and the president fixes the prices. The required agreement between the president of the dairy market union and the provincial leader of the yeomanry, for all appointments except those of the consumer representatives, gives almost every guarantee against a price policy displeasing to the farmer.

Each dairy market union has the duty of effecting smooth co-operation between milk supply unions under its direction, and also between them and the group of butter and cheese wholesalers in the region. It, moreover, fixes the prices of cheese.¹ Each dairy market union has a president, appointed by the president of the Central Union, and a board of directors similarly appointed and composed of one representative from each of the subordinate milk supply unions. The board of directors may veto decisions of the president, but the president of the Central Union has final decision.

The Central Union of the German Dairy Industry has as its members the dairy market unions, the union of butter and cheese wholesalers, the union of preserve manufacturers, and the union of the processed-cheese factories. Its organs, appointed by the Secretary of Agriculture, are a president and a board of directors composed of one

¹ An example is shown in Table 25 (p. 217).

representative of each of the member organizations and five other representatives.

The entire cartel setup under the Reichsnährstand would have been a complete duplication of the former non-centralized but actively operating system of independent and co-operative organizations, and their national overhead organizations as well, among dairymen, creameries, merchants, brokers, and financiers. The cartel machine was built upon the conviction of the Secretary of Agriculture that the entire system of associations and organizations of all sorts was not worth any attempt at reorganization. It was assumed that the reform of the old system would take too much time, give rise to passive resistance, and finally not lead to a well-functioning cartel. It was, therefore, determined to build the cartel as if no organization had previously existed. Only the bricks of which the former system consisted—the farms, the dairies, and the merchant enterprises, plus some of the market agencies and exchanges—were used in building the new cartel, which was built precisely according to blueprints drafted in the Department of Agriculture. In little more than a year every single association of milk farmers, milk dealers, and creameries was dissolved, and the last remnant of the former system disappeared.

ACHIEVEMENTS OF THE REORGANIZATION

In a brief résumé of the achievements of the reorganization of the entire dairy market through the instrumentality of the cartel, we have first to recognize the great shift in the total functioning of the market as such. Before the cartel, the German dairy market consisted of independent individuals or privately organized individuals in the fields of production, collection, conversion, and distribution of milk and dairy products. Acting in a free price economy, they adjusted their activities primarily according to the prices determined by supply-demand relations. It is quite

wrong to assume that under that regime nothing was planned or organized, but there was nothing like a centralized command and no opportunity for coercion to attain particular ends. Competition and the greatest share for the most efficient were the driving forces, mitigated by many personal relationships and traditions. The state acted mainly as a policing force in the market, to insure obedience to the rules and traditions of the game.

Under the cartel, the market has changed completely. A huge synchronized and co-ordinated machine operates from the moment the commodity leaves the farm until, through all the channels of transportation, conversion, assembly, storage, and distribution, it reaches the final consumer. This machine is controlled by a vast civil service in its various moving parts, with one man at the master control-board. This commander represents the interest of an entity made up of all dairy farmers, all converters, all merchants, and all consumers—on the assumption that the well-being of the farmer is supreme in the interest of all. Price is no longer the mobile factor under the influence of the total market. It no longer provides the incentives for consumption and production, or supply and demand, to adjust to its oscillations. The price has become relatively stable. Most of the price curves are of the typical monopoly type: straight lines with eventual steps but no continuous oscillations. The level is arbitrarily fixed at a point supposed to be sufficient to meet the costs in each field of production, conversion, or distribution for every one engaged in the business, and then to leave a "just" profit in addition.

Prices for butter, wholesale and retail, are fixed by the Reichsnährstand through the Fat Monopoly Administration, as pointed out in chapter ix (p. 164). Those prices remain the foundation upon which the structure of all milk prices paid to farmers ultimately rest. Many of the founders of the new milk cartel had hoped to separate

fluid-milk prices from prices of butter and cheese; but the economic forces responsible for the stratification of prices in the dairy market under a liberal market constitution proved so strong that even the all-embracing powerful cartel could not emancipate itself from them.

The cartel, however, approached the problem of milk prices in such a way as to reduce the disparity between farm prices for milk paid to dairymen in the neighborhood of the main markets—that is to say, in the hypothetical fluid-milk zone—and farm prices for manufactured milk in the more distant zones. Such a mitigation was the necessary compensation for the erection of strict boundaries between fluid-milk zones and zones for manufactured milk.

The method applied had been developed in Switzerland more than a decade earlier. It consists of deducting a fee from the returns for fluid milk, and distributing an equalization bonus to the farmers who receive only the price for manufactured milk. In most of the territories the cartel levies 1 mark on every 100 liters of fluid milk sold; in others the levy amounts to 2 marks, and in the Palatinate it is 4 marks. This provides an equalization fund of approximately 35 million marks a year.¹ Half of the contributions to the fund is redistributed within the territories of the provincial dairy market unions, and paid as a bonus to farmers with a low farm price for milk; the other half is distributed for the equalization of manufactured-milk prices all over the Reich. The equalization operates, so to speak, by taxing sales of fluid milk and disbursing the tax revenues pro rata over the sales of manufactured milk, thereby seeking to bring returns for individual farmers to a common level.

The farm prices for milk are adjusted to the quotations

¹ See the comprehensive survey on the dairy market regulation in the Sunday edition of the *Frankfurter Zeitung* of Aug. 22, 1937, Reichsausgabe No. 425-26, p. 15, "Milchmarktordnung als Beispiel," by Dr. Günter Kelsner.

made by the provincial milk unions. The whole Reich is, therefore, cut up into fifteen different price areas, just as price fixing for other commodities establishes many price planes for each. Table 24, supplemented by Chart 24,

TABLE 24.—WEIGHTED AVERAGE FARM PRICES OF MILK IN THE SEVERAL PRICE REGIONS OF GERMANY, 1934 AND 1935*

(Marks per 100 kilograms)

Area of provincial dairy market union	1934	1935
I. East Prussia	9.35	9.96
II. Eastern "Mark"	10.44	10.85
III. Baltic Provinces	10.63	10.95
IV. Northern "Mark"	11.07	11.59
V. Lower Saxony	10.96	11.46
VI. Rhineland-Westphalia	12.18	12.52
VII. Hesse	13.21	13.08
VIII. Central Germany	11.66	12.25
IX. "Kurmark"	12.63	12.31
X. Silesia	11.11	11.41
XI. Saxony	12.89	13.31
XII. Baden, Palatinate	13.84	14.08 ^b
XIII. Württemberg	13.25 ^c	13.38
XIV. Bavaria	11.98	12.76
XV. "Allgäu"	11.70 ^d	11.70 ^d

* I. G. Farben-Industrie, *Statistische Zusammenstellungen, 1936*, pp. 11, vi, 8. Except as indicated in footnotes a and b, prices are f.o.b. creamery. In all cases equalization bonuses are included.

^a F.o.b. milk-collecting stations; farm prices about 1.3 pfennig less.

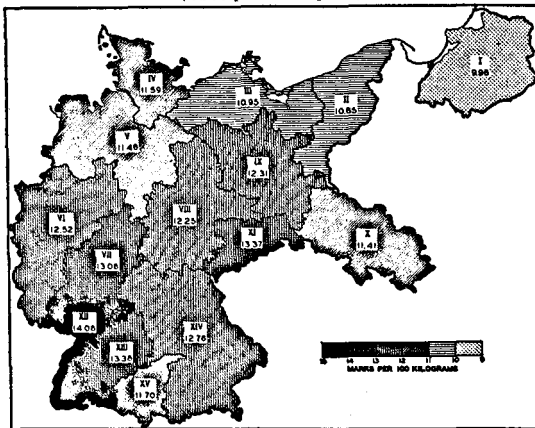
^b Manufactured milk only.

shows the areas and the weighted average price received in each by farmers in 1934 and 1935, including equalization bonuses. The interregional differences are caused by differences (a) in the proportions sold as fluid milk, (b) in the retail prices for fluid milk, (c) in the fat content of the milk, and (d) in the efficiency of creameries. The broad decline of price levels toward the East is explained in part by the higher land values and higher price levels in general in the West, with a gradual decline toward the East. In the case of wheat this has led to the establishment of 20

different price zones, which also show a gradual decline toward the East.

The Reichsnährstand claims that the reorganization of

CHART 24.—REGIONAL AVERAGE FARM PRICES OF MILK
IN GERMANY, 1935*
(Marks per 100 kilograms)

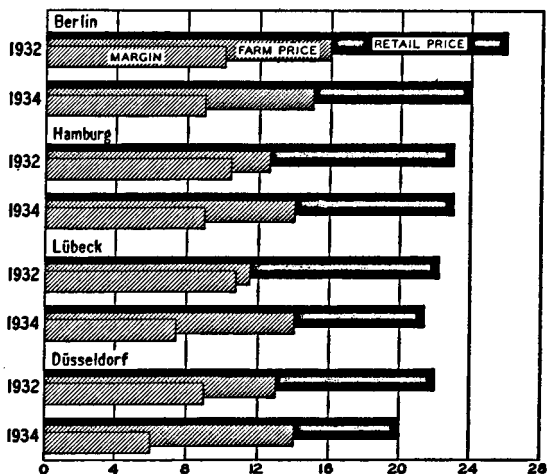


* For source and notes, see footnote under Table 24.

the milk market under the cartel has succeeded in reducing the dealer's margin considerably, whereby the farmer gains without charging the consumer more. The explanation given is that, on the one hand, large savings have been made through a more efficient organization of contracting for milk, economies in overhead costs, rearranged hauling routes, and elimination of the risk factor, while on the other hand superfluous dealers have been forced out. It is asserted that the milk wholesale trade as

the former middleman between contracting farmers or creameries and retailers has practically disappeared because the milk unions regulate the supply. However, a part of these saved costs reappears in the form of taxes for the Reichsnährstand. Efforts have been made to

CHART 25.—AVERAGE RETAIL PRICE, FARM PRICE, AND GROSS MARGIN FOR FLUID MILK IN FOUR GERMAN CITIES, 1932 AND 1934*



* Adapted from chart in Georg Reichart and H. A. Schweigart, *Aufbau und Durchführung der landwirtschaftlichen Marktordnung*, (Flugschriften des Reichsnährstandes, Vol. XXXIV, Berlin, 1935), p. 17.

eliminate many of the independent milk distributors who started business during the depression when no other employment was available. With the improved situation in the labor market and a shortage in labor in some

occupations, this is a sound development which would have come anyway. But the reform of milk markets has not dared to touch the problem of eliminating the duplication of service by competing milk distributors. The proportion of milk delivered at the doorstep is much smaller in Germany than in the United States, as a result of the relatively small part of bottled milk and the higher cost. Nevertheless, the services of two or more competing retailers frequently overlap in the same apartment house. The attempt to assign certain city blocks to one retailer exclusively has been abandoned and has been replaced by an assignment of blocks to three competing distributors. The same continuation of overlapping services is true for towns and places where farmers receive licenses to peddle their own milk. But a restrictive tendency prevails with reference to the grants of renewal of retail licenses.

Chart 25 gives some samples as an illustration of the curtailment of dealers' margins and the maintenance or reduction of fluid-milk price which the cartel claims.

This assertion of the cartel officials is correct as far as the farmer and the dealer are concerned. With respect to the consumer, it does not tell the whole truth because, under the stabilization of the fat market, the consumer has to pay higher prices for other forms of milk, such as butter and cheese. The fluid-milk price has not been raised more, because the consumer would then have curtailed his consumption still more, and the dairy industry would have lost more from reduced volume than it would have gained from the increased price. At the same time, artificial separation of the fluid-milk price from the butter price gives rise—even under a dictatorship—to all the illegal forms of bootlegging milk from manufactured-milk zones into fluid-milk markets. Moreover, if the price of milk rises high enough, millions of consumers refrain from buying milk and start producing milk of their own with goats, a practical diversion in most parts of Germany.

The reason why the cartels are conciliatory and acknowledge the necessity of a certain degree of competition is the assumption that only through a maximum of service can the last potential marginal demand be activated. What the housewife considers as a "good service" depends largely on very subtle personal reactions to the particular salesman who may switch his customers from one milk-supply company to the other. The danger of losing a certain proportion of the demand by interference is an important warning against too much regulation in the retail field. With prices fixed and quality also fixed, the real competition has been transferred with more vigor into the entire sphere of services, which include charge accounts, prompt response to changed orders, delivery at earliest morning hours, and similar demands.

It is impossible to calculate at what level the price of fluid milk would be if only the price of butter had been stabilized through restriction of fat imports, and there had been no fixing of cartel prices for producers and retail trade. It is safe to say that the difference between the prices of fluid and of manufactured milk would be larger by the amount of equalization payments. Beyond that, one cannot even guess; too many factors affect the prices. In general, it seems to the writer that the price level as fixed does not differ essentially from the "natural price level" that would have developed behind the fat-monopoly protection, except for the equalization payments.

In other respects, the cartel has achieved what it was expected to do. Price wars in fluid-milk markets are over. The supply is regulated through quotas and percentages thereof, fixed weekly or daily. The fluid-milk zones have been contracted by achieving almost 100 per cent deliveries in the near-by area and transferring all the manufacturing, as well as the shipping of additional equalizing amounts of fluid milk, to the more distant districts.

But the cartel achievements which are more valuable from the standpoint of strict economy, and which cannot be denied by any objective observer, are in other directions. They begin with the control of investment and planning in the system of creameries in the manufactured-milk areas. The Central Union of the Dairy Industry has to license any new investment in creameries. Its market research division and its engineering division co-operate in the investigation that precedes any grant of a license. The credits from governmental and private sources for the construction of new creameries or for remodeling existing ones totaled some 35 million marks in 1934,¹ and from 40 to 50 million marks in 1935 and 1936.² Such control had been developed on a smaller scale by some central banks, beginning in 1928. With the unification of the dairy industry, the control has approximately the same effect as that exerted by the National Dairy Products Corporation, as a holding company, over its affiliated and subsidiary dairy companies all over the United States. The German cartel has started the construction of creameries where they were needed but absent. In many instances, it has forced competing corporations or rival co-operative associations to merge for their own benefit. Where a creamery was obviously badly managed, or inefficient because of inadequate mechanical equipment, the cartel saw to it that the necessary changes were made. And in many cases the most drastic action led to the liquidation of plants which were mislocated, had become superfluous, or were in a condition that did not warrant reconstruction.

Other important improvements consisted in the reorganization of the membership of creameries. A mapping of the hauling routes from farms to creameries

¹ Friedrich Ackermann, "Molkereien und Ausgleich, zwei Grundfaktoren milchwirtschaftlicher Marktordnung," *Deutsche Molkereiz Zeitung*, Mar. 21, 1935.

² Keiser article in *Frankfurter Zeitung*, Aug. 22, 1937, previously cited.

showed that they usually overlapped considerably. Sometimes such maps showed a criss-cross system of haulings in opposite directions, most of the hauls passing one or two creameries. Here a clearing system was set up under the milk supply unions.

In brief, the cartel has successfully undertaken to attack all those problems of management within the field of milk utilization which present themselves as soon as large areas can be considered as a unit or an industry under one management. The cartel, with its 18 sub-cartels and their 79 sub-sub-cartels, comprehends the entire industry of pasteurizing, butted - making, cheese - making, evaporating milk, and producing milk powder. This coordinated and co-operating unified enterprise is considered the service machine for the dairymen and the consumers, and the utmost efficiency of this machine is the controlling objective in all controversial matters.

The functioning of the industry likewise comes under the jurisdiction of the cartel. It has the power—and uses it most energetically—to regulate the output of certain dairy products. It regulates the stocks of commodities in storage, diverts supplies from certain markets, and contracts them at others. Before the cartel these duties were partially performed by merchants, brokers, and exchanges. Now they are a part of the policy of the cartel, and the merchants are simply executives obeying orders from above.

The cartel, moreover, may go farther than the merchants ever could, by regulating the demand through certain devices. For example, an ordinance of 1934, concerning cocoa and cocoa products, increased the required minimum content of milk and of butterfat in various types of chocolate. Before, it was sufficient if a "milk chocolate" contained 12.5 per cent dry-milk substance. The ordinance provided that "cream chocolate" must have a minimum content of 15 per cent dry-milk substance and

at least 8.25 per cent butterfat, that "whole-milk chocolate" must have no less than 20 per cent dry-milk substance and 3.2 per cent butterfat, and finally that "skim-milk chocolate" must have at least 20 per cent fat-free dry-milk substance. A compulsory admixture of skim-milk powder with flour in the bread-baking industry lies in the same direction.

The cartel uses the evaporated-milk industry as a shock absorber, and changes the quotas for any one of the products according to the necessities of the total market and the price policy. It decides that sometimes whole-milk powder shall be manufactured in large amounts. As soon as it finds that a shortage exists in the butter market, it immediately closes down the whole-milk powder production and switches the milk into butter manufacturing. The same is true for block milk,¹ block cream, evaporated whole milk, evaporated skim milk, skim-milk powder, and casein. It is obvious that such operations are not profitable from the standpoint of the factories producing those products, but the cartel can compensate for losses caused by sudden changes by adjusting the prices of these products accordingly.

STANDARDS, GRADES, AND QUALITY IMPROVEMENT

The cartel has improved the position of all the creameries and cheese factories by a successful campaign against the churning of butter by the farmer. In 1934, 12.1 billion liters of milk were so used for butter production and 2.1 billion liters for cheese making. The creameries

¹ "Blockmilch" is whole milk evaporated to a consistency permitting slicing, with sugar added. The legal minimum content is 12 per cent fat and 26 per cent fat-free dry-milk substance; the maximum water content is 16 per cent, and the permitted coating of cocoa butter must not exceed 1 per cent of the total weight. "Blocksaabne" is similarly evaporated cream with 18 per cent fat, 20 per cent fat-free dry substance, 16 per cent water, and 1 per cent coating of cocoa butter. "Erste Verordnung zur Ausführung des Reichsmilchgesetzes," May 15, 1931, *Reichsgesetzblatt*, I, 150.

received only 6.9 billion liters for making butter and the cheese factories 405 million liters. Thus both together had only 51 per cent of the output of butter and cheese, in milk-equivalent. The other 49 per cent was still made by the farmer. It is the aim of the cartel to force through the creameries and cheese plants all the milk that reaches the market in the form of cheese and butter. This process is already under way. The farmers are compelled to join creameries or cheese plants, and to deliver all the milk that is not retained on the farm either for home consumption, in one form or the other, or for direct sale to consumers.

This will have a most beneficial effect upon the whole dairy economy. Because small separators do not work efficiently, separating and churning on the farm inevitably resulted in feeding a considerable part of the butterfat in skim milk to calves and pigs. On the other hand, the quality of butter turned out by the farmer is very low compared with the standard of creamery butter, because the cream undergoes "wild fermentation" and cannot be pasteurized and cultured on the farm because this requires too costly an equipment. Buttermaking on the farm is all right for the part that is consumed on the farm because this need not keep long; but in a modern marketing system, farm butter does not meet the essential requirements of a standardized quality product.

It may be expected that, within a few years, the German creameries will receive practically all the milk that is to be manufactured. The latest reports claim that in 1936 about 80 per cent of all manufactured milk was delivered to the creamery plants. This development will compensate the creamery industry for many of its hardships under the cartel. Since the total volume of milk and butterfat may be expected to rise under the influence of the curtailment of margarine supplies, this too will aid the creamery and cheese industries.

Other important achievements are based on legal provisions and on the activities of the Reich Milk Cartel. By a butter ordinance of February 20, 1934, uniform legal standards for butter were established.¹ The standard comprises five different grades:

1. German Certified Butter (*Marken-Butter*)
2. German Fine Creamery Butter (*Feine Molkerei-Butter*)
3. German Creamery Butter (*Molkerei-Butter*)
4. German Farm Butter (*Land-Butter*)
5. German Cooking Butter (*Koch-Butter*)

Grades 1 and 2 are put under a rigid system of inspection, which embraces the creameries as well as their products; the eagle brand marks Grade 1 as of certified quality. The ordinance lays down explicit definitions, and the entire procedure for inspection and administration of the standard and the grades is delegated to the provincial cartels, the dairy market unions. Mixing of butter, which was the usual practice in some parts of the butter trade, is forbidden under extreme penalties. Finally, the ordinance compulsorily regulates standardized packing and marking of the package for butter in wholesale and retail quantities.

A similar ordinance established the standardization of cheese.² This does not mean that the number of cheese types was reduced, but rather that the essential names and terms of the market vocabulary, as well as the measurements of quality, have been precisely defined. Eight different grades differing in minimum butterfat content, calculated on the dry substance, were established as follows:

¹ "Verordnung über die Schaffung einheitlicher Sorten von Butter," Feb. 20, 1934, *Reichsgesetzblatt*, I, 117.

² "Verordnung über die Schaffung einheitlicher Sorten von Käse," Feb. 20, 1934, *Reichsgesetzblatt*, I, 114.

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Grade	Minimum percentage of butterfat
1. Double-cream cheese	60
2. Cream cheese	50
3. Full-fat cheese	45
4. Fat cheese	40
5. Three-quarter-fat cheese	30
6. Half-fat cheese	20
7. Quarter-fat cheese	10
8. Skim-milk cheese	Under 10

In addition, it was stipulated that certain cheese types could be produced only as special grades under this standard. For example, Gervais types were permitted only as Number 1 (double-cream grade); Bel paese, Brie, Stilton, and Imperial types could be produced only as Number 2 grade; and Emmenthaler (Swiss, Gruyère) exclusively as full-fat cheeses. All cheeses with brand names had to comply at least with the full-fat grade, and Camembert at least with the fat cheese grade. "Leather cheese" and soft rennet cheese were permitted as quarter-fat or skim-milk cheese. Table 25 indicates how the standardization of varieties serves as the base for the fixing of prices for dairy products in all three stages—farm, wholesale, and retail.

The cheese ordinance ends by establishing a system of cheese control numbers, with a registered control label made of casein for each individual cheese loaf similar to that in use for two decades in Holland, and with regulation of branding and declaration of cheese on the package material. Imported cheese has also been subjected to a compulsory declaration of standard and grade on the wrapping material.

All these measures are not crops that grew in one or two years of the rule of the cartel. They were prepared through many years of intensive study and thorough discussion in the various departments and the parliamentary councils of the pre-dictatorial period. The German Eco-

TABLE 25.—FIXED PRICES OF CHEESE, KURMARK, WEEK OF SEPTEMBER 21-28, 1936*

(Marks per 50 kilograms)

Type	Terms	Price to producer	Price to retail store	Retail price
Raw cheese				
Double-cream cheese	c.i.f.	150-190	180-220	225-265
Cream cheese, butter cheese.....	c.i.f.	83- 85	95- 99	120
Full-fat cheese				
Bavarian Emmenthaler	f.o.b.	93	110	140
Steinbuscher	c.i.f.	76- 80	90- 95	120
Plate Brie	c.i.f.	60	70	90
Camembert	c.i.f.	83-108	108-127	127-160
Beer	f.o.b.	75	90- 95	120
Fat cheese				
Edam	c.i.f.	78- 82	86- 92	100-120
Gouda	c.i.f.	78- 82	86- 92	100-120
Limburger	c.i.f.	68	76- 78	100
Romadour	c.i.f.	71	80- 85	100
Half-fat cheese				
Breakfast	c.i.f.	48- 58	63- 73	78- 88
Limburger	c.i.f.	44	48- 50	60
Romadour	c.i.f.	52	60	73- 83
Lean cheese				
Sour-milk*	c.i.f.	30- 33	34- 37	45- 50
Square	f.o.b.	20	28- 32	40- 50
Cottage cheese	f.o.b.	17	.....	.....
Pasteurized cheese				
Full-fat				
Emmenthaler 6/6 pack .....	.....	116	126-136	155
Emmenthaler 1 kg. block.....	.....	98	105	120
Emmenthaler 2 kg. block.....	.....	95	103	120
Half-fat				
Tilsiter 1 kg. block.....	.....	55	65	80
Tilsiter 2 kg. block.....	.....	53	63	80
Limburger 1/2 kg. block.....	.....	50	58	65- 70

* As published by the provincial dairy market union, "Kurmark," Deutsche Molkereizentrale, Sept. 30, 1936.

* Harz-, Caraway-, Fist-, Point-, Cow-cheese.

conomic Council (*Reichswirtschaftsrat*) had dealt, in many sessions, with the advisability and the best methods of

standardization. What must be credited to the cartel and its influence is the enormous energy put behind these principles, the removal of obstacles or dilatory tactics, and the thoroughness of its administration. Within three years an advance has been achieved that otherwise would have taken at least twice as long and that would by no means have come so comprehensively.

To be fair, however, it must be said that Switzerland, many years earlier, had organized its national dairy industry with equalization fees and one national cheese export corporation, exclusively by co-operation, without compulsion, and with an efficiency that can easily bear comparison with the German cartel. Holland had developed a system of cheese control into an internationally recognized model institution many years before Germany thought of it, and again without using more than a legal provision for inspection of cheese plants. Even the margarine legislation was a Dutch and Swedish device in principle, operating in both countries without subjecting the whole dairy industry to any comparably severe discipline and compulsion.

CHAPTER XI

OTHER EFFORTS TO CLOSE THE "FAT GAP" IN THE FOOD SUPPLY

THE POLICY IN GENERAL

With the fat monopoly in control of the entire domestic fat market, and with the dairy industry perfectly cartelized throughout, the ambition of the Reichsnährstand and the policy of the foreign-exchange dictator are by no means exhausted. It is the aim to close the "fat gap" entirely—to render Germany independent of imported fats and fat-producing materials.

From the standpoint of monopoly price policy, one might argue the desirability of leaving the "fat gap" permanently open, because this would permit continuing the control indefinitely without giving rise to a surplus situation that might require complete reshaping of the intricate machinery; but a number of reasons outweigh such arguments in Germany. Food supplies are considered basic for national defense; and so long as the country does not produce all its essential food within its own borders, the economic general staff considers this resource inadequate and regards the country as unprepared for emergencies. The strict control of foreign exchange and the persistent shortage of foreign exchange lead to the same reasoning from the standpoint of currency management and foreign-trade policy. Last but not least, the German farmer considers it his great opportunity to expand his output until it equals the national food demand. It is obvious that such expansion has the great attraction that it promises to reduce overhead costs, and thereby improve the profitability of farming in general. Unfor-

tunately, the gain made by better utilization of overhead may be absorbed to a certain extent by increasing costs under the influence of diminishing returns. For food commodities as a whole the total gap still represents about 20 per cent of the value of the national food consumption.

Largely as a direct consequence of grain stabilization, Germany had attained self-sufficiency in carbohydrates in 1932. In meat it was also self-supporting, on a rough estimate. The real gap in the domestically produced food supply was and is the shortage in fats. Considering indirect imports in the form of feeds, the "fat gap" is around 1.2 million tons of pure fat, or 60 per cent of the national consumption of fats. This is immense, and indeed much greater than was realized at a time when autarchy propaganda swept the country. The National Socialist government and the Reichsnährstand are doing their utmost to close this gap.

The regime has copied the Italian *battaglia del grano* and the Soviet Five-Year plans by a national drive for increased food production called the Battle of Production (*Erzeugungsschlacht*). This is an integral part of the Four-Year Plan, which covers the entire economic system of the country. All producers are urged to do their utmost in order to reach a national goal of 100 per cent domestic supplies of all foodstuffs and feed materials.

INCREASING OIL-SEED PRODUCTION

The Four-Year Plan also includes some measures which seek to increase production of fats by subsidizing special branches. The Maize and Feed Monopoly Administration pays an equalization subsidy of 50 marks for every 100 kilograms of oil crushed from domestically produced rapeseed, mustard seed, and linseed, provided the German farmer is paid a minimum price of 30 marks per 100 kilograms of rapeseed and 22 for linseed. Beechnuts and poppy seed receive the same subsidy.

As shown by Table 26, the oil-seed acreage has been rising rapidly and it will probably continue to rise. December figures for the winter-rape area also show a persistent upward trend. The average yield per hectare, moreover, has risen steadily with the increase in acreage. From 1932 to 1935 rapeseed yields were 1.23, 1.31, 1.57, and 1.72 tons respectively, and flaxseed yields were .65, .72, and .75 tons respectively. This is probably due to more intensive cultivation, the choice of the best land for oil seeds, and the adoption of oil-seed cultivation by the most progressive and efficient farmers.

TABLE 26.—AREA AND PRODUCTION OF OIL SEEDS IN GERMANY, ANNUALLY, 1932-36*

Year	Area (hectares)				Seed produced (metric tons)			
	Rape and flax	Rape	Flax	Hemp	Rape and flax	Rape	Flax	Hemp
1932....	10,517	6,017	4,500	300	.....	7,414	.....	.....
1933....	9,992	5,103	4,889	200	9,870	6,702	3,168	.....
1934....	35,528	26,738	8,790	400	48,430	42,066	6,334	.....
1935....	69,279	47,004	22,275	3,636	97,524	80,901	16,623	1,954
1936....	98,671	54,604	44,067	5,630	132,642	100,218	32,424	3,449

* Data from von der Decken, *Deutschlands Versorgung*, p. 97; *Statistisches Jahrbuch, 1937*, pp. 94-95.

The farmer's calculation of returns can best be shown by a comparison of gross returns per hectare from wheat and rape in 1932 and 1936. Both of these are main products whose by-product, straw, may be neglected for this comparison. Under German conditions both crops require good soil, heavy fertilization, and cultivation. If we take as the basis for the comparison the average yield per hectare harvested in 1935, namely 2.22 tons of wheat and 1.72 tons of rapeseed, the gross returns per hectare work out as follows:

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Product	Price (marks per ton)		Returns (marks per hectare)	
	1932	1936	1932	1936
Wheat	230	188-210	511	417-466
Rape	157	300	260	516

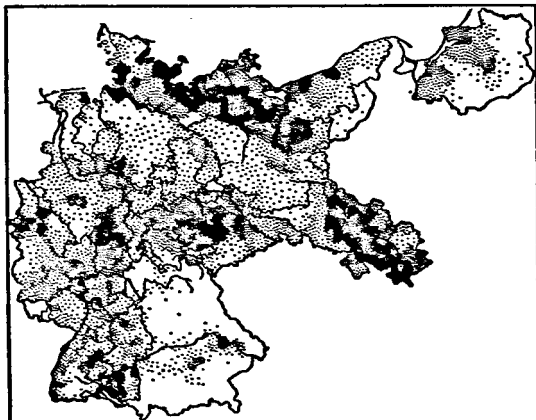
In 1932 the farmer's gross returns from rape would have been only about half as large per hectare as from wheat. In 1936 he could expect a cash return from rape better than even the return from wheat in the best price region. Hence in 1932, considering only these two crops, it was reasonable to increase the wheat area and to grow little or less rape, while in 1936 the farmer could hardly do better than to grow all the rape he could afford. Since wheat prices are fixed for 20 different regions varying from 188 marks to 210 marks, while oil-seed prices are the same all over the country, this might tend to stimulate the growth of rape, especially in the low-price wheat regions such as the East.

Despite the rapid increase recently, however, the acreage in rape and flax is very small in absolute terms. Other factors are responsible for not growing these crops. With well-balanced manifold rotations, and especially difficult adjustments necessary to maintain the balance of the labor load during the growing seasons, it is not exclusively a question of cash returns.

Rape cultivation, moreover, is a rather intricate job. The plant is subject to several damaging diseases, especially if much nitrogen fertilizer is applied. Rape has insect pests too. When it becomes ripe, the birds concentrate on the rape field and do much damage. Finally, rape has to be mowed at night or during the early morning hours to prevent seed from shattering. The harvesting wagons have to be covered with large cloth sheets to prevent the seed from spilling. All of these considerations prevent large expansion of the proportion of rape within the rotations. Of course, the greater the difference in returns, the less weight such obstacles have.

Rape cultivation will probably concentrate again in the same regions where it was formerly densest. Chart 26 shows that formerly one rape belt lay in the coastal plains and another in Silesia, both of them on loam or clay soils. Other clusters of intensive rape culture were scattered from the central part of the country to the western border, and also south of the Danube to Lake Constance.

CHART 26.—RAPE AREA IN GERMANY, 1883*
(Each dot represents 10 hectares)



* Reproduced, with slight modifications, from chart in *Entwicklung und Stand des Anbaus von Raps und Rübren in Deutschland*, originally from *Vierteljahrhefte zur Statistik des Deutschen Reiches*, 1933, Heft 4, p. 7.

The question of increasing the acreage of flax is still more difficult. Flax in Germany is primarily a fiber plant, although special varieties with high yields of seed have been bred since the war. Flax must be grown on fields that

are absolutely clear of weeds. The highest price is paid for raw fiber which is free of weeds and has been pulled from the ground, instead of being mowed, since this gives a longer fiber. Flax is therefore typically a plant requiring intensive use of labor and lies in the domain of the small farm. There, however, the rotation is usually already adapted to the labor available in the rush period of the summer and fall. This puts the brakes on any radical increase in flax acreage. Nevertheless, the premium that flax promises with the subsidy may be high enough to lead hundreds of thousands of small farms to put in small strips of flax.

In addition, there are large-scale farms growing sugar beets which have grown flax before. Their advantage lies in the hoe-crop land, which has practically no weeds, and in large labor gangs that can be thrown for a day or two into flax cultivation. These farmers mow the flax, instead of pulling it up by the roots as small farmers do; this reduces both yield and price, but it also reduces labor costs.

Germany's supply of flax fiber in recent years, as compared with 1913, was as follows in metric tons of pure fiber:¹

Year	Domestic	Imported	Total
1913	13,000	81,000	94,000
1934	5,000	48,000	53,000
1935	14,000	31,000	45,000
1936	30,000	18,000	48,000

To produce some 40,000 tons of flax fiber to replace recent imports, the country would need approximately 50,000 hectares under cultivation for fiber. In 1936 the area in flax was already 44,000 hectares. It may well be that the country could consume much more linen, which is pre-

¹ Data in round figures from von der Decken, *Entwicklung der Selbstversorgung Deutschlands mit landwirtschaftlichen Erzeugnissen* (Berichte über Landwirtschaft, N.F., Sonderheft 136, Berlin, 1936), p. 146.

ferred by the German *Hausfrau* as a more durable material than cotton or the mixture of cellulose-staple-fiber with cotton; but as soon as the point of saturation of the present demand for fiber is reached, flax prices will decline, tending to prevent a further increase of the flax acreage.

The limitation that holds for flax as an oil plant applies also to hemp. In order to produce at home the average net import of 20,000 tons of hemp, the country must cultivate approximately 21,000 hectares of hemp. Beyond that, the price would suffer from fiber surpluses, and this would tend to prevent further expansion.

Beyond the limit of the domestic market's capacity for flax and hemp fiber, therefore, the further production of vegetable fat depends on the rape cultivation. As a single product without by-products, rape is hampered by no limitation from the market side.

The achievement of the Four-Year Plan, especially with respect to the increase in domestic oil-seed production, is widely publicized in Germany. Great satisfaction is taken in the increase of the acreage by 1,000 per cent. That indeed is a change. As soon as we look at the total "fat gap," however, the achievement shrinks into insignificance. If we calculate the average extractable fat content of rapeseed at 36 per cent, and that of linseed at 32 per cent, the 1936 crops would represent 46,406 tons of oil. This amount is subject to deduction for seed requirements, which are relatively high so long as the total acreage is increasing. Let us assume that the total output of oil is 40,000 tons net. The net import of vegetable oils plus whale oil was 857,000 tons in 1934, about 728,000 in 1935, and in the months from January through September 1936 about 651,000, pointing toward a 1936 figure of about 800,000 tons.¹ The German supply of oil from domestic

¹ Data from I. G. Farben-Industrie, *Statistische Zusammenstellungen, 1936*, p. III.

seeds would be just 5 per cent of these net imports. In addition, approximately 90,000 tons of oil cake were obtained from the domestic crops. This is over 8 per cent of the net imports of oil cake plus cake from imported oil seeds (Table 21, p. 178). At the same time, on approximately 100,000 hectares of land mainly wheat has been displaced. Assuming that all of it was formerly wheat acreage, this has opened a gap of 220,000 tons of wheat, which has to be made up at least in part by higher yields on the remaining wheat acreage.

INCREASING BUTTERFAT PRODUCTION

Other efforts of the Four-Year Plan center on the increase of butterfat production. Since the Maize and Feed Monopoly Administration curtailed the import of oil seeds and oil cake, the dairy industry has to get along without the additional feed protein that was formerly imported. The total net import of digestible feed protein¹ in all forms of feed materials declined from 938,000 tons in 1932, to 776,000 in 1933, to 680,000 in 1934, to 507,000 in 1935, and in 1936 to approximately 450,000 tons, or less than one-half the amount available in 1932.²

It is obvious that the dairy industry needs a substitute for this large amount of protein. A notable step in this direction has recently been taken. On March 23, 1937, the Commander-in-Chief of the Four-Year Plan issued a decree, effective January 1, 1937, by which prices of nitrogen fertilizers (except cyanamid) were lowered by 30 per cent and prices of potash fertilizers by 25 per cent.³ This decision is the more remarkable because for many

¹ The term "digestible feed protein" (*verdauliches Eiweiss*) is used in all German feed calculations. It is based on the tabulations of Kellner and Fingering of the Agricultural Experiment Station Mückern.

² I. G. Farben-Industrie, *op. cit.*, p. III.

³ "Verköndungsblatt des Reichsahrstands, 1937, No. 22," Mar. 31, 1937, *Reichsgesetzblatt*, I, 376.

years the German farmers' league (*Reichslandbund*) had desperately struggled for such a reduction. The fact that fertilizer sales at good prices in the domestic market subsidized the export of German dyes and drugs had always stood in the way of such welcome farm relief. The labor unions backed the chemical industry in its resistance to a more drastic reduction of prices of synthetic nitrogen. They were afraid of increased unemployment in case the chemical industry should lose its competitive power on the world market. If all such objections no longer carry weight, it again indicates how strongly agriculture is entrenched politically.

A few figures will indicate how the price of the most important fertilizer has changed. Per 100 kilograms of pure nitrogen in ammonium sulphate, c.i.f. farmers' railroad station, average annual prices in marks were as follows:¹

Year	Price	Year	Price	Year	Price
1913	.....132.00	1929	..... 88.98	1934	..... 67.50
		1930	..... 83.40	1935	..... 65.25
1926	..... 99.89	1931	..... 78.77	1936	..... 66.33
1927	..... 93.79	1932	..... 73.18	1937	..... 50.00
1928	..... 91.36	1933	..... 70.08		

Compared with 1926, the price of nitrogen has been cut in half, while the index of commodities sold by farmers fell by only 23.5 per cent.² Even on such low prices the chemical industry will thrive if the volume of sales increases correspondingly so that overhead costs are reduced. Recently, moreover, technological progress seems again to have reduced the costs of producing nitrogen as the main product, while the cost of by-product nitrogen

¹ Data from *Statistisches Jahrbuch*, 1936, p. 287, except that the 1937 figure is estimated according to the decree of Mar. 23, 1937.

² The 1925-26 index was 132, while that of 1935-36 was 101.

has declined with the stepping up of the German steel output.

The new prices of pure nitrogen make it possible for the German farmer to begin to use this important lever for higher yields on a different scale. For the dairy industry this simply means that it now pays better to convert nitrogen via grass into butterfat. With the safely established stable price level for butterfat and the reduced price of nitrogen and potash, no risk from the price side is involved. It remains only for good management to learn the limits upon more intensive fertilization. Since fertilizer is only one among many cost items, it is obvious that a rather favorable new calculation of joint costs may be made.

The consumption of fertilizers by German farmers has expanded as follows, in thousand metric tons:¹

Year	Pure nitrogen (N) equivalent	Pure potash (K ₂ O) equivalent	Pure phosphoric acid (P ₂ O ₅) equivalent
1931-32	..... 325	540	395
1932-33	..... 353	615	398
1933-34	..... 382	713	461
1934-35	..... 425	816	544
1935-36	..... 490	949	636

Nitrogen fertilizer is manufactured from the air in German factories in such abundance as to yield a large exportable surplus. Basic slag as the main form of phosphoric acid fertilizer is a by-product of the smelting of iron ore. After the depression it again became available in larger amounts as soon as the iron and steel works began to resume their full production with the rise in general business activity. The existing capacity of German fertilizer plants probably permits a considerably larger output without much new investment. These circumstances explain why every effort is made to bring this powerful force into play in the Battle of Production.

¹ Data from I. G. Farben-Industrie, *op. cit.*, p. vii.

During the years 1930-32, as shown by Table 27, the ratio between a unit of butter and the amount of oil cake it would buy was unusually favorable to the feeding of a large quantity of high-protein concentrates. Since then the ratio has changed to the disadvantage of the farmer who used to feed a large proportion of oil cake. The 1936 ratio was not far from the prewar ratio, which also prevailed at the peak of the business cycle in 1928 and 1929 when butter prices were high.

TABLE 27.—RELATIONS BETWEEN GERMAN PRICES OF BUTTER AND OF SOY-BEAN MEAL, 1913 AND ANNUALLY 1926-36*

Year	Prices (marks per ton)		Price ratio (butter to soy-bean meal)
	Butter	Soy-bean meal	
1913.....	2,493.00	147.30*	16.92
1926.....	3,407.20	196.40	17.35
1927.....	3,464.20	200.30	17.30
1928.....	3,591.70	216.70	16.57
1929.....	3,437.50	203.50	16.89
1930.....	2,790.20	141.50	19.72
1931.....	2,501.80	128.50	19.47
1932.....	2,228.80	111.20	20.04
1933.....	2,177.80	122.60	17.76
1934.....	2,513.40	147.20	17.07
1935.....	2,540.00	142.40	17.84
1936.....	2,540.00	157.73	16.10

* Data from *Statistisches Jahrbuch*, 1936, p. 285; *Ibid.*, 1937, p. 301.

* Calculated from the price of peanut cake, since no data are available for soy-bean meal prices in 1913.

Under the fat-monopoly program, the changed ratio has favored the use of home-grown fodder. Only farmers with a high efficiency of the dairy herd and relatively good prices for milk can now afford to feed concentrates. With the high profitability of dairying in relation to other crops, and with much additional scope for expansion of its

market, every farmer is doing his best to increase his output of butterfat. But the means toward that end consist in a slow process of intensifying home-grown fodder crops, especially for winter feeding.

The main question in the dairy industry is how to produce sufficient quantities of farm-grown feedstuffs of improved quality—which means primarily higher protein content. There is no opportunity to add to the acreage. The projects for reclaiming swamps and waste lands, which are perennially suggested and are financed and carried though on a small scale, account for nothing worth considering in the run of five or ten years. To enlarge the total output of agricultural production is therefore exclusively a question of greater intensity of cultivation.

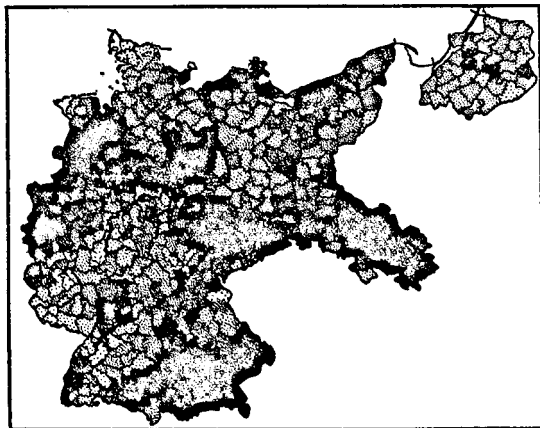
The Four-Year Plan continues the work that had been vigorously organized and financed by the Department of Agriculture since the war ended. All over the country the installation of drainage-tile systems on tillage, and of open-ditch drainage and dikes with pumps for pastures and meadows, is financed by long-term loans at minimum interest rates. As soon as the water is thus under control, it becomes feasible to use fertilizer, since there is no longer the risk that it will be washed away. Improvements in the fodder basis for cattle embrace all the known methods of better management, beginning with good seed mixtures for grasses, clovers, and alfalfa, continuing with the utilization of manure at the right time, and extending to mechanical treatment of the green land and more mowings in order to harvest more protein and less cellulose.

EXPANSION OF SILAGE

Another element in the Four-Year Plan, which is also the continuation of a policy adopted in 1927 by the Department of Agriculture, is the financing of silo construction by long-term loans. The regional distribution of the silo capacity at the end of 1935 is shown in Chart 27. The rapid

CHART 27.—GEOGRAPHICAL DISTRIBUTION OF SILO CAPACITY IN GERMANY, END OF 1935*

(Each dot represents 100 cubic meters)

* Reproduced from I. G. Farben-Industrie, *op. cit.*, pp. v, 15.

recent growth is suggested by the following round numbers of silos built under this program:¹

Year	Number	Year	Number
1931	4,000	1934	34,000
1932	7,000	1935	67,000
1933	21,000	1936	86,000

Besides the grass that is available for grazing on pastures, the roughage for cattle consists of hay, some legume straw, mangolds and similar root crops, and silage. It is

¹ Data from *Wirtschaft und Statistik*, May 1, 1937, p. 333. Prior to 1931, some 19,500 had been built.

only during postwar years that silos have come into general use in Germany, and some time elapsed before methods of obtaining good silage from the rather acid plants available were developed. Today farmers use any green plant substance that is available for storage: grass, clover, alfalfa, mixtures of legumes and grains (especially vetches with rye), mangold leaves, sugar-beet tops and leaves, sweet lupines, and some other green crops. Either molasses or special acids are added to secure a fair lactic-acid fermentation. The breeding of rapidly maturing varieties of maize has also been successful, so that today maize for silage is grown in all parts of Germany.

Storage of roughage in the form of silage has special merits in Germany, because the weather for haying is often such that a good deal of the hay is either lost entirely, or its quality spoiled by repeated wetting, thereby making it almost worthless as feed for milk cattle. The Economic Department of the Chemical Trust has estimated that, in order to secure sufficient silage to feed 20 kilograms per milch cow per day for 200 days a year, the country needs another 35 million cubic meters of silo capacity in addition to the existing 4.3 million. In other words, nine-tenths of the necessary silo capacity is still lacking. Under the Four-Year Plan the attempt is being made to build up the silo capacity rapidly, so that silage can be carried over for one or more years.

How valuable an equalization of the fodder supply for cattle through silage would be can be seen from Table 28. The sharp reduction of the hay crop in 1934 forced the dairy farmers to cull their herds heavily.

OTHER PRODUCTION APPROACHES

The government is also attacking the butterfat problem through improvement of dairy herds and their management. The Reichsnährstand is trying to extend the official milk-yield control, or herd test for cows, over the entire

TABLE 28.—GERMAN HAY PRICES, AND CROPS OF HAY AND PRINCIPAL FODDER ROOTS, ANNUALLY, 1928-36*

Year	Hay prices ^a (marks per ton)	Crop (million metric tons)		
		Hay	Mangels ^b	Swedes ^c
1928.....	45.20	30.2	22.6	8.0
1929.....	68.00	31.2	24.2	6.7
1930.....	36.10	37.0	30.4	7.5
1931.....	30.30	37.0	29.8	8.3
1932.....	27.30	37.0	34.5	9.3
1933.....	26.10	32.8	30.7	9.2
1934.....	58.60	26.4	33.8	7.6
1935.....	57.20	33.2	34.7	9.0
1936.....	39.40	40.2	37.8	8.9

* Data from *Statistisches Jahrbuch*, 1936, pp. 91-93; *ibid.*, 1937, pp. 98-99, 301.

^a Berlin, f.o.b. producer's station.

^b Futterrüben.

^c Kohlrüben.

German herd. In 1931 hardly a million milch cows out of a total of 9,658,533 were tested. From 1934 to 1936 the percentage under test rose from 11.2 to 36.0.¹ The progress has been extremely different in the various regions of the country. In 1936 Brunswick had 95 per cent of all milch cows under test, Hanover 39.1 per cent, and Bavaria 24.1 per cent; in other parts of the country the percentage remained very low, in Hesse-Nassau only 3.4 per cent. Denmark had 39.6 per cent and New Zealand, its great competitor in the Antipodes, 16.6 per cent. It is safe to forecast that within a few years Germany will lead the world in milk-yield control. This will doubtless have a marked effect on the efficiency of milk production and the average yield per cow.

With the milk control is combined a very well-trained extension service of feeding specialists. When they check the milk yield every fortnight, they suggest the most appropriate feed ratio, point out the least efficient producers

¹ Note in *Der deutsche Volkswirt*, Nov. 27, 1936.

in the herd, check the gestation of cows, and tell the farmer the fat content of the milk of each cow. Since the country seeks first of all to increase the output of butterfat, and not milk yield, this facilitates the elimination of poor fat-yielders both from the herd and from the breeding stock.

We have already mentioned the similar attempt in the dairy industry to improve the utilization of the fat produced. The campaign to force every dairy farmer who does not ship fluid milk to join a creamery, and to cease separating his cream at home, is designed primarily to save more butterfat for human consumption. Finally, the dairy cartel tries to make the fat available in the form that appears to be most urgently needed. The production of heavy cream, and of certain cheeses with especially high fat test, has been restricted temporarily in order to save more butterfat for the production of butter. All told, however, the methods of saving fats through more efficient utilization do not seem to be of great importance in the balance sheet of fat supplies.

In the hog industry a definite adjustment to the newly created price relation between meat and fat has been made. Farmers are most eager to produce a hog which yields more lard and more bacon, or more fat in general; and they fatten their hogs up to a higher live weight, thus improving the ratio of fat. Germany has never had a special lard type of hog. The prevailing breed is the *veredeltes deutsches Landschwein*, a white type similar to the Poland-China type. It can be brought up to the heaviest ham and sausage weight, and at 230 pounds yields a fair proportion of good pork. Besides this breed there are several breeds of "dish-faced" meat pigs (*Edelschwein*), and finally a few "razor-backed" breeds (*Hildesheimer*, etc.).

Before the fat stabilization the general trend pointed toward a lower slaughter weight, because young lean pork paid better than fat pork. With the premium on fat,

the average dead weight has increased considerably. In 1932, the last year before the fat plan, the average dead weight per hog was 86 kilograms or 189 pounds. It increased to 91 kilograms in 1933, to 95 in 1934, to 96 in 1935, and to 98 kilograms or 216 pounds in 1936.¹ This increase in the average weight is most drastic if we consider that feed materials have been scarce during the whole period and that the total number of slaughtered pigs remained high, so that the total output of meat rose from 1,969,300 tons in 1932 to 2,269,700 tons in 1936. The animals which yield the largest proportion of fat are culled brood-sows. These are the best converters for carbohydrates. While growing pigs pick up from 1.5 to 2.2 pounds per day, lean brood-sows gain up to 5.5 pounds per day and add most of their weight in the form of fat.

It is hard to estimate how much fat this adjustment has yielded, but it probably represents a remarkable gain. If we assume that a gain of 12 kilograms in dead weight for an average of 23 million pigs a year included 4 or 4.5 kilograms of fat, this would represent an increase of not less than 100,000 tons in fat production. Even if we assume less than that, it remains an amount of first magnitude. Probably most of it does not appear anywhere in the fat balance of the country, because it is consumed in the form of fatter pork and fatter sausage. Even if this be so, it helps in overcoming the fat shortage. German housewives know that as soon as fat prices rise, it pays for all those with a limited budget to buy fat pork, serving the remnants from the dinner table cold in sandwiches without other fats, or using fat pork for frying potatoes.

Aside from cattle and hogs as a fat-producing resource, sheep deserve a little consideration as well when the potentialities of closing the fat gap are examined. In 1916 Germany had 25 million people and a sheep flock of

¹ A. Vogel and C. Boshm, "Einfluss der Preise auf die Produktion in der Landwirtschaft," *Vierteiljahrshefte zur Wirtschaftsforschung*, July 1937, XII, 42.

16 million, or 63 sheep per 100 of population. From then until 1860 the flock grew steadily to its peak of 30 million sheep, or 79 per 100 of population. After 1861 the sheep flock declined rapidly. It reached a more or less stable bottom of 3.4 to 3.5 million animals in 1929, which was maintained until 1934 (see Chart 7, p. 27). During that period the number of sheep per 100 of population remained almost stable at 5.

In 1928 the German net import of wool and wool-equivalent for domestic consumption totaled about 145,000 tons. In 1931 it had dropped to 100,000 tons, but in 1933 and 1934 it reached 157,000 and 136,000 tons respectively. These figures take no account of raw materials used in exported finished products; including these the total demand of the country has been about 180,000 tons. Von der Decken has calculated that in 1932 only 13 per cent of the total demand was supplied from domestic production, while in 1934 the domestic proportion was only 9 per cent.¹ The net import of the country in 1934 equaled the annual wool yield (4.2 kilograms per sheep) of 37 million sheep. At this rate, the German flock would have to be increased by more than 1,000 per cent in order to supply the wool imported in 1934. It is extremely improbable that any such increase will take place, because the area that formerly served as the feed base for sheep had to be given over to intensive cultivation of crops and to cattle. With the disappearance of fallow, wool-sheep could not stand the competition of alternative uses of the land.

Sheep are joint producers of wool, meat, and fats. With growing intensity of sheep husbandry, meat becomes the more important product and wool the by-product. From the side of the wool demand, there is no significant limit to the increase of the number of sheep. For lamb and mutton there is a sufficient margin also. In the German market, mutton has a higher price than pork, beef,

¹ Von der Decken, *Deutschland Versorgung* . . . , p. 80.

or veal, and nobody knows where the saturation point may be.

The real limitation on sheep production lies in the field of farm management. Some poor mountain ranges in moderate altitudes in the west and south of the country, and some heatherlands and moorlands in the northwest, will be used for grazing hardy types of sheep of low consuming capacity and modest need of feed. In the sugar-beet districts and in some marsh-lands, German dual-purpose merino sheep—and here and there a few black-face down-sheep—will be raised in perhaps moderately increasing numbers. These will contribute relatively small amounts of additional tallow. But in the organization of intensively managed farms, sheep will only fill in the gaps which cattle leave.

Aside from the stimulation of the production of more butterfat and of the production of more and fatter hogs, another approach toward improvement of the fat-supply situation has been tried—also from the side of better utilization of fats already produced. In 1933 one of the large oil mills developed a patented process to utilize the heads, feet, and other poor cuts of pork more efficiently for the production of fat. The process applied to meat the method used for the extraction of fats from oil seeds. It consisted of chemically extracting the fats with benzine or a similar hydrocarbon, and producing a fat similar to neutral lard; the remaining waste product was to be used as a meat-meal for feed. It was assumed that the best material for extraction could be supplied by fattened old breeding sows that had to be culled. These sows are the most efficient converters of feeds into fat and can be fattened with less cost than other pigs, whereas their price per pound, when lean, is the lowest of all classes.¹

The government provided every facility for the whole-

¹ See Michael Ott, *Die Entwicklung der deutschen Fettwirtschaft und ihr neuzeitlicher Ausbau* (Kempten, 1934), pp. 56-58.

sale application of that process. For some time the factory operated at full capacity. It extended its process to the extraction of whole carcasses from which only the best cuts of meat were removed. If 50 per cent of the total weight of the pigs consists of the parts for extraction, and the yield of fat from them is 80 per cent, the fat yield represents about 32 per cent of the total weight. These yields were the average result of the experiments in the markets of Hamburg, Berlin, and Halle. After being refined the fat looked white and had no distinct taste or odor. It proved to be well adaptable to hydrogenation for the conversion into grades of different consistency. But the process proved too expensive and in the spring of 1935 the factory had to be closed, and operations have not since been resumed.¹

The plan could be tried only by the extracting oil mills, neglecting the other possibility of rendering poor cuts in autoclaves under steam pressure, as is widely practiced in the knackers' plants. But decentralized slaughtering has prevented using such equipment on a large scale. Moreover, there is too good a market for the poor cuts. For the raw material the consumer pays more than the renderer can afford to pay.

CONSUMPTION APPROACHES

A last group of measures to close the fat gap needs mention—that is, to reduce the demand for edible fats. The necessity of adjusting national food consumption instead of adjusting the supply is much stressed by many of those who write on the problem of food autarchy as well as on questions of the general saving of raw materials. The technical terms *Bedarfslenkung* and *Verbrauchslenkung* are the idiomatic symptom of these endeavors.

Major Theodor Macht, in his essay on the German

¹ According to information from the Institut für Konjunkturforschung.

fat economy, writes: "... even before the war one ought to have tackled the problem of how consumption could be adjusted to the production economy instead of adapting production to consumption. This problem could hardly be solved only through state interventions like monopolies, tariffs, consumption restrictions. For this aim a political education toward a national community-sentiment was required."¹ Other authors try to make more technical approaches and seek economic devices to achieve the desired adjustments. The restriction of margarine production and of butter and lard imports has reduced the supply of available fats. But time and again the question of whether the demand for fats could not be reduced directly, through fostering shifts in consumption, has been discussed in German magazines. In principle this goes back to the war-time device of inducing the eating of jams and marmalades instead of fats. As a rule, articles in the technical fat magazines by representatives of the Reichsnährstand simply lament the "abnormally" high fat consumption as a luxury, and suggest that fruit jellies be eaten instead.

Only recently this trend of thought has found an economic interpretation. An article in Germany's best economic journal, which is backed by the economic dictator of the country, Dr. Schacht, points out that the price relation between sugar and fats has been responsible for the shifts in consumption.² The changes in the relation between the wholesale prices for sugar and three fats are shown in the following price index numbers:

Year	Sugar	Butter	Lard	Palm oil
1913	100	100	100	100
1932	167	90	55	41
1934	168	101	50	29

¹ Theodor Mecht, *Die deutsche Fettwirtschaft in und nach dem Kriege* (Hamburg, 1936), p. 26.

² Hugo Richards, "Zucker und Fett," *Der deutsche Volkswirt*, Nov. 6, 1936, pp. 271-73.

It is also shown, by means of two other groups of data, that the relation between the prices of fats and sugar has changed to the disadvantage of the latter. The calories utilizable by man are calculated as follows:

	Sugar	Margarine	Lard	Butter
Per 100 grams	320	760	920	780
Compared with sugar....	100	230	280	240

Price ratios between sugar and these fats are as follows:

Year	Sugar	Margarine	Lard	Butter
1913	100	500	550	1,070
1928	100	320	350	880
1932	100	220	200	530
1933	100	280	320	520
1934	100	320	410	600

The writer of that article concludes that an adjustment of the price relation back to that which prevailed in 1913 would probably cause a shift of consumption toward the proportions between fat and sugar that prevailed in prewar times. He suggests that this result could be secured by reducing the price of sugar to a flexible level kept in a fixed relation to the prices of the major fats. It may be doubted whether such a measure would have the effect sought, but it probably would cause some shift in that direction.

The Four-Year Plan administrators have already adopted a policy which operates in a similar way. Since August 1935 the fruit-jam and marmalade industry has been getting low-priced sugar, subsidized by contributions from the sugar industry and the sugar-tax revenues. In 1936 a subsidy of 22 million marks was distributed for 105,000 tons. For 1937 the subsidy was raised to 26 million marks for 120,000 tons. Total revenues from the sugar excise tax in 1935-36 were 314 million marks, and the total wholesale value of the sugar production, without tax, was 750 million marks in 1936. The effect of the

subsidy may be seen from the following data on sales of marmalade (tons):

Year	Sales
1931	53,250
1933	62,100
1934	68,050
1935	100,500
1936	125,000

Aereboe had pointed out how the sugar excise tax through many years kept down the German fruit industry, fostered exports of fruits as raw material for foreign jam industries, and in combination with dumping sugar into England subsidized jams made there with dumped German sugar and German fruit. Aereboe fought energetically, but in vain, for the abolition of the sugar tax.¹ The Four-Year Plan met his demand by discriminatory marketing of sugar while maintaining the sugar tax. How the German fruit industry reacted may be seen from the increase in number of hectares in German fruit orchards:²

Year	Hectares	Year	Hectares
1929	48,199	1933	56,403
1930	48,025	1934	61,680
1931	48,996	1935	102,656
1932	53,139	1936	101,967*

* Exclusive of the Saar, to be comparable with earlier data.

The increase is due not only to the subsidy for cheap sugar, but is in part a consequence of the restriction of imports of fruits and the ensuing high prices for apples and pears. However, with the scarcity of sunshine, German fruits and grapes are usually low in sugar content

¹ Friedrich Aereboe, *Agrarpolitik* (Berlin, 1928), chapter on the sugar tax in Germany, pp. 327-43.

² The statistical procedure was changed in 1934, so that data for 1934 and following years are not directly comparable with those of preceding years. However, the trend is correctly indicated.

and require unusually large amounts of added sugar for their preservation.

Again, as in the case of increased nitrogen consumption, it is a question of fully utilizing the productive capacity of an abundant resource. Germany can produce amounts of sugar far beyond the present consumption. It has abandoned its former export policy, and reduced its sugar-beet acreage in accordance with the International Sugar Convention. But if domestic consumption expands, the country can easily produce more sugar beets without causing a large deficit of grain; for sugar beets produce very high yields of carbohydrate per acre, and a vast amount of valuable cattle feed in the form of leaves and tops, which are fed green or artificially dried.

The marmalade subsidy helps the fruit industry. It also helps to replace some butter and margarine by jams. But it does not use the much larger lever of permitting the German population in general to consume sugar instead of fats. In 1929-30 Denmark consumed about 54.8 kilograms of raw sugar per capita, Switzerland 44.4, and Holland 39.6. While these countries import most of their sugar, Germany as a sugar exporter consumed only 26.5 kilograms.¹ Licht's latest annual review gives for Germany, in terms of raw sugar, 23.6 for 1934-35 and 25.0 for 1935-36.² It seems obvious that there is a wide margin for a higher sugar consumption in Germany. Such an increase would at least save flour from grain, even if its influence toward a shift from fats to sugar is problematical. The major obstacle to such a policy is the large and safe revenue from the sugar excise which cannot readily be derived from another source.

Another doubt as to the replaceability of fats by sugar

¹ F. O. Licht, *World Sugar Statistics, 1929-30* (Magdeburg, 1930).

² German official statistics give 25.4 kilograms of refined sugar for 1929 and 21.7 for 1935. *Statistisches Jahrbuch, 1936*, p. 361.

has to be raised. The period of increasing per capita consumption of fats in Germany coincides with the reduction of per capita intake of alcohol. Since the consumption of sugar has remained fairly stable, the increment in fat consumption may have been the equivalent of a decrease in the amount of calories formerly supplied by alcohol.

How serious is the official desire to solve the fat problem from the side of shifts in consumption may be seen from a note in the economic journal mentioned above.¹ This points out that experiments of the Institute for Baking Research in Berlin have proved that 20 per cent of fat may be replaced by sugar in almost every one of the bakery products the dough of which contains both fat and sugar. It is estimated that an additional use of 50,000 tons of sugar for that purpose would save 30 million marks in foreign exchange.

In conclusion it may be said that certain trifling shifts in consumption of fats may take place. With respect to all the attempts to close the fat gap, it seems permissible to conclude that the more substantial achievements have been and will be made in the production of fats, while in human consumption only limited shifts can be brought about without involving great social friction.

Still another approach from the side of consumption is theoretically possible. Considerable waste of fats happens in the kitchen. Housewives cut off the fattest parts from beef or pork and throw them into the garbage. Other quantities of fats from gravy, canned fish, or residue from meals pass into garbage or sewage. And yet little can be done to reduce this waste because even under the exceptional German conditions it does not pay to recover these waste fats; moreover, high prices force the consumer to be efficient and thrifty in the utilization of fats.

¹ Hugo Richards, "Zucker statt Fett," *Der deutsche Volkswirt*, Nov. 27, 1936, pp. 411-12.

CHAPTER XII

EFFECTS OF FAT-STABILIZATION MEASURES

After having surveyed the situation as it existed before stabilization, and after having discussed the stabilization campaign in most of its important aspects, it might seem possible now to make an appraisal of the effects of the fat monopoly and the dairy cartel. But we have no possible means of measuring the specific effects directly, since no one can prove beyond doubt the nexus of cause and consequence, and nobody knows what would have happened in the absence of the campaign. Accordingly, it seems safer to compare only data of the preceding period with data of the period in which the stabilization campaign was operating. Even toward such a comparison, an attitude of skepticism as to cause and consequence should never be abandoned.

EFFECTS ON FARMERS

To what extent the fat monopoly and the foreign-trade restrictions have succeeded in raising the price level is relatively easy to determine. The difference of the domestic price level from that prevailing outside of the tariff borders is a safe indicator of the efficiency of the complex system of causes operating toward that end. As in the case of carbohydrates, the domestic market price level has become independent of that abroad. But it cannot simply be assumed that the tariff, and the correlated measures to make it effective, directly determine the domestic price level. Behind that protective wall the domestic supply of agricultural commodities finds its aggregate value determined largely in correlation with

industrial payrolls, or what is, with some qualifications, its equivalent—the volume of industrial production.

Table 29 and Chart 28 show that the broad correlation has not been interrupted by all the measures applied.

TABLE 29.—FARM CASH INCOME, PAYROLLS, AND INDUSTRIAL PRODUCTION IN GERMANY, ANNUALLY FROM 1924-25*

Year		Income (billion marks)		Ratio of payrolls to farm cash income	Index numbers		
Farm cash income	Other items	Farm cash income	Payrolls*		Farm cash income	Payrolls	Industrial production
1924-25..	1925..	7.5	33.7	4.5	100.0	100.0	.....
1925-26..	1926..	8.1	34.8	4.3	108.0	103.3	100.0
1926-27..	1927..	8.3	38.9	4.7	110.7	115.4	128.6
1927-28..	1928..	9.3	42.6	4.6	124.0	126.4	127.1
1928-29..	1929..	10.2	43.0	4.2	136.0	127.6	128.2
1929-30..	1930..	9.8	39.9	4.1	130.7	118.4	113.0
1930-31..	1931..	8.6	33.4	3.9	114.7	99.1	92.5
1931-32..	1932..	7.4	25.7	3.5	98.7	76.3	74.6
1932-33..	1933..	6.4	26.0	4.1	85.3	77.2	83.2
1933-34..	1934..	7.4	29.2	3.9	98.7	86.6	105.8
1934-35..	1935..	8.3	32.2	3.9	110.7	95.5	121.7
1935-36..	1936..	8.7	35.0	4.0	116.0	103.9	135.6

* Data from *Statistisches Jahrbuch*, 1933, p. 494; *ibid.*, 1936, pp. 502, 509; *ibid.*, 1937, pp. 534, 541, 52*. Note that 100 represents a different base year in the three cases.

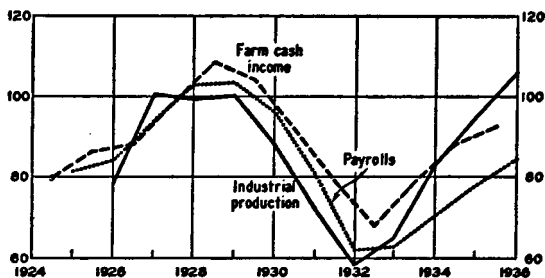
* Industrial wages plus salaries of white-collar workers and civil servants.

The curves on the chart move in general harmony. During the recent years of both recovery and control, the curves of payrolls and of cash income of farmers have not risen so much as that of the volume of industrial production, because the general price level has been prevented from rising to its former level. Obviously what has been achieved, with all the measures applied to industry and agriculture, is the stimulation of agricultural cash income and a considerable lag in the rise of the payrolls behind the great upswing of industrial output.

It has been claimed (for example by Wagemann, the

head of the Institut für Konjunkturforschung) that through the elimination of agriculture from the competitive price system, the vicious circle of repercussions between industry and agriculture during depressions has

CHART 28.—INDEXES OF CASH FARM INCOME, PAYROLLS, AND INDUSTRIAL PRODUCTION IN GERMANY, ANNUALLY, 1925-36*



* Based on data in Table 28. To improve the comparability, the index numbers have been recomputed to substantially uniform bases, namely, averages for 1926-27 to 1929-30 for farm cash income, and averages for 1927 to 1929 for the other two series.

been broken. It is said that under the competitive-price system a recession in industrial business causes a price crisis for agricultural commodities, that agriculture then refrains from buying and thereby creates more unemployment in industries, which in turn causes a greater price pressure upon agriculture. It is also said that National Socialism has found the remedy by subjecting agriculture to a planned market economy. Such a bold statement seems not yet substantiated by facts, for the experiment with planned prices for agriculture was started when recovery had already definitely begun. It remains an open question whether or not in another depression

the device of pegging agricultural prices will of itself break the vicious circle. It could even be argued that such a policy would make a depression more severe, because it would require more purchasing power for food and thereby create more unemployment in industry.

At least one may say that, if the special methods applied under the cartelization of the markets for farm products have been successful to a certain extent, the success has largely been a result of the total industrial recovery which followed an energetic program of public spending. It lies beyond the scope of this study to go into the highly controversial subject of the causes for the German business recovery. In 1932 a normal business recovery had already begun, and it is impossible to prove to what extent the recovery policy was responsible for the subsequent recovery. As far as the fat policy is concerned, it suffices to state that it was organized and set in motion during a period of general business recovery which put the millions of unemployed to work and put money into their pockets. Had the huge unemployment continued, it would have been politically and socially impossible to carry out a policy which raised the costs of a basic food, even with the mitigation of costs for low-priced fats for the unemployed. The reverse question, whether the farm-relief program enacted from 1933 on may have retarded the general business revival, will be considered below (p. 273).

Our description of the manifold methods, ordinances, and regulations under the tight rule of the totalitarian dairy cartel, and of the universal cartel of the Reichsnährstand besides, may have left the impression that the farmer has been put into some kind of a strait jacket. That impression may not be far from the truth, so far as concerns the delivery of the produce to the market, the marketing itself, or the activities combined with selling. But it is one of the outstanding features of the German

cartellization of agriculture that it does not interfere directly with production. The farmer still has freedom of action in the domain of managing his farm, organizing his livestock herds, and utilizing his land for manifold purposes. As formerly, he has the primary task of adapting his crop and livestock production to the changing relations between cost factors and prices for his produce. The overwhelming majority of German farms, no matter of what size, belong to the types of diversified farms with income from livestock, animal products, grains, and at least some root crops. Hence, farmers must still constantly watch price relations and act according to their own judgment about the present and the future in the market. The Four-Year Plan and similar nation-wide drives may lay special stress on some of the most desirable changes, but unless the price relations confirm these public appeals, the farmer will be hard of hearing.¹

Nevertheless, the entire picture has changed in some basic aspects. Besides fixed prices, there exist quotas for the volume of produce that may be sold at a price which may be satisfactory, while any amount beyond the quota can be disposed of only at a price that means pecuniary punishment. The paramount task of the farmer is, therefore, to organize the farm in such a way as to permit the full utilization of the various quotas, and also to expand production into those markets where no quotas as yet exist and where the highest net return may be expected, under the specific conditions of his particular farm, its climate and soils, its inventory and operating capital, its mechanical power, its labor supply, and its

¹ See an unusually illuminating approach from the angle of pure economic theory, to the problem of adaptations to prices by farmers under planned market economy or monopoly situations, in Heinrich Marquardt, "Die Ausrichtung der landwirtschaftlichen Produktion an den Preisen," *Probleme der theoretischen Nationalökonomie* (edited by Walter Eucken, Jena, 1934), Vol. III. See also Carl Boehm, *Die Elastizität der deutschen Getreide-Anbauflächen* (Sonderhefte des Instituts für Konjunkturforschung, 48, Berlin, 1936); and Vogel and Boehm, *op. cit.*, pp. 34 ff.

proximity to markets—to mention only some of the decisive factors.

Such adjustments of farmers are just as rapid as they used to be before the planning of the market. The hog cycle in its previous form has disappeared as a natural consequence of fixing the price of hogs and the price of feed, thereby stabilizing the changing ratio between hog price and feed price to which farmers formerly reacted en masse. What remains is a fluctuation that follows the volume of the feed supply.¹ The persistent mobility of the farmer and his precise final adaptation causes a good deal of grief to the planning board of the Reichsnährstand because, in addition to many welcome and anticipated changes, there are often a good many unforeseen and unwanted shifts and reactions. Since the planning boards are after all manned only by human beings, and have to suffer from the natural limitations of such—as these officials recognize more than do the over-zealous advocates of more planning—they have to be vigilant against such shifts.

EFFECTS ON LAND UTILIZATION

Table 30 indicates something of what the German farmer did between 1932 and 1935 in response to the new cartel policy of fixed prices and quotas. Unfortunately, because of changes in methods of collecting data in the agricultural census of land use, the 1935 figures are not precisely comparable with those of previous years. Nevertheless, the general tendency is evident.

The loss of 733,000 hectares of area in agricultural use is explained by increases in the acreage used for forestry, housing, and farmyards, and for roads and other public purposes. This loss overcompensates for the inclusion of the territory of the Saar, omitted up to 1935, which added 115,000 hectares in agricultural use.

¹ See Vogel and Boehm, *op. cit.*, pp. 33-42.

TABLE 30.—CHANGES IN AGRICULTURAL LAND UTILIZATION IN GERMANY FROM 1932 TO 1935*

(Thousand hectares)

Use or crop	1932	1935	Net change	1935 as percentage of 1932
Tillage	20,475	19,331	-1,144	94
Permanent pastures	2,658	2,908	+ 371	109
Meadows	5,502	5,623	+ 121	102
Horticultural land	592	583	- 9	98
Orchards	53	102	+ 49	192
Vineyards	83	81	- 2	98
Basket willows	7	9	+ 2	129
Total	29,370	28,637	- 733	98
MAJOR USES OF ARABLE LAND				
Wheat, rye, barley.....	8,298	8,251	- 47	99
Oats and mixed grains.....	3,651	3,310	- 341	91
Mixed legumes	57	43	- 14	75
Mixed grains and legumes.....	221	142	- 79	64
Malze	38	72	+ 34	189
Potatoes	2,879	2,750	- 129	96
Sugar beets	271	373	+ 102	138
Mangels and Swedes	1,067	1,077	+ 10	99
Peas, beans, cabbage	76	131	+ 55	172
Rape, mustard, flax.....	11	69	+ 58	627
Clover and alfalfa	2,062	1,833	- 229	90
Other fodder plants*	244	266	+ 22	109
Pasture on tillage.....	506	310	- 196	61
Fallow	326	160	- 166	49

* Data (all exclusive of the Saar) from *Statistisches Jahrbuch, 1933*, p. 65; *Ibid.*, 1935, pp. 84-83.

* The most important is serradella (*Ornithopus sativus Brotzeri*), first separately given for 1935.

Within the reduced total agricultural area, the most remarkable shift is that of 371,000 hectares from crop land into permanent pastures and meadows. The doubled acreage for orchards is also astonishing if we think of the heavy long-term investment they require. If we ignore bush berries, at least five or six years elapse before new orchards yield marketable crops.

The German dairy farmer chose to give his cattle herd 5 per cent more pastures and meadows, as the cheapest and most necessary means of enlarging the home-grown fodder basis. This shift was made to close the gap in the protein-feed supply, caused by the decline of imported oil cake from 2.3 million tons in 1932 to 1.3 million in 1935. It may be argued that hay is no real substitute for oil cake, but feed experiments show that the requirement for concentrates depends essentially on the amount and quality of the basic feed, especially hay. More and better hay can save even such a large amount of concentrate feed.

At the same time, the area in fallow has been cut from 326,000 to 160,000 hectares. This means an increased intensity of cultivation and production on the "land on vacation," as the progressive farmers who have abolished fallow long used to call it. The effect of reducing fallow is almost the same as an addition of arable land. The removal of temporary pasture from tillage similarly renders that land more available for crops.

The total acreage under wheat, rye, and barley did not change much, though less wheat and more barley was grown; but the acreage in oats and mixtures of oats, barley, and rye has been reduced by more than 9 per cent. The potato acreage has been reduced by nearly 4.5 per cent; this is almost entirely due to reduction in the acreage of early potatoes, which rank as a vegetable rather than as a starch carrier. Mixed legumes and mixtures of grains and legumes have been planted on a much smaller scale, while the small maize acreage has notably increased.

This brief survey is given only to demonstrate the striking mobility within the millions of individually managed crop rotations. Though the changes are not more striking than over other three-year intervals, they bear witness to the continuing alertness of the farmers and

their close observation of the repercussions of the cartel activity upon the price situation. Though the prices are no longer the direct barometer of the market, but rather signals to obey, they nevertheless remain the compass for every single farmer. Many farmers have resented the quota system for marketing because their assigned quotas did not fit the necessities of their specific type of farming, or because, during the years taken as a quota base period, their farms had bad crops or no production at all. But since they have no alternative and the quota cannot often be adjusted to their needs, they have to adjust their farming to the quotas. As a rule, the farmer has accepted this process without revolting because of the general improvement of the farm situation all over the country, whether or not he accepts the official interpretation of this improvement as an achievement of the new regime.

EFFECTS ON AGRICULTURAL OUTPUT AND RETURNS

The stabilization plan is alleged to have changed the prices of agricultural products, especially prices of milk and dairy products, cattle and hogs, lard and bacon, oil seeds and fibers; and those responsible for the plan assert that it has increased the volume of production as well.

According to the index computed by the German Institute of Business Research, taking the average for 1927-28 and 1928-29 as 100, the volume of agricultural production has varied as follows; column A including, and column B excluding, the share due to imported feedstuffs:¹

Year	A	B	Year	A	B
1924-25	86	87	1930-31	107	111
1925-26	89	95	1931-32	106	113
1926-27	88	90	1932-33	104	108
1927-28	97	96	1933-34	110	117
1928-29	103	104	1934-35	113	122
1929-30	104	109	1935-36	112	121

¹ Supplement to the *Weekly Report of the German Institute for Business Research*, Feb. 16, 1937, p. 2.

The total volume of production has obviously a tendency to continue the rising trend, as would be expected under the condition of an artificially created shortage in the market and renewed profitability after four years of radically receding net returns.

Indexes of wholesale prices, with the average for 1913 used as the base, run thus for selected years:¹

Year	Industrial finished goods	Agricultural implements	Fertilizer	All farm products	Animal products	Livestock	Crops
1928	158.6	126.8	81.8	134.3	144.0	111.3	142.2
1929	157.4	127.0	84.5	130.2	142.1	126.6	126.3
1932	117.9	112.5	70.4	91.3	93.9	65.5	112.0
1935	119.4	105.5	66.8	102.2	107.1	84.3	113.4
1936	121.2	105.3	66.8	104.9	109.4	89.4	114.1

From the low in 1932, prices of agricultural products as a group recovered to about the prewar level. By 1935, both crops and animal products had attained relatively high price levels, while livestock prices lagged behind. But much of the disparity between agricultural and industrial prices had been overcome. Indeed the 1935 indexes for farm implements and fertilizer indicate that prices of some important commodities that farmers buy continued to decline during the recovery. A comparison between the price indexes for production goods that farmers buy and those for products that farmers sell would probably show that the disparity has almost disappeared.

A better price and a larger volume of production together must find their expression in improved cash returns to the farmer. The figures in Table 31 show this. It follows that the stabilization measures at least did not prevent such a change. Between 1932-33 and 1935-36, dairy farmers gained more through increased returns from

¹ *Statistisches Jahrbuch, 1937, pp. 296-97.*

cattle and calves than from sales of milk. Prices of cattle and calves had dropped more than those for milk. They also rose more after the depression, and showed a tendency to regain their former relation to milk prices. Prices of calves and veal showed a rise even more pronounced than those of cattle and beef, because the demand is more elastic. From the depth of the depression up to

TABLE 31.—GROSS CASH RETURNS OF GERMAN AGRICULTURE, SELECTED YEARS, 1924-25 TO 1935-36*

(Million marks)

Year	Grand total	Crops				Livestock and animal products		
		Total	Grains	Oilseeds	Other	Total	Live stock	Cow milk
1924-25.....	7,530	2,991	1,347	46	1,596	4,539	2,709	1,454
1928-29.....	10,228	3,752	1,733	23	1,996	6,476	4,069	1,927
1932-33.....	6,405	2,645	1,377	3	1,265	3,760	2,057	1,371
1935-36.....	8,698	3,355	1,542	38	1,775	5,343	3,254	1,650
Percentage of 1932-33	135.8	126.8	112.0	1,266.7	140.3	142.1	158.2	121.0
Year	Specific products							
	Potatoes	Sugar	Fruits	Vegetables	Hogs	Cattle	Calves	Sheep
1924-25.....	570	441	225	170	1,483	858	279	89
1928-29.....	602	488	314	289	2,509	1,113	384	63
1932-33.....	381	429	168	137	1,243	593	182	39
1935-36.....	594	494	233	195	1,871	1,002	331	50
Percentage of 1932-33	155.9	115.2	138.7	142.3	150.5	169.0	181.9	128.2

* Data from *Statistisches Jahrbuch, 1936, p. 509; Ibid., 1937, p. 541.*

the crop year 1935-36, gross cash income from all crops increased 27 per cent, that from livestock 58 per cent, and that from animal products 23 per cent. These figures offer supporting evidence for what was stated in

discussing the experience with the stabilization of carbohydrates (p. 157). From 1928 on, that campaign had put the brakes on declines in prices of grain, potatoes, and sugar beets; hence, carbohydrates could not gain as much in the recovery as animal products and livestock, the prices of which had been forced down further by the stabilization of carbohydrate prices.

It may be objected, with good reason, that the farmer lives neither on prices nor on prices times volume, but on the margin between gross income and all expenditures. Table 32 shows that the general situation for the

TABLE 32.—GROSS AND NET RETURNS OF GERMAN AGRICULTURE, ANNUALLY, 1924-25 TO 1936-37*

(Million marks)

Year	Gross returns	Expenditures	Net returns	Year	Gross returns	Expenditures	Net returns
1924-25.....	7,530	5,703	1,827	1931-32.....	7,350	6,153	1,197
1925-26.....	8,072	6,231	1,841	1932-33.....	6,405	5,519	886 ^b
1926-27.....	8,334	7,185	1,149	1933-34.....	7,409	5,522	1,887
1927-28.....	9,345	7,992	1,353	1934-35.....	8,302	5,591	2,711 ^c
1928-29.....	10,228	8,033	2,195 ^c	1935-36.....	8,698	5,989	2,709 ^c
1929-30.....	9,808	7,881	1,927	1936-37.....	8,861	6,324	2,537
1930-31.....	8,646	6,920	1,726				

* Data from *Statistisches Jahrbuch, 1936*, p. 500; *ibid.*, 1937, p. 541.

^a Pre-depression peak.

^b Depression low.

^c Recovery peak.

farmers was improved to such an extent that this net income in 1934-35 and 1935-36 exceeded that of the peak postwar year (1928-29) by 23.5 per cent. It now pays the farmer to produce more fats, and the average net income also permits an increase in the breeding stock and other improvements in the productive capacity of the land.

But it will take time to increase the volume of production, because no more land reserves are available.

The reclamation of swamps by ditches and of marshes by dikes (*polder-land*), which has received so much publicity, contributes no additional acreage to speak of, and it takes a long time before reclaimed land can produce average yields. As a matter of fact, the total area in agricultural use suffers a small decline because of a growing demand for land for public use. Every additional unit of volume must be produced by more intensive cultivation.

It is not difficult to show that the artificial price control was achieved essentially by restriction of imports, the longest lever the government had at its disposal. This indirect control of the price level has been more powerful than any one of the other interferences. The separation of the domestic price level from that of the world market, in combination with the radical reduction of taxes and interest and, last but not least, the revival of urban purchasing power, have ultimately re-established the profitability of German agriculture. The general price level would remain the same if all the other measures applied, especially the cartelization of the market, were scrapped or their compulsory character removed. Such a course is most unlikely to be chosen in the near future, but it is mentioned in order to stress the real force behind the domestic price level.

EFFECTS ON CONSUMERS

From the standpoint of the consumer, the situation has very similar features. He has lost a good deal of the advantages in purchasing power for food that developed during the depression. It is a well-known phenomenon that real wages (that is, money wages adjusted for purchasing power of money or the index of commodities consumers buy) in general tend to decline with the progress of the business cycle toward its prosperity peak

and to be highest during the depression. This refers, of course, to the wages of those who are still fully employed. The previously quoted data on purchasing power for fats illustrate this clearly (p. 99). The impression is reinforced by the accompanying tabulation showing the relative purchasing power for certain fats represented by the earnings of a coal miner for one shift in the bituminous coal industry.¹

Year	Butter ^a	Margarine ^b	Imported lard ^c
1913	100	100	100
1929	88	154	118
1932	103	206	159
1935	96	94	80

^a Berlin retail.

^b Based on the cheapest grade of margarine. In 1913 only one grade of margarine was on the market; in 1932, four grades; and in 1935, three grades. See Table 23, p. 181.

It is true that the high output of German agriculture plus the high food imports from 1929 to 1932 permitted the German population, considered as a whole, to maintain an unusually high standard of nutrition during the depression. In fact, at the depth of the depression, the German people consumed more meat, more fats, and more fruits and vegetables per capita than ever before. This has been the great social contribution of agriculture in the world at large: through its stable production it pegged the purchasing power of the consumer for food, though with the extremely painful consequence of collapsed prices for its products.

Averages of per capita consumption, however, do not tell the whole truth. With several million workers and their families on relief, low agricultural prices did not provide for a distribution of the whole food supply such as prevailed before the depression. Those who remained

¹ Data from *Statistisches Jahrbuch*, 1926, 1934, 1936.

employed enjoyed a disproportional gain in purchasing power for food, while the unemployed, with their dole—representing at best only one-third of the income of the employed—lost disproportionately.

The German consumer has now a lower average purchasing power, especially in food, than before the depression. Income from wages and salaries, which at its peak in 1929 had reached 43 billion marks and in 1932 fell to its low of 26 billion, climbed to only 32 billion in 1935, or to 74 per cent of the pre-depression level, while agriculture and forestry obtained in 1935 an income of 102 per cent of that in 1929.¹ The food component of the cost-of-living index, if taken as an inverse measure of the purchasing power of the mark spent by the food consumer, fell from 155.7 in 1929 to 115.5 in 1932, and then rose slowly to 120.4 in 1935 and 124.0 in July 1936.

These figures seem to be in contrast to the extraordinary increase in the cash returns of agriculture from 6.4 to 8.8 billion marks between 1932 and 1935—an increase of 37.5 per cent. This increase was due in part to an increment of output by 8 per cent between the years 1932-33 and 1935-36; but prices played an even larger part in raising the total gross income.

The only plausible explanation for the disproportionality between the food-price index and the farm income that remains is that "dealers' margins" absorbed a good deal of the increase in prices. Such an absorption would not be exceptional. It is a well-known phenomenon that the gross margin between farm prices and retail prices tends to be relatively rigid. When prices decline, this margin represents an increasing proportion of the retail price, and vice versa it represents a declining share in the retail prices when they rise.² It is the many rigidities

¹ *Statistisches Jahrbuch, 1936*, p. 542.

² Karl Brandt, "Handelsspanne und Deflation," *Blätter für landwirtschaftliche Marktforschung*, December 1931, II, 275-80.

in the cost items included in the miscalled dealers' margin—like freight charges, rents, wages, salaries, taxes, insurance premiums, interest, and others—that cause this lag. It is obvious that the farm prices of agricultural commodities suffer from this circumstance when prices fall, but that they also gain when prices rise. The dealer, on the other hand, is often better off when the margin per unit is relatively small.

This rigidity of the gross margin exists under a *laissez-faire* policy toward the market as well as under any other system. It may well be that strong pressure exerted upon the trade by the cartel may temporarily bring about a small reduction in the gross margin. But in the long run, only such measures promise any success which reduce costs of distribution of food. A concentration or contraction of the trade may have such an effect. But in a country like Germany, where the food trade has been one of the few remaining fields in the economic system where well-nigh perfect competition ruled, it is very doubtful whether such wholesale savings can be achieved.

A glance at the retail prices of foods shows that quite a number of basic foods were lower in 1935 than in 1932, and that only in some groups did prices rise from 1932 to 1935. The retail price of rye bread, which is the bulk of the bread consumed, declined from 35 pfennig per kilogram to 33. The Berlin retail price of wheat bread declined from 54 to 49. Prices of potatoes did not change much. The retail price of fluid milk and eggs declined or remained stable in most cities. This is another reason why the increase in retail prices of meat, and especially of fats, did not find as marked an expression in the cost-of-living index for food, as might have been expected at first sight.

Berlin retail prices of the commodities here under consideration showed a conspicuous rise between 1932 and 1936, as shown in Table 33. These prices show clearly

TABLE 33.—BERLIN RETAIL PRICES OF VARIOUS FATS, 1929, 1932, 1936*

(Marks per kilogram)

Commodity	1929	1932	1936
Pork	2.42	1.38	1.60
Bacon	2.84	1.72	2.18
Lard	2.37	1.59	2.05
Butter	4.12	2.76	3.11
Margarine			
Grade I	1.38 ^a	1.20 ^a	2.20 ^b
Grade II	1.20 ^a	1.05 ^a	1.96 ^b
Grade III .....	.96 ^a	.80 ^{a,c}	1.28 ^{b,d}
Milk .....	.30	.25	.24

* Data from *Statistisches Jahrbuch*, except as noted below.

^a Prices from a graph in Karl Brandt, "Die deutsche Speisefettversorgung," *Der deutsche Volkswirt*, Aug. 26, 1932, based on an investigation by the Institut für landwirtschaftliche Marktforschung. This source had to be used because official German statistics have never published retail prices for margarine.

^b Prices from Institut für Konjunkturforschung.

^c Average of grades III and IV; price of grade IV was 0.68.

^d With the tax reduction (see p. 173), grade III sold in 1936 for 96 pfennige per kilogram.

where the consumer has been taxed. The major loss of purchasing power is that in margarine.¹ Prices of the

¹ The Economics Department of the Deutsche Bank und Diskonto Gesellschaft Berlin in a letter of July 3, 1937 gave the information on margarine prices summarized below.

The department stores sold margarine at the following prices, in marks per kilogram:

1929 Jan.-June	1.04	1932 Jan.-June .....	.64
July-Dec.	1.00	July-Dec. ....	.50 ^a
1930 Jan.-June	1.00	October .....	.545 ^a
October .....	.96	November .....	.535 ^{a,b}
December .....	.88	December .....	.49 ^a
1931 Jan.-June .....	.88	1933 Jan.-Apr. ....	.49 ^a
July-Dec. ....	.77		

^a Only in 1.5 kg. lots.

^b Changed to 49 at end of November.

These used to be considerably below the prices asked by independent retail stores.

The prices given were for the lowest grade, but the bulk of all margarine produced belonged to this group. Besides this grade, better grades were sold. The best of these had a price of 2.00 marks per kilogram in 1929; and for this

other fats have risen from the depth of the depression but have remained lower than in 1929, as is true of the general price level also.

The agricultural market cartel has had still another effect in so far as it curtailed the supply of available fats. While retail prices cannot rise beyond the level fixed by decree, the limited supply has been differently distributed. Some consumers have enough money to buy all they want and, if necessary, store it, while the underprivileged people can get little or none. It was feared that all sorts of unfair practices would grow up under the shortage—for example, the war-time trick, that reappears where-

the industry maintained a price of 1.60 marks per kilogram from 1931 through 1933.

From April 1933, the price of margarine was raised by an excise tax of .50 mark per kilogram. But the poorest people on relief received certificates worth the tax for use in buying margarine. The margarine industry began to shift into higher grades. From July 1933 on, it was forced to produce the lower grades in the same proportions as in previous times. From November 1933 on, the government fixed the prices as follows:

Market grade, without tax.....	.76
Second grade, including tax	1.32
First grade, including tax.....	1.96
Select grade, including tax	2.20

From November 1934, the market grade was abolished and the price of the second grade fixed at 1.26 mark, while the first and select grades were kept at the same price. But the certificates worth .50 mark per kilogram were reintroduced for people on relief. The second grade represented 75 per cent of the volume of production, while the first and select grade covered 12.5 per cent each.

The price of the second grade is a definitely fixed retail price, while the prices for first and select grade are only maximum prices which may be lowered by the trade if it chooses.

The largest butter retail chain (*Verkaufs Verband Norddeutscher Molke-reifen*), owned by a group of east-German co-operative creameries, gives the following data on the prices of five grades of margarine as they were obtained in its retail stores:

Year	I	II	III	IV	V
1930	2.16	1.76	1.36	.96	...
1931	2.00	1.60	1.36	.96	...
1932	1.60	1.36	.96	.56	...
1933	2.20	1.96	1.68	1.32	.76
1934	2.20	1.96	1.26	...	...
1935	2.20	1.96	1.26	...	...
1936	2.20	1.96	1.26	...	...

The author is obliged to both corporations for their courtesy.

ever prices are fixed, of requiring consumers to buy other goods also if they want to get the scarce commodity. To prevent this, in the fall of 1936 the government introduced a system of rationing sales of fats according to customers' lists to be kept by the retail stores, which are a less ignominious equivalent of war-time ration cards. In addition, any compulsion to buy fats in combination with other goods was declared illegal. The customers' lists have solved the problem of fair distribution of fats in the form of a retail-distributing quota.

At the same time, the government felt it necessary to investigate the curtailment of fat supplies. When the reduction in margarine output was decided upon in 1933, the figure set was hardly more than a guess based on past supply-price relationships. It is hardly surprising that adjustments had to be made when more money began to circulate at a faster rate and when the demand over-compensated the increase in price. The production of margarine and lard compound (*Kunstpfeisefett*) has increased as shown by the following output figures in metric tons:¹

Year	Margarine	Lard compound
1934	381,682	12,167
1935	407,185	12,867
1936	423,252	13,643

These concessions to consumers reflect the growth of domestic supplies of fats, so that the original restriction upon imports of raw materials was not directly affected.

It is almost superfluous to ask who pays the excise tax. When the Prussian government, in a grim attempt to keep its budget balanced, in 1932 introduced a slaughter tax with a yield of 350 million marks, it was assumed that the butchers and the consumers would have to pay it. In fact, by depressing cattle and hog prices, it was

¹ *Wirtschaft und Statistik*, May 1, 1937, p. 337. From April 1, 1936, data cover the Saar, which was previously excluded.

wholly shifted back upon the farmer, who was then the weakest party in the market.

The result of the margarine tax is entirely different, for obvious reasons. Neither the fat producer nor the converter nor the dealer pays it. The consumer pays the tax because prices are fixed in all stages in such a way as to leave no leeway for shifting the tax burden. In 1935-36 the margarine tax yielded 217 million marks. But this figure shows only the magnitude of the item in the budget for state revenues. As a measure of the burden for the consumer it is rather immaterial, since what counts is the total price of fats and its relation to income and other goods, and not the derivation of fees or taxes.

Perhaps the actual per capita consumption of food in Germany may show better than any relative figures how the German consumer has been affected by the fat monopoly and the cartel for the dairy industry.

As Table 34 indicates, the average intake of all fats was 2.9 kilograms lower in 1935 and 1.6 kilograms lower in 1936 than in 1932, or 10.7 and 5.9 per cent lower, respectively. This does not mean that the population suffers from anything like a shortage of food. The total caloric intake in 1935 was about 5.5 per cent, and in 1936 about 2.7 per cent, lower than in 1928.¹ But even these figures give no indication of any real suffering. As pointed out before, nobody knows enough about the physiological optimum of fat consumption in its relation to caloric requirements. The differences between Latin and North European levels of fat consumption are important in this regard.

The German consumer, while he certainly likes to buy his food cheaply, is aware that he cannot expect to have the German farmer supply him permanently at the prices or price ratios that prevailed in 1932. It is recognized all

¹ According to Supplement to the *Weekly Report of the German Institute for Business Research*, Feb. 10, 1937.

over the country that the well-being of the farm population is to the ultimate benefit of the mass of the consumers, in part because it creates employment. There can

TABLE 34.—AVERAGE PER CAPITA CONSUMPTION OF VARIOUS FOODS IN GERMANY, 1929 AND ANNUALLY 1932-36*

Food	Kilograms per year						1936 in percentage of	
	1929	1932	1933	1934	1935	1936	1932	1936
Bread flour	105.8	98.0	100.5	101.8	104.6	110.5	113	104
Other grains and legumes*	11.5	11.8	12.8	....	11.5	10.7	91	83
Potatoes	172.0	191.0	187.1	179.9	173.8	171.0	90	99
Sugar	23.4	20.2	19.9	21.4	21.7	22.5	111	96
Fruits*	48.1	38.6	40.7	....	34.3	37.3	97	78
Vegetables*	41.4	41.0	41.2	....	41.5	43.7	107	106
Fish	9.2	8.5	8.8	8.7	9.9	11.8	139	128
Eggs*	8.0	7.8	6.9	....	6.5	6.6	86	82
Meat, excluding fats.	44.9	42.1	42.1	45.4	44.5	43.4	103	97
Milk	117.0	105.0	104.0	107.0	109.0	113.0	108	97
Cheese*	5.2	6.0	6.1	....	6.2	6.3	105	121
Butter	8.0	7.5	7.8	7.8	7.8	8.5	113	106
Margarine	7.0	7.8	6.2	5.8	6.1	6.3	81	90
Edible oils	2.0	2.0	1.8	2.1	1.8	2.5	78	81
Vegetable fats	1.1	1.2	1.3	.7	.7	....	....	....
Bacon, lard, tallow..	8.2	8.5	8.1	8.3	7.7	8.1	95	99
Fats	26.3	27.0	25.2	24.7	24.1	25.4	94	97

* Except as noted, data from *Statistisches Jahrbuch, 1937, p. 363.*

* Data from Supplement to the *Weekly Report of the German Institute for Business Research, Feb. 19, 1937.*

hardly be any better illustration of that attitude than the fact that the stabilization of agricultural prices was begun, and developed in its technique, by the representatives of the German labor unions when they were the most influential party in the German Diet.

One phenomenon that has attracted international attention requires brief explanation. Under the rule of the food cartel there have repeatedly been shortages of cer-

tain food commodities. In 1935, and again in 1936, the retail trade was temporarily unable to meet consumers' demands for eggs, butter, lemons, and certain cuts of meat. These shortages are always of a sporadic character. They find their explanation in the accidents of a planned economy, where commodities do not flow according to the automatism of freely moving prices, so much despised by the advocates of planned economy. In such a system of commanded prices, commodities move at certain times only upon the order of the official who is responsible for that particular commodity. It sometimes happens that everything has not been taken correctly into account, that some forecasts were wrong, and that supplies are consequently inadequate in certain areas.

This holds true not only for the domestic market but also for imports, for which foreign exchange has to be granted by another department upon application filed in advance. If the application called for too small an amount—perhaps not because the required volume of commodities was miscalculated, but because the price abroad went up—or if it was filed too late, the unavoidable consequence is a temporary shortage in the market, especially if the stocks and the usual carryover have been reduced as a part of the market policy. In the domestic market such errors can be more easily repaired, provided that not all of the available supplies had erroneously been disposed of too completely or too early. But such are the typical accidents of a planned economy which operates with scarcity as its main lever, and the results of the concomitant red tape even in a country with a civil service functioning as perfectly as that in Germany.

EFFECTS ON MANUFACTURERS AND MERCHANTS

In an attempt to evaluate the effects of the fat plan upon the processing industries and the merchants, we

have to consider first the influence of the higher price level and the consequences of the business recovery. With lower interest rates, stable wages, and a reduced pressure of competition, both converters and distributors are getting along more easily. The creamery industry and the cheese factories enjoy the peculiar advantage of increasing activity because of a rising share of domestic milk production in the market. Both have attained a much greater efficiency, are better organized than before, and enjoy a really prosperous business. The margarine industry has lost 40 per cent of its turnover and the possibility of expansion, but has gained relative stability under the quota system.

The merchants, however, have been under constant pressure. It has been one of the main aims of the Reichsnährstand to satisfy the consumer and the producer by curtailing dealers' margins. This is in line with a claim of the farmer that has persisted through the ages. We have already noted that a rising price level tends automatically to reduce the relative weight of the gross margin and to improve the farmers' share in the retail price. The government, however, was anxious to reduce the margin still further. Table 35 shows how the prices and gross margin for butter have fluctuated, in marks per ton.

The reduction in the gross margin, from 682 marks per ton in 1933 to 580 in 1935, is considerable. The increase in the turnover of the butter trade has made it possible to utilize the overhead more efficiently. Butter has its special wholesale trade, but many retailers buy direct from the creamery. In the majority of cases, as explained in chapter iii, retailing of butter is not a specialized trade but a part of the delicatessen or grocery store business. Costs of distribution in such stores are joint costs for all the dozens or hundreds of commodities sold. The same is true of margarine. When the total

supply of fats on the market declines, butter and margarine acquire a special attractiveness for the consumer and the dealer.

TABLE 35.—BUTTER PRICES AND PRICE MARGINS IN GERMANY,
ANNUALLY, 1930-35*

(Marks per ton)

Year	Butter price at creamery	Butter price at retail store	Gross margin*	Margin in per cent of creamery price
1930.....	2,744	3,680	936	34.1
1931.....	2,502	3,280	778	31.1
1932.....	2,231	2,840	609	27.3
1933.....	2,178	2,860	682	31.3
1934.....	2,507	3,110	603	24.1
1935.....	2,640	3,120	580	22.8

* Data from *Hildesheimer Molkerei Zeitung*, Dec. 30, 1935, p. 2839.

* Including freight, wholesale expenses (storage, packing, turnover tax, interest), and retail expenses.

The retailer might conceivably renounce any claim for a reward for his service and sell butter at wholesale price plus freight charges, as a kind of a special service to all his patrons who cover all their other requirements at his store. The city of Hameln for instance, had for many years an agreement with consumers' co-operative stores, whereby it granted them the exclusive right to sell a certified raw milk for babies in return for which they had to distribute that milk at farm prices.

The possibility of such shifts in costs of distribution from one commodity to a group of others makes it very difficult to get a basis for appraising the achievement represented by a reduced distributors' margin for fats. With the necessity of maintaining high prices for the farmer and keeping the consumer in good spirits, constant pressure on the dealers' margin is a natural issue. This is especially true in an economic environment where

the maintenance of a low wage level is accounted a supreme necessity in order to foster industrial exports, and where, at the same time, the rising price level for imported raw materials and foods threatens to overthrow the entire domestic equilibrium of prices and incomes so meticulously guarded and patrolled.

EFFECTS ON EXPORTS AND IMPORTS

A final measure of the effects of the stabilization program may be found in the changes in foreign trade. After all, the desire to save all possible expenditures for imported foodstuffs was one of the essential motives in the drastic restriction of imports. To understand the necessity of watching with the utmost care the balance of payments and the liquidity in the foreign-trade budget, we have to consider for a moment Germany's political obligations imposed upon her by the former Allies.

In 1928 the Dawes plan was in force. It provided that Germany had to pay reparations of 2 billion gold marks annually. Since such a transfer of savings was possible only with a favorable balance of trade and services, everything had to be done to establish that balance with a sufficient surplus. During the fairly prosperous years with the influx of American credits, the balance of trade remained unfavorable because the country could pay for its high requirement of foreign raw materials with credits. Even if we ignore the political obligations, it was inevitable that the country would be threatened with economic collapse whenever the influx of credit should stop. The outflow of capital, forced by the run of foreign creditors upon German banks, made it necessary for the government to take emergency measures lest the supply of imported food and raw materials should be stopped. Such a catastrophe could be avoided only by increasing exports or by curtailing imports. Since during the world depression the expansion of exports met fierce resistance

from the majority of nations which are the best markets for German export goods, the only alternative was to curtail imports and save every parcel of foreign exchange for purchases of raw materials. This in turn was a necessity if the export industry was either not to lose ground or to expand.

The balance of payments is directly tied up with the stability of the currency. How narrow became the leeway left to the Reichsbank is best indicated by the fact that from 1932 on the financing of the recovery policy forced the country to throw into the foreign-payment budget its last gold reserve that served as cover for the currency, and to sacrifice it for purchases of raw material.

As a consequence of the political attitude of the Hitler regime, there was no possibility of securing a sizable foreign loan. Therefore the lack of a sufficient volume of export trade and the necessity to buy essential raw materials for the maintenance of employment, combined with the absence of a reasonable gold coverage for the currency, remain up to this day the real forces behind the restriction of imports and the attempt to build up the domestic resources in order to save foreign exchange. Here is a political deadlock or an economic trench war between Germany and England as the potential creditor for a loan to her. Germany insists on economic concessions which England refuses to grant without an agreement on the political issues at stake. With reference to the United States, a similar purely economic deadlock persists. The American industrial tariffs and the anti-dumping legislation prevent a marked improvement in exchange of goods by normal trade as well as by barter.

Bearing in mind the axiom of saving means of payments for foreign raw materials, we shall try to find out to what extent the restriction of fat imports has succeeded in making such savings.

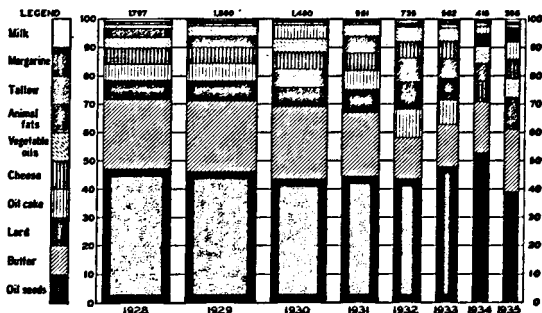
During the first three years of the Hitler regime, the

press and propaganda resounded with bold claims that at last a heroic attempt was launched to deliver the country from dangerous dependence on foreign food.

As Chart 29 and Table 36 indicate, the main reduction in the amount of foreign exchange required for net imports of fats, oil seeds, and oil cake was made between 1928 and 1932. Recalculated at the prices of 1928—in order to get a rough index of the volume of trade—the

CHART 29.—GERMAN GROSS IMPORTS OF FATS (EXCEPT BACON),
IN TERMS OF VALUE, ANNUALLY, 1928-35*

(Vertical scale indicates percentages of annual totals)



* Data from *Statistisches Jahrbuch*, 1932, pp. 174-77, and *Ibid.*, 1936, pp. 226-23. The width of each bar indicates the total value of imports of fats, expressed in million marks at the top of each bar. The area of each section indicates the value of imports of the specified fat. "Animal fats" are almost exclusively whale oil.

value of net imports declined from 1,543 million marks in 1928 to 1,517 million in 1932 and to 1,055 million in 1935.¹ In other words, the reduction of 863 million marks in the net imports between 1928 and 1932 was due to a

¹ *Statistisches Jahrbuch*, 1932, pp. 174-77; *Ibid.*, 1933, pp. 186-89; and *Ibid.*, 1936, pp. 222-25.

TABLE 36.—GERMAN IMPORTS AND EXPORTS OF FATS (EXCEPT BACON), ANNUALLY, 1928-36*

(Million marks)

Year	Net imports	Gross imports	Gross exports	Milk		Butter	
				Imports	Exports	Imports	Exports
1928.....	1,543	1,798	255	15.0	.8	435.4	.4
1929.....	1,570	1,861	291	11.0	2.1	461.4	.5
1930.....	1,275	1,479	204	6.0	3.2	376.9	.7
1931.....	850	981	131	2.0	1.7	219.8	.3
1932.....	680	735	55	.8	.9	106.6	.3
1933.....	523	561	38	1.8	.5	83.8	.0
1934.....	394	416	22	1.7	.3	73.7	.0
1935.....	383	396	13	2.5	.3	86.6	.0
1936.....	415	426	11	3.2	.2	97.7	.0

Year	Cheese*		Lard, oleo		Vegetable oils		Margarine, etc.	
	Imports	Exports	Imports	Exports	Imports	Exports	Imports	Exports
1928.....	102.7	1.9	124.7	.5	66.0	120.9	17.3	26.6
1929.....	106.3	2.8	132.1	.3	70.3	144.1	13.7	31.5
1930.....	88.7	2.9	99.9	.1	71.3	93.3	11.0	25.3
1931.....	62.7	4.4	81.7	.2	42.4	51.8	7.2	26.9
1932.....	41.8	1.8	72.5	.0	38.6	24.4	10.4	10.2
1933.....	33.7	1.6	43.5	.0	26.1	19.1	7.7	6.4
1934.....	31.4	.8	19.0	.0	25.4	13.5	2.6	2.6
1935.....	26.8	.4	20.5	.0	27.3	9.3	4.1	.6
1936.....	27.6	.1	23.1	.0	33.4	8.4	3.5	.4

Year	Tallow		Animal fat ^b		Oil seeds		Oil cake	
	Imports	Exports	Imports	Exports	Imports	Exports	Imports	Exports
1928.....	24.2	1.7	59.3	6.3	849.8	3.4	103.8	92.5
1929.....	18.4	3.1	73.1	6.0	860.7	4.0	114.3	96.7
1930.....	13.8	2.2	96.6	7.4	645.6	1.5	68.9	67.6
1931.....	7.5	1.3	58.2	6.7	436.3	1.3	63.5	38.1
1932.....	8.6	.6	62.1	5.5	320.5	.9	72.9	10.1
1933.....	8.4	.2	38.6	3.1	268.6	.8	48.5	6.4
1934.....	5.9	.0	26.3	2.7	219.9	.3	9.8	1.7
1935.....	4.6	.0	44.5	1.8	155.5	.2	23.6	.3
1936.....	6.6	.0	40.4	1.5	185.6	.1	4.8	.3

* Data from *Statistisches Jahrbuch, 1932*, pp. 174-77; *ibid.*, 1936, pp. 220-23; *ibid.*, 1937, pp. 242-43; and monthly official trade data.

^b Hard and soft.

^c Excluding bacon, but including whale oil.

reduction in volume by only 2 per cent, coupled with a 54 per cent decline in the world level of fat prices. The reduction in the value of net imports from 1932 to 1935 by 297 million marks was due to a 13 per cent decline in price.

Facing these facts, it may be said that the plan has achieved its aim to the extent of at least restricting fat imports. It has succeeded in preventing an increase in the foreign-exchange budget for fats during the period of rising prices and of domestic business recovery, and even made a saving in addition.

One puzzling question remains to be answered: why does Germany with its scarcity of foreign exchange continue to sacrifice the equivalent of 87 million marks (1935) for increasing imports of butter instead of replacing that amount of fat by whale oil for margarine production, whereby, for instance, seven-eighths of the value of the butter import could have been saved in 1935? As a matter of fact, such a radical adjustment is equally inexpedient in foreign trade as in domestic policy. German exports to the Baltic countries depend on payments in farm produce, notably butter. Moreover, most of the import of butter does not require foreign exchange because it is bartered. The last but not the least important reason for the increasing imports of butter consists of the insistence of German consumers on having butter and not margarine spread on bread. Shortages of supply create subversive attitudes among farmers, trade, and consumers which are beyond control.

The rise of the price level abroad has also had the effect of reducing the spread between fat prices in Germany and those abroad. With the passing from the crisis into the phase of recovery, raw-material prices began to rise in the world market. First and most drastically, prices of foreign agricultural export commodities rose. This operated against Germany, because prices of raw

materials rose faster than prices for finished goods. Since she buys raw materials and exports finished goods mainly, the disparity in price advances curtails the advantage of savings made by reductions in quantities imported.

Germany's net imports of food and feed materials declined from almost 5 billion marks at the peak of the prosperity in 1927 to 1.3 billion in 1934, or by nearly 4.7 billion marks. The fat economy has contributed about 1.2 billion marks, or 25 per cent, to that reduction. To this extent the restriction of foreign trade has done what it was expected to do. The other invisible part of such an account defies any attempt at statistical measurement. Nobody can say to what extent higher food prices have pegged the wage level and thereby handicapped German exports in overcoming their chief obstacle—the lower prices of competitors. It is equally impossible to calculate how much the reduction of German food purchases abroad has forced the countries concerned to refrain from buying German industrial goods simply with reference to their own balance of payments. The increased purchasing power of the German farmer has made up for a certain part of the loss incurred by creating more domestic employment. The real net loss lies, however, clearly on the side of Germany, because her industrial exports represented a higher amount of value added as a result of skilled labor, management, and invention than the agricultural production plus the secondary industrial employment. A relatively important part of Germany's industrial plant lies commercially idle and has to be employed by public spending based on public borrowing.

If we ignore these shortcomings of the entire scheme of self-sufficiency in a country with a surplus of skilled manpower and a shortage of raw-material resources, we may say that the fat plan fits into and plays its part in the general policy.

POTENTIALITIES FOR CLOSING THE "FAT GAP"

Thus far, we have dealt with the situation as it existed before the stabilization plan, and with the aims of the plan, the technique used, and the results achieved. In so far as other data have been accessible to the author, they have been used as supplementary evidence, as a check upon deductions and logical conclusions derived from official data and their official interpretation. It remains to evaluate cautiously the potential further development.

Such an evaluation with reference to the total market is necessarily speculative and controversial, but the issue can hardly be dodged. Whether Germany possibly can, and whether she probably will, attain self-sufficiency in fats is a question that has been put time and time again to the best experts that Germany can muster; and it insistently offers itself to the reader of the foregoing pages. Will the country, with its limited land resources, be able to close the "fat gap," and, if so, how will it be done? Or, if the country cannot achieve that ambitious objective, where will it stop and why?

If the author did not have a fairly intimate knowledge of German agriculture in its manifold aspects and through practical experience and research, he would not dare to attempt to answer these questions. But since he had drawn the attention of German agriculture and the public to the fat problem and its intricacies before it was generally recognized as an important issue, and since he had also ventured forecasts, he feels strongly impelled to make a new forecast for some years to come, perhaps with greater apprehension and restraint than five years ago, but also

with more evidence and larger experience than was then at hand.

To avoid misunderstandings, certain assumptions must be set down. The process of changing the structure of essential supplies of a whole nation against many odds, and of turning a trend that has persisted for sixty years, depends on circumstantial factors and the existing objective margin for freedom of action as well as on the political action itself which utilizes that margin. Since the latter is largely irrational in character and therefore unforecastable, it must be excluded from the speculative discussion. It has to be assumed that the German government will continue to try, with the same energy as in recent years, to utilize every opportunity to make the country self-supporting in fats. With such a limited working hypothesis, the possibility that the country will change its entire foreign-trade policy, and consequently a good deal of its domestic economic policy, also, must be excluded.

In an attempt to estimate the existing margin for activities toward self-sufficiency, it must also be borne in mind that the margin is not measurable objectively. Certain economists make the serious mistake of assuming that physical or economic circumstances leave man no alternatives but have a plainly determinable value. They forget that man himself changes his margin for action; and, moreover, that actions which are not directly aimed at changing basic conditions do change them nevertheless.

Approaches toward a solution of the fat problem from the side of drastic changes in the human consumption of fats, except for desperate emergencies, are almost inconceivable and can therefore be ignored. It is a fact that there is a certain wing of opinion in Germany contending that the country should abandon the high fat-level ideal of northern Europe and be content with the lower fat-level of the south Europeans, use more vegetable oils and less animal fats, use less fat and more starch. Feasible

though shifts from one type of fats to others are, the reduction of the total consumption of fats, even with replacement by sugar and starch, would be a most doubtful undertaking. Probably the changed age composition, which results in a larger proportion of adults in the total population, makes for a higher total intake of fats. As long as the people insist on their customary demand for fats, a shortage of supplies creates a most uncomfortable situation in the market—even under dictatorial rule. The discussion of potentialities for closing the "fat gap" must therefore center on supplies.

The first step toward an evaluation of the German fat supply during the next five years must be devoted to the most flexible portions of the fat economy.

In 1934 Germany produced 1,101,000 tons of pure fat. All told, cattle contributed 641,000 tons of milk fat plus 68,000 tons of tallow (including negligible amounts of tallow from sheep). Goats yielded 37,000 tons of butterfat. Hogs accounted for 324,000 tons of fat in the form of bacon and lard. Oil seeds probably contributed some 40,000 tons. German agriculture is organized and operating on the principle of high yields per acre, which is typical of intensive agriculture where land is scarce and other means of production are relatively abundant. The first question, therefore, must be how to produce more fat by fostering those branches of production which yield the highest output of fat per acre, not per farmer.

Once before, during the emergency of the war blockade, the country had to calculate the same way. Aereboe has pointed out that, as a member of the War Food Council, he relied on the following data on average fat yields per hectare (in kilograms), which were supplied by other experts:

- 53 if used as pasture for dairy cattle (plus 48 kilograms protein)
- 80 if used for grazing oxen for fattening (plus 64 kilograms protein)

180 if grown with barley for fattening hogs (plus 40 kilograms protein)

680 if grown with rape (plus 650 kilograms protein)

These data¹ seem to hint at a simple solution. Yet it will be seen that the task is more involved than appears at first sight.

CATTLE AND HOGS

The German cattle herd is a dual-purpose herd. Since there are practically no meat cattle, as such, the German herd has to supply milk as well as meat.² The most realistic way to learn how much fat cattle produce per hectare is to divide the total output of butterfat and tallow into the total acreage used for the maintenance of the cattle herd, including pastures, meadows, and fodder crops on tillage. The 709,000 tons of butterfat plus tallow produced in 1934 were the yield of 12 million hectares—an average of 59 kilograms of fat per hectare—as a joint product with almost one million tons of beef. If we were to count the fat which is not separated from the beef, but is nevertheless an important element in the fat supply, we should probably arrive at something like 900,000 tons of butterfat, tallow, and beef fat—or 75 kilograms per hectare. In the German husbandry of cattle, lean and fat are about equally prominent.

It is much more difficult to point out how much land is used to feed hogs, but we may at least hint at the probable yield of hog fat (in the form of bacon and lard) per hectare. The average yield of potatoes is about 16 tons per hectare, while barley yields 2 tons. Assuming that four units of potatoes equal one unit of barley, and assum-

¹ Friedrich Aereboe, *Der Einfluss des Krieges auf die landwirtschaftliche Produktion in Deutschland* (Wirtschafts- und Sozialgeschichte des Weltkrieges, Stuttgart, Berlin, Leipzig, New Haven, 1927), p. 68.

² The few herds of cross-bred shorthorns in some sea marabes north of the Hamburg-Lübeck line, and some of the Simmenthal meat herds in the subalpine regions, may be ignored in this connection.

ing also that the acreage under barley equals that under potatoes, the average yield per hectare in potatoes and barley would be 3 tons of grain equivalent. Converted into hogs, this represents approximately .6 ton of hogs (dead weight), or .1 ton of pure fat, if we do not count the fat pork. If the method of extracting the fat from the meat also were to be considered, one hectare would yield from .15 to .23 ton of pure fat. This would still leave out of account the pork protein, which is a joint product.

The fact that cattle are the source of 1 million tons of meat, and hogs the source of 2.3 million tons of meat (both in 1934), has to be considered most carefully.

If the total production of hogs should increase sharply, it would tend to depress hog prices. To increase the output of fat through hogs requires, therefore, that increase in the supply of meat be avoided by raising not more but fatter hogs, unless the increased supply can be sidetracked from the meat market by extracting the fat from all the surplus hogs, thereby insuring that only a small percentage of preferred cuts of pork appear as such in the market.

It seems probable that the trend of recent years toward higher weights of hogs will continue. In order to fatten hogs to a heavier slaughter weight, the country needs more carbohydrates. Since the carbohydrate yield per hectare of potatoes is twice as high as that of barley, potatoes produce the same volume of carbohydrates on only half the acreage. It seems logical to expect the potato crop to be expanded perhaps up to 50 million tons as compared with an average of 44 million for the years 1931-35. An average increase of 6 million tons of potatoes, or 1.5 million tons of grain equivalent, would produce 300,000 tons of hogs (dead weight) or 50,000 tons of pure fat, or, if all the fat were extracted, up to 100,000 tons or more. If the total supply of hogs should rise, such extraction may become necessary to relieve the meat market. The in-

crease of 380,000 hectares in potatoes would tend to create another deficit in the national food supply. To make up for that loss, grain yields per hectare would have to be increased by 3 per cent, or a corresponding increase distributed among grains, potatoes, and sugar beets.

If the output of butterfat and tallow is to be increased also—a policy which is stressed with great vigor—the problem is again how to improve the feed supply, and how, at the same time, to avoid the depression of the beef market which will follow a surplus. All the methods that have been mentioned in chapter xi will slowly raise the total feed output. But unless this is achieved by higher yields per hectare of grass and other fodder crops, it will again be necessary to make up the deficit caused by shifting land from one use to another. The attempt may be made to put the best pasture land under the plow, in order to produce fodder crops which yield much more feed per acre than pasture. On the other hand, intermediate crops will be used to raise two crops per year instead of one. Many mixtures of legumes have long been used in all the better climates. Unfortunately, they are fairly expensive because of high seed costs and relatively low yields. They also require more labor at the peak-load period.

Larger crops of sugar beets promise to be the most efficient aid to the dairymen, because the crop of leaves and tops, either alone or with the additional supply of by-product chips, yields a high feed volume per hectare.

A rise in the cattle herd must be prevented not only to avoid a surplus of beef, but also to make cows and cattle in general fatter for slaughter and to increase the milk yield per cow. If the butterfat yield per cow rises considerably, this will most favorably alter the total cost of producing fat. The value of milk increasingly exceeds the value of the culled dry cows. If the yield per cow rises high enough, the price obtained for the outworn "machine"

when it has to be scrapped does not matter. It may even become economical to dump the culled cows, unfattened, into the feed market. Denmark did this, even before the last depression; cows were scrapped by converting the carcasses into industrial fats and meat meal for hogs and poultry.

The same issue, of diverting a part of the joint product from the food market to the feed market, looms up in the production of milk. The more butter Germany produces, the more skim milk or milk protein will become available. As soon as the capacity of the market for absorbing cheese, skim-milk powder, and evaporated skim milk is taken up to the saturation point, all the rest of the protein has to go into the feed manger. But since Germany also seeks to attain independence from foreign protein feeds, this form of utilization of the by-product milk protein fits into the general plan.

It may be safely guessed that the German output of butterfat will continue to rise for a long period. An annual increase of 10,000 to 15,000 tons of butterfat seems to be attainable. In five years this would contribute an increment of 50,000 to 75,000 tons of butterfat plus an equal weight of protein. The required improvement of the average fat yield per cow and per annum, from 65 in 1936-37 to 70 or 72.5 kilograms in 1941-42, is attainable, though it will require much more effort with a herd of ten million cows than for one of two or three million cows, such as those of Denmark, Holland, Switzerland, and similar progressive dairy countries, where conditions for the whole dairy industry are more nearly uniform than those in the different parts of Germany.

OIL SEEDS AND SOY BEANS

The third lever for raising more fat is the production of rapeseed and linseed. One hectare of rape yields .5 ton of pure fat; this is five times as much as hogs via

potatoes, and more than eight times as much as cattle. Rapeseed cake, the by-product, when used as a feed for milk cows, yields .08 ton of butterfat. Hence one hectare of rape really produces approximately .58 ton of fat. If the rape acreage could be increased from 100,000 hectares in 1936 to 200,000 in 1941, this increase would eventually contribute 58,000 tons of fat. To make up for the former yield of the 100,000 hectares shifted into rape, the only feasible way would be to increase the yield of grains, potatoes, and sugar beets or to shift pasture into hoe crops plus cow fodder. Such shifts and consequent adjustments can be achieved slowly, although there may be setbacks due to poor crops. In general, this discussion shows how narrow are the limits for changing agricultural production when a relatively high grade of intensity has been reached and the land supply is so strictly limited.

In German technical bulletins and journals the importance of the soy-bean plant is frequently stressed. It is pointed out that soy beans contain 36 per cent crude protein, 18 per cent fat, 20 per cent carbohydrates, 1.6 per cent lecithin, and 5 per cent mineral substance.³ It is asserted that in Germany soy beans yield as much as in Manchuria—from one to two tons per hectare. But the government has not found it worth while to establish such soy-bean prices as would stimulate production. The propagandists for soy beans call for a price of 400 marks per ton. With a yield of 1.2 to 1.6 tons per hectare, this would mean from 480 to 640 marks per hectare. Inasmuch, however, as soy beans are predominantly a source of protein and yield fat only as a by-product, the decision whether soy beans shall replace other crops falls primarily in the realm of protein economy, although it is ultimately a question of the price relation between fats and proteins whether fat or protein counts more.

³ For example, see A. Dieckmann-Heimburg, *Die deutsche Sojabohne* (Berlin, 1937).

Factors operate against the soy bean that have been mentioned time and again. The soy bean is a delicate plant that has been adapted to German climates only in recent years. It competes in the most intensive truck-farming, hoe-crop, and fruit belts, where plants with the highest yields are grown. As principal crops, legumes fit much better into extensive farming because of their low and unreliable yields. They can utilize nitrogen from the air, and potash and phosphoric acid from the upper subsoil. But all these capacities do not count much in a system where artificial plant food is used to such an extent. "Intensive" plants, i.e., plants with a high capacity for consuming fertilizers, are preferable to thrifty plants like legumes, in spite of the capacity of the latter to improve the soil. Soy beans require a larger amount of solar radiation than Germany has available except in a few counties. Following decades of intensive breeding, the German Chemical Trust in 1929 abandoned its soy-bean division as a hopeless enterprise from a commercial standpoint; and though recently this research is said to have been resumed, the prospects are not much better.

If all the changes previously assumed were to take place within the next five years, and if per capita consumption remained the same as it was in 1934, the deficit of 600,000 tons of fat for food would be reduced by 100,000 tons of fat from hogs, by 50,000 to 75,000 tons of butterfat, and by 58,000 tons of vegetable fat. This total of 208,000 to 233,000 tons would still leave a deficit in food fats of some 367,000 to 392,000 tons, to say nothing of the 344,000-ton deficit in fats for the soap industry. But the German population increases by some 350,000 to 400,000 per annum, or in five years by approximately 1,750,000 to 2,000,000 people.² With an average consumption of 20 kilograms per capita, this adds another 40,000 tons of fat required for

² However, the changing age composition of the population raised the German ratio of adult equivalents from 83 per cent in 1900-13 to 88 per cent in 1938.

food; and it still leaves the fat deficit for food at some 400,000 to 450,000 tons, unless a rather improbable further acceleration in domestic output can be achieved.

CHEMICAL POSSIBILITIES

Within the field of production a certain further potential resource has to be mentioned. Many years ago Professor Bergius developed a process for chemical conversion of wood into a carbohydrate feed which can be processed into sugar. The Scholler process permits attainment of the same end. In principle, these processes solve the problem of how to produce meat and fat from pine or other poor varieties of wood, which will grow on the poorest sandy soil far below the limits of agriculture. Wood carbohydrate may be fed to hogs and thereby converted into meat and fat, and feeding experiments have given evidence of the good quality of the product. It may also be converted into a valuable yeast protein, with carbon bricks as a by-product.

Unfortunately, after almost ten years of small- and large-scale experiments, the question of production costs has not been answered conclusively. The cost of transportation of poor grades of wood seems to be almost prohibitive. Costs of hauling logs out of the forests have been reduced by the use of pneumatic tires and roller bearings on the hauling wagons. But this only reduces the cost for draft power, and poor grades of wood cannot yet be profitably hauled. If heavy timber from forests near the main rafting rivers is used, the price of the timber is prohibitive. If waste wood or poor grades in remote forest areas are used, costs of cutting and transporting become prohibitive. This is why this resource is left idle, under the most ideal circumstances that could be imagined for the exploitation of this invention—the "fortress economy" of Germany today.

Even if the product could compete with agriculturally

produced feed grains, another difficulty would remain. Germany is a wood-importing country. The demand for wood has increased with the building of a vast new industry producing substitutes for cotton and for wool, such as staple fiber, vistra, and woolstra. German forestry has such a remarkably long tradition of efficiency that hardly any reserves of increased production exist that have not been already exploited. From this side, no great surprises are to be expected within the near future.

All the approaches of the fat plan toward the aim of self-sufficiency in fats, from the production side and from the side of human consumption, have applied the lever to that part of the fat economy where one should not expect the greatest leeway for progress. The largest possibility for reducing the country's fat requirements lies in consumption of soap and candles. It is said that Germany, of all nations, has the highest per capita soap consumption. Though it may be difficult to prove this by accurate statistics, it is probably correct that in this respect Germany is in the top rank. The soap industry utilizes "inedible" and waste fats. But the demand has long since grown to such proportions that the great resources for vegetable fats in the tropics have had to be tapped in competition with the margarine industry. Modern methods of refining, decoloring, and deodorizing render any fat so white, bland, odorless, and tasteless that former limits to the variety of fats that are available no longer exist. In the last two decades the soap industry has shifted more and more to the use of palm oil and palm-kernel oil, two products of the same plant.

If chemistry should succeed in making soap from other materials than animal or vegetable fats, and if such other materials can be produced in Germany, it will help to close the "fat gap." During the war period, when the country began to starve because of lack of fats, the German chemist Carl Neuberg solved the problem of produc-

ing glycerine synthetically. The process requires carbohydrates as a raw material from which it derives the product through alcoholic fermentation. Either potatoes or artificial wood-sugar (Bergius) may be used. During the war Neuberg's invention was used to the limit for the production of nitroglycerine and its tamed form, dynamite. Today its use is handicapped because carbohydrates are scarce and the costs are too high. Under normal economic conditions the process is too expensive to compete with natural glycerine, which is essentially a by-product recovered from waste fats.

The replacement of fats in soap must therefore be attacked from another angle. Germany has an abundance of coal and lignite ("brown coal"). Coal is the raw material for the synthetic production of gasoline and lubricants. It is also the raw material for substitutes for the soap base. At present considerable amounts of industrial soap are already produced from lignite and bituminous coal. Candles—formerly another though nowadays relatively unimportant use of fats—are now made almost exclusively from lignite derivatives. It is not impossible technically for the soap industry to shift over entirely to the use of synthetic raw materials for every purpose except that of fine toilet soaps. Whether or not this will materialize will be decided by costs and prices.

But chemistry has launched another, more direct attack upon fats as a raw material for soap. Instead of removing dirt by means of soap, dissolving the fat and grease which makes the dirt stick to the surface of textiles or other goods, these fats and greases may be directly turned into soap (saponified). During the war, direct removal of dirt by mechanical means was used to save fat-soap. The country then produced clay soap with a small fraction of real soap added. Clay simply rubs the dirt off the skin. But since the war the German cleanser industry, with the powerful Henkel factory at Cologne as its

leader, has developed a number of chemical compounds which contain alkalis or discharge nascent oxygen. Some of those, used for washing textiles, contain a little fat.

Another interesting process, which might be called a biological one, yields a washing powder containing no fat. It is based on the fat-digesting enzymes in the intestinal glands of animals, and is produced from them.

The total saving of fats by the use of washing powders has been estimated at about 100,000 tons. Though the details of that private guess are not known, it sounds reasonable.

Washing powders and synthetic cleansers have to some extent taken the place of soaps wherever suds are used. For dishwashing in the restaurant and household, for washing cans and milking machines on the farm, and for the huge bottle-washing machines in the milk-bottling plants and in brewing and mineral-water industries, such fat-free soap substitutes are used exclusively.¹ This process of replacing animal and vegetable fats will go on as chemistry supplies better substances for detergents. Thus far, it encounters limits wherever the human skin or hair, or where other protein substances like wool or silk, must be treated. They obviously can stand neither much alkali nor much nascent oxygen. The bottle-washing powders, for example, cause bad lacerations and eczemas on the hands if they come frequently in touch with the skin. Soaps for toilet use and for washing wool and silk are thus far the strongholds of fat-soap.

Table 37 indicates that the soap industry consumes about 63 per cent of the fats used industrially. Up to 1934 the trend of consumption was definitely upward. Apparently, all the chemical inventions only prevented a still faster growth. It is doubtful whether these figures have

¹ In the United States, cafeterias, restaurants, and households still use for dishwashing suds almost exclusively some form of soap, chiefly flakes and powders.

any bearing upon the trend after 1934. Because up to 1933 the soap industry took full advantage of the sensational decline of its raw material prices on the world market, individuals and industries could not only maintain their soap consumption through the depression but were able to expand it, just as individuals did their margarine consumption. This was promoted by the extreme competition that existed in the soap industry, and especially in the soap trade.

TABLE 37.—FATS USED IN GERMAN NON-FOOD INDUSTRIES, ANNUALLY, 1928-34*
(Thousand tons of pure fat)

Industry	1928	1929	1930	1931	1932	1933	1934*
Total	345	332	322	311	320	375	406
Percentage domestically produced ..	17	19	18	18	18	13	15
Soap industry	210	200	210	210	220	240	255
Paint and varnish industry.....	83	80	65	60	60	85	95
Linoleum, oilcloth, and imitation-leather industry	25	27	23	18	16	20	25
Stearin and similar industries.....	17	16	15	15	15	17	17
Leather industry	10	9	9	8	9	13	13

* Data from von der Decken, *Deutschlands Versorgung* , p. 74.

* Preliminary data.

It was only in 1934 that technical fats were subjected to regulation, hence the data in Table 37 are inconclusive regarding the influence of the fat plan. What they do clearly show, however, is that soap is of considerable importance so far as a possible saving of fats is concerned. If we divide the 255,000 tons of fat used for soap by the population, we arrive at some 3.8 kilograms per capita consumption of fats for soap. It is obvious that the replacement of only half of this amount would be easier than to obtain an equal effect in the food fat budget from either the production or the consumption side.

It may be asked, then, why the fat program did not at-

tack the problem immediately from this angle, the more so since war experience showed that great savings can be made by curtailing the fat supply for the soap industry. Possibly, for all its broad scope, the plan did not go far enough, and operated only on food fats because these seemed the essential concern of the government. More probably, however, another reason was responsible for the omission. The higher prices for oils and fats, and restrictions upon the supply of foreign exchange and of actual supply of fats, were already stimulating the inventiveness of chemists in the cleanser and washing-powder industry to the limit. These industries belong to the best and most reliable taxpayers that the country has. To subsidize them is neither necessary nor desirable. Hence the country can safely count upon gradual replacement of other domestic raw materials for fats in soap production in any event.

As Table 37 also shows, the other main consumers of fats for technical purposes are the paint and varnish industry and the linoleum, waxcloth, and imitation-leather industry. In both cases the oils used as raw materials are so-called drying oils. The best-known drying vegetable oils are linseed oil and tung oil. Chemistry is, however, succeeding more and more in converting other fats into drying oils, thus enabling the industry to choose its materials according to prices. Yet this does not affect the deficit in fats. The chief opportunity for making adjustments consists in replacing plantseed-oil paints by materials that bind the pigment to other drying liquids. Probably no other country has gone farther in that direction than Germany. The German dye, paint, and varnish industries have developed a wide range of cellulose and other paints and varnishes that contain no vegetable oil and have superior qualities. On the other hand, the progress made in nonstaining metal alloys renders unnecessary a good deal of the former painting of metals. But it is

improbable that the demand for vegetable-oil paints will shrink much, since linseed-oil paints are still the most inexpensive and useful treatment for all kinds of woodwork. As Table 37 indicates, this demand fell off during the depression and rose to prosperity heights as soon as the building industry became active again. But it is also a question of the upkeep of wooden structures. In all countries, as soon as depression starts, this expenditure (re-painting) is the first to be postponed for several years.

In the linoleum industry, no substitutes have been invented in the production of good "inlaid" floor covers. Linoleum consists of dried linseed oil in a mixture with cork or cork and rubber. The cheap American types of paper-linoleum are practically unknown in Germany. Here also it is improbable that great changes will occur, because linseed is the cheapest raw material for this purpose. On the other hand, linoleum has been known and used so long in Germany that radical changes in the demand can be expected only if a better material should be produced at equal or lower costs.

A GERMAN WHALING INDUSTRY

In principle, another resource for fats is accessible to Germany. Whaling might be organized with a German whaling fleet. This requires capital investment and the training of crews. The leading German industry producing soapflakes, kitchen soda, and similar cleansing materials has recently been compelled to take an interest in the whaling business, mainly at the suggestion of the Four-Year Plan authorities.

A small German whaling fleet now exists. Its owners have hired whole Norwegian crews of whalers. In the spring of 1937 the whaling fleet consisted of a mother or cooking ship and the necessary complement of whaleboats, plus two chartered outfits. The 1936-37 season was estimated to yield a pure fat equivalent of 15,000

metric tons compared with 5,000 tons in the preceding year.¹

During the Antarctic whaling season 1937-38, Germany was able to more than double her 1936-37 catch. Her share in the international whale-oil production amounted to 90,000 tons. At the same time the Norwegian Whale Oil Selling Pool sold to Germany 107,000 tons of whale oil produced on Norway's factory ships. While the international output rose 27 per cent above that of the preceding year, prices declined to £12-13 sterling per ton compared with £17-18 in 1936-37. The Norwegian fleet has kept up its production and reduced its unsold carryover, although at prices which are said to be below the costs of production.²

If the country had not exploited this opportunity on a larger scale, there were several reasons. The policy toward self-sufficiency, recovery, and rearmament absorbs such huge amounts of capital for long-term investment that many projects have to be postponed temporarily. The costs of whale oil are higher under whaling with German boats than under purchases from Norway, because the Norwegian investment has been amortized to almost nil while the German whalers have to amortize their new equipment. In 1935, when the world output of whale oil (1935-36) totaled 486,000 tons, Norway exported 230,469 tons of whale oil to Germany at an average price of 166 marks per ton or 16.6 pfennigs per kilogram.³ In 1936 this export declined to 115,580 tons.⁴ If we look upon whaling without consideration of cost, but only from the standpoint of foreign exchange, we find that the purchases of whale oil now require no foreign exchange. This is now secured in barter trade. Moreover, if Ger-

¹ Loyd V. Steere, "German Agriculture in the Four-Year Plan," *Foreign Agriculture*, March 1937, I, 113-14.

² Deutsche Bank, *Wirtschaftliche Mitteilungen*, 1938, No. 4, p. 90.

³ *Statistisches Jahrbuch*, 1936, p. 266.

⁴ *Ibid.*, 1937, p. 250.

many were to cease buying Norwegian whale oil entirely, Norwegian trade could answer with retaliatory measures, and for the moment Germany does not want any additional obstacles to her industrial foreign trade. Such a calculation must also consider other possible changes. If the general economic condition of Germany should develop favorably, the exchange of German industrial goods for the produce of Norway's fisheries, other than whale oil, may continue on an even larger scale than today.

Germany may nevertheless try to supply all her whale oil through her own whaling fleet. If German whaling were to yield 250,000 tons, this would leave a deficit of only 90,000 tons of edible fats. Compared with the original deficit of 600,000 tons of fats for food, this would represent only a small remaining gap which might be closed eventually. A complete solution of the fat problem, in the sense of complete self-sufficiency, would require, in addition, the elimination of the total requirement of the soap industry.

This very sketchy outline indicates that technically it is not impossible to make Germany independent of foreign fat supplies, given sufficient time. All retarding factors duly considered, it might take at least a decade and probably much more before such a goal could be attained. In practice it is much more likely, however, that no such 100 per cent program will be fulfilled, but that domestic fat supplies will rise steadily at a moderate pace.

ECONOMIC POSSIBILITIES

It seems safe to say that economic science can point out certain possibilities in the future economic process. In spite of the excessive self-confidence of a particular type of economist, it seems equally safe to say that economic science will never be able to state what is impossible, or to define the limits of man's freedom of action in his

economic activity. Attempts to do so are not merely beyond the competence of economic science; they also involve misjudgments regarding the limitations of human knowledge. Economic reasoning proceeds by rational methods according to limited experience, or with logical deduction based on certain assumptions as to human psychology and behavior. But the economic life of nations is conducted according to economic maxims only to a certain extent. A remarkably large part of economic policy is determined politically. Conclusions concerning future possibilities of German economic policy can hardly be more than an opinion. How well such an opinion is conceived can be demonstrated only in the course of history.

As to the duration of the era of planned economy in Germany, it does not seem permissible to argue that the present policy could not be adjusted to more normal and relaxed economic conditions. If Germany were relieved from the nerve-racking economic pressure and strain of moving on the brink of economic collapse, year in and year out, it is probable that the shining cuirass of the planned economy would gradually be stripped off as an unbearable and even useless nuisance. No matter how such relaxation might be achieved, whether peacefully or by force, this would be a most probable consequence. Economic and political reconciliation with other powers, a foreign loan, or new favorable trade treaties might bring about the change. If concentric political pressure from the side of Germany, Italy, and Japan and their smaller allies should succeed in overcoming their present shortage of foreign exchange, this might have very similar effects. The fervently claimed former colonies which may be returned to Germany sometime in the future seem to be the most dubious item in calculations for an improved fat supply. It would require a long-term investment and would yield only over longer periods.

Basic changes in the entire economic situation of the country that, twenty years after the Armistice, still finds itself in the plight of the loser of the World War would probably change the problem of the fat economy at its very roots. The country would certainly continue to increase the interrupted per capita consumption of fats and would buy huge amounts of foreign oil seeds, while maintaining a moderate protection for the domestic animal-fat industries. The present policy toward closing the "fat gap," based on the philosophy that no other solution is conceivable, would fade away under the powerful impetus of a prospering industrial export policy. This would be especially likely if Germany should obtain a position in her international relations which removed the reasons for the phobia of food shortage.

However, as stated before, this is a vague opinion based on historical observations and on the persistent sentiment of influential German economists, among them Dr. Hjalmar Schacht.

From this optimistic forecast we turn to the question: What might happen if the precarious German economic and financial situation should take a turn for the worse? The answer lies beyond reasonable speculation, because it involves social and political upheavals of incomprehensible dimensions. The author is more inclined to anticipate final though long-postponed success of the German struggle for greater economic freedom of action.

For the American observer it may be said, however, that under the most optimistic prognosis there is not too much hope of reopening the German market for large quantities of American lard or bacon. The German policy of protecting the German farmer will be maintained even if import duties generally should be lowered. The markets for butterfat, tallow, lard, and bacon will remain well protected. Increasing imports of butter might be expected, while the cheapest fats such as oil seeds and whale oil

would be imported in larger quantities. Still, no prediction is trustworthy because too many items in the calculation are flexible. If sufficient compensation in the form of tariff reductions on industrial finished goods should be made and if lard should be offered at sufficiently low prices, Germany might even reopen her lard market within narrow limits to the corn-hog farmers of the Middle West. Since in this country hog fat has lost out in the battle with processed vegetable oils, there is scant reason to expect a contrary result in Germany, especially as long as the same amount of foreign exchange buys four to five times as much whale oil as lard and as long as the German consumer prefers a whale-oil margarine to lard.

CHAPTER XIV

ECONOMIC IMPLICATIONS OF THE GERMAN EXPERIMENT

The reader of the preceding chapters, especially if an economist, has certainly been often struck by the lack of obedience to the laws of costs, and even by the lack of any consideration of them, so obviously demonstrated by many of the measures and policies explained. Valid as most such economic objections may be, in an environment where lowering costs wherever possible is considered as a moral obligation, it is hardly possible to come to any plausible interpretation of the policy pursued by the stabilization campaign for dairy products and fats, if one's thought is limited to economic reasoning.

FORCES BEHIND THE EXPERIMENT

The stabilization of the German fat market is no isolated experiment in farm relief. It is solidly embedded in the economic policy of autarchy. Beyond that, it is part of a new political, social, and economic ethics which is the successor to the postwar phase of socially restrained and transitional capitalism. Correctly to interpret the fat plan in its widest ramifications requires familiarity with the basic thought on the general course of economic policy. This is no new invention of the dictatorial regime. It was adopted in principle in 1928 and has since been pursued with increasing insistency, but has been fully developed only under the era of compulsion.

Some of the main psychological presuppositions underlying the adoption of the aim of food autarchy go back to the war period. The desperate lack of food, and especially

of fats, and the consequences of the blockade, have engraved themselves deeply in the memory of the urban populace. As in many other European countries, the desire to have at least an adequate emergency supply of food at hand has created the mental platform for a policy that abandons the principle of buying food where it is cheapest. In many small countries it has led to the introduction of a grain monopoly and premiums for keeping up grain acreage, even where the climate is altogether unfavorable. In Germany this partly subconscious fear of a new scarcity of food has been nourished on the fear lest desperate scarcity of foreign exchange may prevent buying necessary food imports. This has slowly removed any objection on the part of consumers to a policy of high protective tariffs and food-import restrictions.

This is not the place to discuss the assumption that an adequate capacity for food production during times of peace guarantees adequate supplies in war time. It can only be hinted that the drain of man power, horses, and mechanical draft power, reductions in supplies of fertilizer (since nitrogen happens to be a major war material) and implements, and the more wasteful disposal of food and feed supplies will probably upset the whole calculation in any war that assumes large dimensions and stretches over a long period of time. But it must be recognized that all over Europe the attitude of the consumer masses, and that of their political spokesmen, is largely determined by the desire to foster the productive capacity for domestic food supplies. This attitude leads to abandonment of predominantly economic reasoning. It is admitted that such a policy may cost an even heavier price and lower the standard of living; but it is argued that, in pursuing protection against emergencies, such a sacrifice is unavoidable. Against such a highly political decision, economic argument is necessarily futile for the time being.

Very similar to this reflection of the fear of the mass of

civilians, but nevertheless somewhat different, is the viewpoint of those who are in charge of the national defense. Modern wars will be and are prepared to be totalitarian wars. Every resource of production will be mobilized, and every civilian will be a combatant even if he is not drafted for direct service. Agriculture, like every other industry, is regarded as a most important *potentiel de guerre*. The economic division of the general staff, which is most influential in economic policies though very seldom publicly recognized, takes a marked interest in the development of the national food plant. Autarchy, better than any other course, suits the requirements of national defense.

Under the circumstances, the old and most natural claim of the farmer in an importing country, that he needs protection against the competition of "Chinese coolie labor" and against exploitive farming in the United States and elsewhere, has received most powerful support. The German farmer could fight for high tariffs and good prices with the best conscience and with a good claim for equality when the state began to build high tariff walls around German industries. Within a few years these industrial tariffs had left a very solid and painful imprint on the mortgage registers of the farmer. Autarchy as a general economic aim lifted the insufficient claim of the farmer into the ethical sphere of national and patriotic duty, thus sublimating it.

At the same time, autarchy opened the way for reconquering that part of the domestic market that had been lost to foreign agriculture in sixty years of industrialization. With a wide margin of 20 per cent of the national food supply for expansion of production, it seemed that the farmer could only gain by autarchy. Surplus problems generally remained outside the realm of near-by realities. Autarchy promised to chase from the German farmers' door the wolf of shrinking prices and agricultural depression. That such a policy would aggravate the situation for

the farmer in the exporting countries, and thereby strike back at German export industries, the German farmer could hardly be expected to realize.

Still other factors came into play in aid of autarchy. The collapse of German foreign credit forced the Reichsbank and the Department of Industry and Commerce to rush to the rescue of the currency by drastic foreign exchange restriction, a gold embargo, and simultaneous import restrictions. The traditional device, raising the discount rate, was useless, because frightened creditors went on strike and a high interest rate lost its lure. From 1930 on, the motives of protecting the currency and improving the trade balance became of importance equal to the farm-relief incentive.

A few years later, when Germany had already passed the bottom of the depression, new arguments began to solidify the trend toward autarchy. Liberal economic principles were vigorously denounced and economics was subordinated to politics. It was recognized that many economic problems could be solved with relative ease if international co-operation were to make credit, and thereby markets, accessible. But since economic concessions from other states would require a peaceful settlement of controversies in foreign policy, the Reich under its new power policy renounced such alternatives. On June 22, 1937, the High Commissioner in charge of the Four-Year Plan, General Göring, said in welcoming the Ninth Congress of the International Chamber of Commerce:

No economy conscious of its national tasks can permit dictation from the outside as to what will be exported or imported. To import at any price or to purchase export possibilities through the assumption of political obligations that are nationally intolerable is out of the question for Germany.

The Four-Year Plan leads us out of such a position of duress. It represents a safety coefficient that guarantees us freedom of action.¹

¹ Quoted from *New York Times*, June 22, 1937, p. 13.

In spite of the reiteration by Dr. Schacht that international co-operation in the exchange of goods is necessary, such plain statements are symptoms of the most profound distrust of any fair international co-operation, and of the pessimistic belief that only a state of independence within the borders of a nation's sovereignty promises security. This attitude is not specifically German. As a psychological result of the World War, it is to be found in every European nation—perhaps with the exception of England and some of the small "neutral" countries.

Finally, it must be taken into account that the entire socio-political atmosphere surrounding German agricultural policy has changed completely. From the end of the runaway inflation, the attitude toward agriculture has been slowly but thoroughly revised, and agriculture has been placed more and more in the center of national existence. To rehabilitate the farmer and to put him in a privileged position is the outspoken aim of domestic policy.

Eugenic considerations are in part responsible for the decision that the economic policy toward agriculture must serve to create conditions that will permit the rural population to prosper. German family farmers are supposed to be—physically, mentally, and spiritually—the greatest resource of creative hereditary stock of the nation. They are expected to develop out of their ranks a new nobility, rooted in the land, and representing the rural population as the most important layer of the entire social stratification. Thus interpreted, agriculture is far more than just an industry producing food and raw materials. The part of the population deriving its livelihood from agriculture has a supreme claim upon the maintenance of satisfactory economic conditions because the nation sees its own future and eugenic strength protected thereby.

The present planned economy of the national food supply has one advantage from the standpoint of pre-

paredness and national defense, which is at least an important by-product of great political weight. Agriculture is organized precisely like an army. The command of the planned economy reaches from the supreme chief and his staff over the divisions, the army corps, the army battalions, and companies straight down to the private—the farmer. What the German economic general staff tried to build up during the emergency of the World War, under Rathenau—which became only a fragmentary provisional institution—exists here with a completeness, uniformity, and functional capacity surpassing the most daring plans of any general staff in the World War.

PREVIOUS RIGIDITIES IN THE GERMAN ECONOMY

Autarchy does not necessitate planned economy. National self-sufficiency might be brought about just as well under a liberal market system with free prices and free competition, provided the restrictions upon imports were made effective. Indeed, an economy free of intervention or rigid control would probably achieve increased production more quickly.

Here also, the policy adopted is no mere accident or arbitrary decision under the dictatorship. It grew steadily within the general environment of German economic development, through the postwar years. About the middle of the last century, Germany adopted the general rule of freedom of domestic trade, which became a basic concept of the Constitution. The underlying liberal philosophy assumed that, under a free price system, the market automatically generates antitoxins against its deterioration. Free competition was supposed to have a purging influence. It was forgotten that a liberal system with freedom of trade requires an energetic market police, with the power to force all the players in the game to live up to the rules wherever and whenever necessary. Ultimately this is no exception to the rule that applies to all the other

freedoms as well—freedom of speech, of teaching, of assembly, of the press, and of research.

Monopolies already existed over a wide range in prewar times, but after the war the restraints upon free competition began to assume pernicious proportions. Under the influence of compulsory wage codes and labor-union legislation, rigidities in the economic system grew rapidly. Compulsory industrial cartels and the process of concentration in industries, trade, and banking led finally to a state where agriculture, the small handicrafts, and the retail trade were almost the only sectors remaining in the state of individual supply and demand and of unrestrained competition.¹

Germany developed a most widespread and well-knit simple network of several thousand cartels of all sorts. From agreements on sales conditions, up to strict price cartel and syndicate with production and territorial quotas, all intermediate shades were present. From the smallest local cartels to the powerful industrial trade combines, all kinds of ingenuity were applied in an attempt to put free competition in chains. Instead of breaking up such monopolistic units, the state tried to keep them under surveillance by a cartel law and favored this so-called organized competition.

The state went further and added considerable territory to the sector of imperfect or monopolistic competition. The state-owned railroad and postal systems constituted two powerful monopolies operating without competition. In behalf of the publicly owned national railway system, a large part of the trucking and bus economy was also eliminated from the sector of free competition by subjecting truck and bus rates to codes and government supervision. The entire public utility system, supplying electric power, gas, and water, belonged in the same

¹ Cf. Leonhard Miksch, "Wo herrscht noch freier Wettbewerb?" *Die Wirtschaftskurve*, December 1938, pp. 339-49.

category. An estimate of 1931 showed that approximately one-half of all the prices were "bound" in one way or the other. Such a state led almost automatically to a defensive campaign on the part of the farmer, and eventually to organize farming in a similar way and to build a militant agricultural monopoly.

THE DRIFT INTO A PLANNED ECONOMY

In fact, however, the initiative did not come from the average farmer. It was the Junkers of the East, as the largest grain producers, together with the deputies of the labor unions, who suggested, projected, and organized the monopoly of the carbohydrates markets; but these were backed by the majority of farmers. Here was a paradoxical alignment of the largest consumer party and the large-scale agricultural entrepreneurs. For the Junkers, it suited their purposes as a subsidy policy. On the side of labor, it was the outgrowth of the Social-Democratic doctrine that the state must control production and distribution. State monopolies were to bring prices and supplies under the control of the state, which was supposed to be permanently controlled by the political influence of the urban toiling masses. The grain market was chosen because there the opportunity loomed up of obtaining one monopoly as a first installment. Perhaps the strongest incentive for the laborites who initiated this policy, in 1928, was the hope of using the monopoly later to keep food prices down. When the carbohydrate markets had been stabilized, it was a logical consequence that the other markets would have gradually to be organized in a similar way, if the whole policy was not to be discarded.

Those who lived through those years, amid the arduous endeavors of the civil service and the strife of party politicians, recall most distinctly how a majority of those who insisted on the superior soundness of price econ-

omy always chose as the "lesser evil" the opposite of what they really believed in. They were too much fascinated by the problems of each day to see how one intervention causes the next. Once the decision had been made to deprive the refined price mechanism of its function as the regulator of the economy—no matter whether in part or in total—then the drift into a planned economy, with all its manifold implications, was a mere consequence. None of the German farmers intended to establish a planned economy. All they wanted was a better price, and all they consented to was putting some weight in the scale to make the pointer move a bit more in that direction.

It is the prevailing fashion in Germany to assert that the policy toward more and more monopolies and a state-controlled economy was unavoidable and the only choice because—so ran the standard argument for many years—the postwar free economy afforded no solution and caused intolerable depression for the farmer. It is an obvious blunder to base accusations against a system of free competition on a period when free competition was rapidly vanishing under the energetic efforts of all those whose gospel called for its destruction.¹ No trial of free competition and freely moving prices has been made, and no period since 1914 can fairly be cited when evidence for the supposed failure of such a system is sought. It could be argued with much more justification that nothing could be more harmful and destructive than the monstrous mixture of a system of supposedly free competition with a policy of vigorous state intervention and fostered growth of monopolies.

FRICIONS IN THE PLANNED ECONOMY

The planned economy, which has been described in its major phases, has had many unexpected results. Prices are under command. They can, therefore, function no

¹It sounds preposterous to hear defeated German Marxians decry the planned economy of National Socialism, though they are its very parents.

longer as a self-adjusting power that moves commodities by every means from the farmer to the wholesale merchant, and from the storage warehouse to the retail trade.

If, under the free price system a short crop happens to occur, prices will be higher. This immediately sets in motion a complex mechanism. If it is bread grain, for example, a high price will attract the last bit to the market. The farmer will save all he possibly can. A minimum will be fed to animals. Even seed grain will be used more thriftily. At the same time, the trade will reduce stocks and carryover. Flour mills will try to turn out more flour by increasing the rate of extraction. The baker will replace wheat flour by an admixture of rye flour. And, of course, the consumer will make adjustments also.

If the planned economy is to achieve the same efficiency, it must foresee every one of these consequences and try to replace the smooth automatism of the free price market by decrees and calculated fixing of price relations. This it must do anew almost daily. As a matter of fact, it does not. This is the result of considerable inefficiency and of slips in the machinery.

Situations arise frequently in which a commodity tends to stick instead of moving. The remedy consists in commanding the flow of the commodity by monthly, weekly, or daily delivery orders or quotas. Storage has to be controlled as well. Neither surpluses nor shortages change the price directly. One of the consequences of which the farmer disapproves is that, in case of scarcity, prices are prevented from rising, in order to protect the consumer. The farmer had acclaimed stability of prices, and favored wholesale abolition of futures trading on the ground that it was something immoral. Suddenly he realized that the change was not always beneficial. If the majority of farmers have a bad crop, the price no longer compensates for loss in output. If prices are stable, agricultural returns become more unstable.

The same rigidity that causes frictions extends through the entire quota system. Allotments become a decisive factor in the value of farms, and in many cases force the reorganization of a farm in a changed direction. In the fat economy, the farmer is fortunate in so far as the deficit in the market permits gradual increase in quotas.

As a part of the entire market control, quotas are administered by the agricultural cartel, which in itself is closely intertwined with the farmers' division of the National Socialist party. This exclusive party has the character of a public authority and is a corporation under public law. But in contrast with a co-operative system of marketing, there is no opportunity for opposition on any of the important issues. The "leader principle" rules throughout. No one can seriously doubt that this system has the technical advantages of operating with the power of command and of enforcing its policy to the last detail. It is only fair to say that the entire monopoly administration and the administration of the dairy cartel manage their affairs with an efficiency consistent with several centuries of traditions of the Prussian Civil Service, from which they originate. Technically, the system operates with perfection and the bureaucracy constantly refines its skill.

This due tribute to technical achievement cannot be paid without adding that it is not obtained without paying a price. The bureaucratic machine, and the concomitant red tape necessary to manage the planned economy, are of dimensions hardly conceivable in countries with a liberal market system. In Germany, it is only a part of the general trend toward a growing influence of the state in every phase of the national life, which more and more transforms private people into some sort of civil servants. Such a bureaucracy does not operate under the restraining influence of competition. Its operating costs are adjusted to its needs. The nation must pay the difference be-

tween the possible costs under a competitive system and the costs actually paid under the planned economy. However, in circumstances under which a considerable though declining number of people still lived on the dole in 1936-37 or earned their income by "made work," this additional cost may perhaps be neglected. Indeed, it may seem not to matter much whether the consumer pays for this additional employment in taxes or through slightly higher prices. The essential difference lies, of course, in the political field.

BEARINGS ON THE STANDARD OF LIVING

The real economic problem of the policy of autarchy is of a much more profound character. When Germany followed the path of England in industrializing the whole country, she had to make up her mind whether she wanted to build up her standard of living at an increasing rate on additional income from industrial exports, or whether she wanted to keep the whole system in some sort of controlled balance. The period of the Franco-German War marked the transition from an agriculturally self-supporting state to an importing one, and from an industrially importing to an exporting state. Thereafter, imports of foodstuffs and raw materials rose steadily, while industrial exports provided the income for almost one-fifth of the population or more. With moderate tariffs giving some protection, agricultural areas developed to a most prosperous state at the same time, but the proportion of imported food increased. Industrial exports became a vital part of the national economy. Agriculture, as well as industries, depended upon it, because the purchasing power of the consumer was derived so largely from exports. The total cost account of industry depended on the full utilization of productive capacity, which again was secured by exports. But the whole price level, which per-

mitted industry to compete successfully in foreign markets, depended very much on the price of food, which is a decisive factor in the wage level.

From 1928 on, the policy of autarchy has abandoned this principle. Food prices are kept far above the world market level. Consequently, the general price level is also out of competition. Maintenance of the previous gold content of the German mark, after the devaluation of the majority of the world's currencies, has made the dissociation more pronounced. Industrial exports, therefore, must be subsidized. With a system of subsidies all around—in agriculture, industries, and domestic and foreign trade—it is next to impossible to come to any conclusions regarding the genuine level of costs in any industry or branch of agriculture. With the regimented price system, state control of investment, and intervention in every sphere, the real competitive cost account cannot be made up. The fat economy, which has been discussed, is an integral part in this whole setup of managed currency and managed economy. One cannot assume that it could be changed independently. Only a change in the entire economic policy would permit a change in the fat policy. High food prices, high raw-material prices, and subsidies have led to low real wages in the end. The wage earner pays the bill.

The German wage structure in 1938 is still the same as it was in the depth of the depression in 1932. Those laborers who were unemployed in 1932 have gained in income, but every laborer who was previously employed has lost considerably. The hourly wage is the same as at the bottom of the depression, and considerable new deductions reduce the available part of the income to some 73 per cent of the gross income. Moreover, the higher price level has curtailed the purchasing power of wages. The index of nutrition rose from 115.5 in 1932 to 122.4 in 1936, and the rising tendency continues. At the same time,

the price indexes ignore the loss in quality during these years.

INFLUENCE ON WORLD TRADE

Finally, we need to consider how the German fat policy, if it should ultimately achieve its aim, will affect the world market. Table 38 indicates that German imports of fats and fat-carrying raw materials (excluding bacon) still

TABLE 38.—GERMANY'S SHARE IN WORLD TRADE IN FATS AND MATERIALS THEREFOR, 1935*
(Thousand metric tons)

Commodity	World exports (gross)			German net imports, 1935	Percentage of world exports
	1929	1932	1935		
Butter	518	544	619	71	11.5
Lard	434	307	146	30	7.8
Tallow	191	176	237		
Olive oil	190	206	207		
Palm oil	238	278	413	-4	...
Cocoa butter	19	16	25		
Hydrogenated oils	157	134	156	17	100.0*
Margarine	87	29	15		
Whale and fish oils.....	205	245	226	247	100.0*
Peanuts	1,548	1,107	1,251	1,334	17.4
Copra	1,030	915	1,069		
Palm kernels	457	530	566		
Soy beans	2,751	1,495	1,906		
Linseed	2,042	2,244	2,044		
Cottonseed	701	479	813		
Total	10,568	8,705	9,723	1,695 ^b	17.4
Oil cake	4,408	3,320	3,556	292	8.2

* Data from *Statistisches Jahrbuch, 1936*, pp. 226-27, 142-43*.

^b Difference is caused by statistical inaccuracies and the usual divergence between import and export figures.

^c This represents 4.3 per cent of the aggregate value of world exports.

represented approximately 17 per cent of the world's exports in 1935. Two items weigh most heavily in this account. In 1935 more than 50 per cent of the world's whale-

oil production or all the whale-oil exports of the world, and 17 per cent of the oil-seed exports, were bought by Germany. The complete disappearance of the German demand for these could not help having a strong influence on the evolution of prices of fats and fat-containing raw materials, at least temporarily.

Even if the present policy should be stubbornly pursued, Germany's retirement as a buyer in the world market will stretch over a number of years, perhaps ten or more. Adjustments will be made gradually also. It must not be forgotten that variability and kaleidoscopic change of all proportions are inherent features of the picture of world commodity trade. The loss of Germany from the world butter market, in which in 1929 she bought no less than 135,000 tons but only 71,000 tons in 1935, has been made good by the butter-exporting countries. Naturally the adjustments affect the entire system of exchange of goods, industrial as well as agricultural. Countries which lose their fat exports will stop their purchases of industrial goods or their barter trade in Germany in corresponding amounts.

To what extent the fats, fat-containing raw materials, and the protein-containing by-products are interwoven with the widespread fabric of German foreign trade may be seen from Table 39. In 1935 sixteen countries participated in supplying Germany with oil seeds, eleven with butter, five with lard, three with oil cake, and three with whale oil. This network of supplies spread all over the globe is also tied to the foreign trade through the German merchant marine. The fat and fat-seed imports are largely return freight on German cargo boats going to the Far East and to South Africa carrying industrial export goods. They help to make the export business pay. The more this kind of cargo disappears, the more must substitutes be found to fill the idle space. It might be assumed that the German oil-seed industry would try to operate on foreign

TABLE 39.—PRINCIPAL SOURCES OF GERMAN IMPORTS OF FATS AND FAT-BEARING MATERIALS, 1935*

(Metric tons)	
BUTTER	
Denmark	25,533
Netherlands	10,726
Sweden	9,637
U.S.S.R.	5,920
Latvia	5,103
Estonia	4,380
Finland	4,262
Hungary	1,057
France	864
Poland	514
Danzig	64
MARGARINE, ETC.^a	
Norway	14,741
LARD, OLEO OIL	
Denmark	11,976
Hungary	10,084
Yugoslavia	3,427
France	1,726
United States	1,445
TALLOW^b	
Argentina	6,457
WHALE OIL, ETC.^c	
Norway	230,469
Great Britain	15,856
Japan	8,143
VEGETABLE OILS AND FATS	
Netherland Indies ...	28,308
China	17,019
Netherlands	11,533
Denmark	4,783
British West Africa..	4,663
Great Britain	3,515
Belgium-Luxemburg .	3,112
U.S.S.R.	2,990
Spain	1,522
Italy	1,043
OIL SEEDS	
China	530,343
Argentina	234,828
British West Africa..	204,117
British India	141,930
Netherland Indies ...	64,148
Belgian Congo	42,328
Rumania	21,078
British Malaya	20,441
Portuguese East Africa	12,358
Other countries ^d	16,206
OIL CAKE	
U.S.S.R.	204,068
Denmark	40,351
France	13,837

* Data from *Statistisches Jahrbuch, 1936*, p. 234. Specified sources include all from which 1935 imports were valued at more than one million marks.

^a Including similar substitute fats.

^b From cattle and sheep.

^c Including fish oils and miscellaneous animal fats.

^d French West Africa, 5,339; Philippine Islands, 4,781; South Sea Islands (Mandate Territory, formerly German), 3,283; Poland, 1,561; Netherlands, 1,242; Ceylon, 1,126; Danzig, 189.

orders, but this seems rather improbable because the oil-seed countries are already tending to build their own oil mills.

CONCLUDING CONSIDERATIONS

Many conclusions with respect to details have already been drawn at various points in this discussion. What remains to be done is to face the question of whether any lessons of more general value can be learned from the German fat plan and the cartelization of the dairy industry. To answer this question seems more important than to speculate on the possible or probable duration of the German experiment or its final outcome. No matter whether the plan is continued in its present form, or modified, or abandoned, it constitutes an unusual experiment the results of which cannot be ignored wherever attempts are made to tackle similar problems.

The German experiment is undoubtedly of keen interest to the dairy, meat, cattle, hog, and other fat industries in every country, as well as to those who are concerned with agricultural policy. But in approaching the German plan, and in any attempt to derive from it suggestions or ideas adapted to similar situations in other countries, the foreign observer must keep fully in mind that the plan is the outgrowth of, and deeply embedded in, an exceptional situation. There should therefore be the utmost caution in taking the results as something normal or, especially, in assuming that the same methods might yield the same results under more normal conditions.

Though the plan cannot be understood without considering the difficulties of the German financial and foreign trade situation, it involves much more than merely temporary protectionism. The plan is conceived with the adamant determination to rebuild the agricultural market from the very bottom and to reshape a good deal of agricultural and economic history. In its perspective it is extreme, and in its administration it is super-thorough, overzealous, and often meticulous. These features reflect certain specific German virtues as well as national evils. For the disclosure of important implications, this is for-

tunate: it is the extreme case arrived at by relentless application of one principle. This extremism has uncovered the character of the problems and the merits and demerits of the measures chosen.

The numerous cunning eclectics who might wish to adopt certain supposedly perfect details of the plan must not forget that it is not simply for the love of fun or an inherent tendency toward exaltation that the present German regime, the most powerful dictatorship that ever existed, works under conditions much like those in a pressure cooker. According to the German version, these conditions are created by the Versailles Treaty, the Dawes plan, the Young plan, the loss of some of the best mineral territories and of the colonies, and, in general, by the politically imposed lack of raw materials and outlets for exports of industrial goods. No matter how correct and conclusive this interpretation may be, for an adequate evaluation of the German fat plan it must be noted that the mechanism operates within the framework of an omnipotent and omnipresent state with absolute authority, which has suspended all kinds of freedom of expression by citizens and habeas corpus rights also. Without this political prerequisite the plan would be doomed, in its most important devices of direct price control, if not in all its parts. The position of the German state is strengthened by the excellent and experienced professional civil service, which has a tradition more than one and a half centuries old, and also—not to be forgotten—by the inconceivable patience of extremely law-abiding citizens.

It should also be noted that the plan operates under conditions of all-round scarcity. To maintain an existing scarcity or to create it in a moderate degree is one of the essential methods of the plan. It is most dubious whether the plan would promise any results in a surplus situation, unless it should begin by creating a deficit in supplies. This, however, would involve the still more serious task

of controlling production directly, something that the German authorities consider impossible and destructive for agriculture. Herein lies a distinction between planned agriculture in Germany and in the United States.

With reference to the limitations and necessities of permanent manipulation of agricultural commodity prices, the plan offers unique material in that it demonstrates the comprehensive intercommunication of all agricultural commodity markets. Subtle but powerful shifts, caused as through the principle of communicating vessels, are usually hidden merely by a certain time lag, such that only a continuing intervention covering a minimum of from three to five years reveals them in their full extension. Private initiative is strong enough to bring about newly adjusted functional instable equilibria, even though only small parts of the economic system are left for its play. If the rye market is controlled and the rye price pegged, adjustments in the grain markets force the government to control the rest of the grains one by one. If this control lasts for some time, the shifts force the government to expand control over all carbohydrates, then over all proteins and all fats. No matter where "stabilization" begins, or how small a territory it leaves without control, only two alternatives are present: it can be either abandoned, or expanded to a final all-embracing control of the markets.

The example of the German fat plan seems to show also that nothing like a perfect or a permanent monopoly exists; and that, consequently, stabilization of a market for a lengthy period is inconceivable without omnipresent vigilance against outsiders, inventors, and pioneers of technical progress. Private initiative and man's ingenuity always find ways to lower costs of production and to supply the means to satisfy our wants with less effort. This, however, is the great disturbance that must be eliminated or checked by market-stabilization policies. After all, it

was the German chemist, Normann, inventor of the hydrogenation process, who caused most of the upheaval in the world's fat economy by strengthening the competitive power of whale oil and vegetable fats. At any moment some other chemist, by inventing an all-round cheap substitute for fats as a raw material in the soap industry, may create sufficient pressure on markets for all fats to upset the new order in the stabilized fat market.

Perhaps we can arrive at more definite conclusions if we confine our summary to the fat economy as such. The struggle of palm trees, soy beans, dozens of other fat-yielding plants, and marine animals against the dairy cow and the lard-and-bacon hog is a simplified case in Germany, because with trifling exceptions the latter two industries are domestic while the vegetable and marine fats are of foreign origin. The competitive situation is a clear-cut case of domestic versus foreign fat, though whale oil may become a domestic fat if German whalers produce it.

In the United States, by contrast, the same battle is waged within its own borders; here domestically produced cottonseed, peanut, soy-bean, and corn oil, and indirectly even tung oil and linseed oil, compete with butterfat, lard, and tallow, although the close imitation of butter in margarine fat compounds has been prohibited by discriminatory legislation.

As long as the consumer insists on buying pure milk, butter, and cream, the price level of these commodities may not perhaps decline very radically. But it is extremely doubtful that the average consumer with a narrowly limited purchasing power will continue so to insist if he finds that he cannot distinguish between butter and margarine, or between cream and heavy vegetable-oil-cream, and notes that for his purposes he buys in vegetable or whale fats the same nutritive value at a fraction of the price of butterfat. The example of the Danish farmer, who eats margarine in order to sell his butter to other

people who insist on butter, may strike the imagination of laborers and intellectuals as well.

If the policy of a strict competitive price economy should be chosen, any illusion as to the consequences must be given up. The dairy and hog industries may try to reduce their costs and make themselves ready for a further price reduction. But they have to fight against joint products or by-products of fibers. If cotton lint prices are pegged, cottonseed oil may be sold for less. It is a safe guess that with full sway for price competition, adaptations of gigantic dimensions would have to be made and be provided for. To what extent this may become reality will depend entirely on the situation in each country. But in most countries, both internal and foreign factors are encountered.

Let us face squarely the consequences of a *laissez-faire* policy bound to the rule that commodities produced at lower costs must conquer others which serve the same purpose but entail higher costs. Let us suppose this principle were applied plainly to a national fat market in a humid country of the temperate zone; and that the production of any kind of substitutes for milk, cream, butter, and lard from fat sources of whatever kind were legally permitted and protected—provided the substitutes used appropriate names and provided the genuine product as well as the substitute might be imitated. It is obvious that, under such conditions, the price level of fats as a whole would come down considerably; that vegetable-oil imports from the tropics would expand rapidly and that the dairy industry, the meat-cattle industry, and the hog industry of this particular country would come under terrific pressure. Only the most efficient dairy farmers on the most productive grazing grounds and the most efficient carbohydrate-hog producers could stand such price pressure. If such a change of the situation came suddenly, the majority of the dairy and meat-cattle farmers would be-

come marginal producers, with obvious social and political consequences. How many of the dairymen and hog farmers could regain profitable operation within some years, and how many of them would be forced to quit dairying and meat-cattle husbandry, would be a question of wholesale and thorough adjustments. And if they try to shift, to what crops shall they turn?

One of the greatest of such adjustments would be in land values, which represent capitalized potential net revenues. Changes in net revenues from cattle must most affect the values of land that can be utilized either exclusively or best with cattle. If the land utilization of a whole country is so closely interwoven with cattle husbandry as it is in Germany, the values of all land must be impaired. Since land values are an important cost factor in farming, land values would have to come down sufficiently to make cattle husbandry profitable again. Adjustment in land values on so wide a range leads to widespread bankruptcies and causes much economic, social, and political unrest.

In the hog industry, which is much more adjustable, versatile, and used to radical changes in profitability, adjustments to a sudden change in the general fat policy could be overcome more easily, although the production of the principal hog feed such as potatoes or corn (maize) would be affected also.

With respect to the interlocking of all agricultural commodities—a feature that has been stressed so much in this discussion—such an ordeal for the two leading animal-fat industries would mean a general agricultural depression. The first reaction would be to shift away from fats into more production of carbohydrates, proteins, vegetables, and fruits. But within a period of two or three years, such a shift would have equalized the margins in these various markets.

Since animal fats are joint products with proteins, a

reduction of fat prices would—*ceteris paribus*—necessitate an increase in the returns from proteins. In other words, if butter prices and lard prices come down, meat prices and casein prices would have to go up, in order to prevent the ruin of a large proportion of producers. But with an elastic demand for meat and casein in its various forms, even this would not ban the evil consequences of the reduction in fat returns, because the capacity of the market would shrink.

These deductions show simply that so radical a change, with the sudden elimination of all protection from the dairy and hog industries, would have consequences which make it politically impossible and economically inconceivable of adoption.

The prospects change, however, if steps should be taken over a period of years, in the eventual direction of allowing tropical fats to compete freely with dairy products. If the tropics export more fats, they will import more industrial goods, or perhaps even poorer grades of meat. Increased industrial activity may compensate farmers to a certain extent by better outlets for proteins, fruits, and vegetables. However, to speculate on the probable consequences of such a gradual return to free competition in the fat market is difficult because all conclusions must be made in terms that reflect the entire set of factors that cause prosperity or depression in agriculture. If the purchasing power of the masses should rise and the preference for butter persist, and if the dairy farmer and the dairy industry utilize all unexploited profit reserves in full, perhaps the dairy industry could retain a fairly good position in competition with vegetable fats.

However, after leaving the greenhouse of super-protection, even under such a process of gradual acclimatization one drastic change would be unavoidable. Dairy land values would have to come down from their previous level, and dairy farmers and creditors would have to share

the losses. Moreover, the expansion of domestic fat production would stop, and perhaps give way to a recession until the period of readjustment was over. Certain advanced positions of the dairy industry, gained under protection, would also have to be abandoned for this period at least; and in hog production certain portions of the field of production would become submarginal.

How great a loss would be involved, how much territory the domestic fat industries would be forced to abandon, and to what extent agriculture would suffer would depend among other things on the intelligent administration of the back-to-competition policy, on the facilities of farm credit during the readjustment period, and on the opportunities for compensation in other fields of agricultural production. Aside from the basic fat production which consists of the utilization of "absolute fat land" (like moist meadows and pastures) that must be used almost exclusively for cattle, the secondary fat production which converts crops is subject to a changing emphasis on this conversion. The pendulum swings to and fro from direct sale of more carbohydrates and less fats to direct sales of less carbohydrates and more fats.

The situation becomes still more entangled because it is not butterfat and lard alone that are jeopardized by vegetable fats and whale oil. These cheap fats themselves may in the future come under increasing pressure from the looming substitution of new raw materials for soap. If their prices are pegged too high in the course of farm-relief policies, such measures will in the long run directly help to generate and promote dangerous competing substances. While it may be possible to protect the edible fats in the food markets for a long period to come, it seems unduly optimistic to expect that the same protection will be granted the field of the technical uses of fats.

The economic existence of nations is identical with a permanent process of change and adjustment. Attempts to

"stabilize" or to replace the dynamic flow by static conditions can only insure a temporary delay of adjustments in order to mitigate unnecessary hardships, to cushion shocks, and to avoid exaggerated losses. Technical progress may be thwarted for a time, but sooner or later it has to be acknowledged and adjustments have to be made.

One of these adjustments consists in slowly shifting more people from farming to other occupations. The steady decline of the nation's percentage of people gainfully employed in agriculture indicates how strong are the forces that bring about adjustments. This process of shifting more people into industries is still going on in Germany, in spite of its back-to-the-land movement and rural rehabilitation.

The greatest achievements of the German fat plan are undoubtedly those which have improved the economic efficiency of the domestic fat-producing industry. Improvement in quality of milk and butter, and reduction of costs in the production and distribution of fluid milk and dairy products, promise to be enduring contributions.

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