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BULLETIN NO. 15

PROCESS CHEESE
JT. RESOLUTION NO. 54, S.
Legislature of 1925

REPORT

BY

J. Q. EMERY

Dairy and Food Commissioner
Wisconsin

Issued
August, 1926
Madison, Wisconsin

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JOINT RESOLUTION NO. 54, S.

Following is joint resolution no. 54 S. passed by the legislature of 1925 relating to certain alleged practices of certain manufacturers and directing the Attorney General and the Dairy and Food Commissioner to investigate and take action:

WHEREAS, Charges have been made that certain manufacturers of loaf or process cheese are incorporating into their products butter, whey butter, renovated butter, skim-milk cheese, casein and albumen; and

WHEREAS, Such alleged practices, if true, are a violation of the federal statutes and of the statutes of Wisconsin as contained in section 352.03; now, therefore, be it

Resolved by the senate, the assembly concurring, That the attorney-general and the dairy and food commissioner, in the interest of the dairy industry of Wisconsin, co-operate or act independently to determine the truth or falsity of such charges and to prosecute under the present laws of the state in case such allegations are based on fact.

PROCESS CHEESE AND JOINT RESOLUTION NO. 54, S., LEGISLATURE OF 1925

Pursuant to the terms of Joint Resolution No. 54, S., of the Legislature for 1925, wherein the Dairy and Food Commissioner is called upon to determine the truth or falsity of charges that certain manufacturers of loaf or process cheese are incorporating into their products butter, whey butter, renovated butter, skim-milk cheese, casein and albumin, Mr. Axel Bruhn, Chief, Cheese Division, and Mr. J. E. Boettcher, Chief, Butter Division, of the Dairy and Food Department, were directed to make inspections to determine the truth or falsity of the charges mentioned.

Following is the report of their findings:

Madison, Wisconsin,
March 1, 1926.

HONORABLE J. Q. EMERY,
Dairy and Food Commissioner of Wisconsin,
Capitol.

Dear Sir: Beginning in the month of October 1925, and following your directions, and pursuant to the terms of Joint Resolution No. 54 S., an investigation was made of the following plants in which Process cheese is manufactured in Wisconsin, namely:

Kraft Brothers Cheese Company, Plymouth, Wisconsin;
Brookshire Cheese Company, Plymouth, Wisconsin;
Phoenix Cheese Corporation, Plymouth, Wisconsin;
Sheboygan Dairy Products Company, Sheboygan, Wisconsin;
American Cheese Company, Sheboygan, Wisconsin;
Pabst Cheese Company, Milwaukee, Wisconsin;
C. A. Straubel Cheese Company, Green Bay, Wisconsin;
Ackerman-Emmenegger Cheese Co., Monroe, Wisconsin.

Doctor H. B. Switzer, of the Federal Bureau of Chemistry, accompanied one or both of us in this investigating service.

KRAFT BROTHERS CHEESE COMPANY'S PLANT

Plymouth, Wisconsin

General Sanitary Condition

Inspection of the plant showed it to be, as a whole, in a clean, orderly and sanitary condition. The machinery and equipment is of such construction and so arranged as to be accessible for cleaning, and was kept reasonably clean.

Products Manufactured

Process American Cheese;
Process Brick Cheese;
Process Swiss Cheese;
Process Pimento Cheese.

Process American Cheese

This food product is manufactured from different lots, forms, sizes and grades of American cheese as produced in cheese factories. The cheese is assembled in amounts capable of producing what is termed in the factory a batch, 350 pounds. The batch, as assembled, is composed of all

grades of cheese with a view to controlling, by blending of the different grades of cheese, the composition and quality of the finished product. It was stated by the plant foreman, that it was possible to use from 40 to 50 pounds of No. 2, or under grade, cheese to each batch, without injuring the finished product. It was further stated, however, that in exceptional cases, where for instance cheese was under grade because of leek flavor, rind rot, or evidence of gassy or yeasty fermentation, the amount that could be used would depend somewhat upon the degree to which the fault in the under grade cheese was apparent. If the faults above mentioned were very pronounced they might manifest themselves in the finished product, especially in the case of cheese produced with gassy or yeasty fermentation, and that a gassy fermentation in the finished Process cheese might appear. This would seem to indicate that actual pasteurization is not always effected. Further, it was stated that a comparatively small per cent of sour cheese would decrease the quality of the finished product.

How Prepared

After the cheese going into a batch is assembled according to grade, flavor and composition, the paraffin is scraped off, the bandages removed and the outer surface of the cheese cleaned. If there are any defects in the rind of the cheese, such as occur in cheese that has been stored and to which mice have had access, such parts of the cheese are carefully cut out and discarded. The cheese thus prepared is put through a comminuting machine, and transferred to hoppers, from which it is conveyed to processing kettles. At the beginning of the process, there is added to the cheese in the kettle a small amount of water, some additional salt, claimed at this factory to be not in excess of 1 per cent. The process of emulsification is now started by subjecting the cheese to heat, whereby it is softened, or partially melted, and thoroughly agitated with specially constructed paddles kept in rapid motion during the entire period of emulsification. The temperature is gradually raised from room temperature to about 145 to 150 degrees Fahrenheit, and maintained at this temperature for a sufficient length of time to produce the desired result of emulsification to such a degree

as is necessary to produce in the finished product a smooth bodied finished product, which lends itself well to slicing without crumbling. Emulsification, amount of moisture, and character of the cheese used in the batch, together with the kind and amount of emulsifying material, if used, determine the character and quality of the finished product. At this plant, it was claimed that no emulsifying salt was necessary in the manufacture of Process American cheese, if cheese of good quality and a certain percentage of well cured or aged cheese is used. *No evidence could be found of the use of skim-milk cheese or skim-milk curd at this plant.*

Size of Packages

The product was packed in five pound loaf size by weighing the semisolid mass of cheese into lots of 5 pounds, which are then placed in the wooden containers, which had previously been lined with tin foil. The semisolid mass of cheese takes on the form, shape and size of the container and at the same time the tin foil is affixed to the outer surface of the cheese in such a manner as to serve as a rind for the product, preventing contamination in handling and the development of molds.

How Labeled

The five pound packages were labeled :

5-lbs.	
Net	
Blended American Cheese	Pasteurized
and the initials JLK.	

We found this company packing Process American cheese for Armour and Company, Chicago, and Morris and Company, Chicago. All of the boxes into which cheese was put for Armour and Company and for Morris and Company bore, in addition to the name and address of the company, the net weight and other labeling such as pasteurized cheese, or loaf cheese, and in addition the following legend: "Patent issued December 2, 1919."

Observations Made and Data Obtained

Records from the Chicago office of this company were exhibited, showing the composition of Process American cheese. The moisture content in some cases was as low as 38 per cent; but in most of the samples tested, the moisture was found to be from 38.5 to 39.8 per cent. The lowest percentage of fat in the water free substance for Process American cheese was 49.6 per cent, and the highest percentage noticed was 51 per cent. Bearing in mind the statements made at this plant by the plant foreman, that no emulsifying substance was used and that only about 1 per cent of dairy salt or cheese salt was added, it would be difficult to explain why the percentage of fat in the moisture free substance in Process American cheese is as low as the records seem to disclose, when it is undoubtedly true that the average percentage of fat in the moisture free substance in American cheese manufactured in this State falls between 52 and 53 per cent. As the methods of manufacture are such that no fat is lost, this low percentage of fat can not be accounted for in this manner. However, it may be possible, that by a process of selection, a concern is able to select cheese with a fat content just up to the average or below.

Manufacture of Process Brick Cheese

In the manufacture of Process Brick cheese, the methods above outlined, in use in the manufacture of Process American cheese, of selecting and preparing batches of cheese from cheese of different grades, weights, flavors and composition, are followed where a suitable supply of Brick cheese is available; but where large percentages of uncured Brick cheese are used, it has been found desirable to add a certain percentage of American cheese, the amount or percentage added depending upon the age and quality of the Brick cheese used. The general method of manufacture as above outlined for Process American cheese is followed, but it was admitted that the use of an emulsifying salt is necessary. The amount of emulsifying salt necessary was said to be about 3 pounds to a batch of 350 pounds, and that about 3 pounds of dairy salt or cheese salt was also added. The emulsifying salt in use at this plant was known as C. C.

salt, billed to them as that product, and shipped to them at a cost of 39 cents per pound. The methods of packaging, labeling and handling, in general, are the same as those employed in the manufacture of Process American cheese.

Manufacture of Process Swiss Cheese

In the manufacture of Process Swiss cheese, the methods of assembling by selection and preparing batches of approximately 350 pounds, are practically those mentioned in connection with the manufacture of Process American cheese, with the exception of the use of an emulsifying salt, which is used to the extent of 3 pounds to each batch, which means, in terms of percentages, from $\frac{3}{4}$ of 1 per cent to 1 per cent, and the product is heated to a temperature of 160 degrees Fahrenheit during the process of emulsification. It was admitted at this plant that as high as 80 pounds of uncolored American cheese were added to each batch of 350 pounds, which in percentages means that from 22 to 23 per cent of the finished product, known as Process Swiss cheese, was uncolored American cheese. The methods of handling, packaging, labeling, etc. are, in the main, those employed in the production of Process American or Process Brick cheese.

Manufacture of Process Pimento Cheese

The manufacture of Process Pimento cheese at this plant was, in the main, the manufacture of Process American cheese, except that to each batch of 350 pounds, there were added four dippers of Spanish pimentos, the dipper used having a capacity of about one gallon; and the pimentos added weighed about 22 pounds. It will thus be seen that a large percentage of water is added to this type of Process cheese, for the reason that the preserved pimentos used are preserved in a brine and carry large percentages of moisture. It will also be noted that the addition of pimentos reduces the percentage of fat in the moisture free solids, and it is not difficult to understand how perhaps a larger percentage of off flavored and under grade cheese can be used in this type of Process cheese because the pimento added covers up off flavors to quite an extent.

The present law defining and standardizing Process cheese does not define and standardize Process Pimento cheese. The product is, in fact, practically Process American cheese flavored with pimento.

BROOKSHIRE CHEESE COMPANY'S PLANT

Plymouth, Wisconsin

General Sanitary Condition

The plant in which the Brookshire Company manufactures their product is a new, modern building, built for the purpose of manufacturing Process cheese, or other cheese products. The equipment is different from that in any of the other plants engaged in this business, and is designed and arranged so that it can be kept clean and sanitary. The plant was found to be in a clean, orderly and sanitary condition.

Products Manufactured

Process American Cheese;
Process Brick Cheese;
Process Swiss Cheese;
Process Pimento Cheese.

Process American Cheese

This product is manufactured from different lots, forms, sizes and grades of American cheese, as produced in cheese factories at the present time, but previously there had been added to the above named product a mixture of cheese curd and whey albumin. The cheese curd would be the ordinary curd obtained in the manufacture of American or Cheddar cheese, and the albumin was obtained by taking the whey from the previous day's cheese making, heating it to a temperature sufficiently high to coagulate the albumin, which would carry with it some of the fat left in the whey in the process of cheese making, together with some of the milk sugar and milk salts found in the whey. The person interviewed, and with whom the inspection of the plant was made, stated that the use of this mixture of curd and albumin had been discontinued. It was also stated, that sugar

was used at one time in their product, but this has been discontinued, so that their Process American cheese, at the present time, is being manufactured from different lots of factory-made American cheese. As at other plants of this kind, the cheese is graded when purchased, stored, and so-called batches of cheese are assembled, with the end in view of obtaining a finished product of good quality by selecting the factory-made cheese going into the finished product. No admissions were made to the effect that any definite percentage of No. 2, or under grade, cheese could be used.

How Prepared

After the cheese selected for the manufacturing process is assembled, the paraffin is scraped off, bandages removed and the outer surface of the cheese cleaned, and any defective portions of the cheese are carefully removed and discarded. The cheese, thus assembled and prepared, is subjected to a different process, whereby the different grades used are mixed and blended, but not separated into batches of any definite weight or size. The cheese is introduced into a heating chamber by means of a worm screw or conveyor, which conducts the cheese through the chamber, wherein it is subjected to the desired temperature for a short time. The temperature of the heating chamber is controlled by a suitable supply of a mixture of steam and hot air. The temperatures used for Process American cheese, range from 140 degrees Fahrenheit to 145 degrees Fahrenheit. The claim was made at this factory, that 99 per cent of the bacteria found in cheese were killed by the heating process. The temperatures used are only slightly higher than the temperatures employed for pasteurizing milk or cream, where the milk or cream is held at pasteurizing temperatures for a period of from 25 to 30 minutes. Whether or not this product can be considered pasteurized, would depend upon the length of time the temperatures of 140 to 145 degrees Fahrenheit are maintained. If these temperatures are not maintained for from 25 to 35 minutes, it is difficult to understand how pasteurization can be effected. Considerable time was spent at this plant, in going over the factory-made cheese, with a view to learning what quality and grade of product was being used. With

the exception of a small lot of fresh, high acid cheese on hand, it is our opinion that cheese of very good quality only, is used at this plant. It is our opinion that the cheese used at this plant, with the exception of the small lot of high acid cheese above mentioned, would sell on the open market for the full price for cheese.

The use of an emulsifying agent was admitted, the claim being made that a small amount, stated to be from 2 to 2¼ per cent, of Rochelle salts were being used; from ¾ of 1 per cent to 1 per cent of dairy or cheese salt was also being used. It is claimed that, in order to produce a smooth bodied finished product of good texture, lending itself well to slicing without crumbling, some sort of an emulsifying agent is necessary. No evidence of the use of skim-milk cheese or skim-milk curd was found, but only cheese of good quality and standard composition was being used.

In the manufacture of Process American cheese this factory was for a time mixing albumin that had been obtained by boiling the whey at cheese factories, which process would precipitate the albumin. The albumin thus precipitated would carry with it quite a little moisture. This practice, however, had been discontinued as had the use of sugar.

Process Brick Cheese

In the manufacture of Process Brick cheese, it was admitted that from 25 to 50 per cent of white American was added at times and at times when the Brick cheese used uncured, thus lacking in flavor, about 2 per cent of Limburger cheese was added. It will thus be seen that Brick cheese manufactured at this plant is really a mixture of at least two different types of cheese and, at times, a mixture of three different types of cheese.

Process Swiss Cheese

In discussing the subject of manufacturing Process Swiss cheese, it was admitted that there was being used from 25 to 40 per cent of white American and, at times, slightly sour white American was used, it was stated, for the purpose of preserving the delicate flavor of the Swiss. The product, like Process Brick cheese, in at least those instances where white American is used, appears to be a mix-

ture or compound. The dry, inner rind from Swiss cheese was ground finer than it was the usual practice to grind the cheese for other varieties, and this finely ground product was mixed with American cheese to be made into American Pimento. The inner rind used, however, was clean and edible and should not be confused with the rind of cheese removed without the cheese having first been cleaned.

Emulsifier and Additional Salt Added

The emulsifying agent used at this plant was Rochelle salts and it was used in from two to two and one-quarter per cent amounts and the claim was made that the use of an emulsifying agent is essential in the production of a Process cheese with uniform texture and of such body that the Process cheese can be readily sliced for table use.

Temperature to Which Cheese is Heated

The Process American is heated to a temperature of from 140 degrees Fahrenheit to 145 degrees Fahrenheit. The Process Brick and Swiss are heated to 150 degrees Fahrenheit. The claim was made at the factory that 99 per cent of the bacteria found in the raw product was killed by the heating process. If their statement is true, the conditions of pasteurization must be met.

Examination of Cheese in Storage

Considerable time was spent examining the cheese in storage with a view to forming a judgment as to the quality and grade of the cheese. It is our judgment that the cheese used is of good quality and with the exception of a small lot of uncured but high acid cheese purchased for the manufacture of Process Brick and Process Swiss, was of such quality that it would readily sell for full market price as cheese on the open market.

PHOENIX CHEESE CORPORATION PLANT

Plymouth, Wisconsin

General Sanitary Condition

The plant in which the Phoenix Cheese Corporation manufacture Process cheese is not a new building, but it is one of the better types of buildings found in use as a cheese warehouse. The plant is of brick construction, equipped with large storage rooms and the plant as a whole is kept in a clean and sanitary condition. The arrangement for the actual process of manufacturing their product in so far as heating, slicing, etc., is concerned, could be improved upon. However, no claim is made that because of the manner in which the Process cheese is prepared and handled that the product is manufactured under insanitary conditions.

Process American Cheese

In our opinion the cheese being used in the manufacture of the various products at this plant was not of the highest grade and not equal in quality to the cheese used at some of the other plants visited and inspected. The cheese appeared to be of higher moisture content and of inferior flavor. The manufacture of the Process American cheese was carried on in very much the same manner that it is carried on in factories in which the product is heated in kettles. Mixtures of different lots, sizes, and quality, are formed into batches, water added, emulsifier added and the whole mass, known as a batch, heated to the desired temperature for a specified time to produce a product of uniform quality and of suitable texture and body. The product is then packaged in much the same manner as described in connection with the report of inspection of the Kraft plant.

Process Swiss Cheese

The Process Swiss cheese manufactured at this plant is composed of a mixture of Swiss cheese and about 20 per cent of white or uncolored American cheese, and the claim was made that the use of white American cheese was necessary to modify or decrease the intense Swiss cheese flavor

found in Swiss. It will be interesting to compare this claim for the use of white American with the claims of other factories who apparently use white American cheese for a different purpose. The plant manager stated to us that they were using about two pounds of sugar for each batch of 350 pounds, while the general manager stated to Dr. H. B. Switzer that they had previously used sugar, but that they were not using it at present.

Process Pimento Cheese

This type of Process cheese is produced by adding 22 pounds of ground Spanish pimentos, an eight pound mixture of salt and an emulsifier, with about two pounds of sugar for each batch of 350 pounds. The unmodified cheese going into Pimento cheese may be one of two or three varieties. It may be straight American Cheddar cheese or a mixture of American Cheddar with returned loaves of Process cheese and at times Swiss cheese may be used in the mixture. In fact, the addition of pimentos seems to afford an opportunity for the use of kinds and grades of cheese not usable in other Process cheese manufacture as Process American, Process Brick and Process Swiss. If light colored cheese such as uncolored American or Swiss cheese is used, the presence of those products is concealed by the use of additional cheese coloring.

Temperature to Which Cheese is Heated

Process American cheese is heated to a temperature of from 140 degrees Fahrenheit to 150 degrees Fahrenheit, Brick to a temperature of from 140 to 145 degrees Fahrenheit, while Swiss cheese is heated to a much higher temperature, at times reaching 160 degrees Fahrenheit. The process of heating is carried on during the process of emulsification, heat being necessary, of course, at all times during emulsification to keep the product in a soft, pliable condition, lending itself to the vigorous treatment similar to that obtained by the use of an egg beater for a period of from 20 to 30 minutes.

Emulsifiers

The emulsifiers in use at this plant at the time of inspection were sodium phosphate and sodium citrate. They were using a combination of these two chemicals and it was stated that the amount used depended upon the condition of the cheese. Common salt was also added and additional coloring matter was added when required.

SHEBOYGAN CHEESE COMPANY'S PLANT

Sheboygan, Wisconsin

General Sanitary Condition

The general sanitary conditions found in the plant were not of such a character as to warrant the statement that the plant was free from objection along these lines. The arrangement of the machinery and the somewhat crowded condition of the factory made it impossible to eliminate a lot of unnecessary work so that the plant might be operated more easily under sanitary conditions.

Products Manufactured

Process American Cheese;
Process Brick Cheese;
Process Swiss Cheese;
Process Pimento Cheese.

Process American Cheese

The manufacture of Process American cheese was along the same lines as that described for the other plants, with the exception of the Brookshire plant, namely the assembling or putting together of batches of about 350 pounds of cheese, each batch having in it a varying percentage of green or uncured cheese and old or cured cheese and cheeses of different grades. Not all the cheese used was fancy nor No. 1; nor was all of the cheese used of No. 2 or under grade quality. Most of the cheese used at this factory was of comparatively low grade, rather high in moisture and some-

what lacking in finish. The foreman stated that he is using the same process of manufacture as that used at the Phoenix plant, where he stated he had learned the business.

Points of Special Interest at This Plant

The method of cleaning the cheese before use was somewhat different at this plant and consisted of scraping off and discarding the immediate outer rind, but the inner rind was later scraped off from the cheese and put into a vat of water to be washed. It is our opinion, although the statement was not made at the factory, that this inner rind, after being washed, would go into Process Pimento cheese. The foreman stated that for Brick cheese they used 50 per cent of Brick and 50 per cent of white American.

Heating Temperatures

Process Brick cheese is heated to a temperature of 145 degrees Fahrenheit, Process American cheese to 148 degrees Fahrenheit or higher, and Process Swiss cheese, the foreman stated, was heated still higher, not giving the exact temperature.

Emulsifiers

For each batch of cheese weighing 350 pounds, 8 pounds of emulsifier, 2 pounds of dairy salt and 2 pounds of sugar were used. It will thus be seen that practically 3.4 per cent of substances not found in the cheese used were being introduced into Process cheese at this factory and each pound of the substances named, or each pound of mixtures of the substances named when introduced into Process cheese will carry with it 38 to 39 per cent of water. The emulsifier used at this plant was sodium phosphate and the foreman remarked that the lower the temperature at which emulsification took place, the better the finished product. This is in keeping with observations made at other plants.

AMERICAN CHEESE COMPANY

Sheboygan, Wisconsin

This is a small plant making Process American and Process Pimento cheese only. The sanitary conditions of the plant were such as to be passable. The processes of manufacture were similar to those found in the other factories with the exception of the Brookshire factory and the same class of raw material was used. The points of especial interest found at this factory were the use, in addition to dairy salt, $2\frac{1}{2}$ pounds of sugar and 8 pounds of sodium phosphate to batches of cheese weighing 300 pounds. It will thus be seen that the percentage of emulsifier used in this plant was slightly higher than in some of the other plants. The purpose of using sugar was stated to be the imparting of a smooth silky texture and a better flavored finished product.

PABST CHEESE COMPANY'S PLANT

Milwaukee, Wisconsin

General Sanitary Condition

The construction of the building, the equipment, arrangement of the equipment and conditions in general in this plant were of the highest order. The motto seemed to be cleanliness, order and efficiency. The plant is located in a building that was formerly used in connection with the brewery business and it would appear from the manner in which the machinery was arranged and the work carried on that the people there engaged had brought with them ideas of cleanliness and efficiency from some other industry engaged in the manufacture of food. The perishable nature of the product formerly manufactured by this company is such that equipment and plant must be kept scrupulously clean or terrific losses result. Every man handling cheese wore white gloves, supplied clean and fresh every morning. The girls likewise were supplied with clean white aprons and caps every morning.

Products Manufactured

Process American Cheese;
Process Brick Cheese;
Process Swiss Cheese;
Process Pimento Cheese.

Process American Cheese

The operation of manufacturing Process American cheese in this plant is carried on in very much the same manner as in other plants where the kettle method of emulsification is used. Cheese of different lots, sizes, quality, flavor, differing in moisture and fat content are assembled in batches and go through the usual form of being reduced to small particles similar to shavings so that it can be readily melted, mixed and emulsified in the kettle. The cheese used was of good commercial quality and was rather carefully assembled into the various lots with an idea of getting uniformity. Some Swiss cheese was at times we feel used in the manufacture of Process American cheese. This company has at its command a well equipped chemical laboratory and is able to properly control the composition of the product manufactured so that it should at all times meet the requirements of the standard fixed by the Legislature for the process cheese of different varieties.

Process Swiss Cheese

The manufacture of Process Swiss cheese is perhaps given more thought and attention at the Pabst Plant for the reason that this company was for some time engaged in the manufacture of Swiss cheese in a Swiss Cheese Factory on the Pabst farm at Oconomowoc and when they engaged in the business of manufacturing Process cheese they sort of specialized in Swiss Process cheese. It was admitted that from 5 to 10 per cent of fresh, clean, good flavored albumin was added to the cheese and that this albumin was received daily from the cheese factory on the Pabst farm at Oconomowoc. The claim was made for the use of albumin that it absorbs the moisture, makes a smoother product with a better texture. The statement was made that in

their opinion they could incorporate a larger percentage of the albumin if they had the supply. Some uncolored American cheese is at times used in the manufacture of Process Swiss cheese. The percentage, if used, was not learned.

Emulsifier Added

The emulsifying chemical used at this plant is sodium phosphate and it was stated that it was used continuously although not needed at all times and that even when used, occasionally a kettle or batch would go wrong. They admitted that there were many things to be learned about Process cheese and the use of an emulsifier and that they were unable to explain failure in producing Process cheese at times. They stated that sodium citrate had been tried but that when cheese in which this emulsifying chemical had been used was stored for some time, the cheese seemed to become grainy or crumbly. A statement made in connection with the manufacture of Process cheese at this plant difficult of understanding, is that they would use more albumin than they now use, namely 5 to 10 per cent, if they had the albumin. It is difficult to understand how they could use 2 per cent of emulsifier, $\frac{1}{2}$ per cent of salt and more than 5 to 6 per cent of albumin, keeping the finished product within the minimum standard for fat fixed by the Legislature for Process cheese.

ACKERMAN-EMMENEGGER PLANT

Monroe, Wisconsin

General Sanitary Condition

This plant is small compared to most of the other plants engaged in the business and the sanitary conditions were such that no severe criticism could be made.

Products Manufactured

Process American Cheese;
Process Swiss Cheese;
Process Brick Cheese.

Process Swiss Cheese

Most of the discussion at this plant centered around the manufacture of Process Swiss cheese. This is natural for the reason that the plant is located in the recognized center of the Swiss cheese industry of the State and because those in charge are primarily interested in Swiss cheese. During the inspection, it was learned that those operating this plant were of the opinion that Process Swiss cheese could not be successfully manufactured unless about 8 per cent of American cheese was used. Further, they stated that some well cured Swiss and some uncured Swiss were also necessary. It was noted that the American cheese used on the occasion of this inspection was salvy and weak bodied.

Temperatures to Which Cheese is Heated

In discussing the temperature at which emulsification was effected for the various types of Process cheese manufactured, we were told that Process Swiss cheese is heated to a temperature of about 150 degrees Fahrenheit; that Process American and Process Brick cheese were heated to a temperature of from 148 degrees Fahrenheit to 150 degrees Fahrenheit; but the statement was made that the temperature used was varied according to the appearance of the batch or mixture while undergoing emulsification and heating. Mr. Eckberg, in charge of the plant, stated that Professor Summers of the University of Wisconsin Dairy School had made some determinations along bacterial lines on samples of their product; but up to the present time he had not reached any definite conclusions, nor submitted any figures to prove that pasteurization was effected.

Emulsifiers Added

The matter of the use of a chemical emulsifying agent was taken up with them and it was admitted that an emulsifier was necessary. We were told that about 2 per cent of sodium citrate was used. They further stated that they favored citrate because they got better results than were obtained by the use of sodium phosphate.

C. A. STRAUBEL CHEESE COMPANY'S PLANT

Green Bay, Wisconsin

General Sanitary Condition

The sanitary conditions found at the plant were such that no serious objection could be made to the manner in which the plant was being operated.

Products Manufactured

Process American Cheese;
Process Brick Cheese;
Process Swiss Cheese.

Process American Cheese

Except in the case at the Brookshire plant, the kettle method as used here is the one employed in the manufacture of all Process cheese; but when the heating and emulsifying process is ended, the product, in the Straubel plant, is drawn into fifty pound pails and allowed to stand until the befitting time for weighing and packing into tin foil lined wooden boxes. In this establishment, the emulsified mass is conveyed by hand from the fifty pound pails to the scales for weighing, and from there by hand to the five pound wooden containers. To manipulate with the hands an alleged "pasteurized" article of food and in an open or exposed room, does not appear to comport with the claim that the article has the merits of pasteurization.

The method used at the Kraft and other plants and for which the Kraft Company is said to hold a patent, consists in pouring the untouched-by-hand semi-molten mass of cheese into a wooden box container which has been previously lined with tin foil.

Process Swiss and Brick Cheese

In discussing with the foreman the matter of manufacturing Process Swiss and Brick cheese, it was stated that in Process Brick cheese especially, about 40 per cent of slightly aged and high acid white cheese could be used successfully to a batch of 250 pounds. It was admitted that

about the same percentage of uncolored American cheese was used in the manufacture of Process Swiss cheese.

Temperatures to Which Heated

The temperatures employed for Process American were 150 degrees Fahrenheit; for Process Swiss, 155 degrees Fahrenheit; and for Process Brick, 145 degrees Fahrenheit.

Emulsifier Added

The emulsifying chemical used at this plant was furnished them under the designation of C. C. salt and they had no knowledge as to what it was composed of. They claimed to use about 1 per cent of this emulsifying material.

SUMMARY

It seems fitting that a few statements be made in an attempt to summarize facts found in practically all of the factories and facts in only some of the factories, so that there can be brought together some of the contradictory statements as well as some of the statements upon which practically all of the manufacturers agree. The object of manufacturing the product is set forth as an attempt to produce a product uniform in quality as far as flavor, texture and body are concerned and to produce an article of food with better keeping qualities than cheese. While cheese puts a highly perishable article, milk, in a semi-perishable form, it was thought necessary to still improve the keeping quality of cheese. Hence the product Process cheese resulted. There are a number of things found by the inspection work which it is difficult to make harmonize, the most striking perhaps being in connection with the manufacture of Process Swiss cheese. Here a reason advanced for the use of American cheese in Process Swiss loaf by one manufacturer was that the American cheese preserved the delicate flavor of the Swiss cheese used. At another plant it was claimed that it was necessary to reduce or modify the strong Swiss flavor by the addition of uncolored American, which

was comparatively uncured. At still other plants, it was claimed that they were unable thus far to produce Process Swiss cheese without the use of certain percentages of American cheese, not basing their claims on the fact that it affected flavor.

In connection with the use of emulsifiers, there is a wide divergence in opinion as to the proper chemical and the percentage of the chemical to be used. One firm in particular condemned the use of sodium citrate as an emulsifying agent, claiming that if the cheese were carried in stock for any length of time, trouble would result because of the fact that the product seemed to crystallize or become granular.

Others engaged in the business found no fault with sodium citrate and claimed that they produced their best product with that chemical as an emulsifier, stressing the fact that they got a tougher or more elastic texture than when sodium phosphate was used. The wide difference in price of the two products may have considerable to do in determining which of the emulsifiers mentioned is used.

An outstanding fact found at almost all of the plants was in connection with the manufacture of Process Pimento cheese. It appears that at almost every place the odds and ends are used in this product. The impression was given that anything that would be apt to impair the flavor or texture of any of the other varieties of Process cheese, but which was clean enough for human food and free from paraffin, could be successfully turned into Pimento. Likewise any batch of the other varieties of Process cheese that did not turn out well were turned back into the manufacturing process for the making of Process Pimento cheese.

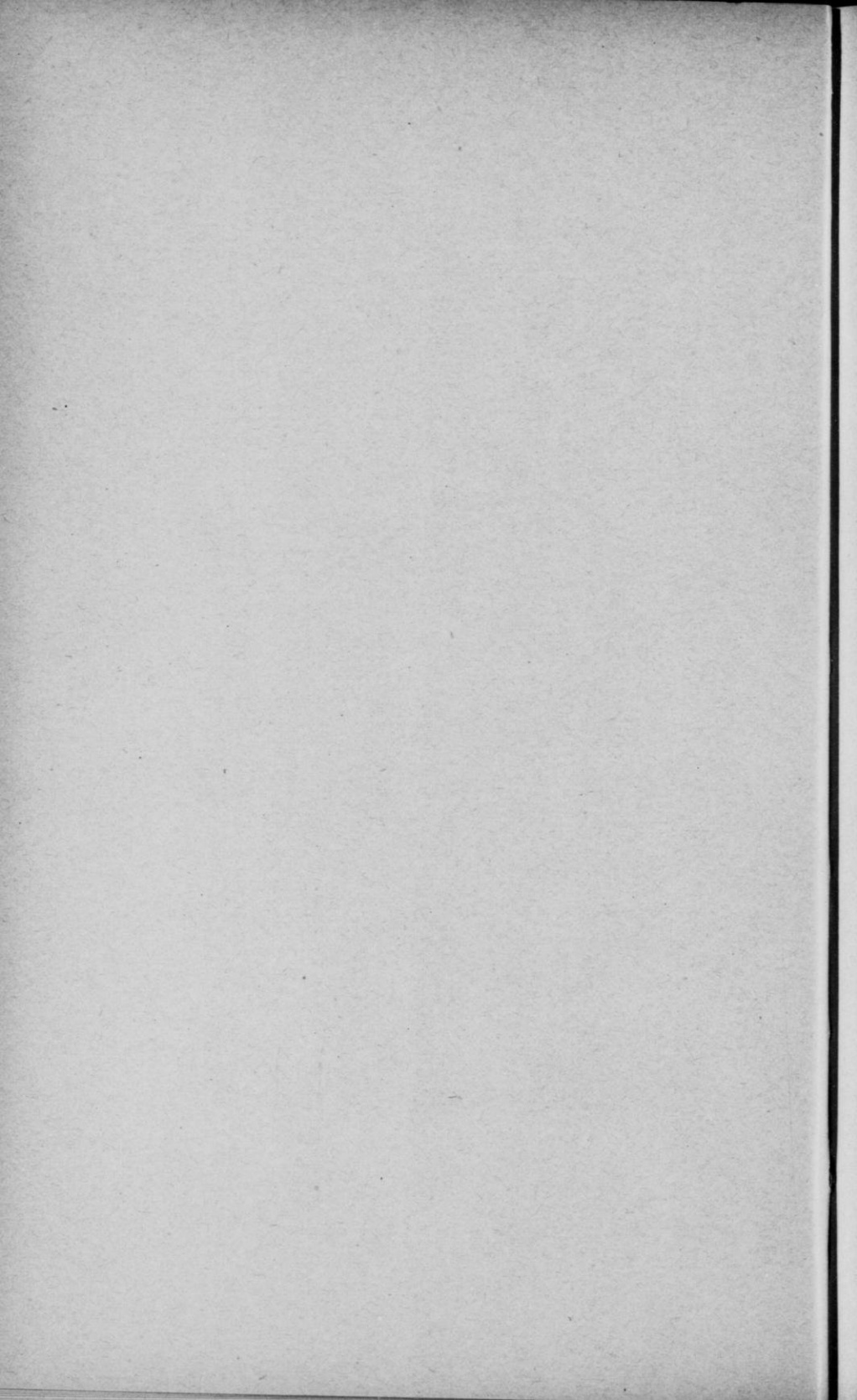
At most of the factories it was agreed that the shorter the length of time it took to get the desired temperature at which emulsification would take place, the better the finished product would be. It also seemed to be the consensus of opinion that if Process cheese in the process of manufacture is held for any length of time at a high temperature, its quality will be impaired. At one factory attempts were made to reduce the temperature as rapidly as practicable by throwing off the larger batch into smaller containers so that the temperature would decline more rapidly.

At some of the plants it was stated that the rind scraped off was burned, at others it was hauled to neighboring farms and at a few it was found difficult to dispose of the same and it was sent to a rendering plant where the fat was extracted and converted into soap grease.

At none of the factories inspected did we find any evidence of the use of milk powder at the time of inspection or just previous to that time. Admissions have been made that butter at one time was used, but no evidence of the use of butter at the time of this inspection, or just previous thereto, was discovered. As a whole, the sanitary conditions in the plants were equal to the average sanitary conditions found in other food manufacturing establishments. There were instances where improvements can be made in the plants both in the construction and in the quality of raw products used.

Table Showing Information Gained by Inspecting Process Cheese Manufacturing Plants

FIRM	PRODUCTS PRODUCED	CHEESE OR KINDS OF CHEESE USED	KIND AND PERCENTAGE OF EMULSIFIER	OTHER INGREDIENTS	HOW CHEESE USED IS PREPARED	TEMPERATURE TO WHICH HEATED
Kraft Cheese Co. Plymouth, Wis.	Pimento Loaf American Loaf Swiss Loaf Brick loaf Limburger—sm. pk. Same in tins and all all types of fancy cheese.	American returned loaf and Swiss Old and green American Swiss and White American Brick and white American Limburger, Brick and White Amer.	1% sod. Citrate 1/4-1% sod. Citrate 2% sod. Citrate 2% sod. Citrate	None	Soaked off by steam Scraped Steamed	150° F. 150° F. 160° F. 150° F.
Phenix Cheese Co. Plymouth, Wis.	Pimento Loaf American Swiss Brick Limburger Packages, tins and prints of all kinds.	American, returned loaf Old and green American Swiss and white American Brick and white American Limburger & white Amer. & brick	1 1/2-3% of a combination of Sodium Citrate and Sodium Phosphate	Sugar about 1%	Scraped with knife	150° F. to 160° F.
Pabst Co. Milwaukee, Wis.	Pimento American Swiss Brick & Specials	American and returns Old and medium American Swiss and white American Brick and white American	2-2 1/4% Sodium Phosphate	Albumen in some cheese	Scraped with knife	145° F.-160° F.
Brookshire Cheese Co., Plymouth, Wis.	Pimento American Swiss Brick & Specials	American & Swiss trimmings Old and green American Swiss and white American Brick and White Amer. & Limburger	1 1/2-2 1/4% Rochelle Salts	None	Scraped with knife	140° F.-150° F.
Sheboygan Cheese Co. Sheboygan, Wis.	Pimento American Swiss Brick	American, returns & Swiss trimmings Old and green American Swiss and White American Brick and white American	3-4% sod. Phosphate	1% Sugar	Scrape with knife	145° F.-150° F.
Achermann & Emmenegger Monroe, Wis.	Pimento American Swiss Brick & Specials	American and Pimento Old and Green American Swiss and White American Brick and white American	2% sod. Citrate	None	Scraped with knife	140° F.-155° F.



PROCESS CHEESE

by

J. Q. EMERY

Dairy and Food Commissioner

and

HARRY KLUETER

Chief Chemist and Assistant Commissioner

Collaborators

Process Cheese

The Legislature of 1925, facing a problem of fundamental importance, by legislative act defined and standardized process cheese in the following terms:

"Process cheese is the food product produced by mixing, blending and uniting with the aid of heat, cheese of one or more lots of different quality, make, flavor, age, size, weight, shape, of like or different milk fat or moisture content, so as to produce a uniform mass readily makable into desired forms, shapes, sizes, and weights; and may contain added seasoning, added harmless coloring matter, harmless emulsifying agents as disodium phosphate, sodium citrate, sodium and potassium tartrate or mixtures of the same or other harmless emulsifying chemicals in quantities not exceeding three per cent; and contains in the water-free substance not less than fifty per cent of milk fat; and process American cheese not more than thirty-nine per cent of moisture with an allowance or tolerance of one per cent in excess, so that in no case shall the moisture content of said process American cheese exceed forty per cent; and process Brick cheese not more than forty-two per cent of moisture with an allowance or tolerance of one per cent in excess, so that in no case shall the moisture content of said process Brick cheese exceed forty-three per cent; and process Emmenthaler cheese or process domestic Swiss cheese shall contain not more than forty per cent of moisture with an allowance or tolerance of one per cent in excess so that in no case shall the moisture content of said process Emmenthaler cheese or process domestic Swiss cheese exceed forty-one per cent; except that process Emmenthaler cheese or process domestic Swiss cheese shall contain in the water-free substance not less than forty-three per cent of milk fat."

An epitome of the struggle resulting in this legislation, and a characterization of conditions disclosing the need of National regulation as well, is set forth in a document prepared, in collaboration, by the dairy and food commissioner of Wisconsin and the assistant dairy and food commissioner and chief chemist, and presented by the latter to the National Joint Committee on Definitions and Standards at Washington, D. C., January 18, 1926. Because of its vital importance, that document is published in full in this bulletin and follows:

We understand that you have under consideration the matter of definition and standardization for a food product produced by mixing, blending and uniting with the aid of heat, cheese of one or more lots of different quality, make, flavor, age, size, shape, of like or different milk fat or moisture content, so as to produce a uniform mass readily makable into desired forms, shapes, sizes and weights, that may contain added seasoning, added harmless coloring matter, harmless emulsifying agents, as disodium phosphate, sodium citrate, sodium and potassium tartrate, or mixtures of the same, or other harmless emulsifying chemicals in specified limited quantities, with the end in view, of establishing its proper and just relation to other articles of food within the jurisdiction of the National Food and Drugs Act.

The knowledge we have to contribute as to the public necessity of establishing such just relationship of this food product to other foods, and to the public, is the outgrowth of experience.

On the 30th of March, 1921, a chemist employed by a leading producer of the article under consideration, called at the office of the Dairy and Food Commissioner at Madison, Wisconsin, for a conference in relation to its production in the State of Wisconsin. As a result of that conference, he was requested to submit the matter in the form of a written communication, which he did under date of March 31, 1921, to wit:

"Dairy and Food Division,
Madison, Wis.

Gentlemen:—

"In accordance with our conversation of yesterday (March 30th) I am putting before you the essential factors of manufacture of our 5 lb. loaf American Cheddar Cheese.

"This product is made from the finest grade Wisconsin full cream American Cheddar Cheese.

"The cheese is milled, then pasteurized in large kettles devised for this purpose.

"During the above pasteurization the aroma of the cheese is lessened, in order to regain this in the final product a small amount of butter (between 5 and 6 percent) is added before pasteurization.

"In order to reduce the high fat test resulting from the addition of butter and also to obviate the formation of rancid flavor, a small amount of skim cheese (about 9 percent) is added before pasteurization.

"The final product meets the food laws for full cream cheese in every state in the union.

"This cheese to be manufactured at Plymouth, Wis. and sold under contract to Armour & Co.

"We realize that it may not be possible for you to give a final statement on this proposition under the circumstances, in that event we shall be entirely satisfied to get your opinions and support in connection with the manufacture of this product in the State of Wisconsin."

Under date of June 15, 1921, I returned the following answer:

"You submit to me the following: Is a product made from 'full cream American Cheddar cheese' milled, then pasteurized with between five and six per cent of butter added thereto during the period of pasteurization with the addition of about nine per cent of skim milk cheese added before pasteurization American Cheddar cheese within the terms and meaning of the Wisconsin laws relating to that subject. Subsection 9 of Section 4601—4a of the Wisconsin statutes as amended by Chapter 48 of the laws of 1921 provides as follows:

'Cheese is the sound, solid, and ripened product made from milk or cream by coagulating the casein thereof with rennet, pepsin, or lactic acid, with or without the addition of ripening ferments and seasoning or added coloring matter and contains in the water-free substance, not less than fifty per cent of milk fat and cheese known as American or Cheddar cheese not more than thirty-eight per cent of moisture.

'Skim milk cheese is the sound, solid, and ripened product, made from skim milk by coagulating the casein thereof with rennet, pepsin, or lactic acid with or without the addition of ripening ferments and seasoning.'

'Skim milk is milk from which a part or all of the cream has been removed and contains not less than nine per cent of milk solids.'

"Section 4607c of the Wisconsin statutes provides:

'Any person who shall by himself, his agent or servant manufacture, buy, sell, offer, ship, consign, expose or have in possession for sale, within this state any skimmed-milk-cheese, or cheese manufactured from milk from which any of the fat originally contained therein has been removed except such last mentioned cheese is ten inches in diameter and nine inches in height, shall be punished as therein provided.

'Full cream American Cheddar cheese' mentioned in your letter is defined by the first definition quoted above. That is the article that under the Wisconsin laws may be legally manufactured and sold as cheese, American or Cheddar cheese.

"When any skimmed milk cheese is added to the above specified cheese, American or Cheddar cheese, the resulting article can no longer be classed as cheese, American or Cheddar cheese, under the terms of the Wisconsin law. The Wisconsin statute does two things, it defines and it also standardizes cheese. 'Cheese' to come within the terms of the law must comply both with the definition and with the standards thereof. If cheese, American or Cheddar cheese is milled, then pasteurized, it probably still remains cheese, American or Cheddar cheese, but when to cheese, American or Cheddar cheese there is added skim milk cheese in any quantity the resulting article does not come within the terms of the definition of cheese as American or Cheddar cheese.

"If the butter fat content of cheese, American or Cheddar cheese, is reduced therein by the addition of skim milk cheese, and to the resulting product there is added butter fat for the purpose or with the effect of bringing the butter fat content up to the minimum standard prescribed by law, it is my opinion that the product no longer comes within the terms of the definition of cheese, American or Cheddar cheese. From this presentation of the case it is manifest that in my opinion your inquiry must be answered in the negative.

"The product you describe it seems clear to us requires classification among the compounds.

Very truly yours,

(Signed) J. Q. EMERY,
Dairy and Food Commissioner."

The statements in this letter were made in answer to, and upon the representations made in the letter answered. Considerable time elapsed without any reply, or further comment, being received from the chemist or the company employing him.

The Legislature of Wisconsin of 1917 had enacted a law making it unlawful to manufacture for sale, exchange, sell, etc., any cheese which contains more than the permitted amount of moisture as provided in subsection 9 of section 4601—4a of the statutes. Subsection 9 is the definition and standard for cheese. At the same time the Legislature amended the standard for cheese, fixing a maximum permissible moisture content for cheese known as American or Cheddar cheese at 40 per cent. Experience with this moisture law demonstrated that the moisture content of

40 per cent for American cheese was too high, and the Legislature, in 1921, reduced the permissible maximum moisture content of American or Cheddar cheese to 38 per cent. The Legislature of 1919 fixed a maximum permissible moisture content for cheese known as brick cheese at 42 per cent.

It was the provisions of this specific statute that unavoidably brought the challenge to the cheese product under consideration. Was this cheese product in truth and in fact American cheese under the terms of the statute, or cheese "*known as American cheese?*" If so, then it was amenable to the moisture content law, and if in its manufacture, it could not be kept within the moisture content fixed by the law, it would be an outlaw in the State, for the jurisdiction of this law extended not merely to the sale, etc., of the article in question, but to its manufacture in the State as well. Analyses of several samples of cheese of this type at about this time, or just previous, disclosed the fact that the product under consideration contained as high as 43, and even 44, per cent of moisture.

The question, therefore, as to its correct classification, under the law, became paramount, and it is today a fundamental question as to its classification when shipped in interstate commerce. Certain it is, under the existing Wisconsin laws, it could not be considered American cheese for the purpose of sale, and *not* American cheese in the matter of manufacture. To determine the correct classification of this food product under existing laws, the actual facts as to its production became necessary. We found the route to this goal by no means clear and easy. A condition of affairs seemed to us to prevail suggestive of the elusive ball in the shell game. The article was found to be labeled and sold as American full cream cheese. We, therefore, held that the article was known as American cheese and that its manufacture or sale in Wisconsin, if it contained more than 38 per cent of moisture was unlawful. In other words, that as it was known as American cheese, it must comply with the Wisconsin law relating to its manufacture and sale.

In the application for letters patent, filed March 14, 1919, Serial No. 282645, containing specification of letters patent and process for treating cheese, one of the chief objects of the invention was therein stated to be to provide a process

whereby lack of uniformity in composition, flavor, moisture, condition of age, etc., is eliminated, and a blended product produced, which may readily be made to conform to the provided standards, etc. A claim in the application of this producer of this product for patent was for the application of the "process" to an admixture of a predominating quantity of Cheddar cheese, with a minor proportion of another variety, and further to provide a "process" for converting ordinary commercial cheese into cheese especially adapted to stand relatively high temperatures for extended periods without becoming spoiled. This tended to confirm that the food product in question was comparatively "new" and "different" from cheese. The application for a patent stresses throughout the patenting of a "process." It seems that when this application was made, the term process was not regarded by its applicant, in its relation to this product, as stigmatizing.

In correspondence, as hereinbefore mentioned, with a leading producer of this article, the article under consideration was referred to as a comparatively new article, in an experimental stage. A further claim was made that the public have placed this article in a class by itself, and consider it a different cheese, and, again, there should be a distinct line drawn in your thinking on this proposition between the regular American and Cheddar cheese and ----- loaf cheese. The public do not think of them in the same way. Yet it was labeled and sold to the consumer for American cheese, but, apparently, in its relation to the Wisconsin law, dealing with the moisture content of cheese known as American cheese, it was to be considered something new, something different. These were some of the perplexing conditions confronting us. Agitation arose by regular producers of American cheese, and others, as to the unfair and ruinous competition of this article with which they were confronted, which challenged attention.

When, under date of August 23, 1922, I announced to the producer of this food product, with whom correspondence had been carried on, that I was thoroughly convinced that this product was being manufactured and sold in violation of the laws of the State relating to such products, and that I had reached the conclusion that if this practice continued,

it would be my duty as Dairy and Food Commissioner of Wisconsin to contest the legality of its manufacture and sale in Wisconsin, the president of the company, his manager and chemist, promptly called upon me at the office of the Dairy and Food Commissioner for an interview. As a result of this interview, and for the purpose of more conclusively settling the legal status of the product in its relation to the Wisconsin law, I stated that I would submit the matter to the Attorney General, based upon his contention and representation as to the constituent elements and the processes involved, and that I would submit a carbon copy of my communication to the Attorney General to him for any correction of erroneous statements I might make; and this I did.

In response, I received from him a communication, in which he stated:

"In the main, I feel that you have stated the situation accurately and clearly. I wish, however, to stress several points in connection with the letter and which I feel should be made a little clearer to the Attorney General, for I feel he will not be as familiar with the subject of cheese as you are. In this he claimed that the food product in question is in a class by itself, that the public has placed this article in a class by itself and consider it a "different" cheese; that there should be a distinct line drawn in your thinking on this proposition between the regular American or Cheddar cheese and ----- loaf cheese; that the public do not think of them in the same way.

"Further, as to whether the processes have the effect to change the character or classification under the law of Wisconsin, this, of course, is a technical legal question, and should be looked at from the standpoint of the public rather than from the standpoint of the law. The character of the product is changed by pasteurization; the texture is changed by the blending; the character of the keeping quality is changed by the boxings, and for these three reasons, if for no other, ----- cheese as a product is distinct. Again, inasmuch as no foreign substance is added, and because of the fact that the best average make of cheese we can obtain in the State of Wisconsin is used, and not to the extreme extent as referred to in the second paragraph of your letter are different grades and qualities used, we do not see how such a query could arise."

It is not to be overlooked in this connection that this producer of the food product in question, approving my letter to the Attorney General as having stated the situation accurately and clearly, particularly stressed the proposition that *no foreign substance was added*.

The paragraph he refers to in my letter is as follows: "Further, the query arises whether such 'blended' (as suggested) article under the terms of the general law on adulteration, calls for setting forth on the labels a statement of the true character and composition of the article as a compound or mixture."

The opinion of the Attorney General was prepared by his deputy, Mr. Ralph M. Hoyt. The facts as he understood them to be stated to him as the basis of an official opinion were set forth in that opinion as follows: "It appears that the cheese in question is made, or rather placed in its final form for the market by ----- at Plymouth, Wisconsin. Their process consists in taking cheeses manufactured by other concerns and grinding, mixing, pasteurizing and reshaping them into loaves. The various cheese thus blended or mixed into the final form are of different grades and quality, but are all of the same general type, that is, either American, Swiss or Brick. **NOTHING IS ADDED TO OR TAKEN FROM THESE CHEESES IN THE ----- PROCESS**; the operation simply blends them together and places them in a distinctive loaf form, in which they are sold to the public."

It is to be noticed that the Attorney General's opinion was based upon the facts *as stated*, and the accuracy of his conclusion or statement, as thus stated, is dependent upon the accuracy of the statement as to the constituents and processes involved in the production of the food product in question. Whether or not the statement as given to the Attorney General at that time as to the constituents then used, was or was not correct, certain it is, that investigation since made, confirmed by admissions, disclose that the product under consideration, is not always limited to the cheese of one single variety but is at times, admittedly composed of two or more varieties, labeled and sold as being the product of a single variety.

Not long after the opinion of the Attorney General had been received, rumors were afloat that a certain C. C. salt, whatever that might mean, was in general use by the producers of the food product under consideration. Litigation was consequently delayed for further investigation to ascertain the accuracy or inaccuracy of the statements upon which the Attorney General's opinion had been rendered. That water was generally added by the producers of this product, in addition to the normal moisture of the original cheese, became a well established fact, and that the product could not be produced without added water. Several inspections were made by representatives of the Wisconsin

Dairy and Food Department, but no discovery of the mysterious "C. C. salt" was made until Mr. Klueter, Chief Chemist and Assistant Commissioner, was sent to the plant of one of the producers of the product under consideration. Following is his report of this special investigation:

As a result of close observation at the factory it was noted that what appeared to be salt from more than one barrel was added to each of the kettles during the process of manufacture. It may be added that the barrels were not side by side. When this fact was called to the attention of the man in charge of the cook room, as it was called, he remarked, "I wondered if you were going to pass this matter up." The two substances, which appeared to be salt, were then examined as to their crystal form, taste, etc., and it was readily ascertained that the one substance was not cheese salt, nor dairy salt. When asked what the salt other than cheese salt, or dairy salt, was, the man in charge of the cook room stated that this salt was referred to as C. C. salt in the plant and that he did not know the composition of the same. He then offered some explanation as to the use of so-called C. C. salt in the production of their product, stating that, with very few exceptions, it was necessary to use so-called C. C. salt in their process so as to produce the proper texture and body and for the further reason that it prevented the product from becoming grainy or gritty. Samples of the product, to which an insufficient amount of the so-called C. C. salt had been added, were exhibited, and it was pointed out that the grainy appearance of the product was due to the fact that not enough of the so-called C. C. salt had been used. When asked what use could be made of cheese of this character to which insufficient so-called C. C. salt had been added, he stated that limited quantities could be added to different kettles in the process of manufacture and thus used up. In this way a sufficient quantity of C. C. salt would be introduced. He made reference to the fact that with an aged, well cured, well broken down American cheese, very little of the C. C. salt, or possibly no C. C. salt would be required. But in my inspection of the cheese going into the product on that occasion, I found no aged and well cured American cheese being used.

Samples of the two kinds of salt used were obtained and analyzed. One proved to be cheese salt (dairy salt), and the so-called C. C. salt proved to be rochelle salts, or sodium and potassium tartrate. Several samples of salt submitted by people about to engage in the manufacture of the product under consideration, or actually engaged in the manufacture thereof, have, upon analysis, been found to be mixtures of rochelle salts and sodium citrate. Other samples proved to be sodium citrate, and still other samples disodium phosphate. Investigations at other factories disclosed the use of disodium phosphate as an emulsifying agent and at one of the larger factories it was found that sugar (sucrose) was being added in liberal quantities. At practically all of the factories it has been admitted that it is necessary to use added water in starting the process of emulsification, together with an emulsifying chemical. It was also observed that in the manufacture of the so-called American type, added cheese color is used.

It is deemed fitting at this point to describe, and discuss the character of cheese used, and the manner of assembling so-called batches. It has been represented at various factories that in order to produce a good marketable product, it is necessary that a certain amount of rather high class cheese be used. The first act by the manufacturers of the product under consideration is, therefore, to grade the cheese when bought, so that it may be used according to grade. In the manufacture of American type, a certain percentage of high class cheese, together with definite percentages of lower grade cheese, are assembled on trucks in lots of about 300 to 350 pounds, constituting what later in the process comprises a so-called batch, consisting of cheese of different age, different flavor and different texture. This cheese is then passed over a table at which men remove the coating of paraffine and bandages and any defects noticeable, such as moldy spots or contaminated or otherwise damaged portions. The product thus prepared is passed through comminuting machines, and this comminuted product is then transferred to the emulsifying kettles. The process of emulsification is started with the addition of water and emulsifying chemicals and the temperature is gradually increased. Occasionally it is found necessary to

replace water lost by evaporation. This illustrates the simplest and perhaps the highest type of manufacture of the product under consideration.

An investigation of one of the plants engaged in this business was made on complaint, and samples taken at the plant. The investigation disclosed large quantities of skim milk cheese curd on hand and in use, and the use of butter. The samples obtained, upon analysis, were found to be of the following composition:

American

Percent Moisture	-----	44.91
Percent Solids	-----	55.09
Percent Fat	-----	25.35
Percent Ratio Fat to Solids	-----	46.01

American

Percent Moisture	-----	45.68
Percent Solids	-----	54.32
Percent Fat	-----	22.79
Percent Ratio Fat to Solids	-----	41.95

Brick

Percent Moisture	-----	48.19
Percent Solids	-----	51.81
Percent Fat	-----	19.10
Percent Ratio Fat to Solids	-----	36.86

It was this condition of affairs, together with criminating and recriminating stories afloat in regard to practices, as well as an unmistakable demand by producers of Swiss cheese, especially, that brought about legislation on this matter. Legislation of the most drastic character was proposed and urged, in which such varied proposals as designating it as embalmed cheese, filled cheese, renovated cheese, remade cheese, made over cheese, were vigorously pressed on the one hand, while on the other hand suggestions were made for designations that would in no way differentiate it from the regular cheese, such as loaf cheese, sandwich cheese, package cheese, blended cheese, pasteurized cheese, although it was conceded by reputable producers of the ar-

ticle, that it cannot be truthfully said that pasteurization is always effected in the process of production.

The cook in a Plymouth establishment of a leading producer of the food product under consideration, has admitted that if the article under consideration be produced from gassy cheese or cheese having yeasty fermentations, the finished product is likely to have similar fermentations, a statement conclusively refuting the contention that pasteurization is always effected in the process.

This definition should be broad enough not to exclude such cheese as comes within the other provisions of the definition, but does not happen to be pasteurized. Further, it is urged that the word pasteurization is descriptive of a single operation, usually applied to such natural articles as milk, cream or finished products.

The Dairy and Food Department was frantically besought to interpose efforts to establish the status of this new product in relation to the old long established and well known product cheese, either by outright prohibition or by adequate regulation. The demand for outright prohibition was by no means small. Hence it followed that the first problem to be solved was, was this new process of such beneficial character to the public, and to the cheese industry as a whole, to entitle it to sincere support and protection if properly regulated; or was it so detrimental to the public interest, and to the cheese industry as a whole, as to call for its extinction. Long, painstaking investigation, independent in character, resulted in conviction that the former was the befitting attitude.

In the clash of opinion, it was forcefully pointed out, that the manufacture of the type of product under consideration had an unjustifiable advantage over the regular, well established cheese dealer, in that he was enabled to take, without serious objection, liberal quantities of off grade or inferior cheese, which he was able to use in the manufacture of this product, eventually selling it under the slogan "good cheese made better." This advantage becomes more apparent by an understanding of the manner in which cheese is purchased. Competition in the purchase of cheese is keen, and in order to insure success as a dealer, it is necessary to secure volume. Therefore, contracts are made with

cheese factories to take the season's output of their product, and because of this keen competition, a cheese factory producing a considerable portion of low grade cheese, if criticised by the dealer, has no trouble in finding another market for his product. It will be seen that the dealer having an outlet for a large quantity of inferior grade cheese is in a position to control the output of a large number of factories, and it was this fact, together with the anticipation that this product ultimately would be recognized, that induced the establishment of factories in Wisconsin. The rights and interests of the public and of the cheese industry alike demanded a just solution of this problem.

Convinced that regulative, rather than prohibitive measures, were the fitting ones for adoption, the question of a truthfully descriptive name, definition and standard, became one of first importance. As has been indicated, there were those who, in the attempted solution of this problem, besought a name that should give the product and the industry a black eye, while, on the contrary, there were those who wanted no action whatsoever, and still others who wanted to give it a euphemistic name, not truthfully descriptive and differentiative. No question is settled until it is settled right.

In the various patents for the production of the food product under consideration, special processes for its production have been strongly featured, apparently not deeming the word "process" in that connection as stigmatizing. It cannot be truthfully gainsaid that this product is obtained through a special process.

The Wisconsin law on this subject as passed by the Legislature was prepared by the State Dairy and Food Department, except that the hyphenated term "special-process cheese" was employed to designate the article as the most truthfully descriptive and fair to all interests of any name suggested or proposed. It is a warning to the public that it is what one of its leading producers frequently asserts, something new, something different. It is likewise equally protective of the dairy industry, which has the inherent right of protection against fraudulent or unfair competition. The Assembly saw fit to strike out the word "special" and the hyphen, and the Senate, in the closing days of the

session, convinced that legislation of a regulative character was imperatively demanded, concurred in the Assembly enactment, and though while the bill was pending in the Legislature its terms were generally approved by producers of the product as having been intelligently drawn and as fair and liberal to the "new", the "different" product, there were those who contended that though regulation is imperatively needed, yet this matter was so wide in its scope that it should become the subject of Federal regulation and that unless so regulated, manufacturers with factories in other states might very well discontinue the manufacture of the product in this State, carrying on their operations entirely outside of the State and thus be in a position to take advantage of those who had their money invested in factories in this State only. This condition became one of the most forceful arguments against and the most serious obstacles to the passage of the bill.

The definition and standard of cheese, both State and National, has been quoted as the sound, solid, and ripened product made from milk or cream by coagulating the casein thereof with rennet, pepsin or lactic acid, with or without the addition of ripening ferments and seasoning or added coloring matter, etc. To contend that an article produced by grinding together cheeses of different grades, adding more than the permissible amount of water thereto, changing by heat, and injecting into it chemicals not in themselves deleterious, but taking to themselves additional water, and taking the place of so much genuine cheese, effecting a change in body or texture and flavor, among the most important of cheese characteristics, I say that so to contend is to do violence to thought, language and truth. Terms truthfully descriptive of each of these cannot be synonymous. To ship in interstate commerce or sell such an article as American or Cheddar cheese, or for such a product to be exploited upon the public under the names long applied to products that have been defined and standardized, is to mislead the public and to be an injustice to the cheese industry.

Nor is this product under consideration always made from cheese as defined and standardized by law, but, to the contrary, often contains either unripened cheese or un-

ripened skimmed cheese. The result of the "process" admittedly employed, is to prevent further ripening of the product. Therefore, any unripened cheese used does not retain the inherent properties of breaking down into the products found in normally ripened or aged cheese.

Moreover, unless regulated, "wild catting" in this "new", this "different" industry, judged by our experience, becomes a serious menace to this "new" this "different" industry itself, as well as to the regular cheese industry. To produce and sell as brick cheese a mixture of Limburger, Brick and American cheese, to produce and sell as Swiss cheese a product composed of Swiss and American cheese, to produce and sell as American cheese a product produced from American and Swiss cheese or American pimento, practices that cannot be honestly and truthfully denied or gainsaid, is dishonest, and an injustice to the public.

With the maximum moisture content of cheese known as American cheese established by law at 38 per cent, with the maximum moisture content, likewise, of Brick cheese at 42 per cent, a minimum butter fat content for all cheese except domestic Swiss at 50 per cent in the water-free substance, and the further fact that cheese, except domestic Swiss and the product under consideration, manufactured in Wisconsin, has an average milk fat content of 52 per cent or over as shown by chemical analyses of numerous samples of regular cheese as to moisture and butter fat content, it becomes scarcely less than axiomatic, that some befitting legislative regulation was an imperative necessity. Attached to this communication is a tabulation showing moisture and butter fat content of samples of the food product under consideration as determined in our laboratory at Madison.

Either this food product under consideration is or is not something different from that from which it is produced, viz., cheese. It cannot consistently and legitimately, at the same time, be one and the same thing, namely cheese, and still be something new, something different, from cheese. One of the most fundamental principles laid down and adhered to by the courts as to food regulation, is that the public, whatever may be its prejudice, its ignorance, or its in-

telligence, has a right to be truthfully informed as to the character and constituents of the food it consumes.

This communication was prepared by the undersigned in collaboration.

(Signed) J. Q. EMERY,
Dairy and Food Commissioner
of Wisconsin,

(Signed) HARRY KLUETER,
Chief Chemist and Assistant
Dairy and Food Commissioner.

**Complete Analyses of Kraft's American and Kraft's Brick Cheese,
Submitted by the Winnebago Cheese Company, Fond du Lac,
Wisconsin**

	American	Brick
Moisture.....	37.85%	39.68%
Solids.....	62.15%	60.32%
Ash.....	3.64%	4.51%
Salt from Ash.....	1.25%	2.13%
Fat.....	32.55%	31.27%
Protein.....	23.09%	23.21%
Other Constituents by Difference.....	2.87%	1.33%
R. M. Number on Fat.....	28.40	26.90
S. B. R. 40° on Fat.....	44.0	44.3

ANALYSES OF PROCESS CHEESE

Date	Insp. No.	Brand	Percent Moisture	Percent Solids	Percent Fat	Percent Ratio F. to S.	
6-4-20	16a H. C. L.	Kraft Elkhorn	38.81	61.19	30.00	49.02	Babcock
7-6-20	177 A. M.	Kraft's Old English	29.73	70.27	33.30	47.38	Babcock
2-4-21	69 W. W.	Kraft American	43.45	56.55	28.95	50.3	Babcock
3-28-21	18 J. M. K.	Kraft American	38.10	61.90	31.50	50.8	Babcock
12-27-21	217 A. M.	Kraft American	36.22	63.78	31.65	49.9	Babcock
3-31-22	45 J. J. W.	Kraft American	42.08				
3-31-22	46 J. J. W.	Kraft American	42.02	57.98	29.25	50.44	Babcock
4-10-22	136 W. W.	Kraft American	44.05	55.95	27.83	49.74	Mojonnier
4-11-22	137 W. W.	Kraft American	43.62	56.38	28.72	50.94	Mojonnier
4-12-22	368 G. H. S.	Kraft American	44.89	55.11	27.31	49.55	Mojonnier
4-22-22	325 C. J. K.	Kraft American	39.16	60.84	29.93	49.19	Mojonnier
4-24-22	326 C. J. K.	Kraft American	41.97	58.03	29.38	50.62	Mojonnier
4-28-22	147 L. R. S.	Kraft American	42.70	57.30	28.95	50.52	Mojonnier
10-25-22	145 W. W.	Phoenix American	39.10	60.90	30.63	50.29	Mojonnier
10-25-22	146 W. W.	Kraft American	40.70	59.30	30.42	51.29	Mojonnier
11-7-22	190 L. R. S.	Kraft American	38.53	61.47	30.44	49.53	Mojonnier
11-7-22	191 L. R. S.	Kraft American	39.43	60.57	31.48	51.97	Mojonnier
12-5-22	Winn. Ch. Co.	Kraft American	37.85	62.15	32.55	52.37	Mojonnier
12-5-22	Winn. Ch. Co.	Kraft Brick	39.68	60.32	31.27	51.84	Mojonnier
5-3-23	173 W. W.	Kraft American	43.17	56.83	28.50	50.14	Babcock
7-17-23	265 L. R. S.	Kraft American	38.65	61.35	31.50	51.30	Babcock
7-17-23	266 L. R. S.	Armour's Veribest	38.92	61.08	31.50	51.50	Babcock
7-17-23	267 L. R. S.	Kraft American	40.09	59.91	31.05	51.60	Babcock
7-17-23	268 L. R. S.	Kraft American	40.69	59.31	31.50	53.10	Babcock
7-17-23	269 L. R. S.	Phoenix American	37.77	62.23	31.50	50.61	Babcock
7-17-23	270 L. R. S.	Phoenix American	38.01	61.99	31.80	51.30	Babcock
7-17-23	271 L. R. S.	Phoenix American	38.25	61.75	31.50	51.00	Babcock
7-17-23	272 L. R. S.	Phoenix American	39.45	60.55	31.80	52.50	Babcock
7-30-23	187 W. W.	Pabst American	42.02	57.88	28.58	49.29	Mojonnier
7-30-23	188 W. W.	Pabst Swiss	43.25	56.75	26.10	45.99	Babcock
7-30-23	189 W. W.	Pabst Brick	43.90	56.10	25.04	44.63	Mojonnier
8-11-23	191 W. W.	Kraft Brick	41.25	58.75	29.31	49.80	Mojonnier
10-1-23	300 L. R. S.	Kraft American	39.14	60.86	31.50	51.70	Babcock
1-24-24	315 L. R. S.	Sheb. Prod. Golden Cream	35.55	64.45	32.58	50.50	Mojonnier
1-24-24	316 L. R. S.	Sheb. Prod. Golden Cream	39.95	60.05	28.36	47.22	Mojonnier
4-22-24	389 L. R. S.	Kraft American	40.83	59.17	31.10	52.56	Mojonnier
4-22-24	390 L. R. S.	Brookshire American	40.63	59.37	29.17	49.13	Mojonnier

ANALYSES OF PROCESS CHEESE—Continued

Date	Insp. No.	Brand	Percent Moisture	Percent Solids	Percent Fat	Percent Ratio F. to S.	
4-22-24	391 L. R. S.	Phoenix American					
5-7-24	218 W. W.	Pabst American	38.53	61.47	31.75	51.65	Mojonnier
6-23-24	Pabst Bros.	Pabst American	39.74	60.26	30.62	50.80	Mojonnier
6-23-24	Pabst Bros.	Pabst Brick	40.78	59.22	30.58	51.63	Mojonnier
6-23-24	Pabst Bros.	Pabst Swiss	40.28	59.72	29.59	49.54	Mojonnier
6-23-24	Pabst Bros.	Pabst Pimento	41.56	58.44	26.87	45.97	Mojonnier
6-23-24	Pabst Bros.	Pabst Mustard	42.39	57.61	29.50	51.20	Mojonnier
6-23-24	Pabst Bros.	Pabst Caraway	42.43	57.57	28.16	49.03	Mojonnier
1-26-25	Wm. Winder	Ladysmith American	42.92	57.08	30.19	52.80	Mojonnier
2-27-25	91 A. J. R.	Ladysmith Brick	44.91	55.09	25.35	46.01	Mojonnier
5-22-25	226 W. W.	Ladysmith American	48.19	51.81	19.10	36.86	Mojonnier
11-6-25	227 W. J. K.	Phoenix American	45.68	54.32	22.79	41.95	Mojonnier
11-6-25	228 W. J. K.	Phoenix Brick	40.95	59.05	29.78	50.43	Mojonnier
			39.50	60.50	30.96	51.17	Mojonnier

Since the preparation of the foregoing document and its presentation to the National Joint Committee on Definitions and Standards, January 18, 1926, facts as to practices that are occurring in production and in interstate commerce are of such an ominous character that we have become convinced that nothing short of legislation akin to that of the oleomargarine and filled cheese legislation, will adequately meet the requisite regulation of the whole process cheese business.

One of the most inexplicable phenomena in connection with this process cheese business has been the contradictory attitude of certain cheese dealers who at first apparently found it difficult to obtain sufficiently vituperative words in the English language in denunciation of the practice, but later reversed themselves, engaged in the practice and by "passive resistance" stood opposed to regulatory legislation. When State regulation has been under consideration they have proposed Federal regulation; and when, subsequently, Federal regulation, akin to that of oleomargarine and filled cheese, has been proposed, have assumed the attitude of passive resistance. Unless adequately regulated by legislation, both State and National, the process cheese business is a great menace alike to the rights of the public and to the cheese industry. There is no more just and fundamental principle in food legislation than that the consumer is entitled to know the character and composition of the article of food he purchases, and no phase of the cheese industry, or any other food industry within my knowledge, affords greater opportunity for fraud than that of the process cheese business if not duly regulated by law, State and National.