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## EC924 Cheese Making in the Home

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COOPERATIVE EXTENSION WORK  
IN AGRICULTURE AND HOME ECONOMICS

1933

U. of N. Agr. College & U.S. Dept. of Agr. Cooperating  
W. H. Brokaw, Director, Lincoln

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CHEESE MAKING IN THE HOME

The History

The origin of cheese dates back so far that it cannot be said with assurance who first discovered it. Legend tells us of a lone Asian traveler who in preparing for a journey, filled a container which was made from a dried sheep stomach, with milk. After many hours of travel he stopped to refresh himself with a drink of milk. Unable to pour any liquid from his container and puzzled as to what had happened to the contents, he cut open the skin and there, much to his amazement, he found in place of milk, a mass of white curd.

Long before America was known to the world or even before the time of Christ, we find that cheese constituted one means of reckoning wealth among the wandering tribes of Asia and southern Europe. The boy David of Bible times is spoken of as carrying cheese to the captain. It is mentioned as a food among the patriarchs and prophets of Bible times, and at the feast of Roman Emperors. Wandering Asiatic tribes brought the art of cheese making to Europe where later it became one of the most important industries. Because of favorable conditions the industry developed in various sections which in the course of time resulted in different varieties.

At the time immigrants came to America, cheese making was rather generally known in Europe so that the early settlers brought with them and practiced the established methods. Immigrants carried English practices across the Atlantic. Climatic conditions of this country and certain parts of England being somewhat similar, have helped the manufacture of cheese of England to predominate here. Cheddar cheese which is best known thruout the United States was brought to America by English immigrants. The term "cheddar" came from a town of that name in England.

Early Demand for Cheese

Between 1820 to 1840 a small export trade in cheese was started. The increased demand for cheese brought about changes in the manufacturing. About 1851 a factory system was started. This system saved labor and brought higher prices for the product. In America Jesse Williams of Oneida county, New York, is supposed by many to have been the first to build and operate a cheese factory. From 1860 to 1870, a large number of cheese factories were built in New York and Wisconsin. States now ranking in cheese production are Wisconsin, New York, Michigan, Ohio and Pennsylvania.

Primitive Methods of Making Cheese

In the early industry of cheese making, the work was done on the farms by women. The methods were crude, the processes simple and the cheese was made in a more or less haphazard way. The milk used for cheese making usually came from two milkings. A small amount was heated to a comparatively high temperature and then poured into the entire amount. By transferring milk of different temperatures back and forth, the desired temperature was finally obtained. Because of the lack of thermometers, the correct temperature was determined by the sense of feeling. One of the serious difficulties was to secure rennet of a uniform strength.



### The Importance of Cheese

The cheese industry was a means of preserving the nutrients of milk in such a form, that it could be kept for a long time. It also brought good returns, hence it has become an important industry. Its production in the United States has had an upward trend during the last 30 to 50 years as indicated by Fig. 1.

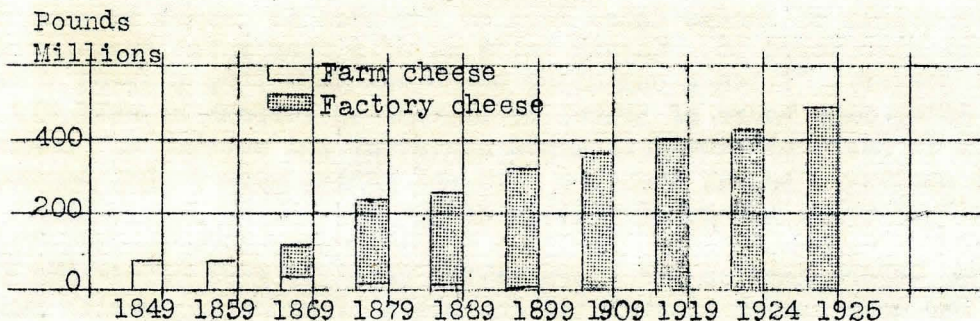


Fig. 1\*

Production of Factory Cheese Shows Increase.  
Production of Farm Cheese Shows Decrease.

The production of cheese increased gradually during the period of 1879 to 1929. Of the various types of cheese, American whole milk Cheddar cheese is by far the most important and dominates variations in total cheese production (See Fig. 2).

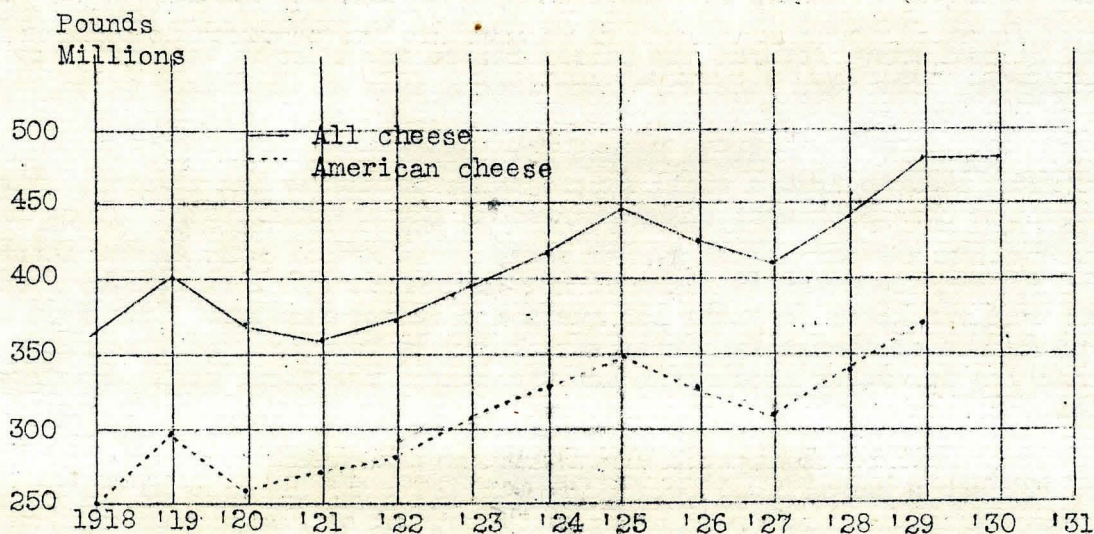


Fig. 2\*

Factory Production of all cheese and of American cheese in United States 1918-1930.

\*U. S. Dept. Miscellaneous Publication No. 124.  
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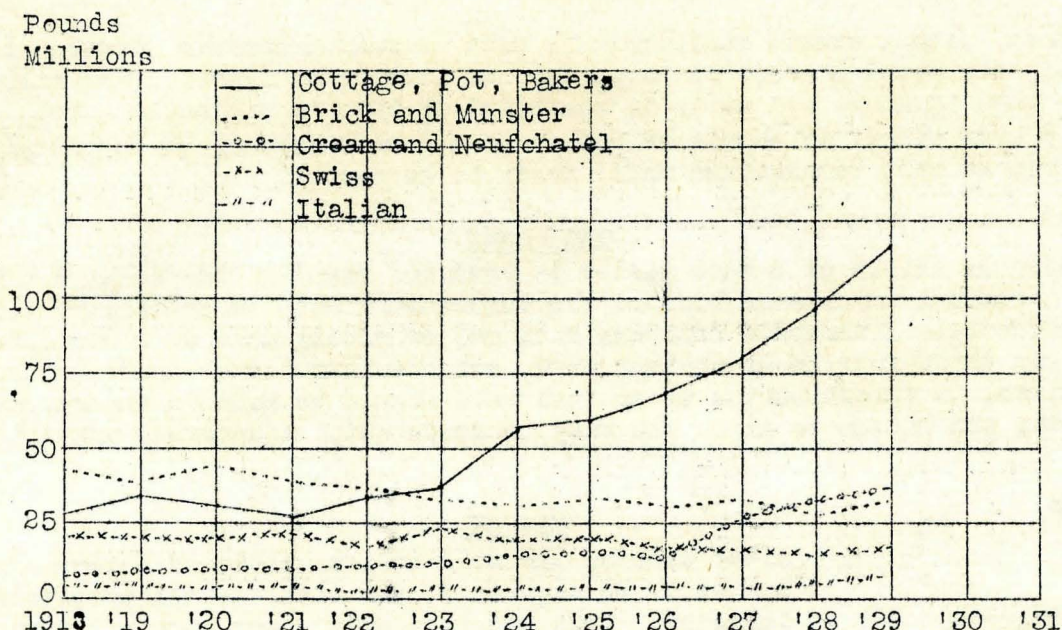


Fig. 3\*  
Factory Production of Cheese by Specified  
Varieties--United States 1918-1929.

#### Classes of Cheese

The varieties of cheeses fall into three classes, namely, hard cheeses, semi-soft cheeses, and soft cheeses. There are probably about 18 distinct varieties even tho we find approximately 400 names. Many of these have arisen locally and have been named after towns or communities. Swiss and Edam are perhaps the best liked of foreign cheese products. The kinds are too numerous to mention, but a few of the more widely used varieties are:

<u>Hard</u>	<u>Semi-Soft</u>	<u>Soft</u>
Parmesan (Italian)	Brick	Cottage
Caciocavallo (Italian)	Limburg (Belgium)	Cream
Sapsago (Switzerland)	Gorgonzola (Italian)	Neufchatel (French)
Cheddar (American)	Brie (French)	Camembert (French)
Emmenthaler (Swiss)	La Trappe (Canadian)	
Primost (Norwegian)	Roquefort (French)	
Edam (Dutch)		
Stilton (English)		

#### Manufacturing Cheddar Cheese in the Home\*

Since the price of milk has fallen more than the price of some of its products, much interest is being centered on the making of cheese on the farm. It can be made any time of the year but is best adapted to regions where it is possible to keep the milk cool so that gas forming bacteria will not develop. Where there is a surplus of milk as there often is during April, May and June, the making of Cheddar cheese offers a means of conserving for later use, milk which otherwise might be wasted.

\*For more complete details consult U. S. D. A. Farmers' Bulletin 1191.  
11766m



Good, clean, sweet, whole milk is used in making Cheddar cheese. If skim milk is used, the final product is hard, dry and lacking in flavor. The milk should not be more than 12 hours old as it is essential to have it perfectly sweet. If the milk is held over night, it should be cooled to a temperature of 60 degrees F. or lower and held at that temperature until ready to be used.

#### Equipment

A large kettle or a wash boiler is used for heating the milk. A thermometer is of paramount importance because the temperature must be controlled thruout the entire process. A homemade draining rack may be easily made of slats one-half inch thick and three-fourths of an inch wide, set one-fourth inch apart and nailed to cross pieces. A three-fourths of an inch hole should be made in the end of the drain box near the bottom to allow the whey to drain out. A homemade press is shown in Fig. 5.

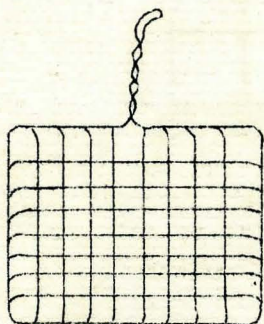


Fig. 4

#### Method

After placing the milk in the kettle or boiler, it is heated to 86 degrees F. and then the cheese coloring is added. This requires only a very small amount, about one-half teaspoon to 100 pounds of milk. Rennet which is used to coagulate the milk is added at this time. Two teaspoonfuls of rennet dissolved in one pint of cold water is required for 100 pounds of milk. (One gallon of milk testing from 3 to 6 per cent fat tests, weighs approximately 8.6 pounds.) Junket tablets may be used if rennet is not available, about  $3\frac{1}{2}$  tablets are required for each 100 pounds of milk. They

should be dissolved in  $\frac{1}{2}$  cup of cold water and stirred slowly into the milk. After adding rennet to the milk, it is stirred thoroughly for a few minutes, then left undisturbed for 30 to 35 minutes. The container should be covered so as to keep the surface of the milk from cooling.

#### Cutting the Curd

The curd is cut when firm. To test the firmness of the curd, insert the forefinger in the curd at about  $45^\circ$  angle and about one-half inch under the surface. Slightly raise the finger and split the curd with the thumb. If the curd splits smoothly without leaving particles on the finger, it is ready to cut.

The curd is cut horizontally as well as vertically. If special curd knives are not available, one can be ready made by fastening wires into a square wire frame as shown in figure 4. Such a device makes it possible to cut the curd in uniform size, of about  $\frac{3}{4}$  inch cubes, which is quite essential.

#### Stirring the Curd

After the curd is cut, it is stirred gently for about 15 minutes to prevent the pieces from matting together. During this stirring process, the pieces of curd contract and expel some of the whey. After fifteen or twenty minutes of this gentle agitation, begin to raise the temperature. This must be done very slowly, approximately not more than 2 degrees in five minutes, until a temperature of 100 degrees F. is reached. It is necessary to stir the curd during the entire heating process. The curd should remain in the whey at this temperature (100 degrees F.) until it is firm and sufficient acid has developed.



### Firmness of the Curd

The proper degree of firmness of the curd may be determined by lifting a handful of the curd from the whey and pressing between the fingers. If the pieces of curd fall apart at once, when the hands are suddenly opened, the curd is of proper firmness. If the curd is allowed to become too firm, the cheese is dry and "corky" while on the other hand if the curd is too soft the cheese will be soft, too moist, and may sour.

### Developing the Acidity

One of the most important steps in the whole process is the development of the acidity in the curd while in the whey. An over-acid curd may produce a dry, mealy cheese with a sour flavor, while a curd with too little acid may develop gas and bad flavors during the curing process.

To test for acidity, remove a small amount of the curd from the whey, press gently with increasing firmness to expel moisture. Rub gently on a clean, hot iron until the curd adheres, then slowly pull away from the iron. If the curd forms strings one-fourth to one-half inch long, sufficient acid has developed and the whey should be removed. Remove the whey by dipping off as much as possible and then place the curd on draining rack which has been covered with a piece of muslin. The curd is stirred continuously until all the free whey has escaped and then every five to ten minutes to prevent it from matting together. The temperature of the curd should still be 100 degrees F. so it is advisable to cover the curd and keep the drain rack inside the container so as to help to control the temperature. When the curd forms strings from three-fourths to one inch long on a hot iron, the curd is ready to be salted. About 3 ounces of salt is needed for 10 pounds of curd. After the salt has been thoroly stirred thru the curd, it should be allowed to dissolve.

### Pressing

When the curd cools to about 85 degrees F. it is ready to put into a hoop for pressing. The pressure is applied gently at first so as to prevent the loss of butterfat. The pressure is regulated by placing a weight on the lever of the press about half way between the hoop and the end of the lever which should be about 12 feet long (See Fig. 5). A pail of stones weighing about 35 or 40 pounds makes a suitable weight. After the first half hour the weight may be moved to the end of the lever and allowed to remain about an hour when the cheese is removed and dressed.

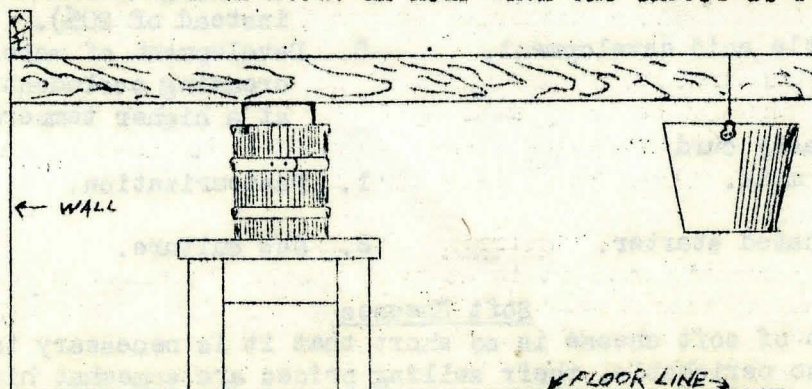


Fig. 5

Homemade cheese press. The cheese hoop should be placed about 3 feet from the wall. Moving the weight outward on the lever increases the pressure. F.B. No. 1191.



### Dressing

In dressing the cheese, a cheese cloth is used to help form a firm rind. This may be placed in the hoop before the first pressing or may be placed around the cheese at the end of the first hour. After placing on the cheese cloth, dip in warm water and remove all wrinkles from the cloth. Fit two round pieces over each end. The cheese cloth is not to be removed at any time during the entire curing process. After the cheese has been properly dressed, it should be put into the press and full pressure applied for 24 hours. After that time it is removed from the press and placed in a cool place to cure.

A cellar with a temperature between 50 to 60 degrees F. and one that can be ventilated is a good place for slow curing. If a fast cure is desired the temperature of the room must be increased. The cheese should be turned daily the first two weeks then twice a week. After a period of two to five days the outer surface becomes dry and then the cheese should be paraffined. This is done by dipping in paraffin heated to a temperature of 220 degrees F.

### Defects and Remedies for Cheddar Cheese

#### A. Dry, mealy texture caused by:

- |                                     |   |
|-------------------------------------|---|
| 1. Too much acid developed.         | 1. Use less starter.                                    |
| 2. Too much acid and too much heat. | 2. Lower setting temperature or shorten setting period. |
| 3. Too much rennet.                 | 3. Use less rennet.                                     |
| 4. Too long cooking period.         | 4. Shorten period.                                      |

#### B. Sticky cheese

- |                                     |  |
|-------------------------------------|--|
| 1. Insufficient draining,           | 1. Drain longer and stir more frequently.  |
| 2. Low cooking temperature.         | 2. Raise cooking temperature.  |
| 3. High pasteurization temperature. | 3. Lower pasteurization temperature.   |
| 4. Use of too much cream.           | 4. Use a higher testing cream (40% instead of 20%).                                      |
| 5. Too little acid development,     | 5. Development of more acid by increasing occludent and setting at a higher temperature. |

#### C. Floating or gassy curd

- |                          |                    |
|--------------------------|--------------------|
| 1. Unclean milk.         | 1. Pasteurization. |
| 2. Contaminated starter. | 2. New culture.    |

### Soft Cheeses

The life of soft cheese is so short that it is necessary to make it often. Because of being so perishable, their selling prices are somewhat higher, pound for pound, than the hard cheeses.

The method of manufacture of Neufchatel and cream cheese and their modifications are simple and the equipment needed for making them in small quantities is not elaborate; therefore, an excellent opportunity is offered to produce at low cost



a fresh, wholesome and attractive food for home use. Since Neufchatel and cream cheese may be marketed upon a small scale, they offer to dairymen an excellent opportunity for the disposal of surplus milk, if a suitable market is available. The soft cheeses are coming more and more into common use. In addition to their rich flavor and high nutritive value, they may be used with other foods to form many appetizing dishes.

The two types of soft cream cheese that may be made in the home with a small amount of equipment are cottage and Neufchatel.

#### Cottage Cheese

The first step in making this type of cheese is to sour or ripen the milk. If care has been used in the production and handling of milk, a good grade of cheese may be made by allowing the milk to sour naturally. Some of the dangers and disadvantages of natural souring are:

1. Slow coagulation or curdling.
2. Gassy and undesirable fermentations causing loss of curd in whey.
3. Bitter and other undesirable flavors.
4. Lack of uniformity in the cheese.

To sour the milk, place in a pan and allow to remain in a clean, warm place at a temperature of 75 degrees F. In about thirty hours the milk will clabber and should have a clean, sour and pleasant flavor. When firmly clabbered it should be cut into pieces one inch square and then stirred thoroly. The curd is now ready to be heated which helps the curd to expel the whey and aids in giving the cheese a firm texture. The curd is raised to a temperature of 100 degrees F. and held at this temperature for 30 minutes. It is best to place the pan of broken curd in a vessel of hot water so as to control the temperature. The curd should be stirred frequently.

At the conclusion of the heating, pour the curd and whey into a small cheese cloth bag and move about freely so as to drain. The draining is stopped when the whey ceases to flow in a steady stream.

The curd is then emptied from the bag and worked with a spoon until it becomes fine in grain. The addition of sour or sweet cream adds smoothness and palatability and improves the flavor. Salt is then added according to taste.

#### Neufchatel Cheese

This cheese is made from whole milk, partly skimmed or skimmed milk. When cheese is made from milk to which cream is added, so as to increase the fat content, it is called cream cheese. Neufchatel or cream cheese requires about the same equipment as cottage cheese. The quality of milk is very important. Milk which is sour or has undergone any abnormal fermentation should not be used. Using fresh, unripened milk without any change in acidity, makes it possible to control the normal fermentations which are necessary for cheese of high quality.

Recipe - Heat  $3\frac{1}{2}$  gallons of milk to 78 degrees F. If a starter is used, add one-half pint and mix it thoroly into the milk. Then add 8 to 10 drops of commercial liquid rennet, diluted in half a cupful of cold water and stir into the milk. Hold the milk at 78 degrees F. and let coagulate. In about 15 to 18 hours, about one-half of whey collects upon the surface of the curd.



After the setting period, pour upon a drain cloth and leave undisturbed for 3 or 4 hours or even longer after which it should be worked toward the center of the cloth in order to hasten the draining. When cooled the bag of curd is placed between two boards and a weight of about 50 pounds placed on top. This is left over night. Frequent, re-arrangement of the bag will hasten the process.

After having been properly pressed the curd is salted and then worked with a potato masher. About 2 tablespoons salt is used for the curd from  $3\frac{1}{2}$  gallons of milk. The curd is placed in a crock or porcelain dish and held at a temperature near 50 degrees F. until consumed. Under favorable conditions it will keep in good condition for from 6 to 12 days. It is most palatable immediately after it is made.

Variations - Finely chopped pimientos, olives, or nuts may be mixed with Neufchatel cheese at the time of salting. This is very good for sandwiches and salads. Farmers' Bulletin 960 gives more detailed information on the making of cheese.

#### Processed Cottage Cheese

Take 3 gallons of separated milk when it is curdled. Heat to temperature of 100 degrees F. stirring most of the time. This makes the ordinary cottage cheese. Hold at this temperature for 30 minutes and continue stirring. Squeeze drier than customary for cottage cheese.

Take  $\frac{1}{2}$  cup butter  
Salt to taste (about  $\frac{1}{2}$  t.)  
1 T. soda

Mix the butter, salt and soda thoroughly into the cottage cheese. Let stand 2 hours. Add 1 cup sweet cream and put all into a double boiler and heat while cooking until a smooth consistency has been formed. Remove from the fire and add one-half cup of sweet or sour cream to which has been added cheese coloring as desired, (about  $\frac{1}{4}$  to  $\frac{1}{2}$  teaspoonful). Beat until smooth and turn into buttered dish to mold.

This complete process must be finished within one day. The cheese should season for about five days. It may be covered with paraffin wax if to be kept. This cheese is mild cheese with very little flavor and for that reason needs an added flavor. Pimientos, caraway seed or a small amount of a strong flavored cheese melted and added, add a good flavor.

#### Cheese in the Diet

Cheese is a valuable food in the diet because it is a protein of excellent quality. It is the milk protein partially digested, and is a complete protein. The fat is the milk fat little changed except that it is less finely divided and hence not so quickly digested. The mineral content varies somewhat according to the amount of salt added. Cheddar cheese is always relatively high in calcium and phosphorus and there is some iron present. In an acid cheese, as cottage, some of the calcium is lost but still contains more than many foods. All varieties of whole milk cheese are good sources of vitamin A.



The concentration of the most important nutritive elements of milk in a food of excellent keeping qualities entitles cheese to a place in the diet which is not always fully appreciated. Its strong flavor prevents its use in many ways in which milk is practical, but makes it more akin to meat in regard to its place on the menu.

Cheese is often served in small quantity with other foods, merely to add flavor and color. Since it is a concentrated food, it may be used in the diet much as meat would be used. It should be regarded as a staple article in the diet rather than an accessory to pie, or as a last course after a heavy meal or for eating between meals. It is these practices and the further fact that cheese by itself is not easily masticated, which have led to the belief that the product is hard to digest.

Because of its texture and its high proportion of fat calories to total calories, it is digested best when used with bread or other cereal foods, and when very thoroly masticated or cooked in such a way as to be soft and not leathery. Certain substances which may develop in the ripening process of the cheese may irritate the stomach if used in too large a quantity.

#### - RECIPES

(Taken from Farmers Bulletin No. 960)

##### Cheese and Pickle

Mix the cheese with finely chopped dill pickle, chow-chow, chili sauce or any other desired pickle mixture. Use as sandwich filling or as a spread on crackers, or in salads.

##### Cheese with Chopped Parsley, Watercress, or Other Vegetables

Into the soft cheese, work finely chopped parsley, watercress, lettuce, spring onions, chives, radishes, cucumber, celery, or any other salad vegetable. Add salt and any other seasoning desired, such as onion or lemon juice.

Use this mixture as a sandwich spread, or for salads- pile it lightly on crisp lettuce or form it into balls as suggested under Cheese and Olives. The balls may also be rolled in chopped parsley or watercress.

##### Cheese with Olives, Pimientos, or Green Peppers and Nuts

Mix equal quantities of the soft cheese and chopped olives, pimientos, and nuts, or any one or two of these if all three are not desired. Add salt and a little onion juice if liked.

Spread on slices of white or graham bread. For salads this mixture may be formed into balls, or stuffed into fresh green peppers from which the centers have been removed, or into canned pimientos, and sliced. These may be served alone on lettuce with salad dressing, or used to garnish many other kinds of salads.

##### Cheese and Tomatoes

Use any one of the mixtures of cheese with olives, peppers, nuts, or chopped vegetables. Spread this on slices of tomato and use these in sandwiches or place them on lettuce and serve as salad. Or for salad, scoop out part of the

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inside of tomatoes after they are peeled, stuff them with the cheese mixture, and arrange them on lettuce. Or make a little mound of the cheese mixture on lettuce and arrange around it a tomato peeled and cut like an apple into quarters.

#### Prunes, Dates, or Figs Stuffed with Cheese

Split cooked prunes, take out the seeds, and stuff the cavities with Neufchatel or cream cheese, plain or mixed with chopped nuts. Serve on lettuce with salad dressing. Stuff the dates in this same way after they have been split and the seeds removed. Canned figs or cooked dried figs may be split and used in this same way.

#### Dried Fruit and Cheese Mixtures

Wash prunes, dates, raisins, or dried figs or apricots, and put them thru the food chopper using the fine knife. Mix the ground fruit with about twice as much cheese. Add a little salt, and chopped nuts if desired. Roll this into balls and use as suggested in salads or on crackers for afternoon tea or as the filling for sandwiches.

#### Cheese Filling for Gingerbread

2 Neufchatel or cream cheeses	$\frac{1}{2}$ t. salt
2 c. chopped dates	1 c. chopped nuts

#### Cream

Mash the cheese and mix with it enough cream to give it the consistency of a soft filling. Add the dates, nuts, and salt, and mix well. Split open a thin loaf of hot gingerbread, spread the cheese mixture on the lower half, replace the upper part and press it down lightly. The quantity of cheese filling given here is enough for a loaf of gingerbread about 8 by 10 inches. Serve the gingerbread at once while still hot.

#### Creamed Cheese and Eggs

3 hard boiled eggs	$\frac{1}{2}$ t. salt	Speck cayenne
1 T. flour	4 slices toast	
1 C. milk	$\frac{1}{2}$ to 1 c. cheese	

Make a thin white sauce with the flour, milk and seasoning. Add the cheese and stir until melted. Chop the whites of the eggs and add them to the sauce. Pour over the toast, then cut the yolks in small pieces and sprinkle over the whole.

#### Cheese Toast

1 cheese or 4 T.	$\frac{1}{2}$ t. salt	$\frac{1}{8}$ t. paprika
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Slice bread thin and cut into round pieces with biscuit cutter. Cream the cheese, add salt and paprika, spread evenly on bread and brown in oven.

#### Cheese, Rice and Tomato

1 cup cooked rice	$\frac{1}{2}$ of medium-sized green pepper
1 t. salt	$\frac{1}{4}$ of medium-sized onion
1 cheese or 4 T.	3 medium-sized tomatoes

Cook tomatoes, onion, and green pepper 20 minutes. Add cooked rice and seasoning, then the cheese. When melted, pour over heated crackers or toast.

(Prepared by Florence J. Atwood, State Extension Agent, Foods and Nutrition. Approved by Dr. P. A. Downs, Dairy Husbandry Department).

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