

ing offers a probable ground for the belief that cheese should be thoroughly chewed before it is swallowed.

The disagreeable effects, such as a burning sensation and other symptoms of indigestion which certain kinds of cheese sometimes produce in the stomach, is explained by Hutchinson (1) as being possibly due to the small quantity of free fatty acid that is produced during the ripening process. Such acids are irritating. If this be the true explanation, then it is evident that such irritating effects are more likely to occur from eating the strong cheeses used as condiments than from the milder cheese used as a staple article of diet.

Because of these opinions, extensive experiments have been carried out by the United States Department of Agriculture (2) in co-operation with the Wesleyan University, Middletown, Conn., and with the Minnesota State Experiment Station, to ascertain by actual trials what proportion of the cheese was digested, and what effect it had in the system when eaten in large quantities.

The work at Middletown was planned to include green and ripe cheese. The cheese was made by the regular cheddar process, and would be similar to a very large part of the cheese consumed in this country. The ripening was carried on under different conditions. One lot was ripened under factory conditions where the temperature varied from 50 degrees to 75 degrees F. Two lots were stored immediately after making, and one was kept at 32 degrees F. and the other at 40 degrees F. Another lot was held in the factory curing room for two weeks, and then placed at a temperature of 40 degrees F. All these methods of controlling the ripening process were carried out with cheese made with three ounces of rennet to the thousand pounds of milk, and with six ounces to the thousand pounds of milk.

The subjects of these experiments were students of the University. The diet consisted of whole wheat bread, bananas and cheese. Of the latter substances from 450 to 600 grams were eaten in the three days of the experiment, or about one-third to nearly one-half pound per day. The number of experiments completed was 184.

Without going into the details of the results, it may be stated that there was found to be little or no difference in the digestibility of the cheese at different stages of ripening. The perfectly green curd was evidently as digestible, and, so far as nutritive value was concerned, was as good as the same cheese at any stage of ripening. Furthermore, the cheese was highly digestible and, though it was eaten in comparatively large quantities, it was well assimilated. The record of the health of each individual shows that there was little or no digestive troubles, and that the green cheese caused no more trouble in this way than the ripened article.

The Minnesota experiments were planned to study the digestibility of older cheese than had been used in the Connecticut experiments, also the digestibility of other varieties of cheese, such as Roquefort, Swiss, Camembert and Cottage cheeses, as well as the so-called condimental value of some of the more highly flavored varieties. Bread, oranges and cheese formed the diet in these experiments.

In general, the results confirmed the previous work, and showed that all kinds of cheese, even the very high-flavored and so-called condimental cheeses, have a high food value. But the so-called condimental value of cheese, when eaten in small quantities as a stimulus, to the digestion of other foods was not demonstrated.

These extended experiments show that, on the average, 95 per cent. of the fat and over 95 per cent. of the protein of the cheese was digested, and more than 90 per cent. of the total energy is available for the body. They also show that cheese may serve as the principal source of protein and fuel in the body for a long period of time.

A comparison of the food value of cheese with that of the other highly nitrogenous materials is of interest at this time. No kind of meat, except dried beef, carries such a large percentage of protein as cheese. Fresh beef as purchased has, weight for weight, a little more than half the food value of cheese in either protein or fat, and the same is true of practically all other meats. Bacon or fat pork are exceptions, but their food value is mostly in the fat, which can be and is replaced to a great extent by the carbohydrate of vegetables at a much less cost and sometimes, perhaps, with benefit to the health of the consumer. Or to put the matter another way, one pound of cheese has nearly the same food value as two pounds of fresh beef, or any other fresh meat as food; it is worth as much as or more

(1) Food and the Principles of Dietetics.

(2) The Digestibility of Cheese.—Circular 166, Bureau of Animal Industry, U. S. A. than a pound of ham and it is more digestible, and it is equal to two pounds of eggs or three pounds of fish.

To place the matter in still another way, let us compare some of the more common foods on the basis of the weight of protein, fat and calories of heat that can be purchased for one dollar.

Protein, Fat, Carbohydrates and Fuel—Value of a Dollar's Worth of Each Food.

	Price per lb.	Protein, lbs.	Fat, lbs.	Carbohydrates, lbs.	Fuel Value, cal.
Milk.....	6c quart	1.38	1.60	2.31	13,800
".....	8c "	1.04	1.27	1.66	10,402
Skd. milk.....	10c gallon	3.40	0.30	5.10	17,070
Butter milk.....	10c "	3.00	0.50	4.80	17,632
Butter.....	25c lb.	0.04	3.40		14,422
Cheese.....	17c "	1.63	2.16	0.24	12,593
Beef, flank.....	8c "	2.12	2.37		13,944
" sirloin.....	18c "	0.92	0.90		5,509
Veal, cutlets.....	15c "	1.34	0.50		4,612
Mutton, chops.....	16c "	0.84	1.80		9,158
Lamb, hind, qtr.....	18c "	0.92	0.90		5,509
Ham, smoked.....	18c "	0.79	1.85		9,276
" smkd. & ckd.....	30c "	0.67	0.75		4,405
Eggs.....	25c dozen	0.71	0.56		3,853
White bread.....	2 1/4 lbs. 10c	2.10	0.50	12.2	28,710
Rolls.....	7 " 25c	3.50	1.90	20.0	51,730
Farinas.....	6 " 25c	2.30	0.24	18.7	40,070
Potatoes.....	90c bag	2.18	0.10	15.6	33,492
Flour, (fall wheat).....	2c lb.	4.75	0.04	38.0	81,087
".....	2 1/4 c lb.	3.80	0.03	30.4	64,868

In view of the foregoing comparison of food values it is a matter of surprises that there is not a greater demand for cheese. Estimates made by the United States Department of Agriculture show that the people of that country use about 175 pounds of meat annually per capita, besides fish and poultry, while the annual consumption of cheese is only about 4 pounds per capita. It is probable that if we had similar data gathered in this country the results would be about the same. Even granted that fresh meats are more palatable to most people, some other explanation must be found for this wide difference in the quantity of the two products eaten. A great proportion of the people of this country are able to buy plenty of wholesome food, but they cannot afford to discriminate against a cheap, palatable and wholesome food in favor of a higher-priced food.

The results of the experiments just cited and the experience of people of the European countries all show that we cannot discriminate against cheese because of any suspicion that it is not a healthful food, and we would do well to take a lesson from the people of the older countries and use greater quantities of cheese in our diet.

Cheese Prices in England.

During the past season, for a short while, many importers in Manchester were afraid that Canadian cheese would not average up as well in quality as during 1911, writes Canadian Trade Commissioner, W. J. Egan. Now that the season is practically over, the verdict, as rendered by the trade, is that, during 1912 Canadian cheese has reached a very high standard, and the quality is highly commended.

From an importer's point of view the present season was very disappointing.

In spite of the fact that there has been a decrease in shipments to Liverpool of 229,702 boxes, prices are, at the present moment, 6s. to 7s. lower than they were last year, and all the season it has been pretty much the same, very unprofitable. Our shortage in shipments has certainly had the effect of holding up prices, for had our shipments been up to former years, prices would have been much lower. The trade, in England, attribute weakness in cheese prices to the low prices at which New Zealand cheese has been offering for the winter delivery. New Zealand's output will greatly exceed last year, and, of course, their free selling weakens the market for Canadian cheese.

GARDEN & ORCHARD.

Three Grades Enough.

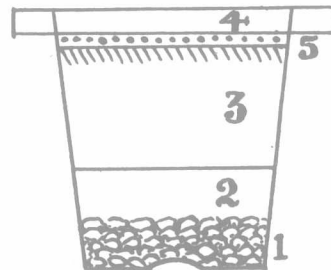
With very rare exceptions, which have been reported to the Department, the trade in Lancashire comment very highly on the Canadian fruit and packing this year. Particular reference is made throughout the trade to the packing of Nova Scotia apples. There have been much larger shipments this season from Nova Scotia of No. 3 grade than usual, and some company shipping from there have adopted a new system, adding to the grade No. 3 such words as "ordinary," "plain," "A," "B," "special," "large," "extra large." The brokers and wholesale dealers in connection with the salerooms here do not approve of this system, as it has the effect, they claim, of inducing certain people in the fruit trade to sell such fruit designated as No. 3 "extra large" as No. 1. This creates great dissatisfaction. On the other hand Nova Scotia has been shipping direct to firms who have no connection with the salerooms, and these people of

course approve of the system, as they say that for No. 3 of different grades they secure prices in proportion. As to results financially, the shipping trade of Nova Scotia will know best if it has been of advantage to make what is practically several grades. In Canada's No. 3 apple. There is no doubt that, generally speaking, the system which has been in existence here for some time, of three grades only, viz., Nos. 1, 2 and 3, and to which the fruit trade here has been educated, would seem the best system.—W. J. Egan, Canadian Trade Commissioner in Manchester.

Seed Sowing.

Editor "The Farmer's Advocate.":

How to sow, what and when to sow, are questions that confront the horticulturist and all who love the garden, whether it be one of large dimensions or a very small plot. While it is a pleasure to know of the increasing value and beauty that a well-planned garden gives to the farmer, and this is being fully realized. I can see distinctly that to help along those who want to learn more about sowing, planting, raising flowers, etc., and improving the house surroundings generally, it is of much assistance that reading matter on the subject should appear at the right time, just about two weeks ahead. The success of seed raising should commence with "good" seed. Cheap stuff gives you as much labor, if not more. A poor, weakly plant takes up the same space, and is probably a menace to others. Another thing is that feeding your ground with artificial manure is a needless task if you allow weeds to grow and suck the substance of it. From the catalogues of seedsmen of our own Dominion, I have found them quite reliable. While my gardening experience has been chiefly in private estates, I have tested seeds



Pot Prepared for Sowing.

1, drainage; 2, rough soil or old manure; 3, fine soil; 5, seeds with covering of soil; 4, space for water.

from many a seed store and firm, from the fine seed of the Begonia to the potato. Summing up the whole question, I find the "sower" more at fault than the seedsmen, for bad germination, bad seed, and so on. I would not exempt the seed trade altogether. However, we should consider whether we have done justice to the preparation of the seed-bed, pot, or box, climate and soil, and the price of seed being duly noted.

FLOWER SEEDS.

Good clean pots, cigar boxes, and even the detestable can, which is always a hideous concern to a practical gardener, do excellently, providing there is a good outlet for water. Boxes are made 4 inches deep, 12 inches wide, and 2 feet long, and have the bottom boards open a little for drainage. These are most serviceable for the hot-bed. You can prepare and sow in the shed, and principally for the convenience of removing to other frames for transplanting. See drawing of prepared seed-pot. The time of sowing to an exact date is not so important as the other details. Flower seeds are raised most successfully in warm, sunny windows by many a lady of the house. A soil that is porous and will not bake hard with water, is desired. Finely sifted soil, leaf-mold, some sand and loam will act admirably. Fine soil put through mosquito netting is essential to cover the minute seeds and also to be an inch in depth underneath the seed, the rougher soil under that and some broken pots or ashes or such like material in the bottom. The boxes or pots should be watered well through a fine rose can or sprayer with tepid water prior to sowing. Asters, stocks, zinnias, marigolds, phlox, carnation, require less than a quarter of an inch of soil. As a covering, nicotiana, salpiglossis, antirrhinums, celosia (kuchia), the popular summer cypress are examples that want a mere dusting of soil. Sunflowers, castor oil plants, and similar seeds of that size need half an inch of soil. Whether in the hot-bed or window, keep them shaded, with brown paper preferably, till germination takes place. The covering of the pots with panes of glass retains the moisture and warmth well till the seedlings come through the soil. Young seedlings like to be tolerably dry before they gain strength. Pots that get very dry should not be watered carelessly overhead. This results in washing seeds and seedlings helter-skelter. Get a pail of tepid water, put the pot