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# Milk, The Growth Food For Health

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**M**ILK is the only product provided by nature to serve solely as food. It adequately serves as a foundation for an efficient diet, when used regularly and liberally, both for children and adults. In Extension Circular 275, "Food Needs for Health," it was brought out that an adequate diet supplied the materials required to take care of the three food needs by providing materials for growth and repair (proteins, calcium, phosphorous, iron, other minerals, water and vitamins), materials for heat and energy (fat, starches, sugar), and materials for regulating body processes (vitamins, alkaline salts, laxative materials including roughage, and water).

Milk contains a greater assortment of nutrients and in better proportion for body needs than any other food. For this reason no other food reinforces the diet at so many points and can serve as well for the foundation of an adequate diet.

## The "Protective Food"

The term "protective food" used by Dr. McCollum, has aptly been given to milk because through its regular and liberal use the body is guarded against a number of deficiencies.

In general the average American diet is deficient in:

1. Calcium (and is also somewhat over-rich in phosphorous in proportion to calcium).
2. Vitamin A
3. Some cases Vitamin C
4. Vitamin D, the antirachitic principle associated with certain fats.
5. Roughage

A few facts in regard to deficiencies of some of the more important natural foods will help to explain why so many diets are inadequate for optimum health and physical development.

1. All cereal grains, tubers, roots, fruits and meats contain too little calcium to promote the well-being of growing children and adults.
2. The above list of foods, especially meat and cereals, are over rich in phosphorus in proportion to calcium. A very favorable quantitative relationship between calcium and phosphorus is very important for the best bone and teeth development. This has been determined by experiments relating to rickets and similar conditions.
3. Many tuber and root vegetables, most of the fruits, and the cereals contain smaller amounts of Vitamin A than is needed for an optimum diet.
4. All foods derived from the plant world or land animals are deficient in Vitamin D.
5. All dried fruits and foods cooked by ordinary methods are lacking in Vitamin C, the antiscorbutic vitamin.

6. Refining of cereal products has accentuated the deficiencies of the average diet. Whole wheat, whole corn meal and unpolished rice are greatly superior in food value to the bolted flour, degerminated corn meal and polished rice in regard to mineral and vitamin content.

In noting the different types of diets in various parts of the world it is interesting to find two outstanding types. These diets, when other factors are equal, appear to be more adequate than the average American diet of the present generation.

One is used in wet parts of the world where rice is the principal cereal and where the animal industry is meager because of the density of the population (principally southern and eastern Asia--about one-half of the world's population).

Their diet differs from the average American diet in two respects. These people never have had an appreciable amount of dairy products. They however, eat great quantities of leafy vegetables as compared to Americans.

The other type of diet is used by the people in somewhat arid regions where grain farming yields little return but where man can find a livelihood thru the conversion of pasturage into food by animals. These people depend to a large measure upon sour milk, curds, butter and meat, with moderate amounts of plant foods.

#### A Correcter of Deficiencies

Extensive experimental studies have shown that milk and leaves occupy an important place in an adequate diet. Because of their make up they correct the defects of cereals, tubers, roots, and meats.

Numerous experiments with animals have fully established the remarkable value of milk and leaves as supplementary foods. This is one of the well-established facts in animal husbandry and is accepted and practiced by all good livestock growers.

When homemakers study the feeding of the family to the same degree and apply the principles learned as diligently as the good livestock growers do in regard to feeding livestock a remarkable improvement in physical efficiency will be noted in a single generation.

Dr. McCollum relates one of his interesting studies thus: "In 1919-20 I had an opportunity to make a study on the group of negro children in an orphanage in Baltimore which brought out clearly the deficiencies of a diet consisting essentially of products derived from cereal grains, including hominy, rice, barley, white flour, corn starch, corn meal, oat meal, bread, dried beans, mackerel, beef, ham, pork, potatoes, string beans, carrots, onions, turnips, beets, cabbage, squash, kohlrabi, preserves, apples, bananas, animal fat and sugar. Approximately 4-5 per cent of the calories of the diet were derived from meat and much less than this of the leafy vegetables. The institution contained 236 children of all ages up to 14. Their history showed clearly that the dietary was insufficient to promote satisfactory physical development, notwithstanding its wide variety and the fairly appetizing quantity. The children were all more or less stunted, many very badly. Over a period of 15 months two groups of children in this orphanage were compared, one being maintained on the institutional diet, the other on the institutional diet supplemented with one quart per child daily of whole milk made by dissolving a high grade milk

powder in cold water. The extraordinary rapid gains made by a number of children on the supplemented diet, and the good gains made by nearly all who were not handicapped by tuberculosis, presented a very marked contrast to the children who continued to subsist on the institutional regimen."

During the last ten years the beneficial results of milk have been demonstrated on tens of thousands of children. Studies have tended to show that a large portion of the younger population subsists on a diet having the properties derived from meat, potatoes, white bread and excessive consumption of sugar, and that where such diets are used substitution of one quart of milk a day remarkably improves the dietary.

Through experiments it has been shown that leafy vegetables and milk make good the deficiencies of almost all other foods and give the basis for the rule in meal planning: A quart of milk for every child and at least a pint for the adult and some leafy vegetables every day.

#### Nutrients Supplied by Milk

**Protein.**—A quart of milk contains more than one ounce of pure protein of the best kind because of its growth-promoting qualities and the fact that it is the most completely digested and absorbed of all proteins.

Cereal proteins are incomplete proteins. Milk enhances the nutritive value of cereal proteins by supplying those essentials in which cereal proteins are lacking. Proteins derived from half cereal and half milk provide a mixture which the body can utilize with the same ease as those from milk alone.

Milk is an economical source of protein. It costs less to produce than protein in form of meat and eggs.

**Minerals.**—Milk contains all the different kinds of minerals needed by the body. Milk ash in composition strongly resembles the body ash of a new born young intended by nature to be nourished by it.

Milk is a good source to off-set mineral deficiencies of fats, sugars, refined cereals.

**Calcium and Phosphorous:** Milk is indispensable as a source of calcium for growing children. One quart a day will insure best storage of calcium in the body. In experiments Sherman and Hawley found that about 70 per cent more calcium is stored when one quart is used per day than when one and one-half pints are used.

Optimum nutrition during the periods when the teeth are formed (before birth and in childhood) is a big factor in insuring good teeth structure. During these periods nutrition is most important from a dental standpoint. Good nutrition is also important in preserving the teeth.

It was not until foods and nutrition were studied and investigated by scientific methods that the oft-asked questions, why so many men and women begin to look old at 40 to 50 years and why the teeth of so many decay, could be answered.

Phosphorous occurs in good proportion to calcium for bone growth.

**Iron:** One quart of milk will supply one-fourth of a young child's need for iron.

**Vitamins.**—Vitamin A: Milk heads the list of our foodstuffs in supplying Vitamin A. The cow is a great collector and storer of Vitamin A. Value of milk and butter therefore, is influenced by the diet of the cow.

One quart of milk yields sufficient Vitamin A for normal growth and one pint suffices for adult needs.

The additional Vitamin A supplied by green vegetables, butter and eggs can well be considered as an investment for periods of rapid growth, for special demands such as child bearing, and for maintenance of a high quality of resistance of the tissues at all times.

One quart of milk yields as much Vitamin A as: One pint of tomato juice, three quarts of orange juice, two ounces of butter, two ounces of spinach.

**Vitamin B:** Enough Vitamin B is derived from one quart of milk to cover ordinary daily requirements. Vitamin B obtained from other foods may be looked at as a health asset.

One quart of milk yields as much Vitamin B as: One quart of orange juice, one quart of tomato juice, one pound of spinach, two pounds of cabbage.

**Vitamin C:** The amount of Vitamin C in milk is not very large. It is influenced by the cow's feed and is destroyed by heating which is often necessary for sanitary reasons.

Hess found that one pint of fresh raw milk will protect a child from scurvy. It is best, however, not to depend on milk for Vitamin C as the orange or tomato juice or other vegetable juices rich in C are more de-years, especially during winter.

**Alkaline Salts.**—Milk is an alkaline food and when used with cereals and other acid foods helps to keep the tissues and fluids of the body neutral.

**Vitamin D:** Milk contains some Vitamin D but should be reinforced by codliver oil, sunshine and egg yolk to protect fully against rickets. It is safest to give codliver oil to children during their first two or three pendent sources.

### Summary

Milk owes its importance in the diet to the following:

1. Its complete assortment and good proportion of nutrients.
2. The fine quality of proteins and their supplementary value for cereal proteins.
3. High calcium content.
4. Sufficient amounts of Vitamins A and B to make a quart of milk a day a practical guarantee against a deficiency of either.
5. Vitamin D together with a proportion of calcium and phosphorous most favorable for bone and teeth development.
6. When a liberal supply of whole milk is used butter is not a necessity—other fats can take its place.
7. Cream is more expensive than milk. A good habit to form is to use milk in place of cream on cereals and puddings.
8. Money spent for milk is one of the best food investments. It is good economy to spend money for one quart of milk for each child and one pint for each adult. It is an economical source of protein with all the other nutrients thrown in. The protein is produced at less expense in milk than in meat and eggs. An acre of cultivated

farm land yields crops which, when fed to farm animals, give the following returns in human food:\*

Food produced	Pounds	protein	Total Calories
Milk	289		711,750
Beef	74		130,000
Mutton	59		137,295
Poultry and eggs	110		148,675

\* "Place of Milk in the Diet," H. C. Sherman, American Medicine, V-13, p. 361 (1918).

- It is not safe to depend on milk for all of Vitamin C and D requirement. Use some raw fruit and vegetable every day to provide Vitamin C, and codliver oil and sunshine for young children to supply Vitamin D.
- A quart of milk for each child and a pint for each adult should be used each day.

## Ways in Which Milk Can be Used in the Diet

### Breakfast Cereals Cooked in Milk

Cereals may be cooked in milk in place of water, and the person who does not like milk will get the value of milk without realizing that he has eaten it. Cereals cooked in milk are especially good for children.

Cereal	Milk	Salt	Time
1 c. rolled oats	2 cups	1 ts.	30-60 minutes
1 c. oatmeal	4 cups	1 ts.	2 hours
1 c. granular cereal such as cream of wheat, cream of barley, etc.	2 cups	1 ts.	30-60 minutes
1 c. corn meal	6 cups	1 ts.	3 hours
1 c. rice	3 cups	1 ts.	1 hour

Method: Combine the dry cereals with cold milk. Add salt and cook in double boiler over boiling water.

### White Sauce

Consistency	Fat	Flour	Milk	Salt	Use
No. 1 Thin	1 tb.	1 tb.	1 c.	½ ts.	Soups, thin gravies, milk toast, etc.
No. 2 Medium	1-2 tb.	2 tb.	1 c.	½ ts.	Creamed and scalloped dishes, gravies, souffles, pudding sauces
No. 3 Thick	1-3 tb.	3 tb.	1 c.	½ ts.	Thick sauces Thick creamed and scalloped dishes, timbales, salad dressing
No. 4 Very thick	1-4 tb.	4 tb.	1 c.	½ ts.	Croquettes, meat loaf, etc.

### Methods of Combining White Sauces

- Melt the fat, add flour with seasoning, stirring vigorously; then add heated milk gradually, stirring constantly until thick.
- Heat milk in double boiler. Cream fat and flour with seasoning. Add a small amount of heated milk to creamed mixture and then add milk in double boiler. Cook until thick.

3. Mix a small amount of cold liquid with the flour. Heat remaining milk in double boiler. Combine the two. Add the fat last.

### Easily Prepared Milk Dishes

Soups	Creamed and Scalloped dishes	Drinks
Cream of spinach	Creamed onions	Milk shakes
Cream of pea	Creamed celery	Chocolate
Cream of lima bean	Creamed cabbage	Caramel
Cream of tomato	Creamed carrots and peas	Fruit
Cream of celery	Creamed brussels sprouts	Vanilla
Cream of corn	Creamed potatoes and green pepper	Malted milk
Cream of potato	Creamed chicken	Plain
Cream of peanut butter	Scalloped onions	Chocolate
Oyster stew	Scalloped celery	Egg Nog
Corn chowder	Scalloped cabbage	Caramel
Fish chowder	Scalloped cauliflower	Chocolate
Tomato bisque	Scalloped potatoes	Fruit
Cauliflower soup	Scalloped meats	Nutmeg
		Cinnamon

### Desserts

Corn starch pudding	Baked custards	Rice pudding
Banana	Caramel	Cooked in milk
Caramel	Cocoanut	Caramel
Chocolate	Coffee	Chocolate
Fruit	Date	Dates
Vanilla	Vanilla	Lemon
with chocolate sauce	Bread pudding	Raisins
with caramel sauce	Banana	Pineapple
with fruit sauce	Caramel nut	With milk
Floating Island	Chocolate nut	Apples and cinnamon
Banana	Maple	Spanish Cream
Chocolate	Raisin	Banana
Cocoanut	Soft custard	Caramel
Orange	Caramel	Chocolate
Peaches	Cocolate	Coffee
Sponge cake	Cocoanut	Fruit
Junket	Coffee	Vanilla
Caramel	Lemon	With fruit sauce
Chocolate	Pineapple	With caramel sauce
Fruit	Vanilla	With chocolate sauce
Vanilla		

### Other Dairy Dishes

#### Milk Sherbet

4 c. skim milk  
 Juice of 3 lemons or oranges or  $\frac{1}{2}$  c. grape or berry juice  
 1 T. gelatin

Soak gelatin in a little cold milk. Heat until dissolved and add to juice sugar or honey and remainder of milk. Freeze.

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#### Spanish Cream

1 oz. granulated gelatin (2 T.)  
 $\frac{1}{2}$  c. cold water  
 $\frac{1}{2}$  c. hot water  
 1 t. vanilla

$\frac{1}{3}$  c. sugar  
 $\frac{1}{4}$  t. salt  
 2 eggs  
 $2\frac{1}{4}$  c. cold milk

Make custard with egg yolks, sugar and hot milk. Add softened gelatine. When about to be thick fold in beaten whites. Chill and serve with whipped cream.

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#### Cottage Cheese Pudding

2 c. cottage cheese  
 $\frac{1}{4}$  c. bread crumbs  
 $\frac{1}{2}$  c. sugar or honey  
 2 eggs slightly beaten

$\frac{1}{2}$  c. raisins, cherries, prunes or apples  
 $\frac{1}{4}$  c. melted fat

Mix thoroughly and bake like custard.

**Buttermilk Lemonade**

- |                  |          |
|------------------|----------|
| 1 qt. buttermilk | 3 lemons |
|------------------|----------|

A delicious variation from ordinary buttermilk may be made by addition of lemon juice and sugar. The quantity of lemon and sugar should be varied to suit the taste of the individual. The beverage is delightful, especially refreshing on a hot day.

**Douchess Soup**

- |             |                     |
|-------------|---------------------|
| 3½ c. milk  | 2 T. onion          |
| 2 T. butter | ¼ ts. pepper        |
| 2 T. flour  | ½ c. grated cheese  |
| 1 t. salt   | ½ c. chopped carrot |
- ½ c. water from vegetables

**Spinach Soup**

1 qt. white sauce (thin)      2 c. cooked spinach  
 Cut up spinach, bring to boiling point, strain. Combine with hot white sauce, reheat and serve.  
 All other greens may be used in the same way.

**English Monkey**

- |                               |              |
|-------------------------------|--------------|
| 1½ c. stale bread crumbs      | or diced     |
| 1½ c. milk                    | 2 eggs       |
| 2 T. butter                   | ¾ t. salt    |
| 1½ c. American cheese chopped | ¼ t. paprika |

**Toasted Crackers**

Scald the crumbs and milk together, mix the remainder of the ingredients and pour over the crumb mixture, and cook over hot water, stirring frequently until the cheese has melted, and the whole is well blended. Serve on toasted crackers.

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**Corn Fondue**

- |                    |               |
|--------------------|---------------|
| 1 c. milk          | ½ t. salt     |
| 1 c. bread crumbs  | ¼ t. pepper   |
| 1 c. corn          | yolk 3 eggs   |
| 1 c. grated cheese | whites 3 eggs |

1 T. melted butter

Mix ingredients in order given. Cut and fold in the beaten whites of the eggs last. Bake in moderate oven until firm.

**Spinach and Cheese Timbales**

- |                     |   |
|---------------------|---|
| 2 c. cooked spinach | 2 T. butter                                   |
| 3 eggs              | ½ lb. American cheese (rubbed through grater) |
| ¾ c. milk           |   |
- ½ t. salt  
 Few grains pepper

Chop spinach very fine. Beat egg yolks, add milk, melted butter, cheese, seasoning, and stir while heating. Mix one-half of cheese sauce with spinach and fold in stiffly beaten egg whites. Fill 10 buttered timbale molds with mixture. Place in a pan of hot water and bake in a moderate oven until firm. Turn out on a hot plate, garnish with slices of hard boiled egg, and pour balance of cheese sauce around the timbales.

**Cheese Puff**

- |                |   |
|----------------|---|
| 8 slices bread | ½ lb. American cheese rubbed through grater |
| 4 eggs         |   |
| 1 qt. milk     |   |

Butter thin slices of bread and place flat in baking dish. Between slices put salt, pepper and grated cheese. Beat eggs in milk, pour over bread, sprinkle cheese on top and bake in moderate oven for half an hour. Serve immediately.

**Eggs au Gratin**

- |            |              |
|------------|--------------|
| 8 eggs     | 1½ c. milk   |
| 2 T. fat   | ¾ t. salt    |
| 3 T. flour | ¼ t. paprika |

½ c. grated American cheese

Hard cook the eggs. Meanwhile, prepare a white sauce as follows; Melt the fat and add the flour, stirring constantly. When smooth, and bubbling, add the salt and paprika. Shell the eggs, halve them lengthwise and arrange in a greased baking dish. Pour the white sauce over them and sprinkle the top with grated cheese and a little paprika. Bake in a medium oven of 350 degrees F. for 15 minutes, or until thoroughly heated and browned on top. Serves six.

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### Cottage Cheese Loaf

1 c. cottage cheese  
1 c. ground peanuts or black walnuts  
1 c. milk or tomato juice

Mix in order given. Bake 30 or 40 minutes. Place in cold water. Custards with cheese or chipped meat may be served with a hot tomato sauce for a meat dish.

### Egg and Asparagus Loaf

1 can asparagus tips  
2 hard cooked eggs  
1 c. liquid from can

1 T. chopped onion  
1 egg  
1 t. salt  
1½ t. paprika

Salt and pepper to taste

Line a mold with asparagus tips. Mix beaten eggs with cream of wheat, milk, asparagus liquid, salt and pepper. Pour in mold and cook 20 minutes. Turn out and serve with egg sauce. Garnish with hard cooked eggs. State College Home Economics department

### Vegetable Loaf

½ can green peas  
½ c. cooked green beans  
½ c. chopped boiled carrots  
½ small onion chopped  
1½ c. milk

1 c. soft bread crumbs  
¼ t. salt  
¼ t. pepper  
½ t. paprika  
1 egg

Press peas through sieve, cut beans in small pieces and combine with all vegetables. Add to the milk and beaten egg, crumbs and seasoning. White sauce No. 4 can be used.

### Salmon Loaf

3 c. white sauce (thick) No. 4  
3 cans salmon (1 lb.)  
6 t. lemon juice

½ chopped onion  
¼ t. minced parsley  
salt and pepper to taste

Bread crumbs should be added to bind mixture. It should not be stiff. Bake one-half to three-quarters hour in moderate oven or until brown. State College Home Economics department

### Cheese Salad Suggestions

1. One cup canned peas, 1 cup cheese, cut in small cubes, 1 cup coarsely ground peanuts.
2. Lettuce and cottage cheese, paprika.
3. One cup celery, one cup apples and one cup cheese.
4. Cottage cheese, nut meats or olives and pimentos.
5. Cucumbers, radishes and cottage cheese.
6. Sliced pineapple and cottage cheese. (Force cheese through a potato ricer or pastry bag over the sliced tomato or pineapple.)
7. Prunes stuffed with cottage cheese or cream cheese and nut meats.
8. Dates stuffed with cottage cheese and nuts.
9. Pimento cheese salad.

¼ lb. pimento cheese or cottage cheese with pimentos  
1 T. cold water  
5 T. cream

1 t. gelatin  
green peppers  
lettuce or cabbage  
salt and pepper

Soften gelatin in cold water and dissolve over hot water. Add this to the cheese which has been rubbed through grater and make smooth with cream. Stuff peppers with mixture and place on ice. When very cold, slice in thin rings and arrange on bed of crisp lettuce or cabbage. Serve with French dressing.

10. Orange and Cheese Salad: Arrange crisp lettuce or cabbage leaves around the edge of a salad bowl. Pile cottage cheese or cream cheese moistened with cream in the center. Make a border of orange slices sprinkled with chopped meat or parsley. Serve with French or Mayonnaise dressing.

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