CHAPTER XX.

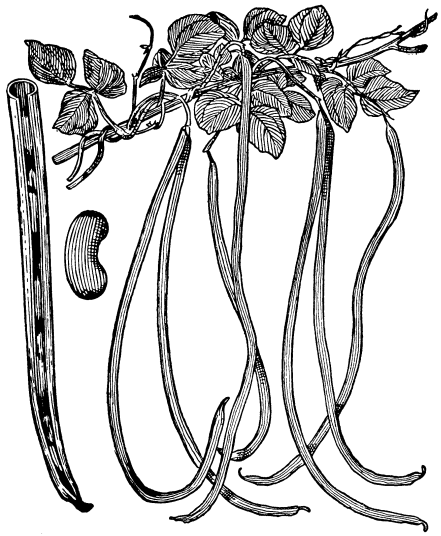
NATURAL FOODS AND THEIR QUALITIES.

THE common potato is by far the most important of the edible tubers, both as to nutritive value and the extent of its cultivation. The sweet potato ranks next to it. It has been estimated that the white or Irish potato (as it is commonly called) furnishes about one-eighth of the total food supply of America. It was first introduced into Europe between 1580 and 1585 by the Spaniards, and some people believe it to be a native of Chili. It is well known to some of the students and exploring botanists of the Southwest that one of its original habitats was in the mountains of Arizona.

When one realizes how large a part it forms in the dietary of the peasantry of Ireland and other European countries, it is hard to conceive that it is only within the last two hundred years or less that it has become so staple a food. Since this time its use has constantly increased, for it is one of the cheapest vegetables to raise, can be kept over the winter, is easy to prepare for the table, pleasant to the taste and very rich in digestible starch. It soon became a staple food among all classes throughout central and northern Europe, so that in the middle of the last century when the black rot wrought its deadly havoc on the potato crops, not only Ireland but large districts in continental Europe were seriously threatened with famine.

It is a fact worthy of mention that, as the potato has been modified by cultivation, it has largely lost the power of producing seeds, and the cultivated potato differs from the wild in seldom producing seed-bearing fruits. This is a disadvantage from the plant breeder's standpoint, as he depends on seeds from blossoms properly fertilized to yield new varieties. From the grower's standpoint it is of little moment, as he always uses the old tubers in planting the potato crop, each "eye" in the potato being a bud on the underground stem which is capable of growing into a new plant.

The corky skin of the potato makes up about two and one-half per cent. of the whole, and the cortical layer eight and one-half per cent., leaving eighty-nine per cent. for the main body of the potato. Theoretically the skin is the only refuse or inedible material, but in practice a considerable part of the cortical layer is usually removed with it, and in the case of potatoes that are lumpy or have shriveled in storage a much greater proportion of the flesh is wasted. When potatoes are baked or boiled in their jackets more or less of the flesh is wasted when the skin is removed, and in this case also the amount of the loss bears some relation to the shape of the tubers. Careful investigation has shown that it is safe to estimate that even with careful peeling about twenty per cent. of the potato is lost. Therefore it is best not to peel potatoes except in the case of those that are to be mashed. A decided flavor that is exceedingly delicious and peculiar to the skin and cortical layers is entirely lost in peeling, and the objection that the potato peeling is indigestible will be found to be groundless when anything like reasonable mastication is practiced.



The Asparagus Bean

The best method of preparing potatoes is, after carefully washing them, to immerse them in hot water, using as little water as possible, and then allowing all of the water to evaporate during boiling.

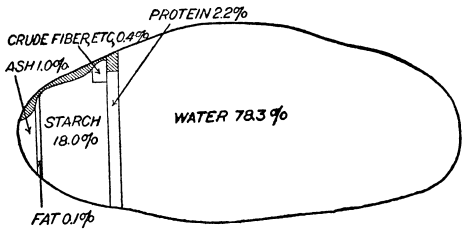
The edible portion of the potato as generally used holds on an average about seventy-eight per

cent. water, and so only about twenty per cent. of the whole tuber has a direct food value.

Our illustration shows the potato's composition in graphic form, indicating the proportion usually wasted when the potato is boiled.

This diagram shows that the bulk of the potato tuber is water. The stage of growth and other conditions affect the proportion present, young tubers being more juicy or watery than those which are fully developed. When potatoes are stored, they undergo a shrinkage, chiefly owing to loss of water or juice by evaporation.

The carbohydrates are by far the most abundant of the nutrients. Of the eighteen and four-tenths per cent. present less than five-tenths per cent. is made up of cellulose, the bulk being in the form of starch, which is, of course, insoluble in cold water, and small quantities of such soluble carbohydrates as dextrose sugar, etc. In young tubers there is a larger proportion of sugars and less starch than when they have become mature. As the tuber lies in the ground the starch content increases. When it begins to sprout, however, part of the starch is converted by a ferment of the tuber into soluble glucose. Thus, young or early potatoes and old ones both have a smaller proportion of starch and a larger proportion of soluble sugars than well grown but still fresh tubers.



A diagram showing the potato's nutritive qualities.

The protein bodies are rather scanty, as compared with those of cereals and such vegetables as peas and beans. Only about sixty per cent. of the total amount present is true protein—that is, in a form which can be used for the building and repair of body tissue. This means that a pound of potatoes furnishes only about one and three-tenths per cent. or two-

tenths of an ounce of true protein, and it emphasizes the statement already made that potatoes alone make a very incomplete diet, as the proportion of nitrogenous material would be very small in a quantity sufficient to supply the body with all the energy-yielding material required.

In cooking the heat affects the various constituents of the potato in different ways. The water expands into steam, part of which evaporates from the surface. Within the minute cells that compose the tuber it presses so hard against the walls that the tough cellulose is ruptured just as any air-tight vessel may be broken by the pressure of expanding steam. The starch grains inside the cells are thus released, some of them being also disintegrated, while part are changed into the soluble form of dextrin by the heat, and part are filled with water or hydrated. The protein coagulates or hardens, much as the white of egg does in boiling, and at least a part of it is broken down into simpler bodies. The mineral salts are probably little affected, but some of them are broken down, part of their constituents passing off as gases and part forming new compounds with quite different characteristics. It is the sum of these and minor changes which make the difference between a raw and a cooked potato.

It is generally considered that potatoes, when properly masticated, yield up their nutrient qualities as easily as any other food. Hence the charge that they are indigestible is not borne out by the many experiments that at different times have been made with them. Yet, as has already been stated, they are not a perfect food when eaten alone. It is seldom, however, that any person, no matter how poor, has to live entirely on potatoes. The poorest of the peasantry in Ireland eat them with an abundance of buttermilk which supplies all the protein necessary. Ordinarily they are eaten with other foods rich in protein, such as meat, milk, eggs, etc., and thus they supplement these nitrogenous foods by furnishing the needed carbohydrates. Their abundant mineral matters are also valuable and they contain enough of the C vitamine to aid in the prevention of scurvy. They are easy to cook, and can be prepared in so many

ways that they add variety to the list of vegetable dishes, especially in winter, when green vegetables are not common. They have a mild, agreeable flavor acceptable to almost everyone, but which is not sufficiently pronounced to become tiresome. Owing to the ease with which they are grown and their abundant yield, they sell at a price within the reach of all.

THE SWEET POTATO.—Another variety of potato that is growing in popular use in this country, although it is almost ignored in Europe, is the sweet potato. It is also sometimes called yam, a name which really belongs to an entirely different order of plant hardly known outside of tropical countries. The edible portion of the sweet potato plant is not an underground stem like the white potato tuber, but a true root, though its rôle in the life-history of the plant is much the same, namely, to act as a storehouse of plant food for the growth and early development of the new crop of plants. The following table shows the average composition of sweet and Irish potatoes:

Average composition of sweet and white potatoes.

KIND OF POTATO.	Refuse.	Water.	Protein	Fat.	Carbohydrates.		Ash.	Fuel value per pound.
					Sugar, starch, etc.	Crude fiber.		
	Per ct.	*Per ct.*	*Per ct.*	*Per ct.*	*Per ct*	*Per ct.*	*Per ct.*	*Calories.*
Sweet potatoes (edible portion)	.....	69.0	1.8	0.7	26.1	1.3	1.1	570
Sweet potatoes (as purchased)	20.0	55.2	1.4	.6	21.9		.9	460
Sweet potatoes (cooked)	.....	51.9	3.0	2.1	42.1		.9	925
Sweet potatoes (canned)	.....	55.2	1.9	.4	40.6	.8	1.1	820
White potatoes (edible portion)	....	78.3	2.2	.1	18.0	.4	1.0	375
White potatoes (as purchased)	20.0	62.6	1.8	.1	14.7		.8	310

Sweet potatoes contain on an average about nine per cent. less water, and nine per cent. more carbohydrates than Irish potatoes. They supply a lot of tissue-building material for the body. They also contain considerable quantities of sugar, a part of which is cane sugar, and part invert sugar or glucose. The proportion of sugar and starch varies with the climate.

The warmer the place in which the plant is grown, the greater the proportion of food laid by in the form of sugar. Tropical sweet potatoes sometimes contain almost equal quantities of sugars and starch. Those grown in New Jersey, on the other hand, probably do not average more than five or six per cent. of sugar, or about one-fifth of their total carbohydrates.

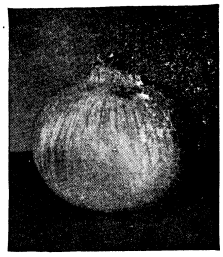
The changes which cooking makes in sweet potatoes are similar to those which take place in white potatoes. One point is generally noticeable—the longer the cooking is continued the more moist does the root become. This is probably due to changes in the carbohydrates. Part of the starch is doubtless changed to soluble carbohydrates by the heat and then dissolved in the juice, and the cane-sugar is inverted—that is, split up into simple sugar. The very sweet Southern varieties become so moist during baking, that a sirup frequently exudes through the skin.

Experiments have shown that sweet potatoes are easily digested when not eaten with too large quantities of butter. Their dryness often induces people to add too much butter. This makes a rich mixture that doubtless accounts for the claim which is often made that they are indigestible.

Considering both their composition and digestibility, it may be said that the nutritive value of sweet potatoes is much the same as that of white potatoes, and that they are well fitted to occupy the same place in the diet, and furnish a palatable substitute for white potatoes. Further, their characteristic and pleasing flavor is an additional advantage. In the North they frequently cost somewhat more than white potatoes, but are still among the cheaper vegetables. In the South they are quite as cheap or cheaper than white potatoes, and merit their extensive use.

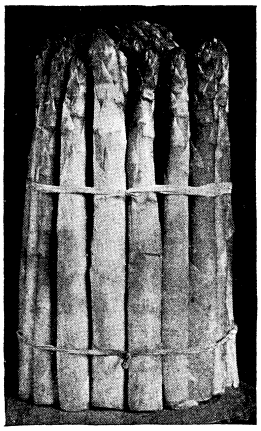
THE ONION.—The onion is a most useful vegetable and cannot be too highly commended. While its nutritive value is not great, it compares favorably with other vegetable foods and at the same time contains elements that are highly beneficial to the stomach, intestines, liver and brain. Like cabbage, it is one of Nature's provisions for winter as it is a vegetable

which can be stored for many months without losing either its flavor or food value. While the pungent volatile oil is objectionable to some people, its positive quality is highly beneficial, both to the healthy body and in most cases of disease.

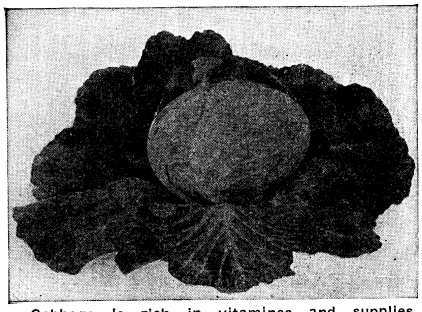


The onion is best flavoring food for vegetarian cookery.

As a blood purifier, it is one of the best of vegetables. While it may be eaten in any manner that is agreeable to the taste, it exercises its beneficial influence better when eaten raw than cooked. The best onions to eat are the young spring onions direct from the garden. If necessary they may be chopped up, tops and all, and either eaten separately or added to any vegetable salad. If chopped up fine, they may be sprinkled to advantage over almost any kind of cooked vegetable just before the cooking process is completed. When young onions cannot be obtained the larger and milder species which are sweet, such as the Teneriffe, Barletta, Rocca and California-Bermuda, may be used. These may be cut up and used in the same manner as the spring onions, or sliced and eaten with a little salt. Where the taste craves a little acid with onion, as with cucumber, do not use vinegar but squeeze a little lemon juice over them.



Asparagus is credited with prompting the function of the kidneys to a marked degree.



Cabbage is rich in vitamines and supplies roughage for bowel elimination.

The natural opiates found in onions, if these

are eaten with well masticated food, produce a soothing effect, without any after injury, as is the case where artificial sedatives are used. Insomnia has been overcome by giving the patient a large basin of Bermuda onions, well sliced and cooked until they are quite soft, without throwing away any of the water in which cooked. The soup should be thickened by the addition of a little milk and corn meal. In the cooking of onions for this purpose, however, as little butter and salt as possible should be used, olive oil being preferable to butter.

ASPARAGUS.—Asparagus is well known as a most palatable and useful vegetable, owing to its action upon the kidneys. It also has a marked tonic effect, at the same time soothing the nerves of those of excitable temperament or those whose occupations make great demands upon the brain.

CABBAGE.—Cabbage in its natural state makes a most delicious dish, and those who become accustomed to eat it thus, when sliced or chopped up, prefer it to cabbage in the cooked state. To those inclined to constipation it has a very beneficial effect and at the same time cools and purifies the blood.

MUSHROOMS.—Few people realize the value of mushrooms as an article of diet. Among the wealthy, they are generally used for flavoring purposes, but both wild and cultivated they are a highly desirable, nutritious and tasty food. The Russian peasant finds in the mushroom one of his chief articles of diet and experience demonstrates that it has great food value.

OKRA.—Although used in the Mediterranean regions of Europe for many centuries, okra, or gumbo, as it is commonly called, has only within comparatively modern times been imported into this country. Its food value is not great, but as it adds a very pleasant taste and mucilaginous consistency to soups which render them most palatable to many people, its use will doubtless materially increase in the years to come. It is raised in the South, but it is found that certain varieties grow very successfully in the middle and northern sections of the country. According to W. R. Beattie, of the Bureau of Plant Industry, the principal use of okra is in soups and various

culinary preparations in which meats form an important factor, as in the so-called gumbo soups, to which the young pods impart an excellent flavor. But it is equally useful where meats are not used. The young seeds are occasionally cooked in the same way as green peas, and the very young and tender pods are boiled and served as a salad with French dressing. Both the stem and the mature pod contain a fiber which is employed in the manufacture of paper.

No copper, brass or iron cooking vessels should be employed in preparing okra, as the metal will be absorbed and the pods discolored or even rendered poisonous. The cooking should be done in agate, porcelain, or earthenware.

OTHER VEGETABLES.—Beets, parsnips, turnips, rutabagas, pumpkin, squash and artichokes are all rich in nutrients and at the same time have decidedly beneficial effects upon the stomach and liver.

SALADS.—Vegetables in their natural condition are Nature's correctives for any of the lighter ailments to which man is subject. Tolstoy called his vegetable garden his "medicine chest."

Vegetables have distinctly soothing, strengthening and healing effects that render them very valuable as regular articles of diet. All of the salads, such as lettuce, endive, radishes, green-onions, water-cress and the like have a decidedly beneficial effect upon the body. Everyone has seen dogs, cats, and chickens eat grass, thus showing Nature's leadings, by instinct, towards the green foods of the earth. What instinct does for the lower animals, reason does for man in that it shows him that these foods help keep his body in that perfect health that every man desires. When the blood is thick and sluggish with overfeeding or wrong feeding, nothing seems to cool it and reduce it to its normal consistency better than lettuce and the other salads mentioned.

All people are familiar with the sedative effect of the salads, especially lettuce and onions. There is enough in these of a perfectly harmless narcotic to induce healthful and restful sleep without any fear of future injury. If those who suffer from insomnia and nervousness would refuse to eat any other

food than a light salad for their evening meal, it would not be long before they would be sleeping as perfectly as a healthy baby.

THE CARROT.—The carrot has long been considered a most healthful vegetable, especially when eaten in its natural state. The best way to enjoy a carrot is to walk out to a vegetable garden at least five miles distant from your home, if possible, and while the blood is circulating freely as a result of the walk, pluck the carrot from the ground, wash or scrape it and immediately eat it, giving it the most thorough and complete mastication. Near Paris a well known ex-actress has long conducted a "Carrot Cure." Her establishment has gained considerable fame because of the many patrons she has of both sexes who have found vigor, health and rosy complexions under her care.

A most delicious dish which is as nutritious and invigorating as it is tasty is made by grating young carrots and apples together. A good salad is made by combining carrots, apples, celery and nuts.

CELERY.—Celery is another of the wholesome and palatable additions to the bill of fare that of late years has been growing in popular favor. No matter how eaten, if properly masticated, it is always beneficial. Originally celery was for a long time considered poisonous, but now it is largely cultivated as a most healthful food in every civilized market in the world.

As ordinarily grown the celery plant has no true stem, the chief endeavor of the grower being to enlarge the root and increase the size of the succulent basic leaves. It is the stalks or stems of these leaves which form the edible part. The seeds of celery also are very largely used for flavoring salads, soups and a variety of dishes. The fleshy root of the celery plant is used in soups; it is also prepared as a separate dish, being cut in small pieces, boiled until tender and then served like asparagus with a dressing of cream.

There is a special turnip-rooted form of celery, known as celeriac, which produces a large root and very small leaf stems. This is more suitable for cooking than the common celery,

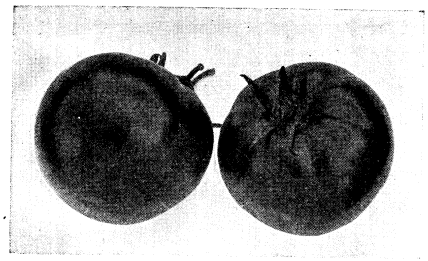
although the edible portion of the latter makes a very palatable dish when stewed in butter with salt and pepper to taste. The principal value in celery, however, lies in its excellence of flavor and other desirable qualities when well blanched and served in the natural state.

While celery may not possess much actual food value, it is very attractive, and its use is an important one from the fact that it furnishes an essential vegetable ingredient of a well regulated diet. To those who engage largely in brain work its effect is both soothing and invigorating.

THE CUCUMBER.—The cucumber is generally regarded as indigestible. The celebrated Dr. Abernethy is said to have given the following recipe for the preparation of cucumbers: "After peeling the cucumbers, slice them as finely as possible. Then sprinkle them well with salt. Place the salted slices inside a soup plate upon which place an inverted soup plate. Now shake the plates vigorously for five minutes, allowing the moisture to drain from the cucumbers. When this is done, shake them again. Now put them in a clean dish and pour plenty of vinegar over them with another dash of salt and pepper, then—*throw them into the ash barrel!*" Cucumbers prepared in this and similar fashions are undoubtedly indigestible, but when eaten as one would eat an apple, without any "fixings," without any additions whatever, except perhaps a little salt, they are palatable, nutritious and digestible. Even the skin which most people remove is perfectly digestible, and those who become accustomed to its flavor claim it is very palatable.

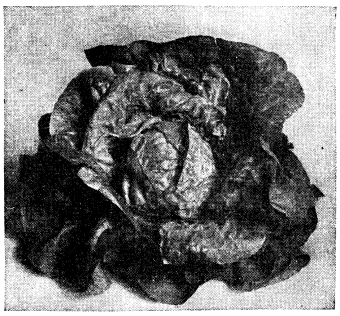
THE TOMATO.—One of the most popular and common of the vegetables in use to-day is the tomato. It is supposed to have come from Peru. For a century or more it was cultivated chiefly as an ornamental plant, the food being regarded as poisonous and liable to cause cancer, and it was not until this strong but foolish and ignorant prejudice was removed, and people learned by experience its tastiness and harmlessness that it became a popular article of diet.

Tomatoes are universally recognized as an invalid food by



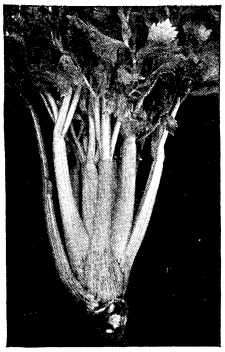
Tomatoes keep the blood pure through the medium of the mild acid and cathartic juices they contain.

medical men. This for the reason that their pulp and juice is not merely digestible, but contains an acid, which is at once a mild aperient and a promoter of gastric secretions. The late Dr. Bull, of New York City, always used to order raw tomatoes for his patients when they reached the solid food stage of recovery, because of their blood purifying and intestinal regulating powers. At the General Memorial Hospital, New York City, better known as "The Cancer Hospital," because the institution makes a specialty of treating cases of the disease, tomatoes in season constitute an important part of the diet of convalescing patients.



As a blood-cleanser and stomach regulator, lettuce has few rivals.

The following eulogy of the tomato was delivered by Professor Charles Wickenham, formerly of Guy's Hospital, London: "It is both vegetable and fruit, partaking of the beauties and dietetic advantages of both. It makes superb soup, either alone or with other materials. It also makes ideal salads, catsups, pickles—green or ripe—sweet, spiced, and sour, or in mangoes. The tomato is equally delectable if sliced, baked, escalloped, dried, fried or stewed. It is a food for the athlete, and a delicious dish for the invalid. It is a food for the sick and the well, the old and the young,



No matter how eaten, celery is always beneficial.

the rich and the poor, the leisurely and the laboring, the saint and the sinner. It is the best of all vegetables as an article of diet. For the sick, especially if they suffer from stomach troubles, it is a gift from Heaven."

A dish of nothing but sliced tomatoes is one of the most healthful articles of diet, especially when eaten with what has been called a physical culture dressing. This dressing is made in a similar manner to French dressing, simply using lemon juice as a substitute for vinegar. The best way to make this dressing is to squeeze and strain the juice of one lemon, then mix and dissolve salt to taste, after which add from two to four times as much olive oil as you have lemon juice and stir in thoroughly. Many prefer a small quantity of mustard with the dressing, and if this is desired it can be added though it is not recommended. However, this dressing can be made even without the use of salt if one so desires, and if some very finely chopped onions are added its tasty quality will be highly enhanced.

Various combinations can be used with tomatoes to advantage; for instance, tomatoes and lettuce make a splendid salad. Tomatoes and cabbage can also be recommended. Tomatoes and water-cress go well together. In fact, almost any of the green vegetables that are ordinarily used for salads can be combined with tomatoes and the combination will, in every instance, have a splendid flavor.

HERBS.—Parsley and mint have healthful qualities which make them beneficial in salads, though owing to their strong flavor very little is required for each dish. Most people regard these merely as garnishings for other dishes, but they may well be combined with other salads and eaten with pleasure and advantage.

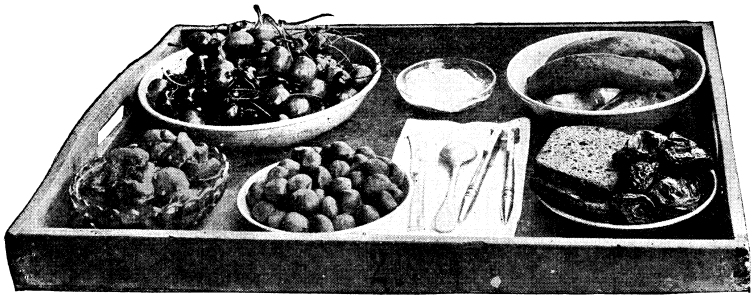
WATER-CRESS.—The anti-scorbutic properties of water-cress have long been known, and this tasty and delicious "brook-grass" is used all over the world, not only by civilized but by aboriginal people, for its palatability as well as healthful qualities.

Another material for making salads is rapidly coming into

vogue in the form of sweet peas with edible pods. When these are of the rich sweet variety, they form the basis for a most delicious salad. Spinach, young okra pods and leaves, kale, sweet peppers and chicory leaves may also be used as foundations for salads, or additions to others.

WILD SALADS.—There are a number of wild salads that can be added to the products of the garden with most beneficial effects. Among these may be mentioned the following: The leaves and tender stems of dock make a fine blood tonic, being rich in iron and other organic salts. Dock leaves can generally be picked wild from the middle of April to the middle of June, but if raised in a garden and not allowed to run to seed, tender leaves can be picked all through the summer into the late fall. Dandelion leaves and hearts are not only tasty but healthful. From time immemorial the dandelion has been used as an anti-scorbutic and excellent blood-purifier and in no form is it so beneficial as when eaten in its natural state. Its slightly bitter taste gives it an appetizing quality that many people much enjoy. Dandelion flowers have also been used to good advantage in salads, both flowers and stems being used.

Sour knot-weed, shoots of young woodbine, shepherd's purse, nasturtium leaves, flowers and seeds, oxalis or wood-sorrel, mustard leaves, plantain, winter-cress, salad burnet, pimpinella, yarrow and the like can all be used to good advantage in salads.



A vegetarian repast, consisting of cherries, figs, plums, bananas, hazel nuts, pudding and bread.

NUTS.—It is only a short time ago that nuts were considered merely as a "digester" to be eaten at the close of a meal, or as a luxury to be eaten between meals. The idea that they should have a distinct place in one's dietary was held by but few. It is a pleasing sign that this mental attitude is changed and thousands of people are making of them a regular article of diet, while the proportion of those who are living entirely upon a fruit-and-nut diet is rapidly and constantly increasing.

There has been a wonderful change also in the common disregard with which our native nuts were held, such as the hickory and butternuts, walnuts, chestnuts, pecans, etc. The demand for foreign nuts, also, which used to be so small that few were imported, has so increased that the supply has grown until now they are within the reach of persons in all walks of life.

This increase in the demand for nuts is due to the growing number of vegetarians, physical culturists and others who have learned that nuts are an excellent substitute for meat and other nitrogenous and fatty foods. The large use of nut-butters, nut-salads, nut-cakes, etc., and the use of nut-stock for soup have also increased the demand, as has the manufacture of special nut foods, such as malted nuts, protose and other meat substitutes.

Of late years the pinyon nut, which for centuries has been used by the Indians of the Southwest as one of their chief articles of diet, has come extensively into use. A similar nut, though a little larger and not quite so rich in flavor, is the European species of the same nut, commonly known as the pignolia. It is a pointed white nut and may now be obtained, properly shelled and ready for use, in the majority of first class stores.

The pistachio nut, largely grown in California, has long been used and prized by confectioners for its delicate flavor and attractive green coloring. It is commonly used as a coloring and flavor in ice cream.

In purchasing nuts the proportion of refuse is important,

as it varies from 16 per cent in chestnuts to 86 per cent in butternuts.

Nuts are a highly concentrated food, containing little water and much fat. They are rich not only in protein, which enables them to supply all the nutrient qualities gained from meat, but when one masticates them to the point of complete

Average composition of nuts and nut products.

KIND OF FOOD.	Refuse.	Edible portion.						Fuel value per pound.
		Water.	Protein.	Fat.	Carbohydrates. Sugar, starch, etc.	Carbohydrates. Crude fiber.	Ash.	
Nuts and nut products:	*Per ct.*	*Per ct.*	*Per ct.*	*Per ct.*	*Per ct.*	*Per ct.*	*Per ct.*	*Calories.*
Acorn, fresh	17.80	34.7	4.4	4.7	50.4	4.2	1.6	1,265
Almond	47.00	4.9	21.4	54.4	13.8	3.0	2.5	2,895
Beechnut	36.90	6.6	21.8	49.9	18.0		3.7	2,740
Brazil nut	49.35	4.7	17.4	65.0	5.7	3.9	3.3	3,120
Butternut	86.40	4.5	27.9	61.2	3.4		3.0	3,370
Candle nut	.....	5.9	21.4	61.7	4.9	2.8	3.3	3,020
Chestnut, fresh	15.70	43.4	6.4	6.0	41.3	1.5	1.4	1,140
Chestnut, dry	23.40	6.1	10.7	7.8	70.1	2.9	2.4	1,840
Horn chestnut or water chestnut	.....	10.6	10.9	.7	73.8	1.4	2.6	1,540
Chufa (earth almond)	.....	2.2	3.5	31.6	50.2	10.5	2.0	2,435
Cocoanut	34.66	13.0	6.6	56.2	13.7	8.9	1.6	2,805
Filbert	52.08	5.4	16.5	64.0	11.7		2.4	3,100
Ginkgo nut (seeds)	.....	47.3	5.9	.8	43.1	.9	2.0	940
Hickory nut	62.20	3.7	15.4	67.4	11.4		2.1	3,345
Lichi nut	41.60	16.4	2.9	.8	78.0		1.9	1,510
Paradise nut	45.70	2.3	22.2	62.6	10.2		2.7	3,380
Peanut	27.04	7.4	29.8	43.5	14.7	2.4	2.2	2,610
Pecan	50.10	3.4	12.1	70.7	8.5	3.7	1.6	3,300
Pine nut, Pinyon	40.6	3.4	14.6	61.9	17.3	.....	2.8	3,205
Pine nut, Spanish, or pignolia (shelled)	.....	6.2	33.9	48.2	6.5	1.4	3.8	2,710
Pistachio	.....	4.2	22.6	54.5	15.6		3.1	3,250
Walnut	58.80	3.4	18.2	60.7	13.7	2.3	1.7	3,075
Almond butter	.....	2.2	21.7	61.5	11.6		3.0	3,340
Almond paste	.....	24.2	13.1	23.9	29.4	7.8	1.6	1,900
Peanut butter	.....	2.1	29.3	46.5	17.1		5.0	2,825
Malted nuts	.....	2.6	23.7	27.6	43.9		2.2	2,600
Cocoanut candy	.....	3.9	2.4	11.9	76.7	4.5	.6	2,000
Peanut candy	.....	3.0	10.3	16.6	66.9	2.1	1.1	2,115
Chestnuts, preserved (marron glacé), air dried	.....	18.2	1.3	.5	79.7		.3	1,530
Walnuts, preserved in sirup, air dried	.....	16.9	13.6	20.0	48.6		.9	2,780
Cocoanut milk	.....	92.7	.4	1.5	4.6		.8	155
Cocoanut, desiccated	.....	3.5	6.3	57.4	31.5		1.3	3,125
Peanut coffee made from entire kernel	.....	5.1	27 9	5.1	12.3	2.4	2.2	2,805
Almond meal	.....	8.5	50.6	15.6	16.0	2.9	6.4	.....
Commercial nut meal	.....	3.0	29.0	51.7	12.1	2.0	2.2	.....
Chestnut flour	.....	7.8	4.6	3.4	80.8		3 4	1,780
Cocoanut flour	.....	14.4	20.6	2 1	45.9	10.1	6.9	1,480
Hazelnut meal	.....	2.7	11.7	65.6	17.8		2.2	3,185

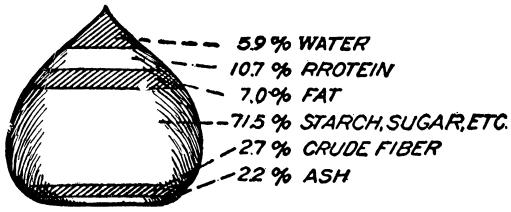


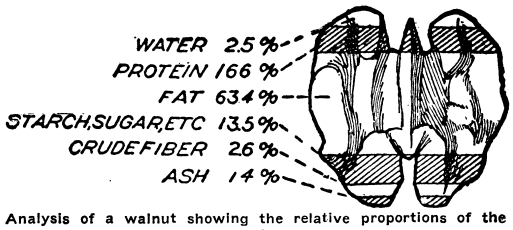
Diagram illustrating constituents of the chestnut.

emulsification and liquification, they are far better for the nourishment of the body than the finest and most nutritive cuts of meat. Indeed, it is claimed that nuts contain chemical salts and other properties that are especially valuable in keeping the muscles of the arteries elastic and pliable and thus preventing the deposition of limy substances in the arteries which, more perhaps than any other one thing, makes men grow old.

The flavor of nuts largely depends upon the oils which they contain, though a few species have a distinct flavoring matter of their own aside from the oils. As the oil in nuts readily becomes rancid, they should never be kept too long or be exposed to a higher temperature than necessary, as this hastens the process by which they become rancid. Those who have eaten a rancid nut know how intensely disagreeable the flavor is.

Some nuts, like the chestnut, peanut, tabebuia, etc., are generally eaten roasted, and the roasted flavor that most people enjoy is largely dependent upon the browned oils, starches or other carbohydrates.

Nuts have a reputation for indigestibility, but this comes from their imperfect mastication. When people have eaten a hearty meal and then hastily swallow a handful of nuts, these are likely to produce indigestion. Thor-



Analysis of a walnut showing the relative proportions of the various food elements.

oughly masticated they are the most digestible of foods. In experiments conducted by the United States Government the protein of nuts was found to be more digestible than that of fruits.

The popular belief that the eating of salt with nuts renders them more digestible is a pure superstition which has no foundation.

NUT PRODUCTS.—There are several nut products, such as nut-butter, nut-oils, nut-milk, nut-pastes, nut-preserves, nut-flour, nut-candies and nut-coffee, which, having decidedly nutritive values, are growing rapidly in popular favor.

There is such a demand for peanut butter that it is now sold in many cities in ton lots.

Nut-butter may be easily made at home. There are a variety of mills for grinding nuts from which one may select at any first class hardware store, though if it is not convenient for one to use a mill, the nuts may be pounded in a mortar. Many of the staple food-grinders are provided with special discs for grinding nuts that may be inserted at will. Nut-butter will keep well if sealed in glass or earthenware jars. Tin cans may also be used, but they are not quite so desirable.

It is well here to call attention to one point in connection with the use of nut-butters which is little known. It is better to take the amount of butter that one expects to use at a meal, and instead of serving it in its original ground condition, to mix it thoroughly with about the same quantity of cold water with a tiny pinch of salt. This makes a delicious cream of it, is more easily spread upon the bread and more readily masticated, and, because of its dilution with water, is in a far better condition for the average person to digest than in its highly concentrated form. If one likes the flavor of olive oil, a little of this may be added to the water.

These nut-butters are entirely different from the so-called cocoanut or cocoa-butter which is sold under a variety of trade names and is made by extracting and refining the fat of the cocoanut or copra. It resembles fine beef-fat in appearance

and is naturally white in color and is solid at ordinary temperatures. It is used as a substitute for butter and in various culinary ways.

Chocolate and cocoa are both products of the cocoa bean, the former being much richer in fat than the latter. The fat that is extracted in the manufacture of cocoa is called cocoa-butter, but is an entirely different product from the cocoanut butter before mentioned.

In many parts of Europe, South America and elsewhere salad oils are made from the almond, walnut, beechnut, Brazil nut, cocoanut and peanut. These nut oils, which are practically pure fat, have a very high fuel value, and, being readily assimilated with other food materials, may be made to constitute an important energy-yielding constituent of one's diet.

Cocoanut-milk is practically water stored in the cocoanut shell, containing only a little mineral matter, sugar, etc, in solution. It is very pure, and is a far safer beverage in the countries where it grows than is water from the springs or streams which are often more or less contaminated with organic matter. This liquid, however, is not at all the same as the nut-milks which are often referred to in books devoted to nut cookery. These latter are nothing more than nut-butters reduced by mixing them with water.

A delicious milky liquid may be obtained by pouring about a pint of boiling water on a freshly grated cocoanut, allowing it to stand until cold, and then straining it. If allowed to stand long enough a cream will rise to the top and this may be served with fruits and used in other ways. Those rigid vegetarians who wish to exclude even milk from their dietary will find this liquid and cream both palatable and invigorating.

Nut-pastes and nut-preserves are generally made only by confectioners, and while they contain large nutritive qualities they are generally made so rich as to belong rather to the needless and harmful luxuries than to the beneficial articles of a sensible man's diet.

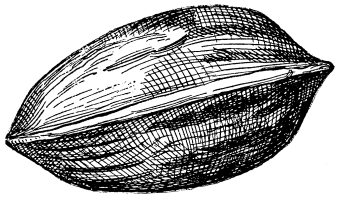
Nut-flours and nut-meals are coming into more general use, though as yet they have but a limited sale. As a rule they are

made from the ordinary nuts by blanching, thoroughly drying and grinding. There is a great difference between "blanching" nuts and "bleaching" them. The former means the simple process of immersing nut-meats for a short time in hot water and then rubbing off the skins; the latter is a process of sulphurizing nuts for the purpose of improving their outward appearance and thus commanding higher prices. This is often done by exposing the nuts to sulphur vapor, or treating them with a mixture of sal-soda, chloride of lime and water. This latter in no way increases the food value of the nuts, and will doubtless be continued no longer than the public desires it.

Nuts sold in their shells should be washed before being put on the table. Where shelled nuts are purchased in bulk, they too should be washed before being used. Hot water poured over them not only imparts a fresh flavor and appearance, but also removes any acrid taste.

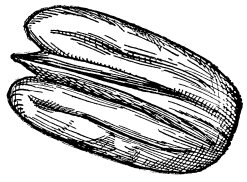
NUT-AND-FRUIT DIET.—Change to the nut-and-fruit diet should be made gradually. If one cares to go through a milk diet for a few weeks as a preparation, a full diet of fruit and nuts will usually prove agreeable and satisfactory.

Beginners upon the nut-and-fruit diet, if they are habituated to taking three meals, should make the first meal of the day on an orange, an apple, a banana, or a small saucerful of berries only. The principal meal should be eaten at noon. A small variety of nuts, such as peanuts, walnuts,



Showing the pecan in its shell. The pecan is one of the most valuable of the nuts, having a high percentage of fat and protein.

A cross section of the pecan.



Kernel of the pecan after outer shell has been removed.

filberts, almonds and Brazil nuts should be taken with such fruits as bananas, figs, dates or raisins. The greatest care must be taken thoroughly to masticate these foods to a complete liquid. This is essential also for the emulsification of the fats which form a large part of the nutritive element of nuts. These fats are digested easily if properly emulsified in the mouth and mingled with the saliva. Otherwise they are difficult to digest and liable to cause intestinal indigestion. Supper should be similar to breakfast. If the two-meal-a-day plan is adopted, the first meal can be eaten about 11 A. M., and the principal meal at 6 P. M.

The following table gives the daily record of one fruit-and-nut eater, whose experience extended over a considerable period and who lived upon two meals a day with one kind of nuts only at each meal. If unusual mental or physical effort was to be made, the quantity of food was slightly increased.

FOOD.	WEIGHT IN OUNCES.								
	Meal one.	Meal two.	Total.	Water.	Proteids.	Fats.	Carbohydrates.	Salts or Ash.	Heat Units.
Brazil nuts	1½	1½	3	.159	.510	2.000	.210	.117	612
Dates	2	3	5	.770	.105	.140	3.920	.065	505
Figs	2½	½	3	.564	.129	.009	2.230	.072	276
Bananas	8½	6½	15	11.300	.195	.090	3.300	.120	435
Apples		8½	8½	7.190	.034	.043	1.210	.026	153
Olives, ripe		2⅔	2⅔	1.720	.045	.796	.114	.090	200
Time	a. m. 7.00	p. m. 6.00							
Totals			37.273 oz.	21.703	1.018	3.078	10.984	.490	2181

Total food, less contained water, 15.57 ounces.

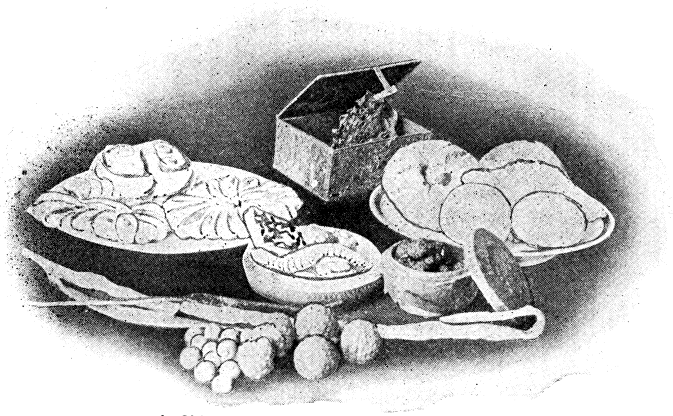
REMARKS: Before eating each meal general physical exercise was taken for fifteen minutes. After each meal 5 ounces of water were drunk. A feeling of exhilaration followed each meal.

As to the pecuniary economy resulting from the use of nuts, scientific experimentation indicates that nothing is to be said in favor of the nut, except in the case of the peanut and this is not a nut at all, but a legume, one of the family of peas and beans. Still, it is popularly considered as a nut, and will be so treated here. Ten cents spent for peanuts will

purchase more than twice the protein and six times the energy that can be gained from ten cents worth of porterhouse steak. In comparison with the almond, the peanut is far more to be desired. The almond supplies only about one-fourth the protein and less than one-third the energy supplied by the peanut.

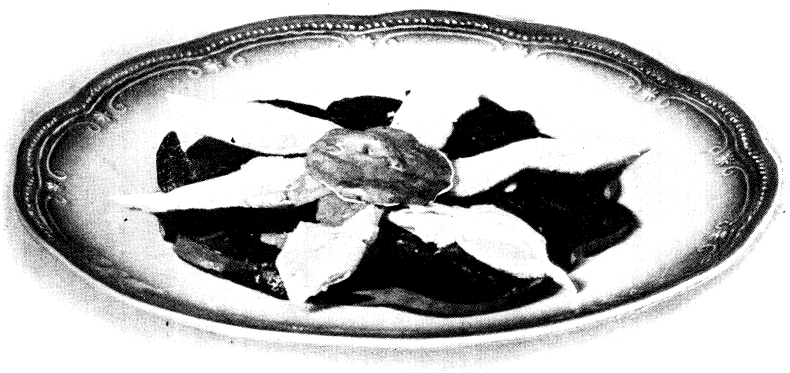
PEANUTS.—The American people are now using yearly about four million bushels of peanuts, at a cost of $10,000,000. This quantity is all the more enormous in view of the fact that nearly all these peanuts are eaten at odd times, as a delicacy, and not as a regular food at meal-time. The majority of the people who thus use them also eat extensively of meat and other foods containing the same elements found in peanuts. So, by using the peanut as a regular article of diet, and by getting along without these between-meal extras, thousands of people could greatly decrease their living expenses and remarkably increase their health and efficiency.

As food, peanuts may be used in a great many ways. They are very good shelled and eaten as ordinary nuts, either raw or roasted. If any variety of candy is healthful, surely those kinds of confectionery composed largely of peanuts—such



A Chinese repast of nuts, fruits and vegetables.

Stuffed Beets.—Boil as many beets as needed until tender. When cold, peel and cut slice from stem end so beet can stand. Scoop out center. Fill with lemon juice and let stand. Meanwhile prepare chopped celery with mayonnaise and when ready to serve turn out lemon juice and fill with celery. Serve on bed of lettuce.



Brussels Sprouts.—Wash and carefully pick over the sprouts and cook in boiling salted water for twenty minutes. Drain, chop finely, reheat and season with butter, pepper and salt. Decorate with hard-boiled egg arranged as petals as in illustration.

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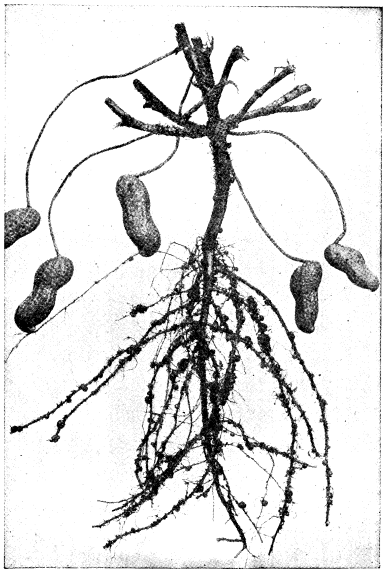
as peanut crisp (made of peanuts and sugar and sometimes cocoanut), and the chocolate-dipped meats—ought to be wholesome. Then there is peanut butter. While non-physical culturists generally consider peanut butter as a sort of picnic dainty, many people use it regularly as a substitute for ordinary butter. Chopped peanuts, not made into butter, make an excellent ingredient for sandwiches. These chopped meats are also delicious when baked in bread. They may be combined with sweet fruits for making wholesome fruit cakes, or with many fruits and vegetables as salads.

Another way in which peanuts are used as a food is in the form of peanut oil, which is often used as a substitute for olive oil. The peanut possesses other virtues than those of a dietetic sort, and, unlike many crops, it enriches instead of impoverishing the soil in which it grows.

Uncooked peanuts are much more nutritious than are those that have been subjected to the action of fire, and what is more, they are appetizing and even delicious when one becomes accustomed to them. A taste for roasted peanuts is artificial. It is due to custom rather than natural desire. But to get the true flavor of the peanut and to extract from it all its nourishing qualities, you must eat it *au naturel,* that is, before it has been steamed or roasted or what-not. Of course, a raw peanut calls for much more mastication than does one that has been cooked, but this is a mani-



Roots of peanut vine, showing the root nodules by which this plant gathers nitrogen.

fest advantage in a dietetic sense. If you try to "bolt" an uncooked peanut before your teeth have done their full duty to it, your digestive organs are likely to suffer in consequence. On the other hand, a well chewed raw peanut is most digestible.

After a time, you will prefer the raw to the roasted nut, and as the nutritive value of a food to a very great extent depends on our enjoyment of it, this too is quite a consideration. It is perhaps unnecessary to add that the brown-red skin which surrounds the kernel should be removed before eating.

FRUITS.—In most families fruit is used more as a food-accessory, an appetizer, or a luxury, than because of its distinctive food value. This is a great mistake. Instead of being looked upon as a "side-dish," fruit should be regarded as one of the most important and principal articles of diet.

Indeed, the acreage of fruit-growing lands in the United States should rapidly increase to many times its present extent, invading the vast, sparsely settled territories now devoted most uneconomically to the raising of animals for food, since the American people ought to consume five times the amount of fruit they now do, to the exclusion of other and less beneficial articles of food. Certainly the result would be a tremendous increase of their healthfulness, vigor and consequent happiness.

To every unperverted taste fruit is palatable, stimulating to the appetite and health-giving. It is a natural food, rich in all nutrient elements, easily digestible to the normal stomach and with nothing disagreeable in its handling from the time of the planting of the tree from which it comes to the moment of its appearing on the table of the consumer.

Edible fruits show great range in form, color, and appearance, and are found in almost countless varieties; yet from the botanist's standpoint all our fruits are the seed-bearing portion of the plant. The edible fruits of temperate regions fall into a few groups—stone fruits, like cherries and plums; pome fruits, like apples and pears; grapes; and berries, like strawberries, blackberries and currants.

There are several products, such as muskmelons, cantaloupes and watermelons, sometimes classed as fruits and some-

times as vegetables, which, of course, would not belong to any one of these groups. Tropical fruits are not so easily classified, though the citrus family (oranges, lemons, etc.), includes many of the more common kinds.

There are a few vegetable products, which are not fruits in any botanical sense, but which by common consent are included in this class of food products, since their place in the diet is the same. The most common of these products is rhubarb, and there are few uses of fruit which the acid rhubarb stalk does not serve.

As a country becomes more thickly settled, less and less reliance can be placed on the output of wild fruits, and the market gardener and fruit grower become of increasing importance. In the United States, strawberries, blackberries and raspberries are examples of fruits which are still growing wild and are cultivated as well, and cranberries have so recently come under cultivation that many persons still think of them as a wild fruit.

The commercial fruit grower, of course, desires a fruit of good appearance, having satisfactory shipping and keeping qualities, and too often the consumer is satisfied to accept a product in which such qualities predominate. Discriminating purchasers, however, will insist on good flavor, texture, and cooking qualities as well, and such demands should be more often urged in order that quality may replace appearance as a standard in cultivating fruit for market.

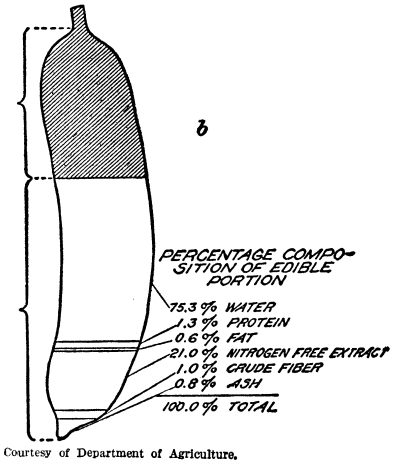
FRUIT MARKET IMPROVEMENTS.—The fruit market has been very greatly modified and extended by improved methods of transportation and storage. A man need not be so very old to remember well the time when, at least in the Northern States, bananas were a comparative rarity outside the large cities, and oranges and lemons, though commoner commodities, were still luxuriously high in price. In the summer there was an abundance of the common garden fruits, but in winter apples were virtually the only fruits that were at all plentiful. A few years have witnessed a great change, and now there is hardly a village so small that bananas and other tropical and sub-tropical fruits

cannot be purchased at reasonable prices, all the year around.

Indeed, bananas are now sometimes spoken of as "the poor man's fruit." The exceedingly low cost of this fruit is due to the wide distribution of the plant, its continuous and prolific yield, and the adaptability of the fruit to easy and cheap transportation, since it can be sent in the hardy, green state, and ripened after arrival at its destination.

At the present time there are a number of fruits, such as avocados, or "alligator pears," mangoes and sapodillas, which are fairly well known in our large markets but seldom seen in smaller towns. The enormous development of the fruit-growing industry in California and Florida, which includes the products of both temperate and warm regions, as well as the possibilities of supplying the northern markets with tropical fruits from Porto Rico and Hawaii, make it probable that within a few years the avocado, the mango, and other tropical fruits will be as well known as the grapefruit or the pineapple.

Improvements in transportation have materially lengthened the season of many fruits, such as strawberries, which cannot be stored for any considerable period. Furthermore, improved methods of culture and transportation have extended the growing area of old and well-known varieties.



Courtesy of Department of Agriculture.

The banana contains 65 per cent nutritive elements and 35 per cent refuse matter. The dark portion (b) represents waste product.

In preparing such fruits as plums, peaches, etc., for the table, the skin may be readily removed, without injury to the flavor, by first immersing them for a short time in boiling hot water.

A silver knife should always be used for paring apples, pears and other fruits. When a steel knife is used, the acid of the fruit acts on the iron of the knife and frequently causes a black discoloration, and there is also very commonly a noticeable metallic flavor. If pared or cut fruit is exposed to the air, it rapidly turns dark in color, owing to the action of oxidases (as some of the ferments normally present in fruits are called) upon the more readily oxydizable bodies, which are also normal fruit constituents.

FRUIT SUGARS.—It should be noted that the principal sugars in fruit are cane-sugar, grape-sugar, and fruit-sugar, and that the kind and amount of these sugars depend largely upon the state of growth and degree of ripeness to which the fruit has been allowed to come. Unripe fruit has much less food value, especially in the sugars, than ripe fruit, but, on the other hand, over-ripe fruit has already begun to lose its palatable, healthful and nutritive qualities by the process of fermentation.

As fruits grow to their full size and ripen they undergo marked changes in chemical composition, both as to the total and the relative amount of the different chemical properties present. A knowledge of these changes, not only while the fruit is on the tree, but after it is placed in storage, is very important both from the housekeeper's and from the commercial standpoint. After being stored some fruits materially improve while others deteriorate very rapidly. Every intelligent housewife should seek to inform herself as to these matters so that she will avoid the loss consequent upon errors. For instance, certain pears and plums improve and ripen after being picked, while other varieties of fruits rapidly deteriorate the longer they are kept. As every housewife knows, underripe fruit is most satisfactory for jelly-making, since artificial cooking is a completing of the natural sun-cooking, while fruit that is to be eaten raw should always be as ripe as possible.

Studies made to determine the ease or rapidity of the digestion of different fruits in the stomach indicate that fruits compare favorably with other common foods in these respects.

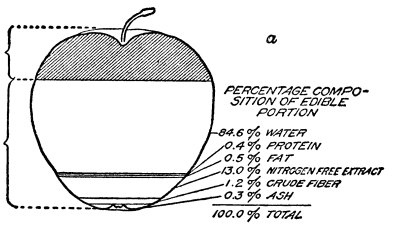
Digestion, of course, is influenced by the nature of the fruit and its stage of ripeness.

Beaumont states that sour apples eaten uncooked require two hours for digestion in the stomach and mellow apples one and a half hours. Another observer notes that about five ounces of raw ripe apples require three hours and ten minutes for digestion in the stomach, but that, if the fruit is unripe, and consequently contains a high proportion of cellulose, a much longer time may be required.

Little is definitely known regarding the relative digestion and absorption of fruits in the intestines, but experiments indicate that as a class ripe fruits are quite thoroughly digestible, and it is evident that, generally speaking, fruits, like other foods, usually remain in the intestinal tract long enough for the body to absorb the nutritive material present, and that therefore the rate of intestinal digestion would not be a matter of special importance.

Over-ripe fruit is often injurious, very probably because of fermentation having begun, and stale or partially decayed fruit is obviously undesirable for food purposes. In addition to a deterioration in flavors there is always the possibility of digestive disturbance if such fruit is eaten raw.

It has been found that the injurious effects of raw unripe fruit are not so much due to the chemical constituents, but rather to the unusual proportions in which the constituents occur, and especially the large percentage of hard cell tissues, which, if imperfectly masticated, may be a source of digestive derangement. Possibly the excess of acid in the green fruit is also a cause of digestive disturbance. Cooked green fruit was found to be practically harmless, being especially palatable and wholesome when cooked with sugar.



The shaded portion of the apple shown above represents refuse. Only twenty-five per cent of the apple is non-nutritious.

Investigations have shown that fruits exposed to street dust and to other unfavorable conditions become covered with bacteria, which are always present in such dust-laden air, and may become sources of contagion. Flies and other insects are also known to be a source of dirt and contamination.

It is often urged that the washing of fruit destroys its flavor. On the other hand, skillful housewives maintain that if properly done the loss of flavor is inappreciable, and on the grounds of common sense and cleanliness it would seem best to sacrifice a little flavor, if necessary, for the sake of removing filth and possibly dangerous bodies, even if the amount of dirt present is too small to be offensive to sight or taste.

THE APPLE.—Of all fruits the apple is one of the most widely cultivated and best appreciated. It is hardy and grows in localities too cold for either the plum or peach. In its wild state it is known as the crab-apple, and is distributed throughout America, Europe and Western Asia. Charred crab-apples are found among the kitchen refuse of the prehistoric Lake-Dwellers of Switzerland, showing that they were a common article of food in the most ancient times.

That fruit is healthful is stated rather forcefully by an English writer, who says: "It will beggar a doctor to live where apple orchards thrive." Mr. John Burroughs gave statistics showing that certain operatives in Cornwall, in a time of scarcity, found apples in some manner a substitute for meat. They could work on baked apples without meat, when a potato diet was not sufficient. To its healthfulness he bore witness: "Especially to those whose soil in life is inclined to be a little bit clayey and heavy is the apple a winter necessity. It is a natural antidote to most of the ills the flesh is heir to. It is a gentle spur and tonic to the whole biliary system."

It may be safely said that, excepting the various kinds of grains, there is no product of the earth in this country which is so good for food as the apple. This noble fruit is no mere palate-pleaser; it is very nutritious, as it contains acids mild and gentle, as well as pleasing to the taste, which act in a beneficent manner upon the whole animal economy.

The apple acts beneficially upon the liver and will correct a sour stomach almost immediately. It is valuable in curing hemorrhoid disturbances and prevents the development of stones in the bladder and liver. It agglutinates the surplus acids of the stomach, and helps the kidney secretions.

THE BANANA.—But few understand the value of bananas as a food. In hot countries, where it usually grows, it is a staple article of nourishment, and there it can be obtained completely ripened. In this condition it has a delicious taste that is very seldom found in the bananas that are secured throughout North America and England, where in nearly all cases it is eaten entirely too green. As a rule it is not allowed to ripen properly. In many cases it is cut too green, though usually the bananas that come to America, if they are ripened under proper conditions, will retain nearly all the nutritive properties as well as delicious flavor of the fruit. I have known many athletes of more than ordinary ability to live almost entirely on bananas for an extended period, and their strength was kept up to a high degree under the influence of the food.

The most delicious bananas that we get here are raised in Jamaica. When the bananas arrive, they are very green. They are stored away in warehouses and allowed to ripen until they are ready for eating. This ripening process is most important, if the banana is to retain its full, delicious flavor. Where they have been cut too green, they never acquire a proper flavor and under such circumstances they often ripen with a dark, solid substance in the center. When this dark substance is noted, the banana has not been properly ripened, or else it has been cut before it was sufficiently matured. Happily, the habit of cooking the banana has not as yet developed. It is far better in its raw state.

A banana that has been ripened properly, has in nearly all cases the appearance of the complexion of a much-freckled boy, the only difference being that the freckles on a banana are black instead of brown. When you can find bananas that are freckled in this manner, you will know that they are properly ripened, and if you will buy them and put them away until the

skin becomes very dark or, in fact, actually black, if the inside of the banana still remains solid, you will be amazed at the palatability and flavor of the fruit.

Even those bananas that do not freckle as they ripen will develop a flavor that will be pleasing in every instance, and in many cases even delicious, if you place them in a dry atmosphere with a moderate temperature and a certain amount of sunlight; also cut off the lower part of the stem and place it in water. This process will enable the bananas to retain their life as long as possible, so that the fruit will secure its full supply of flavor. It will then taste like nothing you have ever eaten before. It will have almost the same delicious flavor that it possesses when picked ripe from the tree.

Some of the ordinary yellow bananas eaten everywhere are nothing more than green fruit. When the inside of a banana begins to decay before the outside starts to blacken it is a sign that it has not been properly ripened and is therefore not fit to eat.

There are various ways of eating bananas that increase their value as a food, and add to the delicious qualities of the fruit. Sliced and eaten with cream they make a delicious dessert. Sliced and mixed with a chopped acid fruit of any kind—oranges, apples, peaches, pears—likewise makes a delicious dessert if slightly sweetened and eaten with cream. Sliced bananas are especially delicious with olive oil. If the sweet taste is not especially pleasant, a little lemon juice can be added to the oil. Bananas, combined with sliced acid fruit, if eaten with olive oil, make a very delicious dish. Bananas and pitted dates with cream make a splendid combination. Bananas mixed with any of the sweet fruits, with olive oil added, will be found delicious.

Bananas make a splendid sweet salad, and when sprinkled with ground nuts and some chopped acid fruit, they will be found delicious. Dried bananas can be purchased everywhere throughout England, though they are not sold to any great extent in America. In this form they are almost as sweet as a fig. Flour has been made from bananas and can be used for

various dishes, just as ordinary wheat flour is used. Coffee made of bananas—which makes a delicious substitute for the ordinary coffee without its stimulating qualities—is also manufactured.

GRAPES.—Grapes are not only a rich and delicious luxury, but have great value as an article of food, either in their fresh condition, or when dried and called raisins. Fresh, ripe grapes contain much sugar, sometimes nearly twenty per cent, in its purest and most digestible form.

Whether grapes are eaten fresh or one partakes of their juice, the physiological effects upon the body in health or disease are of inestimable value. The juice not only contains considerable nutritive value, but the healthful and natural acids promote excretion and secretion, stimulating the healthful action of the kidneys, liver and bowels, and have a decidedly enriching and purifying effect upon the blood.

The dextrin contained in grape-sugar promotes the secretion of pepsin and in this way is a helpful aid to digestion. The phosphoric acid which it contains in large quantities feeds the brain and nerves, healthfully stimulating them to perfect and complete action. To those who use grapes or grape-juice habitually, the use of cathartics or pernicious mineral-waters will be unnecessary. Grapes healthfully produce the natural bowel movement that the cathartic and mineral-waters produce artificially and injuriously.

In the cure of disease, grapes and grape-juice rightfully hold a most honored place. Indeed, the "grape cure" has been in operation for many years, both in this country and in Europe, and thousands of grateful and happy people, relieved from the incubus of disease, can be found singing loudly praises of the treatment.

This cure is being used successfully as a remedy in cases of catarrh of the stomach, intestinal catarrh, diseases of the digestive organs, heart affections, dyspepsia, loss of appetite, sluggish movement of the bowels, hemorrhoids, jaundice, suppressed menstruation, affections of the skin, and in numerous other diseases. The sum and substance of the grape cure is

that it is a cleansing and purifying of the system. Fasting or an abstemious diet is recommended in connection with the grape treatment.

The cure is begun by eating one or two pounds of grapes the first day, then increasing the daily allowance one-half pound each day until the desired quantity is reached. Usually the amount of grapes varies between three and nine pounds daily. A prescribed diet or a complete fast should precede the treatment, though benefit will, of course, be derived even if this suggestion is not followed. The treatment should not be dropped suddenly after a cure is effected. Instead, the quantity should be gradually diminished each day.

The fruit used in treatment must be completely ripe. The grapes should not be crushed by the teeth, but pressed by the tongue against the roof of the mouth. There are a considerable number of people who feel an aversion for grapes because of the blunting sensation of the teeth that follows eating them. In cases of this kind, freshly pressed juice is advised. Under ordinary conditions, when grapes are eaten in small quantities and with other food, it does not make much difference whether or not the skins and seeds of the grapes are swallowed, but where grapes are made to be the exclusive, or nearly exclusive diet, as in the grape cure, it is advisable to reject the skins and seeds.

In the systematic cures practiced in the sanitariums in Europe, the day's allowance of grapes allotted to each patient is divided into three portions. The first portion is substituted for breakfast, or, where the patients cannot be induced to omit their breakfast, the grapes are taken an hour later; the second portion of grapes is taken in the forenoon, an hour before the regular meal; the third portion is taken in the afternoon between three and four o'clock. In some sanitariums a fourth portion of grapes is allowed to be eaten late in the day.

OLIVES.—The olive is a most useful article of diet. Unfortunately, in this country its use has been confined largely to the unripe green olive, eaten not as an article of definite food value, but as an appetizer or tid-bit. Fortunately, a great

campaign of education has been carried on by the State of California showing the value of ripe olives and olive oil as regular articles of diet, so that their use is rapidly increasing.

The so-called Greek olives have but a limited sale in America, being almost exclusively used by citizens of foreign birth, and those who have acquired the taste abroad. These olives are picked when ripe and dried like prunes. They are then sprinkled with olive oil and so eaten. The flavor is peculiar but appetizing. Greek olives are invariably sold by weight, whereas the ordinary olive is sold by the bottle or jar.

The ripe olive, preserved in brine, is practically a Californian product. It has a tint akin to a ripe damson plum, and a nutty, rich flavor of a unique kind. Also, it contains much oil. Cut it across and gently squeeze it and the oil becomes very evident to the eye. Like all home-grown olives, there seems to be some little difficulty in preserving it in the ordinary way. So that, after undergoing a proper process of "pickling," it is placed in tins or bottles in company with a weak solution of brine, and "processed" or hermetically sealed.

As has been intimated, olives when ripe are true nutrients. The California station of the Department of Agriculture has recently issued an analysis of the relative nutritive qualities of the ripe and green olive as follows:

	Fat (oil) per cent.	Carbohydrates per cent.	Protein per cent.
Ripe	25.52	3.75	5.65
Green	12.90	1.78	6.91

By this it will be seen that while the ripe olive is very rich in the elements that make warmth and "energy," it is by no means deficient in the flesh-forming protein. The green olive lacks fat but also has its due share of protein. In both forms, it compares favorably with the great majority of the most nutritive of vegetable foods.

In all the olive-growing countries of Europe, the pickled fruit—green or ripe—is used as a staple article of diet. In Spain, for example, the peasant takes a piece of brown bread and a pocketful of small olives and labors in the fields all day

without any other nourishment. In Europe, Central and South America, the use of the olive as food—not a relish—is far more general than it is in the United States.

The green olive in its raw state is bitter and astringent. The ripe, raw olive has a sour and persistent bitter flavor also. In both instances, the unpalatable quality is removed by a pickling process. The fruit averages from 150 to 250 to the pound. Both pulp and pit contain oil. In the case of all other fruit, it is only the pit that furnishes oil. Only the ripe olive is used for oil-making purposes, the green fruit having but very little oil in its pulp. In the case of the ripe olive, the oil will run as high as eighty-eight per cent; with the green it rarely rises above two to four per cent.

In this country, the olive is eaten as a relish before or during meals, with salads, as an accompaniment to cold dishes, and so forth. Some beverages are served with an olive in the bottom of the glass as a sort of agreeable aftermath to the drink itself. A variety of delicious sandwiches may be made with the help of the olive. Thus, there are walnut and olive, lettuce and olive, cheese and olive, and plain olive sandwiches. But the olive is worthy of a better place than that of a side dish. A dozen or less of the ripe fruit, a couple of slices of whole meal bread, and a glass of milk make a lunch that is at once tempting, satisfying and healthful. The ripe olive also furnishes a new sensation to the vegetarian epicure. One medical enthusiast declares that: "No product on earth contains as much nutrition as the ripe olive. The oil is equal to meat; the pulp is as good as bread."

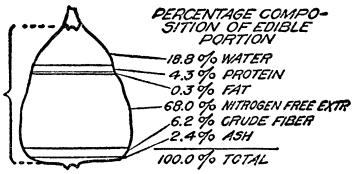
Olive Oil.—Pure olive oil, like the olive itself, is a true food. What is more, its elements are such that it can be used in quantities that, in the case of practically all other fats, would cause nausea. When employed for cooking purposes, it imparts some of its agreeable flavor to the edible. It mellows salad dressing, and can be used as a palatable and wholesome adjunct to a number of other foods. It is especially useful when taken in connection with those nutritives that, while possessing plenty of protein, lack carbohydrates or fats, such as beans, peas,

lentils and the like. In the case of pastry, the oil "shortens" readily. To those vegetarians who object to the use of animal fats of any kind, olive oil is a boon indeed.

Within a comparatively recent period, olive oil has taken its place among rational and certain curatives. Its mild nature and fine flavor commends it to those who have weak digestions, and it is frequently used by those who wish to gain weight. As a remedy for constipation, when combined with other physical culture methods, its power for good is remarkable. It is now used by a large number of medical men as a remedy for indigestion and nervous dyspepsia. In the case of any troubles of the digestive organs, its continued use brings benefit. When taken judiciously, it will almost always bring about a change for the better in the appearance of those who are unduly thin.

The mineral salts are contained in fruits in the most perfect form for immediate assimilation into the body, and for growing children whose bony structure is not yet complete a large use of fruits cannot fail to be highly beneficial. There is also a natural desire for acids in the body which is as persistent as is the desire for food itself, and these acids are supplied to perfection in the citric, malic and other acids found in fruits. Especially are the citrus fruits valuable to meet this demand. These are the orange, lemon, grape-fruit, kumquat (a small orange which is eaten entire, both skin and pulp) and the lime.

To those who are in the habit of abstaining largely from the use of mineral salt in their dietary and who refuse to use vinegar, these fruits fill their places in most healthful and satisfactory manner. The salts of the orange are clearly discerned by those whose taste buds are not vitiated by the overuse of mineral salt, and the lime and lemon are immeasurably to be preferred in the making of salads to any kind of vinegar.



Courtesy of Department of Agriculture.

As illustrated above the fig contains little waste matter, and is almost entirely composed of nutritive elements.

SERVING FRUIT.—There are many different ways of serving fruit, from those varieties that are never eaten except when raw, such as muskmelon, water-melon, etc., to cranberries and the ordinary varieties of the quince, which are never eaten raw. Methods of preparation are quite varied, including drying, or evaporating, and baking, boiling and stewing, while quantities of fruit are used in puddings, pies and other dishes and for preparations of jams, jellies and preserves. Fruit-juices form the most healthful beverages, and fruit ices make a most appetizing and healthful dish, if the ice is held in the mouth long enough to be perfectly "tasted," and warmed so as to prevent chilling the stomach. Some fruits, notably the ripe olive, are prepared for the table by pickling in brine.

The temperature at which fruits are eaten is largely a matter of fashion or individual taste. In summer time it is well always to keep them in a cool cellar or in an ice-chest, provided that in the latter they are not allowed to become too cold. Not only does over-chilling lessen the delicate flavor and accentuate the acid taste in fruits, but if they are not thoroughly masticated fruits so treated chill the stomach, and thus arrest the process of digestion.

The best time to gather fruits for the table, if for immediate use, is in the morning. If they are to be kept over night, or longer, they should not be gathered until the close of the day.

DRIED FRUITS.—While fresh fruits and vegetables possess more advantageous qualities as human food than their chemical analyses alone seem to indicate, it is not always that one can secure these even at a time when they are most needed. The next best substitute is to have them dried. Prunes, raisins, peaches, apricots, pears, apples and many other forms of dried fruit are regular articles of commerce that can now be purchased in any city or village in the country. These can be washed and soaked in clean water and then served without cooking; while they are not quite so appetizing as when eaten fresh, they more nearly approximate the fresh fruit than when prepared in any other way. Few people use dried fruit in this

simple fashion. They invariably cook it and think it cannot be served in any other way. This is a mistake, as soaked dried fruits are both palatable and wholesome.

Care must be exercised in purchasing dried fruits, as some mercenary packers put up kinds that are unfit for human food. They are full of refuse and waste, and are often vile with grubs and worms. Then, too, much dried fruit—such as peaches, sliced apples, etc.—has been subjected to a process of sulphurizing to keep it from turning dark, and until we learn to buy food for its nutritive values rather than its appearance, the packers will continue this deteriorating process. Prunes, too, are often dipped in a solution of lye, salt and sugar to make them "glisten," and until this is washed off they are not fit for human consumption.

Of the highest food value are the dried sweet fruits, such as dates, figs and raisins. The dietary of every person seeking health and vigor, or desirous of maintaining it, should include a large proportion of these excellent foods.

DATES.—Dates can rightly be termed condensed energy. They contain a large amount of fattening and energy producing elements. Some people deem them too rich for their stomachs, but this is owing to the fact that they are not properly masticated. A date should be masticated to a liquid before swallowing, if the digestion is to be carried on satisfactorily. Dates are especially valuable in combination with an uncooked diet. They are not only highly nutritious and very palatable but they can be mixed with various articles of food as sweetening, instead of sugar. The ordinary sugar purchased in the market is refined to such an extent that nearly all the nourishing elements have been destroyed, or brought into such a condition that the digestive organs find it difficult to assimilate them.

There are various kinds of dates, but the most palatable and the most easily digested are those termed Persian dates. These dates are cheaper than any other kind, and when they are clean and fresh they are by far the best. When in good condition they contain but little fiber. Fard dates are smaller,

contain more fiber, are harder and darker and more difficult to masticate. They are not so easy to digest, and are not so satisfactory a food as the Persian dates. One who is fond of sweets should avoid sugar and substitute dates.

Dates can be used to sweeten puddings, and cakes, etc., and, if you have no device for grinding the date meat to a pulp, they can be soaked in water and the water added to whatever you desire to sweeten. They can be used to sweeten coffee or tea or any one of the food coffees.

Date coffee can be made by adding one quart of water to about one-half pound of dates. Allow the dates to soak for a few minutes. Then with a potato masher, or something of the kind, break up the dates until they are reduced to seeds and fiber. Strain the liquid, heat to near boiling point. Then add cream or milk in accordance with taste. This makes a splendid drink with about half milk. To those who lack energy this will often help to bring about surprising results.

FIGS AND RAISINS.—Figs and raisins are equally valuable as palatable and healthful sweeteners and, being easily digested, as nutritious foods. Properly masticated they are very valuable foods and should be better known, more widely appreciated and far more largely used.

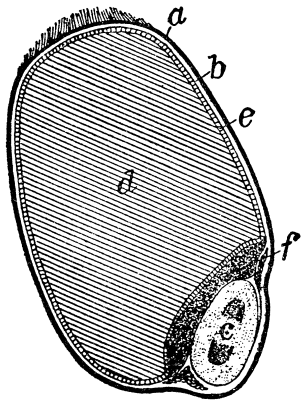
CEREALS.—There is no part of the world, except the Arctic regions, where cereals are not extensively cultivated. From the oats and rye of the North to the rice of the hot countries, grains of some kind are staple foods. This universal distribution would seem to imply that the cereal is a natural food well adapted for man under all conditions, circumstances and climes. Scientific investigation justifies this assumption.

Cereals are cheaply and easily grown; they are readily prepared for the table; they are palatable and digestible. Owing to their dryness, they are compact and easily preserved without deterioration. They contain good proportions of the necessary food ingredients with a very small proportion of refuse. In their natural state, they are usually not considered pleasant to the taste and are thought to be difficult to digest, although there was never a greater fallacy than this, as will be shown.

BREAKFAST FOODS.—Until a comparatively recent time, oatmeal, corn meal, or ordinary flour were stirred into hot water and made into porridge or mush. The Scotch use the double boiler and keep the porridge cooking continuously. Then came the grains which were steamed or otherwise partially cooked before being ground or rolled. The third form includes those preparations called "breakfast foods" which have been more thoroughly cooked and sometimes acted upon by malt, which induces a greater or less chemical change in the starch present.

It is not necessary to enter into any explanation of the grains used for porridge and mush. Barley is, perhaps, one of the least used except in soup. Corn has always been largely used, especially in the South. Oats are a distinctly northern cereal and keep better than other food of this kind. Wheat has always been largely used in England, both cracked and ground.

The growth of the modern breakfast food is one of the most remarkable of the many phenomena connected with the history of food. During the youth of many people who by no means regard themselves as "old" the cereal of the morning meal was mush or porridge, made of either coarsely ground wheat, or oats, or of corn meal. The wheat and oats took a long time to cook.



Vertical cross section of a grain of wheat. The outer coats a, b and e, together with the germ (c) and other nutritious parts, are destroyed in ordinary process-milling in order to produce white flour.

In the course of time, these grains were replaced by the so-called rolled oats and wheat prepared by being swelled with steam and then crushed by hot rollers. The two latest developments have been in the preparation of the so-called malted breakfast foods and in the "ready to eat" corn flakes, rice flakes, puffed rice, etc.

The methods of preparing this latter class of foods are many and varied, and the exact

details in some instances are the secrets of the manufacturers; but one can generally give a fairly correct idea of the processes followed. Some are made of grains dried and crushed after being cooked in water; others are made of the mixture of different grains; while still others have salt, malt and sugar, molasses or other sweetening material added to them. Wheat flakes, corn flakes and rice flakes are cooked by steam and while still wet are run between hot rollers and pressed into thin flakes. One well-known food is made into a dough, baked, dried, brushed and recooked. The shredded preparations are made with special machinery, which cooks and at the same time thoroughly grinds or crushes the grain, and then deposits it in shreds. The "malted" or "predigested" preparations usually have malt or some other such substance added during the processes of manufacture. The diastase of malt has the power, under certain conditions, to change the starch, which is insoluble in water, into various soluble forms, which it is claimed are more easily acted upon by the digestive juices than the original starch.

Although the wholesomeness of these modern preparations is sometimes interfered with by too much cooking, predigesting, etc., they certainly possess one great advantage over the old style. This is absolute cleanliness. In the modern food factories the most scrupulous care to exclude dust and dirt is exercised both in manufacture and packing. In these processes human hands scarcely touch the product in any way whatever and they reach the consumer in the most hygienic and sanitary condition.

In the milling of many of the grains the bran is often eliminated. This is a mistake, as bran is effective as a "scouring" element in digestion. Accordingly it is well for the ordinary vigorous person, especially if he is inclined toward constipation, to mix bran with his breakfast cereal, after soaking it awhile in cream to render it palatable.

The following table gives the comparative composition of the various cereals:

Average composition of cereal grains.

KIND OF CEREAL.	Water.	Protein	Fat.	Total carbohydrates.		Mineral matters.	Fuel value per pound.
				Starch, sugar, etc.	Crude fiber.		
	Per ct.	*Per ct.*	*Per ct.*	*Per ct.*	*Per ct.*	*Per ct.*	*Calories.*
Indian corn	10.8	10.0	4.3	71.7	1.7	1.5	1,800
Barley	10.9	11.0	2.3	69.5	3.8	2.5	1,735
Buckwheat	12.6	10.0	2.2	64.5	8.7	2.0	1,600
Kaffir corn	12.5	10.9	2.9	70.5	1.9	1.3	1,630
Oats	11.0	11.8	5.0	59.7	9.5	3.0	1,720
Rice	12.0	8.0	2.0	76.0	1.0	1.0	1,720
Rye	10.5	12.2	1.5	71.8	2.1	1.9	1,740
Wheat	10.6	12.2	1.7	71.3	2.4	1.8	1,750

CORN.—From this table it will be seen that corn holds a high place as a nutrient. Corn, or maize, as it is properly called, is a characteristic American product. About one-third of all the land under cultivation in the United States is devoted to corn. The annual crop is valued at about three billion bushels, which is thrice that of the wheat crop, which is next to it in value.

The major portion of the American corn crop is not used as human food but as food for farm animals. Indeed we would not be able to consume corn in anything like the proportion in which it is grown, without an undesirable increase in carbohydrate foods. Whole corn products would be better than the denatured white flour. Yellow corn is better than white for vitamines.

While meal, hominy and similar products are the principal corn foods, there are a number of others of much importance. "Corn on the cob" of certain sweet varieties is a favorite vegetable dish during the season. A large amount of popcorn is consumed, and there are very few substitutes for coffee in which roasted and ground corn does not form a part.

Corn meal is cooked in a great variety of ways, but most of the dishes fall under two general heads, namely, bread prepared by baking, and porridge or puddings made by boiling. In the case of the ready-to-eat corn breakfast foods the cooking and general preparation have been done at the factory.

This usually consists in rolling or flaking and sometimes parching and flavoring the thoroughly steamed or boiled and softened grain.

Composition of corn preparations, compared with wheat bread.

KIND OF MATERIAL.	Water.	Protein.	Fat.	Carbohydrates.		Mineral matters.	Fuel value per pound.
				Starch, sugar, etc.	Crude fiber.		
	Per ct.	*Per ct.*	*Per ct.*	*Per ct.*	*Per ct.*	*Per ct.*	*Calories.*
Hominy, boiled	79.3	2.2	0.2	17.8		0.5	380
Hoecake	52.8	4.0	.6	40.0	0.2	2.4	885
Johnnycake	29.4	7.8	2.2	57.5	.2	2.9	1,385
Boston brown bread	43.9	6.3	2.1	45.7	.1	1.9	1,110
Corn breakfast foods, flaked, (partially cooked at factory)	10.3	9.6	1.1	77.9	.4	.7	1,680
Corn breakfast foods, flaked and parched (ready to eat)	7.3	10.1	1.8	77.2	1.2	2.4	1,735
Indian pudding	60.7	5.5	4.8	27.5		1.5	815
Cornstarch blanc-mange (made with cornstarch and water)	87.3	2.9	.1	9.5	.....	.2	230
Parched corn	5.2	11.5	8.4	72.3		2.6	1,915
Popped corn	4.3	10.7	5.0	77.3	1.4	1.3	1,880
Hulled corn	74.1	2.3	.9	22.2		.5	490
Granulated corn meal	12.5	9.2	1.9	74.4	1.0	1.0	1,655
Wheat bread	35.3	9.2	1.3	52.6	.5	1.1	1,205

In digestibility corn and corn products compare favorably with other grain foods, and in cheapness of cost far exceed them.

RICE.—As an article of diet, rice is one of the most important foods in the world. It is habitually used by over 120,000,000 people, and is the chief article of diet of about one-third of the human race. Otto Carque says:

"So far as it is known rice was the first cereal used by man. Probably the Aryans carried it with them in their migratory marches from the cradle of the human race in the earliest dawn of history. We know that it was introduced into China about five thousand years ago; that it was grown in the valley of the Euphrates over two thousand years ago; that the Arabs took it to Spain, and sustained by its marvelous powers of nourishment, planted their victorious banners in many lands. It was introduced into Italy in 1468. Sir William Berkeley first cultivated it in Virginia in 1647. Today it is the staple article of food of the millions of India, Siam, China, and Africa. In the Mediterranean countries, and in the tropical and subtropical regions of North and South America, it is cultivated as a principal means

of subsistence. It is the chief diet of the wonderful Japanese soldiery whose strength and prowess compel our admiration and wonder.

"The main reason for the superiority of rice over all other forms of foods is its ready digestibility, plain boiled rice being assimilated in one hour, while the other cereals, legumes, and most vegetables require from three and one-half to five hours. Rice thus enables a man to economize fully seventy-five per cent of the time and energy expended in the digestion of ordinary food, thus adding it to the reserve force of the system. A rice diet is generally prescribed for any inflammation of the mucous membrane, whether of the lungs, stomach or bowels. It is but self-evident that these statements particularly refer to unpolished rice as it is used by the Oriental nations. Unfortunately, Americans and Europeans are still ignorant of the great difference between polished and unpolished rice.

"Estimated according to standard food values, the parts removed by the polishing process are nearly twice as valuable for food as polished rice. This polish contains the germ and the cuticle and, as in all other grains and fruit, it is the sweetest part. In a hundred pounds of rice 'polish' there are, besides water and starch: 11 pounds of protein, 7.2 pounds of fat, and 5.2 pounds of mineral elements. In a hundred pounds of polished rice there are only 7.4 pounds of protein, 0.3 pound of fat, and 0.4 pound of mineral elements.

"The unpolished rice is, on an average, ten times as rich in organic salts as the polished rice of commerce. As the flavor is in the fats and organic salts, it is easy to understand the lack of it in commercial rice and why travelers universally speak of the excellent quality of the rice they eat in Oriental countries.

"Of the mineral elements lost in the polishing process silicon is especially valuable. Silicon in the form of silicic acid constitutes a large part of the solid surface of our planet. It is indispensable for the growths of plants and it is likewise important in the animal body. It makes the muscles firm, for it protects them against chemical decomposition, and has, consequently, an antiseptic action; it warms the blood by isolating and keeping together the electricity by its salty constituents. Sulphur and silica are found in the hair, making the latter a non-conductor of heat and electricity. Iron, which is also removed to a great extent with the polish, is necessary for the formation of the red blood corpuscles, magnetism, and heat. Sodium is found in unpolished rice in a higher percentage than in any other cereal; this element combines with the carbonic acid which is constantly formed by the oxidizing processes in the body, and enables this gas to be properly discharged through the lungs. Sodium protects the blood from acidity which is the cause of many diseases. Calcium, magnesium, and phosphorus are also predominant and these elements are important for building up our bones and teeth.

"From an economic point of view the production of rice should be favored. When compared with the annual return from an acre of wheat, corn or oats, rice appears to excellent advantage, and its cultivation too is not attended with danger of loss from drought that attends the growing of other cereals, because the rice grower is not dependent on the elements for the necessary water supply, having an abundance of water at hand during the entire season for use as needed. Wheat exhausts the soil rapidly; ten to fifteen years continuous cropping, even in the fertile prairies of the Northwest of America, reduces the annual yield to scarcely paying quantities. On the rice lands of Louisiana and Texas, one man with a four-mule team can plant and harvest one hundred acres of rice and, if well tended, his crop will net him from one hundred and sixty thousand pounds to two hundred thousand pounds of hulled rice, enough to sustain five hundred people for one year.

"Japan, with a population of forty-five million people, produces and consumes approximately twenty-two billion pounds of rice annually. China consumes about one hundred billion pounds. India demands as much as China, and including Burma and Siam, exports about seven billion pounds to Europe. The United States is using for food about five hundred million pounds of rice annually, the per capita consumption being about six pounds, while in Japan it is over four hundred pounds or over one pound a day per head of the population."

Where rice is not the chief dish of an Oriental meal, it is always its accompaniment. It also enters largely into the composition of soups, cakes and all sorts of fancy dishes. More than bread it deserves the title of the "staff of life" from the far greater number of people for whom it forms the chief article of diet.

BREAD.—The baking of bread has been practiced from prehistoric times. Not only have archæologists discovered stones for grinding meal and baking bread in the excavations of the lake dwellings of Switzerland, but the bread itself, baked in that almost inconceivable antiquity, has been recovered in liberal quantities, preserved by the accident of having been charred or carbonized, probably in the fires which sometimes destroyed the pile-dwellings of these primitive folk. The forms are small round biscuits, about an inch to an inch and a half in diameter. The material used was grains of barley more or less crushed. The bottoms of these little cakes indicate that they were baked by placing lumps of dough upon hot stones, then covering them over with glowing ashes.

This primitive bread has not been improved upon since. It could not be improved upon, because it was the simple baking of Nature's own product, uncontaminated by adulterants and robbed of none of the valuable constituents of the grain. And the more substantial breads of the present time do not differ essentially from those primitive little loaves, except in the use of a special oven, instead of heated stones. The coarse, unleavened breads of some nations of the world to-day are made either of crushed grains, or of grains ground only into a simple meal, mixed with nothing but water, and with not an atom of the valuable food material removed.

For instance, some of the Norsemen of the present time use a hard-tack bread made of unground rye. The grains are first soaked, then merely mashed by pounding, after which they are baked in disks of about a foot in diameter and an eighth of an inch in thickness—or thinness rather. In the center of each piece is a hole, so that the bread may be stored away on thin poles after baking, or hung up on strings below deck in the fishing smacks. This hard tack is used chiefly by the fisher folk.

In the remote country districts of Scandinavia, also, the poor people bake "flad-brod" only twice a year, storing it away for future use. Their diet is chiefly bread and porridge, with a little herring or other dried fish. The bread is made either from rye or from a mixture of barley, rye and pea-meal, baked in thin layers, and is as hard as flint.

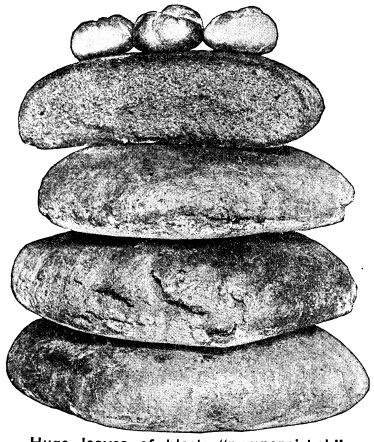
The extreme poverty of the peasantry of Russia in some sections is such that they cannot even enjoy the pleasures of a whole-meal rye bread, but are compelled during parts of the year to mix their meal with ground birch bark, husks or pounded straw in order to make it go farther, or to last until the next harvest. Pitiful as this is, however, it may really not be very much worse than a diet of simply white bread and tea.

Barley will grow farther north than any other cereal, and is consequently much used by the Norwegians for bread. But for the most part, rye is used in Austria, Russia, Lapland Northern Scandinavia and parts of Siberia, as wheat is used

in the United States, and chiefly in the form of black bread. It may be said just here that the so-called black bread is not literally black, but varies from a dark golden brown to a *very* dark golden brown, the term "black" being used to distinguish it from white bread.

It is usually considered that the whole grain of wheat is a more perfect human food than that of rye, approximating more nearly the exact chemical constituents of the human body; but this black rye bread disputes the claim, for its eaters possess remarkable vigor, and live to an advanced age. It is said that reindeer sledge parties subsist upon it, in combination with unsweetened brick tea, for weeks together, with only the occasional addition of a bit of fish. Among the peasantry in many sections the almost exclusive diet of black bread is modified by the addition of onions or garlic.

There is such a large Russian-Jewish population in New York City that there are many bakeries which supply the same bread which is used so largely in Russia. This black "pumpernickel," as it is called, is baked in enormous round loaves about eighteen inches in diameter and weighing from sixteen to twenty pounds each. These loaves are cut up and sold by the quarter loaf, or smaller "chunk," at a relatively low price. They are heavy and solid, and have the purest rye flavor, even though somewhat sour, the sour taste being developed by the rapid fermentation of the sugar contained in the rye. From each baking a small piece of dough containing live yeast plants is retained to mix with the next batch, the whole-rye flour being mixed with



Huge loaves of black "pumpernickel," a plain, rather unattractive, but very nutritious bread made of rye flour.

nothing else, except water, and allowed to stand for six hours before baking. This is a bread that not only may be but *must* be masticated; otherwise one could not eat it at all. Another rye bread of a rather lighter character, somewhat soured also, but more leavened, is likewise much used in certain sections of New York City; it is sold chiefly in round loaves of eight to ten inches in diameter, at eight and ten cents a loaf. This also is superior to the so-called sweet-rye commonly sold in bakeries, the word sweet being applied not because it is sweetened, which it is not, but to distinguish it from the sour rye bread. There is a Bohemian rye bread very similar to the rye bread described, though a little heavier, perhaps less leavened, and yet not solid like the pumpernickel.

SWEET PUMPERNICKEL.—There is also to be had in the various delicatessen shops of New York a sweet pumpernickel, so called only because it is not soured. To the American taste, not accustomed to the acid character of the Russian black bread, this is much more satisfactory. It is, indeed, perhaps as near to ideal bread as anything could be, outside of a whole-wheat loaf made in a similar manner.

In addition to the black bread of Siberia a small ringed hard-tack is used considerably. It does not even contain any salt, and, after being first steamed, is baked to render it thoroughly dry. It is sometimes soaked in hot tallow to increase its heat-imparting properties, and is then especially valuable as a cold weather food. It can also be made to give both heat and light directly, as a candle does, by inserting waxed strings and touching a match to them.

The Italian coast-working population uses a disk-like hard-tack, with a hole in the center for storing, known as macaroni *pane duro,* which is usually soaked in their cheap wines before it is eaten. It is of a light color, like that of the regular strip of perforated macaroni, and may be used similarly in soups, though in this way is not as satisfactory.

The Italian breads for the most part are fairly substantial, though not so much so as the darker and more solid breads of Germany, Austria and the more northern countries. Some of

their loaves are narrow and very long, while others take the form of large rings, the "family" loaves being large enough to put one's head through with ease. For feasts and special occasions they are sometimes made of enormous size, frequently two or three feet in diameter.

Oat cakes, which are still used somewhat in the rural districts of Scotland, are made by mixing up oatmeal, warm water and salt into a stiff paste, kneaded into a thin cake, first fired on a hot plate or griddle, and finished in front of an open fire. In the towns, and even a part of the country, this wholesome form of bread and the old-fashioned porridge have now been largely displaced by the increased use of white bread and tea, and there can be no doubt that the present decreased vitality and lower standard of health in the Scotch people can be attributed largely to this cause. Cereal vendors in the United States are now endeavoring to introduce the idea of oatmeal bread as a novel and wholesome food, to further their business interests, but the recipes usually call for as much white flour—sometimes twice as much—as of oatmeal, in order to satisfy the craze for light and puffy bread. However, even this must be better than the unmixed white bread.

The corn-breads and "johnny-cakes" with which we are all familiar are invariably made with a certain proportion of white wheat flour, and are not bad, even at that, but it is necessary to go to Mexico for a real corn-bread. The much appreciated *tortillas* of Spanish-American countries are flat cakes made simply of roughly ground maize, salt and water. In connection with milk or coffee they form practically the entire breakfast of the people of Mexico, regardless of race or physique, and are also much used by the native Indians.

In parts of Asia and Africa the natives make bread of several varieties of millet, a grain which in our own and many other countries is used as food only for animals. East India consumes more millet than all other grains put together. Great numbers of the more poverty-stricken classes of northern China, who cannot afford rice, grind up millet for bread and for porridge, and during a Russian famine some years ago

millet bread was for a long time the only food which remained between the peasantry and starvation.

Bread may be made from buckwheat, though this is commonly used only for griddle cakes. It is not a grain, but a herbaceous plant botanically related to the rhubarb and sorrel. The name was originally beech-wheat, owing to the three-sided, angular shape of the seed.

Among the Japanese and Chinese rice is frequently ground into a flour from which both bread and cakes may be made. A bread can also be made from potato flour, which is made by slicing, drying and grinding potatoes to a powder.

Boston Brown Bread.—One of the best and most wholesome of American oven products is the "Boston brown bread," made from rye, graham flour and corn meal, with black molasses, and usually served very hot. Graham breads and so-called whole-wheat breads are commonly sold at up-to-date bakeries, though in some cases they are not much better than the white loaves retailed at the same places. Some are darkened by molasses.

So much attention is directed to the task of satisfying the popular taste for light, spongy bread, that manufacturers of whole-wheat flours endeavor to give their customers a product of the same consistency as the white flour, and so it is hard to get a genuine whole-wheat flour. The best plan is to buy a small wheat mill that will enable one to grind his own meal and have it fresh every few days.

The flour thus made contains the bran and all the rougher elements of the grain, which are of decided advantage in supplying nutriment for the teeth and bones, and is also healthful because it demands proper mastication.

The human alimentary canal requires a certain amount of waste products to assist in the proper digestion of the food. Whenever a highly concentrated food is used, especially if it is hurriedly masticated, it is a source of danger. The peristaltic activity of the bowels requires a certain amount of coarse or fibrous material in order to secure proper digestion and assimilation. This is furnished very thoroughly by the bran or

woody fiber, which is found in the covering of wheat and all other grains. When this has been removed, and the usual hurried process of mastication is followed, there is defective digestion and assimilation, and slowly but surely functional defects develop which in practically every case finally result in some chronic disease more or less serious in nature.

Hot bread made from whole meal of wheat or from any of the other grains is wholesome in every case if thoroughly masticated. Graham gems, for instance, make a splendid article of food, wholesome and nourishing, and one could make an entire meal on them with the greatest physical advantage. Bread made from whole meal is usually compact and rich in nourishment. It is not light and frothy, as you generally find white bread. Therefore, if you do not have a distinct appetite, you do not enjoy eating bread made from whole grains. If, however, you have a healthy and normal appetite, if you really need nourishment, then you will find that there is a sweet, nut-like flavor to bread made from whole-wheat that you can not possibly find in white bread. Wheat bread becomes really and truly a staff of life only when it is made from the whole grain.

Beyond a doubt, many will inquire what one should do for pastry, pies, puddings, etc., if not able to use bolted white flour. You will find that the whole meal of the wheat can be substituted for white flour in your recipes in practically every case, and that the results will please you. Delicious pies can be made from the whole meal of the wheat which have a tastiness about them that far surpasses those made from white flour. For the hot rolls and hot biscuits that are so delectable to the ordinary appetite when permeated with quantities of melted butter, the whole-wheat meal can be substituted, and although the product resulting therefrom may not be so light, it will be even more delicious, if you have a genuine appetite.

There is one kind of bread furnished ready-made by Mother Nature, or at least all ready except the baking, namely the "bread-fruit," originally native of the South Sea Islands, but now transplanted to countries throughout the tropical regions of both hemispheres. It grows on a tree of moderate height,

and is similar in shape to a football, and almost as large. The fruit is gathered for use just before ripening, when it is packed with starchy matter. It may be prepared for use in many ways, and in its fresh condition is frequently baked entire, in hot embers, whereupon the interior may be scooped out; this has a soft smooth consistency and a flavor not unlike the taste of potatoes boiled in milk. It combines well with fruits and other ingredients for puddings. In the tropical isles of the Pacific bread-fruit takes the place that cereals hold in temperate latitudes. It is commonly preserved for use by cutting it into thin slices, which are dried in the sun. These dried slices may then be made into flour at any time, from which bread and biscuits may be prepared much the same as from any other flour, or the slices themselves may be baked and eaten without grinding. Its flavor is so pleasing and delicate that one never tires of it.

WHITENING OF FLOUR.—The word "bread," however, to most Americans still connotes the baked product of white wheat flour. Unfortunately stress is laid upon the quality of whiteness as a prime essential in the flour. To this predilection millers have pandered, inventing new processes for eliminating in milling the parts of the grain which would give the flour a dark color, even though these contain the most nourishing elements of wheat. Combined with this they have more and more employed injurious and even poisonous chemicals for bleaching the flour—alum, nitric acid, etc.

To understand fully what the modern miller does to the grain as it comes from Nature's stores, let us examine and analyze the wheat as we find it and then see what the flour is that is sold in its place. We find in the wheat cereal the following primary elements, viz., bran, phosphates, gluten and starch. Under a strong magnifying glass we first come in contact with a very slight woody-fibrous covering outside the bran proper. There is no food value in this, nor in the fuzz at the blossom end of the berry, which also contains a minute amount of dust. These may properly be termed waste, and as they are easily removed, machinery has been designed that

thoroughly removes and cleanses the wheat of this and other foreign substances which get mixed in with the wheat, by screening, scouring and winnowing. This covering removed, we come to the bran itself.

Now, wheat bran is not only easily digested by any normal stomach, but has valuable food qualities, being rich in proteids, certain minerals, etc. This fact is recognized by the very millers who eliminate it from flour, in advocating this bran and middlings, offals as they are commonly termed (middlings being mainly fine particles of bran and the germ of the wheat), as the best of food for stock. Wheat bran contains 12.5 per cent digestible protein, middlings 12.8 per cent, whereas corn contains only 7.9 per cent. Bran and middlings therefore form, *par excellence,* the feed for the dairy, furnishing the qualities so much needed in the formation of milk.

Now, is it not a little strange that these offals should be of such inestimable value to stock, have such beneficial food values, and yet be so unfit for man? If these prime elements, protein, phosphates and minerals, are of such value to cattle and horses, why are they not to men also? Besides, an eminent authority has demonstrated that wheat bran contributes something to the composition of the enamel of the teeth, and if we always lived on entire wheat flour we would have few decayed teeth.

Next we notice the germ of the wheat, which is found at the stalk end of the berry, uniting the end of the berry to the ear. Wheat, like all other cereals, contains a germ, that living and life-giving element, which germinates and reproduces itself. Chemistry tells us it is the phosphates of the grains which feed the brain and nerve centers of our being. If our brain and nerves are not properly nourished, we cannot have physical vigor and health, and we become mere weaklings susceptible to all the ailments that strew our pathway.

Third, the gluten. This is a gluey or gelatinous substance which contributes to the muscle, sinew and bone, and constitutes the base of animal tissue. It is scattered all through the internal part in minute globules, but the greater part lies next

the bran and adheres tenaciously to it. An illustration on a preceding page shows a cross section of a grain of wheat greatly magnified.

Fourth, the starch. This occupies the internal part of the grain. It preponderates in quantity, and is the white portion of the wheat, all the other elements having color. This starch is what makes fat and contributes to the warmth of the body. Thus we see the importance of retaining in our bread all these different elements, and the folly of discarding any of them.

But, not satisfied with the evil they have done in this elimination, the millers add to the injury. Infinitesimal particles of bran find their way through the meshes of the silk through which the flour is passed in the process that is called bolting the flour, and the millers, to get rid of these, resort to bleaching, claiming that this does not affect the flour. Their statements, however, are not true, because in order to change the color of any physical substance there must be a change in the substance itself. Without some chemical change, you cannot make black white. If, then, there are changes, these changes must be in the cell structure of the flour. If so, what are they and what will be the effect of the changes? Sometime ago Prof. Fleurant, one of the most eminent of French chemists, read before the French Millers' National Convention a paper giving an analysis of three different samples of flour that had been subjected to the bleaching process by acids combined with the use of electricity. These samples had been carefully stored from one to four months, and in each case the result was found to be mainly the same. He said:

"The gluten was reduced in quantity, the fatty matter was diminished, and the acidity increased. In each case, the result was the same. The acidity had been doubled, and the effect upon the system cannot be but baneful. This instantaneous bleaching by electricity is simply the introduction of burned air, the electric flame being a convenient method of destroying the oxygen or carbonic acid gas, thus destroying the natural oil so essential in bread."

This whole system of bleaching or otherwise doctoring up

flour in order to produce extreme whiteness is mainly the cause of the alarming increase in constipation and the whole train of ailments that follow in its wake. It is a well-known fact—attested by eminent physicians—that constipation, stomach and bowel troubles and nervous prostration have greatly increased since the introduction of this modern extra-fine white flour.

White flour was bad enough to cause our opposition, but when bleaching was added the detriment to the health of the people was so materially increased that we redoubled our fight against it. Then the Government passed its pure food bill, and one of the first things the experts of the Department did was to investigate the methods of making bleached flour. This it did with much thoroughness, its researches extending over a period of many months. The chief result of the reports of the investigators was an announcement by the Secretary of Agriculture to the effect that a large proportion of white flour was artificially bleached, peroxide of hydrogen being the agent usually employed, and that therefore it was an adulterated product under the law, and its makers were subject to incidental legal pains and penalties. In consequence of which the Secretary issued orders that no such flour was to be exposed for sale in the District of Columbia or the Territories, or to be transported by interstate commerce.

TOAST.—Bread, especially white wheat bread as found in our bakeries, is usually not thoroughly baked. When, therefore, one is compelled to eat it, it is well to rebake or toast it.

There are comparatively few people among the civilized races who are not more or less fond of toasted bread as an article of diet. It is generally considered more digestible and by many more palatable than untoasted bread. With the Germans and others it generally assumes the form of zwiebach, which simply means "twice baked."

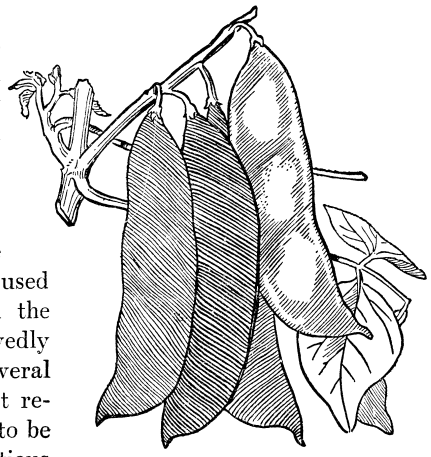
There are many methods of preparing toast, but they should all aim at about the same result. Too hasty toasting browns the surface too quickly, while it leaves the interior almost unaffected by the heat. Ordinary baker's bread, if toasted when new, as is the fashion in many country hotels,

namely, by placing it on the top of a fairly heated stove, makes a piece of soggy, steamy, leathery, unpalatable pretense of toast with a mere brown coating which is a delusion and a snare. Toast should never be made from bread less than twelve hours old and should first be dried in an oven and then toasted over a modern broiler, or held in an electric toaster, or on an old-fashioned toasting-fork over hot coals or flame. It is thus thoroughly dried through and the outside browned crisply without being burned.

LEGUMES.—After cereals, the most valuable and widely used vegetable foods are the legumes. The seeds are eaten green, either alone or with the pod, as in the case of string or snap beans and edible podded peas. Others are not eaten until in the fully ripened state, as split peas, dried beans, lentils and peanuts. They are hardy and therefore are found in all climes and countries. They grow rapidly and are cultivated in far northern lands where the summer is short. They also stand high temperatures so that they are found both in tropical and subtropical regions. In middle and northern Europe the pea is the favorite, while in the Mediterranean countries the bean holds first place. In our own country, both the pea and bean are grown extensively and indeed so prolific are our crops that we have an excess which we sell to other nations. One has but to see the vast bean-fields of Ventura County, California, and other nearby regions to realize what a tremendous hold these foods have upon the nation. The lentil is less generally cultivated in the United States and has not yet come into popular favor. But it is one of the most useful of the legumes and for centuries has been known for its high value as a human food.

BEANS.—The bean was cultivated by the Egyptians, Greeks and Romans and it was known to the aborigines of the North American continent long centuries prior to the coming of Columbus. Almost everywhere where the human family exists beans may be found. The earliest cultivated bean is the broad one, known in England as the Windsor bean. It is not as well known in this country as it should be. In

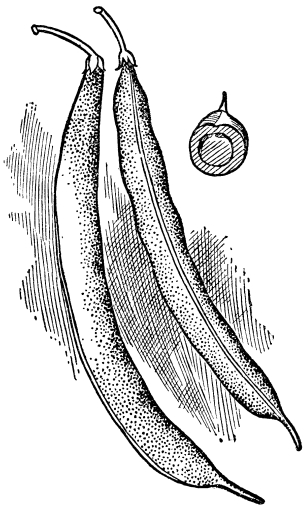
England it is eaten before the seed becomes full grown, being then well-flavored, exceedingly tender, and yet rich in easily digestible muscle-building and heat-forming properties.



The Lima Bean.

The Lima bean is the broad bean generally used both green and ripe, in the United States; it is deservedly popular, though in several parts of Europe it is not regarded in its green state to be the equal of the nutritious green Windsor broad bean.

String or snap beans are extensively used, and form a tasteful and nourishing food which can be eaten with relish either hot or cold. These generally belong to the kidney-bean family. They are supposed to be native of South America, having been introduced from there into Europe in the sixteenth century. The so-called wax-beans all belong to this species. There are certain of these beans that turn dark in cooking. Some people have a prejudice against these dark beans, but it is altogether unfounded as they are most palatable, well-flavored, easily digested and very nutritious.

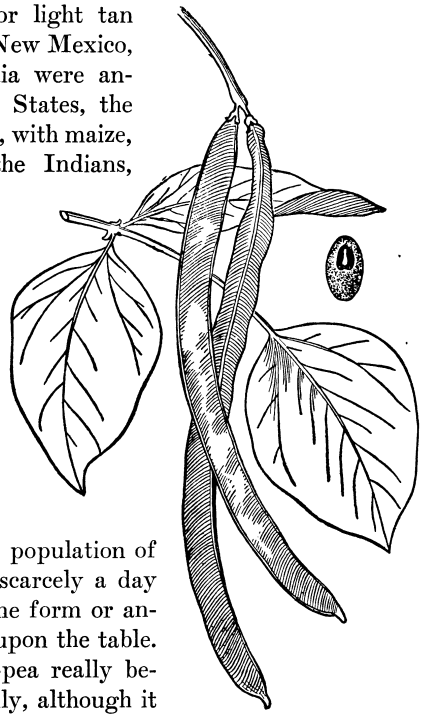


The Snap Bean.

A species that is familiar in the United States as an ornamental climbing vine, but which seems to be almost totally unknown for its

food qualities, is the scarlet runner. In England several varieties of these are very much preferred, both as string and shelled beans, to the varieties of kidney beans. When picked early enough they are tender and delicious, and it is time that the American people began to realize how much they are losing by not using this palatable, healthful and nutritious food.

A variety that is very largely used here and is recognized for its palatability and healthfulness is the small, reddish colored bean of Mexico and our southwestern country. To the Mexican it is known as the *frijole* (pronounced free-hó-ly). It is a small, flat bean, generally of a reddish brown or light tan color. When Texas, New Mexico, Arizona and California were annexed by the United States, the *frijole* was found to be, with maize, the staple food of the Indians, Mexicans and Spaniards, and among these people it still holds its former position, at the same time having won considerable favor in the eyes of the more recent American population. At the proper time it is used as a green or snap bean. And among the native population of these regions there is scarcely a day in the year when, in one form or another, it is not placed upon the table.



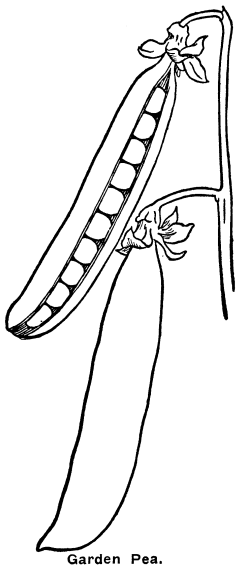
The Cow-pea.

The so-called cow-pea really belongs to the bean family, although it is known in the Southern States as

the field-pea. There are many species of this legume which are grown in the South, both as a forage plant and for human food, but mainly as green manure for the soil. Considerable quantities are consumed during the season, being gathered when the pods begin to change color, and before they begin to turn dry. They require a longer season for growth than the kidney bean, and therefore are impracticable for the colder northern climes, but the dry bean might be introduced with advantage into the northern markets and would become a great acquisition to the northern dietary because of its distinct and agreeable flavor.

The soy bean and several other uncommon varieties are used to a very great extent by the Chinese and Japanese, both in their own countries and all over the United States. They are not as well known as they should be, and if more extensively cultivated and placed upon the market they would undoubtedly soon become favorites.

There is still one other bean that is familiar in the American market, the carob or locust bean, which, having formed a chief part of the food of John the Baptist, is often known as St. John's bread. It is grown on the shores of the Mediterranean and the poor people eat it to a considerable extent, though its greatest use is as a food for cattle. When dry it contains about fifty per cent of sugar, and as the flavor is agreeable to many people, children eat it with relish. While differing from it in some regards, the bean of the honey locust of this country is somewhat similar to the carob and is equally as nourishing and palatable.



Garden Pea.

PEAS.—The pea is a most popular food, being found on the table of rich and poor alike, not only during the time it is fresh, but, owing to the perfection

of the processes of canning, when it is out of season as well. It is not known where the pea originally came from, but as late as the time of Queen Elizabeth it was not grown in England. Fuller says that peas were brought from Holland and were accounted a "fit dainty for ladies, they came so far and cost so dear." In Europe the dry or split pea is largely used, both as a vegetable and as a basis for soups, though in our own country its use out of season is largely confined to the canned varieties.

The field-pea and the garden pea have a great number of varieties which we have insufficient space to describe here. Those known as the sugar peas are generally the favorites, but all varieties should be eaten as early as possible after picking. The longer they remain uncooked, the less sweet and finely flavored they become.

The Lentil.

LENTILS.—The lentil is possibly the most ancient of food plants. It was undoubtedly the reddish Egyptian lentil that furnished the red pottage of Jacob for a mess of which Esau sold his birthright. Owing to the fact that the lentil has a little stronger flavor than peas and beans, some people do not like it, but there are those who pronounce it the most palatable of legumes, as it certainly is the most nutritious. It is not yet cultivated to any large extent in the United States except in Arizona

and New Mexico, where it was brought three hundred and fifty years ago by the Spaniards. It is a hardy plant, will grow in sandy soil, and is a prolific bearer.

HONEY.—Honey is a food rather difficult to classify. It is the only food product which we take from the insect world, and yet it is a vegetarian food. We are not eating the bees but appropriating their gather of food stores. It is much as if we would domesticate squirrels and let them gather nuts and then rob their nut stores.

Honey is the nectar of flowers unchanged by the bees except for the evaporation of part of the water. Honey varies slightly in composition and flavor according to the flowers from which it is chiefly derived. Honey usually contains sugars akin to those of the fruits and also cane sugar. With this natural sugar syrup is mixed a small amount of mineral salts and protein elements. Both because of its composition and its fine and distinctive flavor, honey is to be preferred to manufactured sugars and syrups.