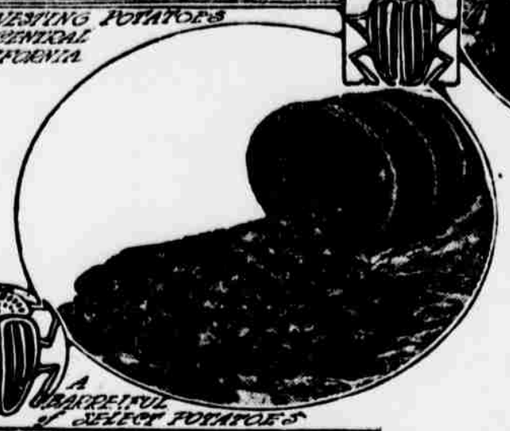
The POTATO AMERICA'S EDIBLE TUBER

BY ALBERT HALE

A WESTERN POTATO FIELD

HARVESTING POTATOES IN CENTRAL CALIFORNIA

WHAT'S SCENE DURING POTATO HARVEST



A HANDFUL of SELECT POTATOES

REPRESENTATIVE and CURIOUS SPROUTING EYES

POTATO PARINGS

POTATO SEEDS FROM THE BALLS or FRUIT - CUTTING OFF SPROUTS

than that the good people there are very fond of it. The misnamed "sweet" potato has no right whatever to the title. That pleasant vegetable belongs to the morning-glory family, botanically being known as Ipomoea batatas, thus again betraying a fictitious relationship to the other family, because the batata is a native term for the real potato as well. Again, it is unjustly suspected that this sweet potato is the vegetable actually brought by Drake and Hawkins into England, where it masqueraded for some years as the genuine South American food of contemporary rumor. It must be understood, however, that the sweet potato is likewise a native of America, but its original home was probably the West Indies and Central America. At any rate, it grows in the tropics and subtropics and finds its climatic limitations at about the temperature and altitude at which the Irish potato begins to thrive. The yam is another appellation of the sweet potato, although that, too, is an error, for the yams—dioscoreae—belong to a group of climbing plants. A number of varieties are found throughout the tropics and subtropics, and they are cultivated in both the East and the West Indies. Other roots and tubers may resemble the potato, and the tomato is related to it, but they must not be confounded with the far better known vegetable, which alone is entitled to the name. The commercial and domestic classification is stronger, however, than the scientific, and therefore no attempt should be made to separate them in the popular mind.

The common, or white, or Irish potato is undoubtedly American all through. Its prehistoric and aboriginal habitat was the western slopes of the southern continent, from the neighborhood of Quito in Ecuador, or as some claim even from that of Bogota in Colombia, to the central region of Chile.

Botanically, the potato is a solanum, one of the most diversified plants of the vegetable kingdom. Something like 1,000 varieties have ben described, but, assuming that several of these are not substantially accurate, there remain at least 800 which are well known. It is remarkable that only about 40 varieties have pinnate leaves and produce tubers on the roots beneath the ground, and that these special varieties are chiefly of American origin. All these tuberous, pinnate-leaved kinds of the solanum are nearly related and very probably have a common origin. This first habitat of the potato has been laid by some students, quite as much for the sake of poetic harmony as for historic exactitude, in Central America near the home of the primitive maize, but in all fairness South America deserves and will hold the honor.

The edible potato, from which all the European and American variations have been developed, was undoubtedly cultivated by even the inhabitants of the west coast of South America who occupied the land before the arrival of the Incas. When the Spanish conquerers arrived there, they found one great source of food supply in this native vegetable. In Peru, however, it was not a coast product, for the climate there semed unfavorable, and what happened to grow on the lower levels were small, insignificant and watery. The best kind of potato grew at an altitude of about 7,000 feet, back of Lima; it was small, round, with a thin skin, and was yellowish inside (papa amarilla). In southern Peru, not far from Mollendo, but among the foggy regions (June to September), up among the rocky hills, the potato has been found wild.

Passing farther along the coast into Chile, where the climate is quite temperate and consequently is suitable, even near the coast, for such vegetables, there is found that other form of the indigenous potato, the Maglia, which so attracted the attention of Darwin when he made his famous voyage in the Beagle. As far south as the Chonos Archipelago (about 45 degrees south) this plant grows wild near the sea. The potatoes from it resemble English potatoes, and have the same smell, but do not stand cooking so well. Little effort seems to have been made to develop the original tubers, although they form a good part of the food of the people, yet in this neighborhood the island of Chiloe alone has about 25,000 acres under cultivation, of the 123,000 acres devoted to potatoes in all Chile. That the Europeans found potatoes in Quito and Bogota need not be denied, but there is no strong reason for supposing that it was more than the same plant already mentioned, transported thither before they came.

Quite another story is uncovered along the coast of South America. There the potato is considered a European vegetable and is cultivated only by those whose experiences are derived from the old world. No tradition connects the few remaining natives with a past in which the potato flourished, and in the minor instances in which the "wild potato" has been found, experiment shows that it is inedible and perhaps even poisonous.

This is the case in the "wild potato" of Paraguay. Such a plant has for years been known to exist in the basin of the River Parana. It grows on the plains, budding in March and April, and ripening during the winter months of May to August. The tubers are about the size of a walnut and sometimes larger, soft and watery, full of irritating solania (the active alkaloid of the potato), and of a poor taste. They are not eaten nor are they cultivated; the so-called edible potato is considered an imported vegetable, foreign to native experience and judgment, while the vegetable that takes the place of potato in all native dietary is the "mandioca," which has been prepared as a food from time immemorial by the pre-Columbian inhabitants.

The food potato of commerce made its way, therefore, from its prehistoric home in the Andes to North America and via Europe to the eastern shores of South America.

Great credit belongs also to Sir Francis Drake, who learned of the potato about 1578, either in Peru itself or in some near-by island. He took specimens back with him, stopping first in Virginia, where he helped to plant them in 1585. In 1586 he arrived in England, carrying potatoes among his treasures, and thus the story arose that potatoes came from North America. Closely allied to this error that other, which confused the South American potato with what is now known as the sweet potato, the "batata," samples of which surely came from Virginia somewhat earlier than this time. It is probable that Drake gave potatoes to Raleigh. At any rate, it is an accepted statement that Sir Walter Raleigh was responsible for their use in Ireland, because he gave several to the grandfather of Sir Robert Southwell, who, to check the famine spreading in that island after the disastrous failure of the grain crop, cultivated them at once there, and popularized their use to his eternal credit.

John Gerard, a celebrated English botanist, grew them in England, following the example of Raleigh, who ordered his own gardener, with a utilitarian purpose, to cultivate them along with other vegetables. The story runs that this man, whose curiosity was intensely aroused by the new plant from America, watched its growth carefully, and when the fruit (sic) was ripe, gleefully plucked it from the stem and tasted it. As he found this part of the plant merely insipid, he spat it out in disgust, and complained to Sir Walter that he had wasted so much time upon the miserable thing: "Is this, then, your delicious fruit from America?" The reply startled the gardener, for he was told to drag up the offender by the roots, for fear that the other plants might be contaminated. On doing so, however, he was astonished to discover among them a mass of exactly the same kind of tubers he had planted in the spring. "Cook them," said Sir Walter Raleigh, "and then give me your opinion." At the first flavor of this strange vegetable he was delighted, and ever afterwards gave particular attention to increasing his supply of the wonderful potato.

By such experiences the potato was spread over Europe. In France it was a rare but prized vegetable in 1616; in Germany it was recognized in 1650, and from that time on, Europe, as well as other parts of the world, gradually accepted it as an addition to the food supply of all peoples. It is unwise to discuss here the mooted point about the so-called indigenous potato of Mexico and Arizona; about the origin of the S. commersonii in Uruguay and Argentina; for the settlement of it cannot disturb the fact that the Solanum tuberosum, the common potato of today, came from the west coast of South America, and that the natives of these regions must be given credit of having recognized its food value long before they were discovered by Europeans.

The widespread botanical order of the solanaceae, to which our potato belongs, embraces plants of little aparent similarity. There are, as members of the great family, among medicinal plants, for example, the hyoscyamus, dulcamara, belladonna, and datura; among food supplies are the thorn apple (a tree, in this case), the artichoke, and the tomato; and adding to man's enjoyment if not to his vital sustenance, the capsicum or the chile of commerce, and the American tobacco. Not many of them have tubers, however, and of the tubers, the potato holds the prize for its usefulness in human economy. The tuber of the plant we are interested in is the common potato.

Now, the tuber is a curious provision of nature which by propagation can be carried on by means of the regular and normal plant activity of the seed above ground, and also by anomalous stems, enlarged by the development, to an unusual degree, of cellular tissue, which are below the ground. Potatoes have seeds and fruit like any other member of the botanic kingdom, but when left to themselves it may happen that more energy is expended in storing up food in the tubers, so that flowers and seeds are imperfect. Theoretically it makes little difference which element—tuber or seed—is used for perpetuation of the potato, but practically so much encouragement has been given to the tuber that the seed is habitually ignored. Incidentally it deserves mention that the popular Burbank potato, the spread of which was one of the earliest demonstrations of the genius of the botanical wizard, Luther Burbank, was propagated from the seed, as he had noticed what splendid fruit certain plants were showing, and reasoned correctly that the product must equal the parent.

Exactly what the tuber is, is another question. By some its production is ascribed to a fungous iritation, although this is not proved. As has been said, not all the solanaceae have tubers, nor are all tubers members of the family. Be the cause what it may, the tuber is not a true root, but a leafless branch, usually below yet sometimes above the ground; the eyes on a tuber are leaf buds which in due time lengthen into shoots and form stems. The contents of a tuber are a reserve supply of food, supporting the young growth until it can put forth roots of its own.

The food supply in the potato, is shown by aanlysis to be about as follows:

	Parts.
Starch, etc.	18.8
Nitrogenous matters	2.1
Sugar	3.2
Fat	0.2
Salines	0.7
Water	75.0
Total	100.0

although of course variations in these proportions, depending upon soil, climate and methods of cultivation, are to be expected. It is evident, therefore, that the potato is not a perfect food, and that it lacks sufficient nitrogenous matter while having a superabundance of starch and sugar. That does not destroy its value nor its usefulness, by any means, nor its popularity, for next to Indian corn and rice, the potato is the most widely used vegetable in the world.

Today no hopeful settler, after trecking into a virgin wilderness, thinks his little garden complete without the pretty patch of potatoes; no domestic or public meal is served without its tuberous embellishment, and after mastering the art of boiling eggs, the next step of the young housewife is to learn how to prepare potatoes.

The grand total of potato production for one year amounts to about 5,500,000,000 bushels, and this gigantic crop comes from every continent in the world. Over one-fourth of the output is grown in Germany; not quite one-eighth from Russia; usually a little less even than that, from Austria-Hungary; about one-ninth from France; about one-sixteenth from Poland, and a slightly less quantity from (contiguous) United States.

In the United States, almost one-third of the year's crop is grown in the North Atlantic states, but the group of North Central states east of the Mississippi river runs a close second; of the other subdivisions, the Central states west of the Mississippi are next in importance, and the far Western states are fourth.

This illustrates one fact about the potato; it is very susceptible to climate and cultivation. Left to nature, it is only a moderately prolific plant, and cannot thrive in a country too hot or too cold, but has its habitat essentially in the temperate zone; on the other hand, it responds readily to good care, so that the more it is nursed the better does it grow.

The few rules to follow in successful potato growing can be learned by any farmer. First the soil must be suitable, but this is not hard to find. It must be light, so as to offer no great resistance to the enlargement of the tubers; well supplied with organic matter, yet no more than moist, and containing abundance of natural fertilizing ingredients. Well drained sandy loam is excellent; clay should be avoided. Crop rotation is advisable, as the potato bears well after certain preceding crops, but may wither if succeeding itself too regularly. Liberal manure is necessary, but of the right kind. The rows should be laid off as close together as practicable without interfering with horse cultivation, and generally speaking the seed pieces should be dropped about 12 inches apart in furrows made in the level field and not on the ridges, yet deep enough—say four inches—to afford ample cover to them. It must be mentioned that in speaking of potatoes the word "seed" means the tuber or portions cut from it in which an "eye" has formed; the botanical seed may be used, but no benefit is derived from that method; care must be taken, however, that the sprouts from the eye are not injured, and it is best, therefore to use eyes from which sprouts have not appeared.

The uses of the potato as a food have long ago been vindicated. Nothing can dislodge it. Not even the latest discovered dashen, a Japanese and Chinese claimant to tuberous popularity, will take its place, even though it may be proved to possess more protein than the South American predecessor. Whole books have been written on the culinary art of cooking the potato. Boiled, baked, stewed, or fried, it has been a garnishment to the more aristocratic dishes of every feast since it was discovered, and has supplied many a full meal to the humble masses who do the world's work. Nothing but a poem could tell its praises, and a sonnet is the least tribute through which our gratitude to Peru should be expressed.

As a source of industrial alcohol, especially that substance which is commercially known as denatured alcohol, potatoes are being regarded as of increasing value.

Next to food, however, the greatest value to mankind of the American potato is a source of starch. In this, too, it vies with corn. Potato starch is every year proving its merit, and whatever can provide starch, has a long popularity ahead of itself. Starch is one of the essentials of civilization. Its uses are protean, the demand for it is unceasing, and for both art and industry the supply must be constant. With such a varied field for its activity, therefore, no one should doubt that few blessings to humanity can surpass that which came to the world through the famous potato

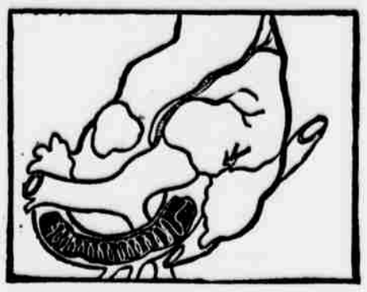
HEART REPAIRED WITH WIRE

How Six Feet of Golden Thread Coiled in a Man's Aorta Made It Strong Again.

Philadelphia.—With the walls of his heart reinforced by a coil of wire through which electricity passes, just as it follows an electric-light wire, John Braden rests at the University hospital, and expects to resume his usual routine in life in a few weks.

The heart is the pump which keeps all the machinery of the human body in motion. It has valves just as all other pumps have, and when an engineer finds a valve leaking in a pump under his care he stops the engine and introduces a new valve if the defective one is beyond repair. The main valve in the heart of John Braden leaked. All through the day he was disturbed by its unnatural noise, and at night it kept him awake.

Finally the pressure became so very severe and the peril to his life so immediately grave that he was removed to the University hospital, where Dr.



Coil of Gold Wire Inserted in Heart's Aorta.

Charles H. Frazier essayed the delicate task of tightening up the valve of his heart and reinforcing the entire structure.

Examination disclosed the fact that the aorta was about to rupture. This would inevitably have resulted in death.

Dr. Frazier opened the aorta as near to the heart as possible and deftly inserted a hollow needle which had been electrically insulated. Through this needle Dr. Frazier pushed and arranged in evenly distributed coils more than six feet of solid gold wire. This thread of wire was guided by the surgeon through the pulsing blood vessel by the sense of touch alone, and it was built up in the aorta, at the point of its weakest dilation, just as a weakened building wall would be strengthened at its most perilous point. Thus the heart was bound round, on the inside, with a coil of strong but fine wire, caught and held in place by the surgeon's trained fingers. Then the problem of preventing hemorhage arose.

Coagulation of the blood was the great, the vital end sought. It was decided to employ electricity to obtain this purpose. Coagulation takes place at both ends of the galvanic current—that at the positive pole being small, black and hard, and that the the negative being larger, softer and of yellowish color. It happens that the blood is the very best agency in the body for the conducting of electricity, and when, as in this case, both poles are inside the sac and near to each other, a mild current of electricity will cause vigorous electrolysis. In applying the current to Braden a rheostat was used to control the flow and to prevent shock when it should be cut off.

Thus by coagulation the reinforcement of the heart was accomplished over the gold wire framework and nature is building a new wall within the valve, stopping all leakage and giving John Braden a new lease of life.

CAT FOSTERS STRANGE BABES

Mother Pussy, Having Lost All but One of Her Babies, Adopts Three Squirrels.

Knoxville, Tenn.—A squirrel is about the last thing one would expect a cat to adopt. Yet a motherly, gray pussy, having lost all but one of her own babies, took charge of three gray squirrels in their stead, and brought them up as carefully and tenderly as she did her own remaining kitten.

They played about her, with one another and with the kitten as unconcernedly as though they had never had any other mother.

A Happy Family.

This happy little family was kept on exhibition in a show-window in Lawrenceburg, Tenn., for a long time—indeed, until they were so well grown that they needed no further care.

Lizard in Stomach a Year.

Milton, N. D.—Loss of flesh at the rate of a pound a day has been successfully combated by Joseph Schneider of Wales since he coughed up a live lizard about an inch and a half long. The lizard had evidently got into his stomach last summer while he was drinking water from a slough where he was hunting.

Ban Mince Pie.

Boston.—Simmons college, following the action of Mount Holyoke, will allow girl students to eat mince pie only twice a year. It makes them drowsy, the pedagogues say