swollen grain is ground between edge stones, and the crushed grain repeatedly agitated with water in a large cistern, and thus the starch is separated

Potato Starch.

The potato is largely used in making starch, especially in France. The quantity of starch not only differs in the different varieties of potato, but also in the nature of the soil, mode of culture, and the season of the year. Even the same kind of potato yields different proportions of starch at different seasons. Professor Playfair found that 240 lbs. of the same kind of potato yielded—

In August	23	lbs. to	25 lbs.
„ September	32	„ „	38 „
„ October	32	„ „	40 „
From November to March ...	38	„ „	45 „
In April	38	„ „	28 „
„ May	28	„ „	20 „

Starch is not distributed equally over the tuber but exists in largest quantities towards the exterior. In large potatoes, the centre is often quite transparent, containing only cellular tissue and water; the tissue just beneath this contains the starch in large quantity, and the proportion gradually decreases towards the centre.

According to Boussingault, the average composition of the tubers of the potato are, viz.:—

	Moist.	Dry.
Water	75·9	—
Albumen	2·3	9·6
Oily matter	0·2	0·8
Fibre	0·0	1·7
Starch	20·0	83·8
Salts	1·0	4·1
	100·0	100·0

As the manufacture of potato starch requires to keep a large quantity of potatoes in store, the best method of preserving them is a point of great importance. Potatoes may be kept for a year or more at the temperature of freezing water, without the loss of starch. It was formerly the practice to keep them in large heaps in underground cellars, but the bruised tubers soon began to ferment, and the heat occasioned thereby led to a general fermentation and loss. Potatoes, are more usually embedded in large shallow ditches, called silos, dug in sandy soil, if that be practicable. They are protected from the air by a thatch, and ventilating apertures made by building trunks of wood in the mass.

In the manufacture of starch from potatoes, the first process is to soak the tubers in water for about six hours, which softens them and assists in its removal. In order to extract the starch the tubers are first freed from adhering earth by a thorough washing, and are then rasped by machinery. The pulp thus obtained is received upon a sieve, and washed continuously by a gentle stream of water—as long as the washings run through milky. This milkness is due to the granules of starch which are held in suspension. When the milky liquor has settled an hour, the starch will be deposited at the bottom of the pan, and the water drawn off, and the deposit is repeatedly washed with fresh water until the washings are no longer coloured. The starch is then suspended in a small portion of water, run through a fine sieve to keep back any portions of sand; and, after having been allowed to settle, is drained in baskets lined with ticking, and the mass is placed upon a porous floor of half-baked tiles, in a current of air, which is at first of the natural temperature; the drying is completed by the application of a moderate artificial heat.

The first liquor that is poured from the starch contains those constituents of the potato that are soluble in cold water, among these is vegetable albumen. Boil the liquor in a glass flask, upon which it will deposit a flocky greyish matter which can be separated by filtration. This is the albumen, a nitrogenised body, which is soluble in cold and in warm water, but is coagulated in boiling water. Albumen occurs abundantly in oily seeds, such as almonds, rapeseed, linseed, &c. If you burn a little of the albumen on a slip of platinum foil it will develop an ammoniacal odour, which indicates the presence of nitrogen, and is thus distinguished from starch.

Colouring Matter in Potatoes.

A fresh cut potato is quite white, but it gradually becomes brown. The expressed juice of the potato, or the first liquor poured from the starch, gradually turns brown. This is the case with many vegetable substances. The seeds of the sweet-pea have a bright green colour when a pod, not quite ripe, is opened, but after a few hours' exposure to the air and light, they become a dark-brown colour.

This kind of starch is hygrometric, and therefore not well adapted to the stiffening of linen; it generally contains about 1-5th its weight of moisture, but when saturated about 23 per cent. It is often adulterated with gypsum, chalk, and argillaceous matters, which are easily detected by incineration. Potato starch is sold under various names for the purpose of food.

Starch-water, from which the starch potato is deposited, is useful for the purpose of irrigation; it contains an azotised matter, and small particles of pulp. The marc of the pulp is deprived of half its water by expression, and is then used as food for cows and sheep. Starch made from potatoes cannot be used alone to make pastry; but a little of the starch added to wheaten flour is thought to improve the quality of the bread. If the proportion of potato-starch exceed one-fifth the weight of the flour, a peculiar flavour is communicated to the bread, in consequence of the presence of a minute quantity of an oily matter contained in several amylaceous principles, and probably identical with the oil of potato spirit or fousel oil.

It forms the basis of the "nutritive farina," for which purpose the starch is carefully prepared, coloured, and aromatized. "The Prince of Wales' Food," "Soluble Starch," "Patent Corn Flour," "Indian Corn Starch," "English Arrowroot, &c. are all chiefly composed of potato-starch. A variety of tapioca is made by heating moistened potato-starch to nearly 212°: some of the granules of starch burst, and form small, hard, and irregular grains, which resemble true tapioca.

Conversion of Starch into Dextrine.

Prepare starch paste with half-an-ounce of potato-starch and four ounces of water. Bring this paste