



STARCH.

SOURCES FOR THE PRODUCTION OF STARCH. — STARCH IN QUEEN ELIZABETH'S DAY. — BEAU BRUMMELL'S CRAVATS. — DEMAND FOR STARCH. — COTTON-PRINTING ESTABLISHMENTS. — LAUNDRIES. — EDIBLE STARCH. — PATENT FOR POTATO STARCH. — PROPORTION IN VARIOUS GRAINS. — WHITE FLINT CORN. — PROCESS OF MANUFACTURE. — THE GREAT MANUFACTORIES OF THE UNITED STATES. — HOW STARCH IS MADE FROM CORN. — THE AMOUNT PRODUCED. — USES FOR THE GLUTEN. — LUMBER FOR PACKING-BOXES.

STARCH plays an important part in the economy of Nature. It is found in greater or less quantity in all the cereals — very pure in rice, barley, and Indian corn, and associated with gluten, mucilage, and saccharine matter in wheat, potatoes, peas, beans, oats, etc. It can be extracted from horse-chestnuts; and every farmer's wife knows how to make starch, if necessary, from wheat flour and potatoes, by simply kneading them through a sieve with cold water, the settlings of the milky fluid which flows through the strainer being starch.

Yet this article, so necessary to cotton manufactories, laundries, and to every household, that the daily consumption in the United States alone is estimated at two hundred and fifty tons, was scarcely known till the Elizabethan era, when a very inferior quality was used to starch the ruffs then worn. Beau Brummell was famous in London for his stiffened cravats, and long kept the secret of starch, as applied to that article of wear. But what was then an article of luxury and fashion for a fastidious exquisite is now everywhere an indispensable necessity.

During the last century starch was used in England in printing cotton with colors, in stiffening linen, and in making hair powder; and soon after the beginning of the present century it became an important branch of manufacture in that country. The cotton mills at Manchester and elsewhere demanded enormous quantities, single establishments using more than three hundred tons in a year. The grains and vegetables commonly used in England and

on the continent for the manufacture of starch are wheat, barley, rice, and potatoes, and in France, in addition to these, horse-chestnuts. Abroad, as in this country, large amounts of edible starch are made, as well as starch for manufacturing and laundry purposes.

In 1802 John Biddis, of Pennsylvania, secured in this country a patent for making potato-starch, and manufactories of this kind are in operation in several states, particularly at or near places where cotton goods are printed. Potatoes yield eight pounds of pure starch to the bushel, and the potato-starch manufactories, which are generally much smaller than those engaged in corn-starch manufacture, will use from fifteen thousand to thirty thousand bushels of potatoes in a year.

The proportion of starch in grains is nearly as follows: In buckwheat, forty-four to fifty-two per cent.; barley, sixty to sixty-eight; rye, sixty to sixty-five; wheat, thirty-five to seventy-seven; Indian corn, sixty-five to eighty, which is next to rice, which contains from seventy-five to eighty-seven per cent. It will thus be seen that in the United States, the natural home of maize, Indian corn is the most desirable for starch manufacture, and large quantities of the white flint variety are raised expressly for the purpose.

In making starch from wheat the flour is kneaded with water, and washed through a fine wire sieve, after which the fluid, with the addition of a little yeast, is fermented. This process separates the gluten from the starch, and the gluten may be used with fresh flour to make macaroni and vermicelli, or may be mixed with potatoes into a wholesome bread. Another process, first applied to starch-making from rice, but equally applicable to other grains, is to mash the rice in a weak alkaline solution, and then add a gallon of water and two hundred grains of potash to every two pounds of rice. In twenty-four hours the liquid is drawn off, the rice is washed, drained, and ground, fresh lye is added, and the mixture is allowed to stand, with frequent stirrings, twenty-four hours longer. In the course of seventy hours afterwards the gluten rises, and is taken off, leaving the starch and fibrous part of the grain. This deposit is washed with cold water, and is then left for the fibrous portion to settle, when the clear starch is drawn off and dried.

Of the corn-starch manufactories, there are two very large ones in the United States, one at Oswego, N. Y., and the other at Glen Cove, L. I. They use the best kinds of white flint corn, brought

to the works and ground on the premises. It is conveyed to the mills through troughs filled with water, and the mixed meal and water go through other troughs to the tubs, where the separation of the starch is effected. The starch fluid then goes to large vats for the partial removal of the water, then into smaller tubs for further draining; the starch is next placed in mass on brick shelves, where absorption and evaporation further dry it; and kiln-drying and packing complete the process. The vats for purifying hold millions of gallons, and powerful steam engines drive the mills and machinery.

The white flint corn will give about twenty-three pounds of starch to the bushel. The gluten is saved for feeding to hogs, horses, and cattle. The careful process of manufacture in the large establishments, and especial watchfulness in the fermenting, result in the production of a clear, white and strong starch, entirely free from sourness. These establishments each produce from twenty to thirty tons of starch per day. There are numerous smaller establishments throughout the country, which manufacture starch for various dessert and invalid preparations, as well as for laundries, and the "farina" and "maizena" business is also carried on in the great manufactories. It is believed that the manufactories at Oswego and Glen Cove each produce more starch in a year than any similar establishments in Europe, and both consume annually millions of feet of lumber, generally basswood, for making the boxes in which the starch is packed.

