Cotton: a soft, downy fiber which surrounds the seeds in the capsules or bolls of plants of the genus *Gossypium* and order *Malvaceæ*. The species are numerous, but only three are important, viz.: *Gossypium herbaceum*, or *Gossypium album*, called also short-staple upland, woolly-seeded, and green-seeded. This is the species generally cultivated. Varieties of it have been multiplied by selection and by special cultivation, and by hybridizing with *Gossypium barbadense* or *G. nigrum*, known also as sea-island, long staple, or black-seeded cotton. The cultivation of the latter is confined principally to soils bathed in a salt atmosphere. It reaches its highest perfection along the coast of South Carolina, Georgia, Florida, and in Egypt. Both these species are annuals. *Gossypium arboreum*, or tree-cotton, a perennial species, grows in South America and Africa. It is inferior to the annuals both in yield and quality of fiber. All the species of the cotton-plant originated in the tropics, a fact which the cultivator must constantly bear in mind. Like the sunflower, it turns its leaves to the morning and evening sun. Though a tropical plant, it is most successfully cultivated in the temperate zone. The climatic conditions favorable to its best development are six months' exemption from frost, a well-distributed, moderate rainfall during the period of growth, with little rain and abundant sunshine while maturing. These are best supplied in the southern tier of the North American States, which have no competitor except Egypt in the quantity or quality of fiber produced.

Cotton-plant.

While the cotton-plant is cultivated chiefly for the fiber, which grows upon the seed, the seed itself has become commercially valuable, and the fiber from the inner bark, little inferior to and resembling that of jute, also has possibilities of commercial importance.

The flower of *G. barbadense* is of a rich cream color; that of *G. herbaceum* a pure white when first open, changing to red the second day. The flower is bisexual and produces a capsule known as the "boll," which reaches maturity in six to seven weeks, when the surface contracting exposes the lint-covered seed ready for picking. This is done almost entirely by hand. A "harvester" recently invented attained partial success in 1891, a dry autumn. This gathers leaves, bolls, and small stems, from which the lint is afterward separated by machinery made for the purpose. Originally, the cotton-gin was an apparatus in which the cotton was passed between two rollers revolving in opposite directions. This, the "roller-gin," is still used for ginning sea-island or black-seeded cotton, which is quite easily freed from its seeds. But green-seeded, upland, or short-staple cotton, the species most generally grown, can not be ginned by such simple means. The lint of the woolly seeded varieties is separated from the seed by means of the saw-gin, invented in 1793 by Eli Whitney, a native of Massachusetts. This consists essentially of a cylinder composed of fifty to eighty steel disks, the edges of which are sharply serrated. These saws *cut* the lint from the seed while revolving with great velocity. The lint is taken from the saw-teeth by another cylinder called the "brush," and conveyed to the "condenser." The lint is then packed into bales weighing 450 to 500 lb. each. Formerly the bales weighed only 300 lb., and were long and round and packed by hand, as wool and the sea-island cotton are still packed. Sea-island cotton is separated from the seed, to which it adheres but feebly, by the roller-gin, which pulls rather than cuts the lint from the seed. In this species the lint separates readily and entirely from the seeds, leaving them sleek and black. A part of the lint adheres to the seed of the upland cotton. These are reginned, before extracting the oil, and yield about 35 lb. of short lint to the ton of seed. This is used for wadding, batting, and other purposes for which inferior grades of cotton are used. The seed is then decorticated, the hulls constituting by weight one-half of the seed; the meats, or kernels, are then steamed, sacked, and the oil expressed, yielding 30 to 35 gal. of crude oil to the ton of seed. The cake is dried and ground, yielding about 700 lb. of meal per ton of seed.

The refined oil is used in a great many ways, such as in the manufacture of substitutes for butter and standard lard; for oiling machinery, dressing morocco, mixing with other oils for the preparation of paints, and after a voyage to Europe returns as fancy brands of "olive" oil. See Cotton-seed Oil.

The meal is extensively employed as a source of nitrogen in the preparation of commercial fertilizers. It is also used directly as a fertilizer, and for feeding stock. Large quantities are shipped to the Northern U. S. and to Europe as food for cattle. The meal and hulls are fed to cattle without other provender with satisfactory results, both as regards "economy" and as regards the production of flesh and fat.

The cotton-plant is subject to the attack of injurious insects and fungi. The larva of *Aletia*, the cotton caterpillar, is no longer dreaded as formerly, since the means of destroying this pest with "Paris-green" is within the reach of the most humble planter. Means of destroying the "boll-worm," which is very destructive in some seasons, by puncturing the young bolls or capsules, have not yet been devised. No satisfactory preventives of the attack of several very destructive fungi have been discovered.

The experiments conducted at the experiment stations in the cotton States have materially improved the methods of cultivation and contributed to economy in fertilization.

The introduction of commercial fertilizers has extended the area of profitable cotton-culture about 50 miles farther north than formerly, in consequence of their effects in hastening the maturity of the plant. Their use has also improved the quality of the lint, by giving it greater length and strength, and by hastening maturity has enabled the planter to harvest the crop at less cost and in better condition.

The early history both of the culture and the manufacture of cotton is obscure. It seems to be generally admitted that India took the initiative in both, and attained a skill in the latter which was never equaled elsewhere previous to the invention of machinery for its manufacture. Early in the sixteenth century—about 1521—the cotton-plant was cultivated for its flowers in Talbot co., Md. Small patches were grown in Virginia and adjacent States prior to and after the war of the Revolution, the lint being picked from the seed by hand, the thread spun, and the cloth for domestic use woven on the farms.

The saw-gin, even in its earliest history, had a capacity equal to that of 3,000 pairs of hands in separating the lint from the seed.

The Southern U. S., British India, Egypt, and Brazil produce practically the cotton-supply of the world. India ranks next to the U. S. in quantity produced, but in quality of lint her product is inferior. Not only are the soil and

climatic conditions of the Southern U. S. superior to those in any other part of the globe, but the plant has received more intelligent cultivation there than elsewhere. The yield in these States ranges from one-fourth of a bale of 500 lb. to two bales per acre. To produce two bales would require a yield of 3,000 lb. of seed-cotton, one-third of which would be lint—1,000 lb. of lint and 2,000 lb. of seed.

If the lint only is removed from the land, cotton is the least exhausting of the crops cultivated in the U. S. An average crop removes in the lint only 2·75 lb. of nitrogen, phosphoric acid, potash, lime, and magnesia per acre, while a crop of 10 bush. of wheat per acre removes 32·36 lb. of the same elements of plant-food. See COTTON MANUFACTURES.

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