JUTE (Beng. *jūṭ*, from Skt. *jaṭā*, matted hair). A fibre produced from two tropical species of Tiliaceæ, the *Corchorus olitorius* and *Corchorus capsularis*, two plants alike in qualities, though slightly different in appearance, and sown indiscriminately. From the fibre, which is the cheapest known, are produced gunny bags, gunny cloth, and cordage; and from the finer qualities carpets, shirting, coat linings, etc., are made. It is extensively used for mixing with silk, cotton, flax, and woolen fabrics, but, owing to its inferiority, such use of it is a fraud. India produces practically the entire world's supply of jute. The plants grow in most climates and on all kinds of soil, but rich alluvial lands, and lands subject to salt-water tidal influences, particularly favor its production. It thrives in the Gulf States, but its production in America has not been successful, owing to a lack of inexpensive labor for its culture. It is an exhausting crop for the soil. The plant, if weeded once, requires no more attention till cutting time. Its single stalk grows to a height of 12 feet without branches or leaves till near the top. In India the plant is cut while in flower, about three months after sowing. Cut close to the ground, stripped of leaves and branches, it is tied in bundles and steeped from 10 to 20 days in water, to loosen the fibre by rotting the outer bark. After steeping, the stalks are beaten till only the fibre remains. This is cleaned, dried, and made into drums of 70 or 80 pounds. If for exportation, it is pressed into bales of 300 pounds and upward. Fine jute has a beautiful glossy golden appearance and is soft and silky to the touch. Great importance attaches to length and strength of fibre. See Plate of FIBRE PLANTS, under HEMP.

Jute Manufactures. Jute is spun by processes similar to those employed for flax, but, as it is from 10 to 15 feet long, it is necessary to cut it into three-foot lengths before it can be heckled. The fibre, which is obtained by maceration from the inner bark, also requires to be saturated with whale oil and water, so as to soften and render it more elastic, preparatory to spinning. Heckling is the first of the spinning operations, and its object is to remove the coarser portions of the jute and lay the fibres in parallel order. The heckle is a kind of comb, with sharp-pointed steel teeth from 1 to 2 inches in length. Formerly the work was done by hand, but now heckling machines are used. Recently the heckling process has been omitted, and the jute has been spun directly without heckling off the tow. The heckled strips are next taken to the *spreader*, or first drawing frame, where they are spread upon an endless creeping sheet, so as to supply the jute continuously to another part of the machine, where, by a peculiar arrangement of rollers, it is drawn out, through combs of closely ranged steel pins, into a continuous ribbon, called a *sliver*. A number—say 14—of these slivers are then taken to another drawing machine with steel combs and drawn out into one. In like manner some 20 of these slivers are again drawn into one. The first sliver from the spreader has thus, so to speak, been drawn out 280 times its original length; and by continuing this doubling and drawing, the fibres become thoroughly parallel and equalized. The sliver from the last drawing frame is still further drawn out and at the same time receives a slight twist in the roving frame. Finally the bobbins of rove are taken to the spinning frame, and spun into yarn upon the throstle principle. See SPINNING.

Just as in the case of flax, the jute tow from the heckling process is also spun into yarn, in which case it is first carded by means of a

breaker and finisher card, and then *drawn*, *roved*, and *spun*, as above described.

The larger portion of jute fabrics is woven from yarn of the natural color; but for some purposes it is bleached, and, when used for carpets, it is dyed various colors. It bleaches with difficulty, but is easily dyed. Jute fabrics are not nearly so durable as flax, the jute being more brittle and more easily affected by water.

Jute has been manufactured on hand looms by the natives of India for centuries. They made not only the coarse fabric known as gunny, but a fine material which they used for clothing. They also have made a coarse paper, by beating the fibre into pulp, drying it in sheets, sizing it with rice starch, and polishing it with a stone or shell. Since 1857 there have been a large number of jute mills fitted up with modern textile machinery and driven by steam, the number in 1899 aggregating 33.

The first mention of the word "jute" is in 1796, in the manuscript commercial index of the court of directors of the East India Company. It is the Bengal name used by the natives of Cuttack and Balasore, where the first European manufactories were established in the middle of the last century. In 1829 the total export from Calcutta was 20 tons, value £60. In 1833 it had increased sixteenfold, and about 1864–65 the increased demand caused jute cultivation to extend to other districts, the exportation in 1879–80 reaching 4,626,710 hundredweight. In 1897–98 the amount of raw jute exported was 15,000,000 hundredweight, while the exports of jute cloth had increased in 10 years from 37,000,000 to 307,000,000 yards. The number of mills in India increased from 25 in 1889 to about 59 in 1912, and the number of employees for the same period from about 60,000 to 202,000. The production of fibre increased from 1,860,000,000 pounds in 1889 to 4,212,602,000 pounds in 1914. Of the production in 1909 India consumed 48 per cent, Great Britain 14 per cent, Germany 8 per cent, and the United States about 7 per cent. Prior to its rapid development in India, Dundee, Scotland, was the chief centre of the jute industry.

England, Bombay, and America originally divided the exports of jute, and up to the time of the Civil War North America took the largest share of the gunnies. (See GUNNY.) Jute and gunnies are now exported from Bengal to all parts of the world.

Until 1870 the entire cotton crop of the United States was baled in gunny cloth imported from Calcutta. Gradually, however, an increasing amount of jute product has been made in the United States. According to the census of 1880 there were only four establishments in the United States making a specialty of this manufacture. In 1909 the number had increased to 24. They employed 6664 hands, and the value of their annual product was $10,795,000. The consumption of jute in the United States in 1909 was 151,791,000 pounds, which represented a decrease of over 25 per cent for the 10-year period. The average value of jute rose from 1.7 cents in 1899 to 2.4 cents per pound in 1909.

The quantity, value, and percentage increase for the 10-year period of some of the principal jute products manufactured in the United States in 1909 as reported by the thirteenth census are given in the table in the next column.

The importation of jute and jute butts in 1914 amounted to 212,066,000 pounds, valued at $11,174,028, and in the same year the acreage planted to jute in India was 3,358,737, an increase of 437,777 acres over 1913. The estimated yield was 10,531,505 bales of 400 pounds each.

PRODUCTS	Quantity in pounds	Per cent of increase	Value	Per cent of increase
Rope	27,749,512	177.2	$1,566,160	238.
Twine other than binder twine	35,516,217	2015.2	2,557,744	2076.1
Flax or hemp mixed with jute	8,907,403	−31.1	936,312	−15.
Yarns	62,512,247	15.2	4,361,550	35.
Carpets and rugs, square yards	2,206,114	−25.3	549,221	53.6

The production of gunny bagging, into which jute largely enters, amounted to 69,311,288 square yards, valued at $3,507,482, for the same year. The importation of jute into the United States grew from 79,703 tons in 1903 to 125,389 tons in 1913. The importation of jute bags grew from $2,061,000 value in 1903 to $4,268,000 in 1913, and of burlaps and other jute fabrics from $14,378,000 to $37,774,000 in the same period.