

In this connection, it will not be inappropriate to make a mention of the great usefulness and convenience of the new mould board that has recently come into use in this district. It is, no doubt, a great improvement on the ordinary mould and differs from the latter in having the conical cavities open at both ends. The lower ends of these are, however, closed with movable wooden pegs, of suitable size and these pegs are prevented from falling out of the cavities by small nails driven into them crosswise. On charging the mould with the crystallised syrup and on turning it over after a few minutes, a slight pressure on the pegs causes the whole of the solidified jaggery to drop down in perfect condition.

When using the new board there is no need for the hard and severe hammering that is required to throw out the jaggery cubes from the old mould board and there is, therefore, no doubt that the improved mould board should last considerably longer than the ordinary one.

## A NOTE ON THE INDIAN JUTE INDUSTRY

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Among the textile fibre crops of the world jute comes next to cotton and flax in commercial importance. The English word 'Jute' probably derived from Sanskrit 'jhat' or 'jhout' meaning "to be entangled" seems to have been in use since the middle of the eighteenth century but its mention for the first time in customs list was about the year 1828.

Jute is cultivated in Bengal from comparatively remote periods for its fibre from which coarse cloth for wear and cordage used to be made. The possibilities of this crop in international trade either being not well understood or more possibly an organised endeavour for its development on a commercial scale not obtaining, jute cultivation and jute manufactures remained in a primitive condition until in the first quarter of the last century, when, with the development of export trade of food grains, the need for a general packing material was keenly felt and jute bags were found handy enough to meet the situation. From that time onwards jute fibre came into the market and began to be exported to Europe and in particular to the Dundee mills in Scotland, chiefly through the efforts of the East India Co. Thus with the opening up of foreign market and the subsequent increased application of the fibre, the jute industry of Bengal came into prominence and grew to phenomenal proportions by the end of last century. Since then, and side by side with the increase in cultivated area, several jute manufacturing and exporting concerns were also established on the banks of the Hooghly.



To the Bengal ryot jute cultivation continued to be so attractive and remunerative that he freely put paddy fields under jute and by the year 1928 there were nearly a million cultivators with an area between  $3\frac{1}{2}$  to 4 million acres in Bengal and in parts of the adjoining provinces of Assam, Bihar and Orissa, capable of a moderate fibre outturn of 12 million bales of standard weight of 400 lbs each. The relative export value of jute, raw and manufactured, is nearly one-tenth of the total exports of all the other Indian commodities.

The following additional points make the history of the Indian jute industry more complete, cogent and interesting. The unique place of Bengal as the world's chief jute producing centre is too well known to need emphasis. The significance of this industry as an integral part in India's national economy in general cannot be more emphatically described than in the words of Sir T. V. Acharya:— "How many people outside Bengal are aware of the vast importance of the jute crop in the Indian national economy? What percentage of the readers of 'The Hindu' realise that in 1934 jute and jute products were the second largest item of India's exports, and that in 1935 they were the largest, even cotton and cotton goods coming down to the second place? Think of what it meant for India in a year of depression to get for her jute a sum of nearly thirtyseven crores of rupees from foreign countries.

"To the poverty-stricken cultivator of Bengal, jute, ever since the Crimean War when the world was cut off from Russia's flax supplies, has been a veritable silver shower from the skies. In bumper years, before the catastrophic fall in agricultural prices that dates from the autumn of 1928, jute has brought as much as 70 crores to the ryot, a sum which if distributed among the population of Bengal would give a dividend of Rs. 15 — to every man, woman and child." Such is the proud privilege of Bengal which produces 90 per cent of India's raw jute and over 80 per cent of world production. But this position was not attained so easily as one would imagine. For the pioneers of this industry had to surmount a good deal of initial difficulties to introduce and popularise jute yarns in the West where prior to 1835 jute was "looked upon with suspicion by users of linen goods," which bore the guarantee seal "warranted from Indian jute". Thus the early history of this industry was one of dire competition with the other well known and copiously used textile fibres like flax and hemp which were gradually suppressed almost to extinction.

From the first inception of a power loom jute factory of 192 looms in 1859 on the banks of the Hugli, the Calcutta Jute Mill industry steadily progressed in three quarters of a century until in 1933 over 60,000 looms were under operation in the whole of Bengal. A little more than 50 years ago the managing agents of the various mills constituted themselves into a body now known as the Indian



Jute Mills Association (which is virtually a jute fraternity) with a view to protect and promote the interest of all those engaged in this industry.

Although Bengal grows practically the whole of the jute supply of the world and the jute export trade is a significant source of revenue to India, the world wide economic collapse since 1930, coupled with over-production naturally created great anxiety in those concerned in this gigantic enterprise. The slump compelled the associated mills to reduce working time by about a third, sealing down 15 per cent of the total looms and the universal adoption of a single shift working with a consequent slow retrenchment of 21 per cent of the workers, a half of which were women employees—all this calculated to bring supply into line with demand. "The effect of the fall in jute prices on the economic life of Bengal has been of tremendous severity and the result has been described.....as something approaching financial paralysis in the province."

The Department of Agriculture was not slow to take cognisance of the situation and to launch schemes of propaganda among the cultivators to restrict the area under jute cultivation and to advocate alternative crops like sugarcane, tobacco, groundnut, linseed and the like. Such intense propaganda together with voluntary restriction resulted in the reduction of the total jute area by about one-half before 1934 and the position is but hesitatingly improving since 1935 as would be seen from the final forecast figures of the jute crop for 1936, viz, 2,180,800 acres with an estimated yield of 7,774,500 bales for Bengal and 364,800 acres with an yield estimate of 961,300 bales for Assam, Bihar and Orissa together.

The price of jute fibre is subject to wide fluctuations due to "forward speculation". In 1936 the price per bale of "Firsts" was on an average Rs. 32 which is slightly less than a third of the highest price realised in 1926. During the years 1927-'30 the price ranged from Rs. 85 to Rs. 65 per bale. The present low price level notwithstanding, as it is only a passing phase and India still remaining the cheapest fibre producer most suitable for general packing and transport requirements, the industry is bound to come into its own before long. For it is highly important to remember that "several countries have experimented in the growing of jute, but nowhere outside India has it proved a success". The chief management of this industry as represented by the Indian Jute Mills Association, "while enthusiastically trying to retain the existing trade, are also initiating a policy of research with the object of discovering fresh market and new uses for Indian jute".

The United Kingdom, Germany, France, Italy and Belgium are regular importers of Indian jute for purposes of converting it into piece-goods, bags, carpets, rugs and other sorts of jute goods which



are placed on the market. Regarding other new uses successfully attempted in a competitive spirit by manufacturers at Dundee are "the use of jute goods to the linoleum and furnishing trades, to the tailor trades, to the boot, shoe and slipper trades, to the cable industry, and for various other purposes, including even road making". (Murray.) Thus the opportunity for the wide application of this material and the expansion of the industry looks very bright, even in spite of the policy of economic nationalism and the encouragement of research on the development of new packing materials in countries like Poland, Italy, Egypt, Chile etc. No wonder then that in pursuance of the recommendations of the Royal Commission on Agriculture the Indian Central Jute Committee has been constituted early in 1936—a distinct land mark in the annals of this industry—"to deal with the interests of all the branches of the trade from the field to the factory. The functions of the committee would be to undertake agricultural, technological and economic research, the improvement of crop forecasting and statistics, the production, testing and distribution of improved seed, enquiries and facilities relating to banking and transport facilities and transport routes and the improvement of the marketing." (Review of Trade in India 1935-36). This Committee which is now financed by the Imperial Council of Agricultural Research has commenced to function actively and is shortly appointing a Jute Specialist at Dacca.

After having thus surveyed the history and the importance of the industry in India some aspects of cultivation of the crop, extraction of the fibre, etc., are briefly outlined in the following paragraphs.

The jute plant (Jew's Mallow) belongs to the Natural Order Tiliaceae. *Corchorus capsularis* and *C. olitorius* are the two chief species under cultivation for fibre. There are many cultivated races belonging to both these species. Races of *C. capsularis* which have short, round fruits are largely preferred to those of *C. olitorius* which have long cylindrical fruits, because, it is said, they are more tolerant of adverse conditions, such as water-logging or submersion or high temperature with the added advantage of better fibre yield.

The season for cultivation of this crop commences from mid-February or early March and ends in September or early October. The period from sowing to flowering is only three and half to four months when the crop is usually cut for fibre. With the first precipitation fields are ploughed several times to a fine tilth and while there is adequate moisture in the soil seeds are sown broadcast cross-wise to ensure even distribution of the seeds using a seed rate of about 10 lbs. to the acre. The sown area is harrowed to cover the seeds, and compacted, if necessary, to retain moisture and help germination.

Viable seeds complete germination in 3-5 days. Subsequent cultural operations are thinning once and weeding as often as necessary



and practicable. A month old seedlings are thinned down to a fairly uniform spacing of about 4 inches to 6 inches between plants. More space is not generally allowed as it will encourage branching which affects fibre yield.

Silt-renewed alluvial or loamy soil is typical for jute cultivation. As for the manurial requirements of this crop application of cattle manure at 5 tons or castor cake at 7 mds. (82 lbs per Md.), per acre is considered ample. Other concentrated fertilisers need not be resorted to under ordinary circumstances, though jute responds well to liberal doses of them in combination with the natural bulky manures. Manuring to improve the fertility of large portion of areas lying enmeshed and inundated by the Ganges and the Brahmaputra rivers and their branches and tributaries is not a serious necessity. Elsewhere liberal application of manures such as dung, house sweepings and ashes is justified better. Green manuring with any suitable crop is also beneficial in areas not liable to submersion. A crop of cold weather paddy after jute is an excellent economic rotation and in that case manuring the jute crop is a sound policy. Jute is said to be an exhausting crop and it is interesting to remember that the fibre being purely a non-nitrogenous substance, the actual drain on the mineral substances of the soil is caused by the non-fibrous portion of the plant. Jute dislikes alkaline lands but tolerates temporary water-logging.

Jute is harvested with hand sickles immediately after flowering or just when seeds are set and sometimes, though rarely, later. But it is best to cut the crop in the first and second stages as then it yields fibre of superior quality. With further maturity it may yield a little more but then that fibre is weaker and inferior. Usually each cultivator leaves a patch of the crop to mature for seeds, for the next crop.

Retting, stripping and washing constitute a set of operations in succession following harvest by which fibre is extracted and prepared for the factory. Each of these processes is simple in technique but delicate and difficult in practice and has to be done skilfully and dexterously. For this the plants are made into small bundles and stacked in the open for a few days when the leaves wither and drop off. Getting rid of the leaves is necessary as otherwise they merely add to the bulk and hinder the progress of retting and also spoil the water. These bundles are then steeped in deep clean and clear water for varying periods from 10 days to even as long as a month depending mostly on the maturity of the crop. During this time the bark gets softened and loosened from the central core. When large heaps are immersed the inner bundles ret easier and earlier which, if left longer than necessary under water, will over-ret. The appreciation of the correct degree of retting is highly essential and is born of experience. By under-retting the fibre gets gummy and by over-retting it loses its essential qualities viz., strength, gloss and colour.



Retting is in reality a process of fermentation during which the tissue in which the fibre is embedded is softened and deteriorated. It can be artificially expedited by the addition of ammonium salts or the salts of phosphoric acid in small quantities to the water. Such artificial hastening though not ordinarily required is sometimes resorted to as a measure of expediency, such as to meet urgent market demands especially during competition and late harvest.

The process of stripping or separating the fibre from the stem and washing and cleaning it is described by Royle as follows:—"The proper point being attained the native operator standing up to his middle in water takes as many of the sticks in his hand as he can grasp, and removing a small portion of the bark from the ends next to the roots, and grasping them together he strips off the whole with a little management from end to end without breaking either stem or fibre. Having prepared a certain quantity into this state, he next proceeds to wash off; this is done by taking a large handful; swinging it round his head he dashes it repeatedly against the surface of the water drawing it through towards him, so as to wash off the impurities; then, with a dexterous throw he fans it out on the surface of the water and carefully picks off all remaining black spots. It is now wrung out so as to remove as much water as possible and then hung up on lines prepared on the spot, to dry in the sun."

When completely dry lots of the fibre are pressed and packed into standard bundles of 400 lbs. each. A moderate out-turn of such finished fibre may be 1,200—1,500 lbs. from an acre which is about 4—5 per cent of the green weight of the entire crop at harvest. The fibre must be packed damp-proof and stored somewhat loosely in ventilated godowns lest the somewhat hygroscopic fibre should swell, "sweat" and deteriorate.

Characteristics of good fibre are light colour, 4—6 feet or more in length, freedom from dirt and spots, and durability. Of the several commercially recognised varieties of jute fibre each having some distinct qualities and indicated through different trade marks the following are popular in the market.

1. *Serajgange (Deswal)*—soft, fine and strong, light grey in colour.
2. *Narainganje*—soft, long and strong, reddish.
3. *Deora*—somewhat coarse and inferior to 1 and 2.
4. *Desi*—moderately strong and dark in colour.

The several articles of use that could be made with jute have been incidentally mentioned before and need not be repeated here,

The unique place of Bengal and portions of the adjacent provinces constituting a jute growing zone, as it were, in India is due to the existence of ideal conditions for the cultivation of the crop and consequently the development of the manufacturing industry such



as—a high temperature (between 60° and 100°F), fertile deep soil capable of moisture retention, a well distributed minimum rain-fall of 50 inches per annum, fairly cheap labour, availability of plenty of clean clear water for retting, and transport facilities.

Absence of any one condition or a combination of them is a serious handicap in the spreading of jute cultivation outside this zone on a large and competitive scale. And there does not seem to exist any published record of a remarkable success of this crop outside this area where its substitutes Bimilipatam jute, crotolarias and agaves, probably because of their greater adaptability are grown in large acres. But, on reading Finlow and Mollison on the extension of jute cultivation in India one wonders why the jute industry could not be given a fair trial in at least those areas of the Madras Presidency which compare favourably with Bengal. Finlow's thought-inciting opinion on the possibility of this crop in parts of Madras is quoted below. "Outside Bengal, the climatic conditions in Madras seem to be more favourable than in any other part of India visited by me. The Malabar coast has already been described as having a climate similar in many ways to that of Bengal. The physical features of the district are very different ; but there is no apparent reason why jute should not thrive on a considerable scale in the large area of rice land in Malabar and South-Kanara. In Ganjam, again, the conditions appear fairly favourable. The rain-fall which, while not heavy, is probably sufficient to raise the crop, and it is well distributed ; the soil especially inland is distinctly good; and the district is well supplied with irrigation. The great deltas of the Godavari, Kistna, and Kaveri rivers .....would at first sight appear to be ideal centres for jute cultivation. In practice the difficulty will be probably the question of the time of sowing especially in the low lands."

During the period 1905 to 1909 experiments on the introduction and cultivation of Bengal jutes at the Samalkot and Thaliparamba agricultural stations have been conducted. The initial high hopes that were entertained on the success of these experiments faded away by 1908 and were prematurely discarded for the following apparent reasons :—

1. Insufficient knowledge of the crop and incorrect time of sowing.
2. Difficulty to early preparation of the land and to secure the required tilth.
3. Inadequate manuring.
4. High cost of growing the crop and preparation of the fibre, and
5. want of sufficient skilled labour.

It may be pointed out that the experiments with this crop were rather empirical and for a comparatively short period only. As such significant and valuable results were not obtained which could be used



as the last word on the prospects of development of the Industry in Madras. Such of those difficulties as were experienced during this short lived endeavour should have helped deeper thinking to earnestly devise ways and means to surmount them. Instead disappointment seems to have prevailed. Further it is not improbable that with the change in the outlook of the agricultural department at about this period to improve local crops and to organise separate crop sections with wider scope for expansion and immediate results, the importance of jute and other long fibre crops was not so striking to justify an equal share of attention. Anyhow Finlow's strong opinion expressed to Couchman in 1908 that "the prospects of jute in Madras is decidedly hopeful" still remains unheeded, though it deserves consideration.

An examination of the Season and Crop Reports for Madras from 1902 to 1936 shows only inconsiderable acreages under jute during most years—varying from about 500 to a little more than 2,000 acres distributed in Ganjam, Vizagapatam, Godavari, Guntur and Nellore districts, to mention only the most important ones. In exceptional years, however, the acreage under jute (*Corchorus* sp.) has been very remarkable as seen from the following figures:—

Period	Total acres for the Presidency	Acres for Vizag, district only.
1919—1920	10,889	10,807
1923—1924	14,358	13,492
1935—1936	25,354	24,425

It is clear therefore that this industry is not altogether unpopular with the ryot. That this crop has a place among the other commonly grown fibre crops of this Presidency, namely Hibiscus, sunn-hemp etc., and also has a decent chance of success in some localised areas are quite evident. Hence it may not be out of place to indicate the necessity for a policy in favour of this crop with a view to exploit the scope of its industry in all its aspects in suitable places of Madras. For this a scheme of experiments, demonstration and propaganda seems highly essential to tap potentialities which may ultimately bring in a measure of prosperity to the needy and favourably located cultivator and others.

"Men talk as if victory were something fortunate. Work is victory. Wherever work is done, victory is obtained. There is no chance, and no blanks" (Emerson).

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## EXTRACTS

**A Coincidence or What?** This year I was asked to remove a growth from the upper eyelid of an Ayrshire cow. The growth, which was the size of a cricket ball, was removed and the surface cauterised and dressed with an ordinary wound lotion; but after a time the growth recurred, and also the lower lid became affected. The cow being very old and nearly due to calve, the owner did not have the growth removed a second time, but said that as soon as she had calved he would have her destroyed. A good heifer calf was born, but here comes the coincidence—the calf had only one eye. There is no doubt but that the growth was malignant. (*The Veterinary Journal*, Vol. 93, No. 9, September 1937.)

**A Treatment for Swallowed Needles.** A Mastiff puppy, six months old, when playing with its mistress, was seen to swallow a needle and cotton at 10—30 p. m. The treatment consisted in taking a large handful of cotton wool, teasing it out and mixing with butter into pills the size of a large walnut. The puppy was fed with these and swallowed about sixteen or eighteen of them. This was followed two hours later with two ounces of liquid paraffin, being repeated every two hours, until the bowels acted. At 6 a. m. the next day the puppy had a large evacuation which contained the needle and thread entangled in large ball of the cotton wool. I have also found this very satisfactory for safety-pins and jagged pieces of bone. It is always better to use long-fibre cotton wool. (*The Veterinary Journal*, Vol. 93, No. 9, September 1937.)

## ABSTRACTS

**Feeding Experiments with Canned Food Packed in Aluminium Containers** by Gulbrand Lunde, Valborg Aschehoug, and Hans Kringstad. (*Journal of the Society of Chemical Industry*, September 1937).

When sardines and other foods are canned in aluminium containers, small quantities of the metal will be dissolved by the food during storage. When storage continues over a period of several years, the metal content of the food may rise to about 100 mg. per kg., i. e., not more than may be dissolved by certain foods during domestic cooking in aluminium utensils.

Experiments with mice fed on canned food containing about 0.05 mg. of aluminium per animal per day were carried out during the most rapid period of the growth of the animals; the animals developed normally and showed no abnormal signs to indicate that aluminium in canned food has any injurious effect. No accumulation of aluminium in the animals could be found.