

THE AMERICAN HEMP INDUSTRY.

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The recent expansion of the hemp industry in the United States entitles it to consideration as one of the most interesting of the nation's newer fields of activity. The hemp plant grows to a height of from five



PISTILLATE PLANT, SMYRNA TYPE.

to fifteen feet, and when cultivated for fiber produces only a few small branches near the top of the slender stalk. The leaves are of a rich dark green color, and the fiber consists of numerous series of long cells in the inner bark, firmly knit together, which, when cleaned from the surrounding tissues, form tough strands nearly as long as the entire plant. This is a bast fiber, and is classed commercially among the soft fibers, with flax, ramie and jute.

Hemp fiber is long, soft, very strong and capable of almost as fine subdivision as flax. It is especially adapted for use where strength is required. It is used in the manufacture of fine twines, carpet thread, carpet yarns, sailcloth and for homespun and similar grades of woven goods. Nearly all of the best grades of long-fiber—"dressed line"—is utilized for making twines and yacht cordage, while the cheaper grades are converted into binder twine. The tow is used for threads and for yarns to be woven into carpets, homespuns and linen goods, while the refuse fiber combed from the tow is used as oakum for calking ships. As indicating the possibilities of development for the domestic hemp industry, it may be noted that of the 18,000,000 pounds of hemp consumed annually in this country, only about 8,500,000 pounds are raised in the United States.

The great center of American hemp production is Kentucky, where in nine counties of the Blue Grass region three-fourths of the American hemp fiber is produced. About two hundred acres are devoted to hemp cultivation in Nebraska, and during the last half dozen years the industry has developed in several different sections of California. A foothold has also been gained on a small scale in Texas and Illinois.

The remarkably successful cultivation of hemp in the Blue Grass region is to be attributed in a great measure to the presence of a yellow clay loam or rich sandy loam soil rather firm in texture and usually overlaid with a subsoil of yellow clay. In Nebraska hemp is cultivated on rich, black, friable prairie loam, comparatively loose and light in texture. In California the most favorable hemp lands are the alluvial soils in the bottom lands along the rivers.

It is sometimes the practice in Kentucky to have hemp follow hemp on the same land for two or three years, but as a rule it is preferred to cultivate a series of crops in rotation. In California and Nebraska no crop rotation is practiced for hemp. In hemp cultivation the best results are usually secured from deep fall plowing, followed by thorough harrowing in the spring. The seed is usually sown in the spring, at about the time for sowing oats, the season in Kentucky being from the middle of March to

the last of April; in Nebraska, from April to June; and in California, in February and March. One of the chief aims of the hemp grower is to secure an even stand of plants, uniform in size, for it is well-nigh impossible to make good fiber from a mixture of stalks of various sizes.

Naturally the harvesting of the hemp is an important operation. The hemp is cut when the staminate plants are in flower, and the time of harvest therefore varies from eighty to one hundred and forty days from the date of seeding, the period of growth being dependent on the mean temperature and the supply of moisture. In Kentucky the harvesting usually occurs in August or September, and in California and Texas in July. On the Pacific Coast the hemp is cut with self-rake reapers or mowing machines. In Nebraska the self-rake reapers have almost entirely displaced the mowing machines. In Kentucky reapers have been introduced of late years, but the major portion of the crop is still cut by hand by means of the primitive reaping knife or hemp cutter, which has some of the characteristics of both the corn cutter and bush scythe.

An experienced workman with a reaping knife will cut the hemp from a tract of about half an acre in a day. With a sweep-rake reaper under the most favorable conditions from five to seven acres may be cut in a day, and with a mowing machine the daily cut ranges from seven to ten acres. After the hemp is cut it is allowed to lie on the ground from four to eight days to dry, and the unbound bundles are usually turned so as to dry both sides. When thoroughly dry the hemp is bound in small bundles with cheap twine or small hemp stalks, and stacked or set up in shocks. If the stacks are properly built the hemp will remain in this position, uninjured, for a period of two or three years, and furthermore the quality of the fiber is improved and the breaking and cleaning rendered easier by a process of sweating or fermentation which the stalks undergo when in stack.

An essential process of hemp production is the retting or rotting, whereby the vegetable gums surrounding the fiber are dissolved and the fiber at the same time freed somewhat from the woody interior portion of the stalk and also from the thin outer cuticle. These gums are not soluble in water, but are destroyed by a kind of putrefaction which takes place when the stalks are immersed for some time in soft water or are exposed to the weather. Retting by immersing the stalks in water is largely practiced in France and Italy, but nearly all of the hemp now produced in the United States is dew-retted; that is, spread in long rows on the ground during the fall and early winter, and exposed to the weather until the bark, including the fiber, readily slips from the inner woody portion. In Kentucky the hemp must, in many instances, be hauled two or three miles from the harvest field to the retting grounds. Retting in Kentucky is carried on during the month of November.

After the hemp has been retted sufficiently to enable the ready separation of the fiber there comes the breaking, by which the fiber is separated from the stalk and roughly cleaned. This is the final operation which falls to the lot of the hemp grower, as the hemp is, by this means, prepared for market as rough hemp. Nearly all the hemp is broken by hand breaks, but with one of the crude, heavy, wooden breaks an experienced operative can readily clean about 250

pounds a day. The work is performed by alternately crushing or breaking the stalks between the long jaws of the break, and beating and whipping them over the break to free the coarse part or hurds from the fiber. It is a slow process, requiring skill as well as strength, but the wage usually paid is only one cent a pound. To break an average crop of fifty acres requires the services of ten skilled hemp breakers for two months and entails an expense of about \$500. This excessive expenditure of time and money has been largely instrumental during late years in forcing the hand break to give way to machinery, of which several types are already in the market.

In Nebraska and California there is in use a machine consisting of a series of coarsely fluted rollers followed by a rapidly revolving spiked cylinder, which breaks hemp and delivers the fiber in the form of tow. In the hemp factories at Lexington, Ky., are machines consisting of long series of corrugated rollers which are occasionally used for softening the fiber. Last season saw the operation in Kentucky, for the first time, of three decorticators, in which the hemp stalk is crushed in passing between rollers, corrugated for unretted hemp and smooth for retted. The hurds are then loosened by a rapidly vibrating mechanism, and the fiber is partly cleaned by a kind of carrier which gives a rapid scraping motion. These machines weigh



KENTUCKY HEMP, HALF GROWN.

only about one ton each and require but six horse power for their operation. The average daily output of a machine is 2,000 to 3,000 pounds of rough hemp.

In some instances hemp is disposed of by the growers direct to the manufacturers, but in most cases the rough hemp fiber is tied in bales weighing about 150 pounds each and sold to dealers in the local markets. Under fair average conditions an acre of hemp yields about 1,000 pounds of rough fiber or about 6,000 pounds of dry retted stalks. At five cents per pound for the fiber it is a very good paying crop, and the minimum limit of profitable production is regarded as about 3¼ cents per pound.

Tools which are for any reason superannated or not up to the standard of modern requirements are ruthlessly discarded in American shops, no matter what they cost, or how short a time they have been in service. A case in point is the enormous steam hammer at the Bethlehem Iron Works which was, and still is, a monster in its class. It is over 90 feet from top to bottom, and is 38 feet square on the base.

The weight of the striking parts is 120 tons, and the steam pressure 120 pounds per square inch. The steam cylinder is 76 inches in diameter, and the stroke nearly twenty feet. The hammer is being demolished, notwithstanding that it has only been in existence 11 years. Hydraulic squeezing presses have been found far more efficacious for reducing large ingots, inasmuch as the stress penetrates to the center, while the hammer-blow is comparatively superficial. The cost of this tool must have been very great, but it had to go, and so was ordered demolished in spite of its cost.



CUTTING HEMP.