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FIBERS AND FIBER CULTURE.

The natural orders of the plants from which the vegetable fibers now in most general use are derived are botanically widely differentiated, and the methods used for fiber extraction are therefore somewhat dissimilar. Such widely separated families as the nettles and hemps (Urticaceae), Spanish daggers (Liliaceae), palms (Palmaceae), peas (Leguminosae), flaxes (Linaceae), aloes or century plants (Amaryllidaceae), and jute (Tiliaceae), furnish the principal fibers for which there are at present good and fairly steady markets. The decortication of a number of these is well understood and provided for by well tried and excellent mechanisms. But in the case of some of the more recently discovered fibers much remains to be invented.

A display of the greatest industrial value was made by Messrs. Ide & Christie, of London, England, at the recent Jamaica exhibition. This firm, who are large handlers of all fibers, displayed samples of at least twenty-five different sorts in the different conditions in which they reach the London markets. To the West Indian, Mexican and Central American resident this exhibit was of great interest and of considerable educational value; and some of the facts gleaned therefrom yielded matter of equal interest to the citizens of our own country.

Under the Palms there were exhibited specimens of fibers from the Dwarf Fan, resembling coarse horsehair; Piassava, from Madagascar, Bahia and Para, the former the finest and strongest; Raffia (Raphia), from brackish swamps and only good for mats, etc.; Coir fiber, from the Coconut Palm (Cocos nucifera), which is very durable and always in great demand in the English market; and the Hat Palmetto (Chamærops humilis), which is hardly a true fiber producer, but which yields an excellent and durable leaf for hats, matting, etc. Of these the Coir (coconut) fiber seems to be the most adaptable and valuable, but is not likely to be successfully cultivated in the United States unless a limited area yet to be reclaimed in the Everglades of Florida shall prove to be suited thereto.

Flax (Linum usitatissimum) the strong bark of which yields the linen fiber of commerce, and which has been thoroughly introduced into this country from Europe, and Jute (Corchorus capsularis), a soil-exhausting crop, only suited to hot, damp climates, are both too well known to need further mention. The latter has an indigenous congener in Corchorus siligosus, a yellow-flowered, low shrub, not uncommon from Florida to Louisiana.

It is, however, among the so-called hemps, found in the three widely distinct families of the peas, aloes, and nettles, that sub-tropical and tropical America have reason to look with the most confidence. Here we have the Sunn, Sausiveria, Sisal, Russian and Indian hemps, and that king among fiber plants, the Ramie fiber. Least valuable in this group may be put the Sunn hemp (Crotalaria juncea), a species of rattledod, whose fiber is of very ordinary quality, commanding a low price.

Next to this in the scale of fibrous excellence stand the Russian or Italian and the Indian hemps (Cannabis sativa and C. indica).

The first of these is an indigenous growth; the latter has been introduced as an ornamental plant. From the first of these, both being nettles of strong narcotic properties, is made "gunjah," a preparation of the dried leaves which is smoked, and which when pounded in water is drunk under the name of "bhang." It is the resin of this Cannabis which produces the nervous excitement, and increasing doses of it lead to delirium, catalepsy, and finally end in insanity. C. indica, the Indian hemp, is well known from its product, "hasheesh," a most virulent narcotic, very popular in the East. Both of the plants yield fair fibers, but the demand for them is decreasing.

This same family (Urticaceae) furnishes us with the genus Boehmeria, the false nettles, from which we derive the Ramie fiber (Boehmeria nivea), which is now universally acknowledged by experts to be the best of all fiber-producing plants known to agricultural science. Ramie or Rhamia has long been known to the Chinese as an excellent substitute for or adulterant of silk. To quote Mr. Wm. Fawcett, director of the Botanical Department of Jamaica, it "has the appearance of silk and the strength of flax."

Messrs. Ide & Christie report Ramie fiber as in great demand, with but very little available at present, and the same report comes from New York. The State of Vera Cruz probably produces over one-half now being sent to market, and it was at a hacienda in that State that the recent trials were made for the large cash prize offered by the Mexican government. These tests, it is understood, were far from being regarded as final. Ramie can be grown from Central America to New Jersey, the crops under the most favorable circumstances in the former averaging seven per year, while two or three may be taken off the land in the pine barrens of the latter. Its congener (Boehmeria cylindrica) is not uncommon in swamp lands, from Florida to the region around Philadelphia.

At present it is the need of proper decorticating and other special machinery which seems to stand most in

the way of the development of both Sisal and Ramie fiber cultivation. There are large areas in the United States, notably in Florida, along the Gulf coast, and in Texas and New Mexico, where both of these fibers could be cultivated to a remarkably successful extent. This is especially true of Ramie, and this is fortunately so, for, as already said, this plant produces a beautiful fiber of silk-like quality and of very great strength, which needs but to be seen and compared with any of its rivals to commend itself as the most desirable for cultivation. It is quite safe to say, indeed, that when the inventive faculties of our American mechanics shall have produced superior fiber-extracting machinery, Ramie is destined to drive from the market many other fibers now used for cordage or spun goods. This plant should yield four crops per year along the Gulf coast of the United States.

Sisal hemp, the fiber extracted from the American aloe or century plant (Agave Americana), and its near ally the Spanish dagger (Yucca aloefolia) are both well known plants in our Northern hot houses. The latter is indigenous to this country as far north as the coast of North Carolina, and the former has a well established congener, Agave rigida, which grows in south Florida, and which I believe will be found to produce a valuable fiber. Spanish dagger (Yucca) may in time yield a fair fiber, though with the great promise held out by Ramie and Sisal, it hardly seems likely that it will be cultivated. Sisal hemp has been much more largely advertised in the public prints, and it is undoubtedly at present the best known and most favorably considered of the American fiber products. Perhaps its remarkable aptitude for growing in the most barren places—on honeycomb rock and in arid sands—has rightfully earned it its present reputation. Be that as it may, it is the plant which has awakened the dormant energies of Yucatan, yielding handsome revenues where only deficits were possible before, and which now bids fair to revolutionize the sterile reaches of the Bahamas, thanks to the judgment and energy of their former governor, Sir Henry Arthur Blake, now governor of Jamaica. A plant that will grow where even a sandpiper would hesitate to alight, or that will flourish on rocky hillsides where the withered vegetation tells of a very sparse rainfall, has much to commend it to the attention of those agriculturists who are in search of a profitable crop to utilize barren or abandoned lands.

There are certain other features of Sisal hemp which will at once recommend it to the attention of planters. It requires no plowing nor manuring; it has no insect nor other animal enemies; it is a perpetual crop when once ready to cut; and it will last from 15 to 25 years without replanting, according to the nature of the soil and climate. Ramie fiber, its only formidable rival for preference in this country, does not last so long, is a favorite food with cattle and horses, and it has its seasons. But while it will mature in a few months, Sisal, on the other hand, requires three years before it is ready for cutting. All that Sisal hemp seems to ask of the cultivator is that it shall be placed where shines the hottest sun, and on the poorest available soil. An unshaded, rocky hillside is an ideal location; the planter will be dumfounded to see it flourishing and sending out myriads of suckers where there seems to be no soil whatever. In the tropics, Sisal is planted during any month of the year, though the rainy season is usually preferred. Fences are not required; hogs, cattle, etc., give Sisal a wide berth. The principal care called for, besides that to be taken in cutting for market, is to avoid an undue and exhausting growth of suckers, and also to prevent its attempting to send up the long flower-stalk, which is invariably the precursor of death, no matter what the age of the plant. But these are items of simplest details, easily mastered by the most indifferent farm hand.

As has already been said, nothing is now lacking but the application of American inventive skill to the problem of fiber extracting. When this shall have reached a reasonable solution, many thousands of acres of land now looked upon as useless will come under profitable cultivation in this country, and fiber growing, if suitably protected during its infancy, will rapidly become a prominent industry in regions where abandoned or uncleared lands are now the rule.

What can the readers of the SCIENTIFIC AMERICAN offer the waiting agriculturist in this direction of decorticating apparatus? The government of Jamaica has a standing offer of £200 (\$1,000) as a premium, and the fiber-consuming world has a far larger sum in store for the inventor of the best machine of this sort.

Valuable Discovery of Silica.

At Friedensville, Pa., five miles from Allentown, according to the Philadelphia Ledger, there have been discovered practically inexhaustible deposits of silica. Over fifty acres are known to be underlaid with that mineral, the veins varying in thickness. Samples of the silica were submitted to pottery experts at Trenton, who pronounced them admirably adapted for chinaware.