Correspondence.

A Petrified Tree.

To the Editor of the SCIENTIFIC AMERICAN:

I thought it might be of interest to inform you of the discovery of a petrified tree 165 feet under ground, at the Stolls City mines, eight miles west of this place. The tree was found under 100 feet of lead and zinc ores and 65 feet of flint rock. The petrifaction is the best I ever saw. The grain seems to be of a fine wood. Some think it mahogany, others walnut.

H. G. VOORHIES.

Mt. Vernon, Mo., June 17, 1895.

The Uncultivated Bast Fibers of the United States.

As the indigenous or uncultivated species of plants producing bast fiber in the United States form an interesting group in the fiber series, and are the subject of constant inquiry, a report upon them by Mr. Chas. Richards Dodge has recently been published by authority of the Secretary of Agriculture and distributed by the department.

For the most part, the species considered belong to three large families of plants: the Malvaceæ, of which the cotton plant is a member; the Asclepiadaceæ, and the Leguminosæ. The malvaceous species are the most numerous and possibly the most widely distributed, their fiber possessing fair strength and comparing with jute rather than with flax and hemp, though whiter in color than the former. These Mr. Dodge would consider as jute substitutes, while the species belonging to the two other families, and which yield stronger fiber, may be termed hemp substitutes, and are therefore more valuable.

That these fibers are not employed commercially is due to several causes, one of the principal of which is the want of a satisfactory decorticating machine.

The first of the malvaceous fiber plants mentioned in the report is the swamp rose mallow (Hibiscus moschentos), one of the commonest of mallows and found in many parts of the temperate United States. Experiments with this plant date back many years, and fifteen years ago it was the subject of renewed experiment in New Jersey, the advent of new machinery for cleaning bast calling attention to the plant and placing its cultivation for fiber among the possibilities. Samples of fiber from the New Jersey experiments were considered not only as good as India jute, but as good as secondary grades of imported hemps.

The plant that furnishes the "rozelle" hemp of the Madras territories belongs to the same genus with the above. It thrives in cultivation in Florida, will grow on quite poor land, but will not stand much frost. Scientifically, it is known as Hibiscus sabdariffa.

Another malvaceous plant, which grows wild all over India, and which is common in Florida, is Urena lobata. The natives of India consider its fiber useful for manufacture into bagging and twine, and it is regarded as a tolerable substitute for hemp. The fiber is described as very fine and strong, white in color, and a meter in length.

Sida is still another genus of malvaceous plants whose bast is rich in fiber, that of S. rhombifolia being known as Queensland hemp. This species, the fiber of which is said to be easy of extraction and fine and strong, abounds in many portions of South America, and has been known as a weed throughout South Carolina for many years. Mr. Dodge's conclusions regarding the cultivation of the plant on American soil (based upon the results of limited experiment, however) lead him to think that the plant is of too slow growth and the stalks too small when grown to make it of commercial value as a fiber plant.

The cotton plant of Southern agriculture (Gossypium herbaceum) also belongs to the Malvaceæ, and it may not be generally known that its stalks contain fiber of good quality. In the collection of fibers sent to the Paris Exposition of 1889 there was a fine example of the fiber of the cotton stalk, from a plant grown in Georgia, prepared by the American Consolidated Fiber Company from a green stalk sixty days from date of planting. In the letter of transmittal it was stated that "the fiber is not only good for thread, but for a thousand other purposes. It is a splendid fiber for paper also, as it will not tear as easily as that made from wood pulp or rags."

The okra (Abelmoschus esculentus) has long been regarded as a fiber plant of value in India and other countries, though the production of its fiber has never assumed commercial importance. The plant is a native of the West Indies, but has been cultivated from early times in the Southern States for it pods, which form a useful article in the domestic economy. A few years ago okra attracted considerable attention as a possible fiber for Southern cultivation, and a large correspondence with the department resulted. As is frequently the case, however, the value of the plant and the ease of its cultivation for fiber were very much overstated, and subsequent experiments did not substantiate the claims made for the plant. "From a careful consideration of the subject in all its details, not only as relates to our own, but to other countries, and considering the weakness of the fiber compared with jute, I conclude," says Mr. Dodge, "that the cultivation of the okra plant for its fiber cannot be made a paying industry in the United States."

A very common malvaceous plant that has been cultivated experimentally in the United States, where it is everywhere common as a weed, is the Indian mallow (Abutilon avicennæ). The fiber of this plant is known in South American countries as cañapiña. Its Chinese name is ch'ing ma, and it has been exported to England under the common name of jute. It has been called also Abutilon jute, and the name American jute was once applied to it in this country. The plant produces an abundance of fiber, which is strong, glossy, and white, and the ligneous body gives more cellulose for paper stock than any other species. The fiber takes dye readily, and an advantage is claimed in this respect over Indian jute, which is antagonistic to cheap bleaching and dyeing. The fiber was once classified in value between Italian and Manila hemp, but it will not grade so high, it coming nearer to jute, as is proved by its being sold as a variety thereof.

The milkweed family, the Asclepiadaceæ, contains a large number of fiber-producing plants found in various parts of the world. The several species found in the United States all possess a fibrous bark, and bear seed pods filled with silky hairs resembling thistle down.

The most important species, viewed as a fiber plant, is Asclepias incarnata, or swamp milkweed, which abounds from Maine to Minnesota and southward to Louisiana. The fiber of this plant was well known to our Indians, who used it for making bow strings.

Samples of fiber from the plant having been submitted to the department were found to be light gray in color, much finer than hemp as usually prepared, soft and glossy, and of greater strength than the majority of bast fibers of wild growth in the United States.

Mr. Dodge thinks that the plant promises better results than any of the indigenous species above considered. If it will thrive upon waste lands where no other crops will grow, as it is said that it will, it has to that extent an advantage over hemp, considering the strength of the fiber to be fully equal to that of the latter. As to the value of the fiber in manufacture, Mr. Dodge can make no positive statements further than that samples of binding twine examined were found to be strong and good. As the fiber resembles hemp, there is little doubt that it could be employed in all uses to which the latter may be applied.

The commonest and best known species of milkweed is the Asclepias cornuti, which is found in Canada, grows over a wide section of the United States, and is well known in portions of South America and the Old World. The culture of the plant is said to be attended with little difficulty, as it generally thrives on poor soil, and, like the former species, is perennial. The only portion of it of which practical use can be made is the bast, which furnishes quite a long, glossy fiber that is strong and durable. Early authorities have given this fiber a place between flax and hemp, and it has been claimed that the yield is about equal to the latter.

Dr. Masters states that "its excellent fiber is woven into muslins, and in some parts of India is made into paper."

The fiber forms a good paper material and, doubtless, might be cultivated with profit for this purpose, if for no other.

A French firm has used the silk-like filaments of the seed vessels by mixing 20 per cent of the material with 80 per cent of wool, the fabric being called "silver cloth." The substance could not be used alone, as the cells are so smooth that they have no felting property, and therefore will not hold together and cannot be spun. They possess little strength, and can be considered only as "down," useful for no purpose but wadding or for stuffing pillows.

The family Leguminosæ contains many species of plants that yield a strong bast fiber, some of the foreign species having a known commercial value. In our own country, the single genius Sesbania of this family has attracted attention as a fiber producer. Specimens of the straight stiff canes of S. macrocarpa, or wild hemp of the Colorado River region, have been sent to the department at different times in the past twenty years. The fiber of the department museum sample is three or four feet long. The filaments as extracted are exceedingly coarse and resemble flat ribbons of fiber, uncommonly white and lustrous, and clear and smooth to a remarkable degree. Single filaments are quite strong, but when several are twisted together they lose part of their strength, a defect sometimes observed in better fibers. The fiber is sufficiently strong for small cordage for ordinary use, though too coarse for fish line or twine, as roughly prepared. Among the manufactures for which it has been claimed that it is fitted are wrapping, writing, and bond papers, twine and cordage, sacking, overall stuff, and Irish linens. The Indians of the West work it into nets and fish lines.

Having noticed the more important species of uncultivated bast fibers, it remains to mention a few forms of less importance that have been the subject of occasional inquiry or of limited experiment.

The Indian hemp (Apocynum cannabinum) has from early times been regarded as a useful fiber plant by certain tribes of our Indians, who manufacture from it bags, mats, baskets, belts, twine, fish lines, and nets. The fiber is easily separated from the stalk, and, when cleaned, is quite fine, long and tenacious. In color it is light cinnamon, though finely prepared specimens are creamy white and remarkably fine and soft. The fiber will rank with that of Asclepias for strength, and is readily obtained, since the stems are long, straight, smooth and slender. Although paper has not been made of it, it could doubtless be used for that purpose.

Urtica gracilis, one of the stinging nettles, abounding throughout the United States and Canada, possesses a good fiber in its bast. A few years ago it attracted attention in Minnesota, and an attempt was made to reduce the fiber, but the experiment was interrupted before completion and no report could be made.

Another of the nettles, Laportea canadensis, produces an average quality of fiber, samples of which were received by the department from Kansas in 1890.

Several years ago the stalks of the common burdock (Arctium lappa) were the subject of experiment in Illinois, with the object in view of producing a fiber material suitable for binding twine. The fibers in the samples submitted to the department were found to be harsh and wiry, very brittle, and to possess little strength. Fiber plants of this class have no value in the industrial economy, the fibrous material in their bast being too inferior ever to be used in manufacture where so many other better fibers are obtainable, and possibly at less cost.

Another form of fibrous material that has been employed to a certain extent in the coarsest of manufactures are the tree basts, or the fibrous inner bark of such trees as the linden and cypress. The linden trees are familiar in our public parks and gardens, where they are cultivated for adornment, though as lumber they are known as basswood. Tilia americana is the American species, while T. europœa is that of the Old World. The inner bark of the former is not utilized, as far as Mr. Dodge is aware, although the bast of the latter is much employed in Russia in the manufacture of an exceedingly coarse kind of rope for making the matted shoes worn by the peasants, and also for the manufacture of the mats which are used to a considerable extent by furniture dealers for packing. The American species was the wigobimizh, or "tying bark tree," of the Algonkin Indians, who used the bast for making ropes, thread, and coarse cloth.

The Southern cypress, Cupressus thyoides, has a very tenacious inner bark that can be readily peeled in long strips. It is not likely to come into use industrially in this country, although worthy of notice.

The wahoo (Ulmus alata) is an elm that abounds in the hummock lands of middle Georgia. The bark is very tough, and, when stripped from the tree and steeped in water for several weeks, becomes quite pliant and is said to make excellent horse collars.

Finally, the leather wood (Dirca palustris), of rich, damp woods from New Brunswick to Minnesota and Missouri and south to the Gulf, has a fibrous bark which is remarkably tough and which was used by the Indians for thongs and by country people for ropes, whence the popular names of leather wood and rope bark.

The Bicycle Hump.

"This protestation against the 'bicycle hump,'" said an old rider to me, "is very funny. As a matter of fact the man who bends over is not 'humped,' but the fellow who undertakes to sit up straight is round shouldered."

"Watch a rider coming head on," he continued, "and you will think the one leaning over the bars is 'humped,' while the other class appears straight. But when they pass and you get the rear view you find the back of the stooped fellow is straight, the bend being at the hips, the shoulders being pushed back square by the weight resting on the rider's hand, resting on top of the bar.

"The rider who tries to sit straight reaches under the grips and by pulling draws his shoulders together, cramping his chest."

I looked for myself and found the statement of my friend to be true. Look for yourselves: you will be surprised.—Bicycling World.

ON the railway bridge of the Chicago & North western Railroad in Milwaukee, Wis., a gas engine has been installed by Mr. E. C. Carter, principal assistant engineer of the road, to operate the draw bridge. It performs its work in a most satisfactory manner, and it would appear that this kind of power is particularly adapted for such work. It is cleaner than a steam engine and the fuel is obtained by simply piping city gas to the central pier of the bridge, while with a steam engine coal must be delivered on the bridge and a large amount of ash removed.