Recent Engineering Inventions.

An improved Car Journal Box has been patented by Mr. Francis M. Alexander, of Marshall, Texas. This invention relates to oil boxes used upon journals of car axles, the object being to prevent the lid from shaking off of the oil box and getting lost, and to enable the oil stop or oil packing surrounding the axle to be removed and replaced by a new one without removing the box from the journal.

Mr. Peter Boisset, of New York City, has devised an improved Propeller, which consists of one or more feathering paddles, that are hinged to the lower ends of oscillating arms, operated by crank rod connections with an oscillating crank shaft. The paddles may be adjusted at any angle or direction. The supporting frames of the paddle arms may be raised or lowered, so as to give more or less dip to the paddles.

The Cultivation of the Common Nettle.

The common European nettle (*Urtica dioica*) was formerly held in much esteem on account of its long delicate fibers, which, being readily separable and easily bleached, were particularly adapted for the manufacture of fine tissues. Although the fibers of this plant possess all the qualifications necessary to constitute a good textile material, the introduction of flax culture from Asia drove the industrial use of the nettle out of the manufacturing world entirely. From the little information that we possess in regard to the matter, we are led to suppose that the plant was abandoned on account of the superiority of yield in the flax; for the nettle, in its wild state, furnishes only about one and a half per cent of the weight of the plant in pure textile fabrics—a yield greatly inferior to that of any other plant used for like purposes. The attention of the industrial world has been, however, directed anew to the qualities of the nettle by very beautiful specimens of papers exhibited at the Vienna Exhibition in 1873, and which were manufactured at Hermanetz, Hungary, from wild nettles collected in the woods of the latter country. Since that period to the present quite a number of experiments have been attempted, either to acclimate in Europe different species of Indian or Chinese nettles, or to cultivate the common European nettle. The exotic species, among which should be mentioned the China grass (*Bœhmeria ramie*), were unable to withstand the rigors of a European winter, and their yield, too, was found to be greatly inferior to what it was in their native country. Experiments in this direction, therefore, promising so little success, have been abandoned; not so, however, with the culture of species indigenous to Europe, for this, judging from what is said by recent foreign papers, would seem to have better prospects.

We learn from a German contemporary that serious trials are now in progress in a two acre field at Stralau, near Berlin, to determine whether the nettle can be cultivated with success, with the view of producing therefrom a textile fiber. The plant was sown last year, and acquired a height, last autumn, of three to four feet, but contained too many branches to make it useful for the production of fiber. The present year, however, the plant looks much better, has fewer branches, and is generally four, and in some cases five or more, feet high. The field in question has been neither manured nor weeded, but the nettle has shown its strength by itself suppressing all weeds. The fear that the nettle would escape into adjoining fields has proved groundless, and an adjoining cabbage field does not contain a single nettle plant. The plants are now in full bloom, and a trial was to be made to cut them at this stage, in order to obtain the fiber in its greatest degree of whiteness. Should this succeed, it will be possible to obtain two crops in one year, a point of very great advantage should the fiber ultimately become a marketable product.

If these interesting experiments and observations should prove the possibility of growing the plant, and obtaining therefrom, as in China, Japan, and India, a useful fiber, there are many at present unproductive fields in Europe, as well as in America, which could be turned to a profitable account. That this plant does produce a useful fiber is shown by its very name, for in German it is a term often applied to calico, thus indicating that cloth brought from the East had been manufactured from it.

The Economic Products of Sea Weed.

The Society of Arts, in 1862, awarded to Mr. E. C. C. Stanford their silver medal for a paper on the economic applications of sea weed. The principal use of these plants at that time was in the production of "kelp," which was afterwards used for making lye for soap boilers and in glass making; and the spent lyes of the former manufacture were used in the preparation of iodine. Mr. Stanford proved that the excessive heat employed in the manufacture of kelp dissipated in smoke more than half the iodine contained in the sea weed; and that at the same time the alkaline sulphates were reduced by the carbon to lower oxy-compounds, and at a subsequent operation required an amount of sulphuric acid to reconvert them, which cost $2.75 to $3.25 a ton of kelp—the whole cost of extracting the salts and iodine from the same quantity being only $6.25 to $7. These facts led to the destructive distillation of sea weed as a commercial undertaking, now carried on on a vast scale by the North British Chemical Company. The products which have a commercial value are, per 100 tons of dried sea weeds, volatile oil, 181 gallons; paraffin oil, 225 gallons; naphtha, 102 gallons; sulphate of ammonia, 63 cwt.; acetate of lime, 9 cwt.; charcoal, 17 tons 4 cwt.; gas, about 116,100 cubic feet; chloride of potassium, 7 tons 16 cwt.; chloride of sodium, 8½ tons; iodine, 326 lbs.; and other products. The gas obtained is used to light the works. The gas liquor yields ammonia and acetic acid. The charcoal left in the retorts yields, by washing, salts of potassium and sodium, with iodides and bromides, and the remaining charcoal (which resembles that prepared from bones) is a powerful deodorizer and decolorizer, and is the cheapest in the market. The collection of the sea weed affords employment to a large and indigent population in the Western Isles, far more remunerative than that of kelp, the burning of which it has largely replaced. The company has works in the shires of Dumbarton, Argyle, and Inverness, and in County Clare. The refining works at Whitecrook employ about 200 men, and are capable of producing annually 50,000 lbs. of iodine, 5,000 lbs. of bromine, 50,000 lbs. of iodide of potassium, 50,000 lbs. of bromide of potassium, 2,000 tons of caustic soda, 1,000 tons chloride of potassium, 100 tons chlorate of potassium, and sea weed charcoal in large quantities. Besides these, chloride of calcium is produced to a large extent in the manufacture of chlorate.

THE POISON IVY AND VIRGINIA CREEPER.

These are two vigorous climbing vines, common, and often found associated, in our woods and thickets, and which,

POISON IVY.

having to the unpracticed eye a general similarity of appearance, are frequently confounded, usually to the painful cost of the person who inadvertently comes in contact with the wrong one. These two plants, the leaves of which are represented in the accompanying engravings, are the poison ivy (*Rhus toxicodendron*), or, as it is also called, poison oak and mercury vine, and the Virginia creeper (*Ampelopsis quinquefolia*), or American ivy. The cases of poisoning resulting from contact with the noxious poison-ivy of so common occurrence during summer will probably prove still more numerous during the fall, when the brilliancy of the autumnal tints invite more than a usual number (of ladies and children especially) into the woods to gather autumn leaves. We have therefore thought we would be doing a service in figuring the plants, and giving such descriptions as would serve to enable any one to distinguish between the two. When the facts have been pointed out, the person destitute of the least idea

VIRGINIA CREEPER.

of botanical science will at once perceive that the points of resemblance between these two vines are really very few indeed; or, to speak absolutely correctly, that there are none at all.

There are two varieties of poison ivy, so marked that they have been considered distinct species. One of these, a small, weak, erect, or decumbent shrub, has leaves of three leaflets, which are ovate, and variously notched or lobed. This is the *Rhus toxicodendron*, and the variety figured in our engraving. The other form is distinguished by its climbing habit; the woody stem, covered with a grayish scaly bark, becomes one to four inches in thickness, and throws out throughout its whole length myriads of thread-like, densely aggregated rootlets, which serve to bind it closely to its support. It is extremely common, and may be seen embracing even fences, as well as infolding large trees, with its snaky branches. Like those of the erect variety, its leaves consist of three leaflets; but in the present case these are smooth and have entire margins.

Both varieties, when wounded, exude a milky juice, which becomes black on exposure to the air and upon fabrics forms an indelible stain. To most persons this plant is extremely poisonous; some indeed being so sensitive that they never fail to experience its noxious effects when they merely approach but do not touch it. The remedies which have been and are constantly being proposed for the painful inflammation, swellings, and itchings that follow from contact with the plant are innumerable; and the reputed beneficial effects of many of them are perhaps absolutely *nil*, the fact being overlooked that the disease ran its course and ended, taking no less time to do so than it would have done without the extraneous aid.

The Virginia creeper, for which the poison ivy is often mistaken, is a very graceful woody vine, climbing extensively, sometimes over fences and wall, but often up trees as high as fifty feet or more. Unlike the *Rhus*, it climbs by means of tendrils, the ends of which terminate in sucker-like disks. This alone constitutes a striking difference in the appearance of the trunks of the two vines; but the structure of the leaves forms one equally as noticeable. These, in the Virginia creeper, are palmately divided into five oblong toothed leaflets of a dark shining green, and with very prominent veins and ribs. The leaves of the Virginia creeper assume in autumn the richest shades of scarlet, crimson, and purple, and as the plants are seen climbing and intertwining among the foliage of some evergreen, or trailing over fences and walls, form one of the brightest ornaments of the season. The leaves of the poison ivy also become colored in autumn, but the tints are not so brilliant as those of the former plant; they are usually of various shades of yellow and dull red.

The Virginia creeper belongs to the grape family, and, indeed, was formerly placed in the same genus with the grape. It is hardly necessary to say that it is perfectly harmless. It may be well for those who do not pretend to any botanical knowledge to remember the following as a safe rule by which to be guided: No native American vine having five-parted leaves is poisonous.

The Japanese Wax Tree in California.

The most important article for illuminating purposes in Japan is the candle made from the fruit of the *Rhus succedanea*, a tree about the size and appearance of the common sumac of this country. It is grown more or less extensively in Japan, and especially in the Western Provinces. According to the San Francisco *Bulletin*, specimens of this tree have been imported to that city by Henry Loomis. The tree has a quick growth, and attains the diameter of a foot and a half and a height of twenty-five feet. They should be planted about seven feet apart, and shaded on the sunny side for the first season. The ground should be well stirred and kept free from weeds. They begin to yield berries the third year, but in California may bear the next year after planting.

The berries are the size of a small pea, of a white color, hanging in clusters, and contain the wax between the kernel and the outer skin. The full-grown tree averages fifty pounds of seeds annually, about one-half of which is wax. It is a hardy plant, growing on indifferent soil, and living for many years. In Japan they are planted by the roadside, on embankments, and out of the way places. The wax is obtained by the berries being crushed, steamed, and then placed in hemp bags and pressed in a wedge press. It is also obtained by boiling the bruised seeds and skimming the wax from the top. In ordinary candle making the unbleached wax is used. When washed and bleached in the sun and air it assumes a pure white color. When formed into candles it gives a fine, clear light.

The vegetable wax of commerce is the imported article from Japan. From experiments made, it is represented that it can be readily and profitably grown in California. The tree is highly ornamental. As the foliage changes it has the peculiar bright and attractive hues so remarkable in the autumn landscapes of the Eastern States. The wax is valuable for candles, making the gloss for linen, for waxing thread, and for other purposes for which the ordinary wax is used.

Piedra.

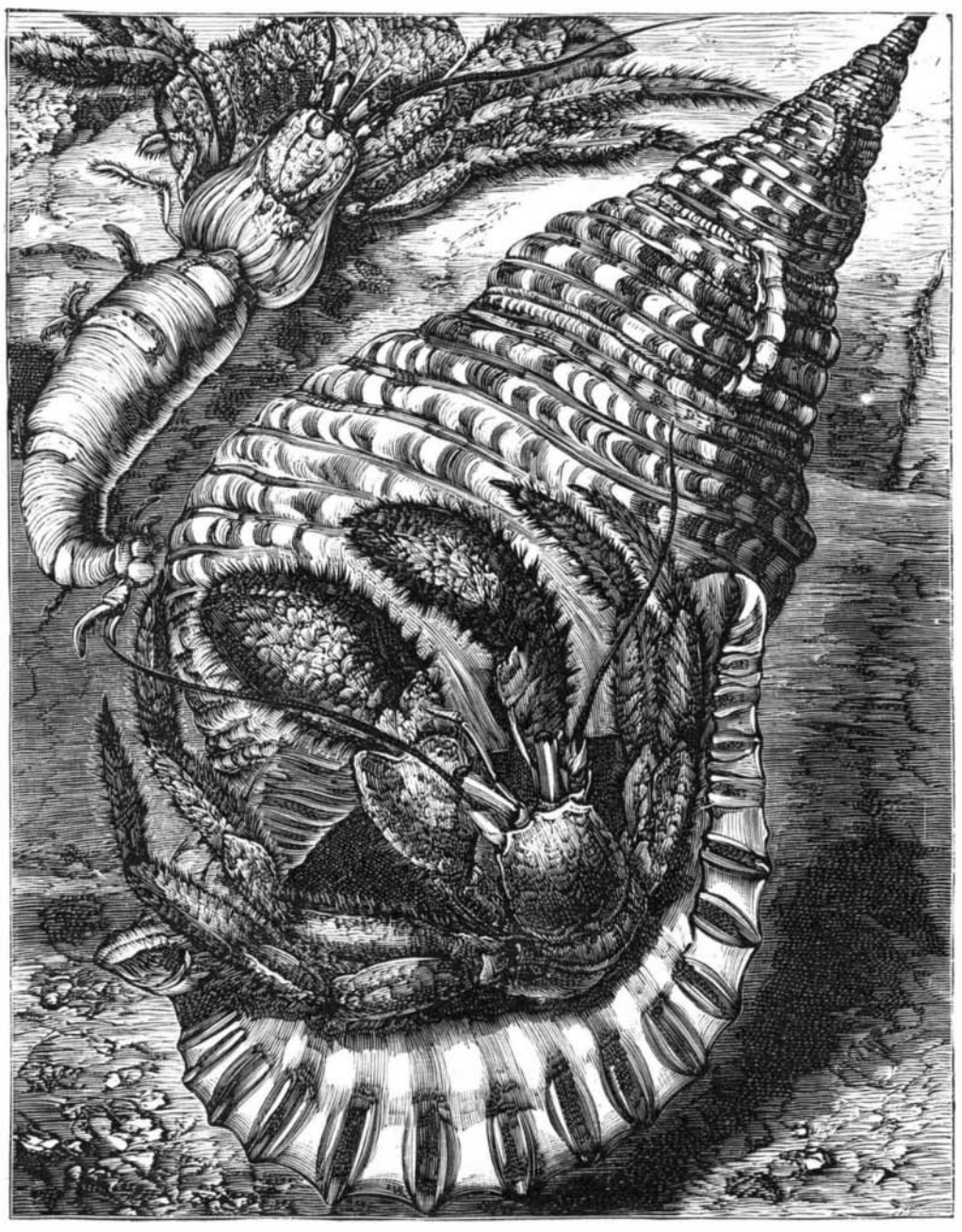
Under this name, according to the *Lancet*, a parasitic disease of the hair, supposed to be a previously known affection, has been described to the French Academy of Sciences by M. Desenne. It has been met with in Columbia in the natives of the province of Cauca. It consists in small nodosities visible to the naked eye, and as hard as stone, resisting and even turning the edge of the scalpel. The hair when properly prepared for microscopical examination presents, under an amplification of 140 diameters, the following appearance. The nodules are placed at a tolerably regular distance apart, without being arranged with any mathematical exactness. They are of two kinds, some surrounding the hair completely, like a fusiform ring; others incompletely, or forming nodules on one side. Under a higher power they are seen to consist of a cellular mass of polygonal elements ·012 to ·015 millimeter in diameter, and regularly arranged, a black line only indicating their intervals. Adjacent to one of these nodosities a network could be seen consisting

of little rods articulated one to another, and extending around the hair. Some of these rods appear to blend with the proper substance of the nodosity, others terminated at some distance, either by an ampulliform swelling or umbellate extremity. It is difficult to say whether these rods are the mycelium of the fungus which forms the cellular mass of the nodules, or whether they are independent of the latter. Nowhere in the substance of the hair could any trace of a vegetable parasite be discovered after the action of liquor of potassa or acetic acid. The interior of the nodules was composed of a cellular stroma similar to that covering the periphery, and on it were some large cavities containing one or two large colorless cells. A writer in the same journal of a subsequent date says that he has a patient suffering from this rare disease in England. He believes it to be the disease described by Hebra as *tricoresis nodosa*. He states that it is not infectious, and that this fact, combined with its resistance to every method of treatment and his inability to discover any trace of a fungus, has led him to abandon all theories of its fungoid origin.

THE CRAFTY HERMIT CRAB.

There are many species of hermit crabs, those of the tropics being the largest and handsomest. This odd creature inhabits the shell of some mollusk in which it can bury its unprotected tail and into which it can retreat when threatened with danger It usurps the deserted home of various mollusks. according to its size When young and small it is found in the shells of the tops, periwinkles, and other small mollusks; and when it reaches full age it takes possession of the whelk shell and entirely fills the cavity.

The crafty hermit crab is found in the Mediterranean, and, among other shells which it inhabits, the variegated triton is known to be a favorite. In the illustration, which we take from Wood's "Natural History," the crabs are supposed to have fought for the shell, and the vanquished is seen on the ledge above, whither it has been flung by the conqueror.



THE CRAFTY HERMIT CRAB.

Heredity.

At the last session of the National Association, in this city, October 8, Professor Alpheus Hyatt, Custodian of the Boston Society of Natural History, announced that the Massachusetts Board of Health had undertaken to investigate the laws of heredity, and was about to make extensive circular inquiries in that department of research. One idea is to trace in direct and indirect lines all hereditary personal peculiarities, large size of nose, peculiar shape of ears, and features of that sort. It is thought by sending out blanks in this country and abroad, many replies will be received. These blanks provide for a collection of statistics upon which can be based an investigation of the laws governing the inheritance of pathological conditions, abnormal characteristics, and any marked family peculiarities. It is also desired to determine the age at which these conditions appeared in ancestor or parent, and the age at which they became perceptible in the descendants or children. Some characteristics remain unchanged in their mode of appearance through many generations, while others vary constantly, sometimes with a periodicity which implies some regularly recurring cause, and sometimes with a very confusing irregularity. It has been observed that normal or abnormal characteristics show a decided tendency to appear in descendants at an earlier age than that at which they first showed themselves in the ancestor or parent. If the answers are sufficiently numerous, the results when tabulated ought to be of value also in the history and classification of hereditary diseases. The Board will furnish these blanks to all who will use them, and they are to be returned to Professor Hyatt.

Scientific Reliance on Soap.

Dr. Richardson lectured recently in this city on the germ theory of disease. He acknowledged his obligation to Tyndall for his microscopic investigation on air dust, spores, and other comforting and salutary topics. It is worth while for common people to learn that 50,000 typhus germs will thrive in the circumference of a pin head or a visible globule. It is worth while for them to note that these germs may be desiccated and be borne, like thistle seeds, everywhere, and, like demoniacal possessions, may jump noiselessly down any throat. But there are certain things spores cannot stand, according to the latest ascertained results of science. A water temperature of 120° boils them to death, and soap chemically poisons them. Here sanitary and microscopic science come together. Spores thrive in low ground and under low conditions of life. For redemption, fly to hot water and soap, ye who live in danger of malarial poisoning. Hot water is sanitary. Soap is more sanitary. Fight typhus, small-pox, yellow fever, and ague with soap. Soap is a board of health.—*Philadelphia Press.*

Preservation of Food by Gelatine.

The subject of food preservation has recently acquired a new development from Dr. Campbell Morfit's new "Gelatine Process," which has several points of superiority over most of the older plans, the chief of these being the use of a preservative which is itself an article of food. The experience of a good many months has tended to show that food preparations (many of them, such as cabbage, tomato, milk, and meat, of a perishable nature), when prepared with gelatine, and dried so as not to contain more than 10 or 12 per cent of moisture, do not become mouldy even when exposed to warm and moist air. A good idea of the nature of Dr. Morfit's invention may be obtained from the following method of preserving milk:

One pound of gelatine is dissolved in one gallon of milk at a temperature of 130° to 140° Fah., and the solution allowed to set into a jelly; the latter is then sliced and dried. By using these slices for gelatinizing a second gallon of milk, a jelly is obtained in which the milk solids are just doubled in amount. The process is repeated until the original pound of gelatine is incorporated with the solids of ten gallons of milk. One application of this process, which is theoretically excellent, is the dissolving of gelatine in lime juice, adding sugar, incorporating the mixture with powdered navy biscuits and pressing in moulds, thus affording lime juice in a portable form. This preparation has become an article of commerce. The range of materials to which the gelatine process is applicable is a wide one; according to all accounts Dr. Morfit's invention has already been successfully applied in several directions, and seems to be full of promise for the future. The "Thao," or seaweed jelly, is well known to possess remarkable preservative properties, and might perhaps, in some cases at least, serve as a substitute for the animal gelatine.

To Turn Oak Black.

The *Revue Industrielle* states that oak may be dyed black, and made to resemble ebony, by the following means. Immerse the wood for forty-eight hours in a hot saturated solution of alum, and then brush it over with a logwood decoction, as follows: Boil one part of best logwood with ten parts of water, filter through linen, and evaporate at a gentle heat until the volume is reduced one half. To every quart of this add from 10 to 15 drops of a saturated neutral solution of indigo. After applying this dye to the wood, rub the latter with a saturated and filtered solution of verdigris in hot concentrated acetic acid, and repeat the operation until a black of the desired intensity is obtained. Oak stained in this manner is said to be a close as well as a splendid imitation of ebony.

Pearl Millet.

Pearl millet has been cultivated for some years as a forage plant in some of the Southern States, as "African cane," "Egyptian millet," "Japan millet," and in some places as "horse millet," but little was known of it at the North before last year, and then only in such small quantities as to hardly allow of a fair trial. From what we saw of it in 1877 we determined to give it a thorough trial this season. A piece of good strong loamy ground was prepared as if for a beet or turnip crop, by manuring with stable manure at the rate of ten tons to the acre, plowing ten inches deep, and thoroughly harrowing. The millet was then sown in drills eighteen inches apart, at the rate of eight quarts to the acre. We sowed on the 15th of May, about the date that we plant corn; in twelve days the plants were up so that a cultivator could be run between the rows, after which no further culture was necessary, for the growth became so rapid and luxuriant as to crowd down every weed that attempted to get a foothold. The first cutting was made July 1—forty-five days after sowing; it was then seven feet high, covering the whole ground, and the crop, cut three inches above the ground, weighed, green, at the rate of thirty tons per acre; this, when dried, gave six and a half tons per acre as hay. After cutting, a second growth started and was cut August 15—forty-five days from the time of the first cutting; its height was nine feet. It weighed this time, at the rate of fifty-five tons to the acre, green, and eight tons dried. The third crop started as rapidly as the second, but the cool September nights lessened its tropical luxuriance, so that this crop, which was cut on October 1, only weighed ten tons green and one and a half dried. The growth was simply enormous, thus: First crop, in forty-five days, gave thirty tons green, or six and a half tons dry; second crop, in forty-five days, gave fifty-five tons green, or eight tons dry; third crop, in forty five days, gave ten tons green, or one ton and a half dry. The aggregate weight was ninety-five tons of green fodder in one hundred and thirty-five days from date of sowing, and sixteen tons when dried to hay. This exceeds the clover meadows of Mid-Lothian, which, when irrigated by the sewerage from the city of Edinburgh, and cut every four weeks, gave an aggregate of seventy-five tons of green clover per acre. There is little doubt pearl millet is equally as nutritious as corn fodder, which it resembles even more than it does any of the other millets. We found that all our horses and cattle ate it greedily, whether green or dry. If sowing in drills is not practicable it may be sown broadcast, using double the quantity of seed, say 16 quarts per acre. The ground should be smoothed by the harrow, and again lightly harrowed after sowing; if rolled after harrowing, all the better. I know of no farm crop that will better repay high manuring, but so great is its luxuriance that it will produce a better crop without manure than any other plant I know of. In those parts of the Southern States where hay cannot be raised, this is a substitute of the easiest culture, and being of tropical origin, it will luxuriate in their long hot summers; even though our Northern seasons may be too short to mature the seeds, our experiments in New Jersey this summer show what abundant crops may be expected if the similar conditions are secured. Pearl millet as a fodder plant presents a new feature in our agriculture, and I feel sure that within ten years we shall wonder how we ever got on without it.—*Peter Henderson in the American Agriculturist.*

Dairy and Poultry Produce in America.

At the annual meeting of the National Butter, Cheese, and Egg Association, at Chicago, the secretary called attention to the fact that the dairy product exceeds in value the entire wheat crop of America. The whole number of cows in the United States is 12,000,000; average value, $40; total