

### CACTUS FURNITURE AND ART WARE AT THE WORLD'S COLUMBIAN EXPOSITION.

BY H. C. ROYCE.

About a thousand different species of the Cactaceae have been found, mainly inhabitants of the new world. They abound in the dry regions of tropical America, and certain varieties are widely distributed through the southern parts of the United States. Transplanted to Europe, some of the opuntias have flourished along the Mediterranean, almost as freely as if indigenous. Many varieties of the cactus family are admired for their singularly twisted stems, tufts of sharp spines, formidable thorns, or bright flowers. For this reason they are favorite objects in conservatories. The more thorny kinds are planted as impenetrable hedges around houses in Mexico and South America. The fruits, especially of the opuntias, are edible, and are better known as prickly pears, or Indian figs. The turnip-like roots of the giant mescal are roasted by the Indians, and from the juices of the same a favorite Indian drink is made. The cochineal insect is raised on the nopals, as many as fifty thousand plants being sometimes found in a single orchard kept for that purpose. But until recently it was thought that, aside from the above uses, the cactus was a sad lumberer of the ground, with very few redeeming qualities.

It has long been known that a woody axis grew under the thick, fleshy stems of the cactus, sometimes quite compact in substance, and again with large round or oval openings. The wood of the growing plant has a soft and worthless fiber; but from the stems of dead plants, as found on the plains, the Mexicans have been accustomed to make canes, which they have sold to tourists as souvenirs.

This has suggested to an enterprising Arizona firm the idea of manufacturing art ware and small articles of furniture from the same material. Their factories are located at Tempe and Phoenix, and the manufactured products are exhibited for the first time in the department of the Liberal Arts at the Columbian Exposition. A medal and diploma have been awarded for the novelty of the material and superiority of the work shown. My attention was called to it by the presence of an admiring crowd, among whom were members of the Swiss Commission, who stated that it would be difficult to find, amid all the many articles of hand-carved ware exhibited from Europe, any so intricately and perfectly ornamented as were here to be seen in the handiwork of nature's carving. And, so far as the writer has knowledge, the public attention is now called to these unique products for the first time through the press.

In reply to inquiries, I was told that the varieties of cactus most suitable for use grew at a high altitude, and had a peculiar grain and smaller pores than similar plants in the valleys. The wood must be obtained from plants already dead, or else be subjected to a special process of seasoning. Green plants are soaked in vats containing a weak acid solution for from six to eight weeks, till all the pulpy leaf, thorns, etc., are completely eaten away. What remains is a very hard and tough woody substance, lighter than pine in weight, and varying in color from corky yellow to dark brown. Its wearing qualities resemble butternut or walnut.

The cholla (*Opuntia fugida*) is regarded as best for cabinet work; for which the stalks are split, steamed, and flattened into boards—a fact more easily understood on remembering the great size to which certain cactus plants grow in Arizona and Mexico. In my travels through that region I have seen specimens whose stalks were twenty feet high and a foot or more in diameter. The fiber of the giant cactus, however, is liable to be pithy, for which reason it is less desirable than some of the smaller kinds. Nearly all varieties of cactus can be made serviceable.

Some of the daintiest art ware imaginable is made from the lace-like fiber of the nopal (*Opuntia Engelmanni*). Sheets of it are steamed and pressed under heavy steam rollers. The result is a natural filigree, very delicate in appearance, but extremely strong. What most excited admiration were the choice veneers made from both the boards and the filigree fiber, and which have advantages over every other kind of veneer known. Being porous, the substance can be filled in with any desired art color or tinted cement. When subsequently polished the effect is indescribably beautiful. This fact enables the expert cabinetmaker to match his veneers to any interior decorations or furniture upholstery. No other kind can have its original color permanently changed without making it seem tawdry or cheap. This evidently opens rare possibilities of fine artistic embellishment.

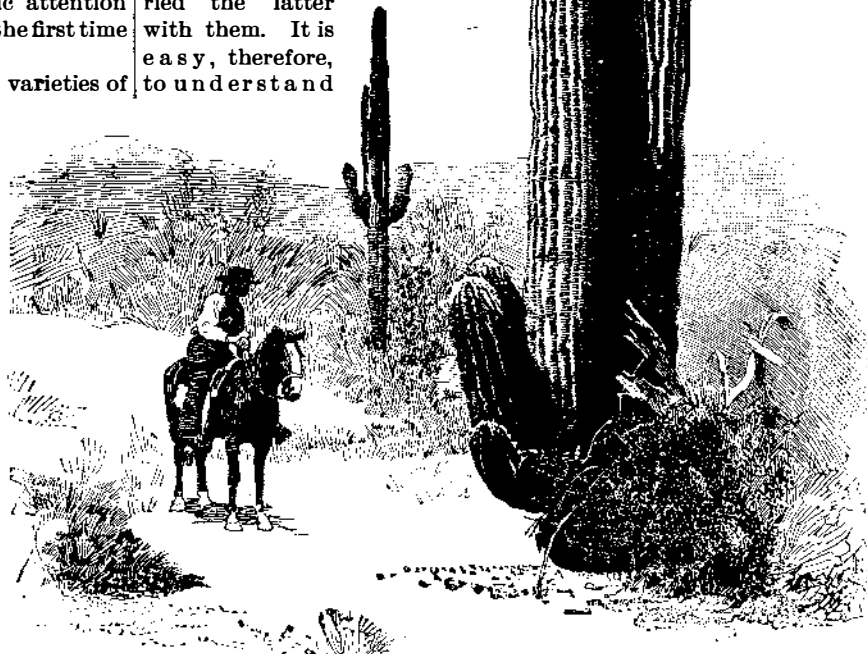
Among exhibited articles of cactus ware were canes, napkin rings, pick holders, smoker's sets, match safes, inkstands, and numerous other interesting small articles. But the novel material is by no means limited to such minor objects. Elegant stands, tables, easels,

music racks, stools, fire screens, hat racks, and mantel-pieces were shown as proofs of what could be done with the once-despised cactus. In picture frames a remarkably pleasing effect was produced by showing the filigree work over silk, and a worker in silver filigree expressed his opinion that the costly wares and ornaments of that metal could be admirably imitated by a suitable preparation of the vegetable filigree and afterward plating it with silver.

The picture of the candelabra cactus represents a very common scene in New Mexico. The columns, straight and angular, are often sixty feet high. It is called a torch cactus in some places. Some lie on the ground; others, attached to trunks of trees as parasites, hang from branches like great serpents.

#### Bullets as Microbe Carriers.

Living animals, it is supposed by some philosophers, may have been brought to this earth in meteorites. Parallel with this idea, some interesting experiments have been recently made in Germany to ascertain if rifle bullets can carry infection. It has long been known that in war gunshot wounds very frequently induce symptoms of acute tetanus or lockjaw, which nearly always ends fatally. Messner's investigations show that if rifle bullets are purposely brought in contact with micro-organisms and then discharged in the usual way they carry the microbes with them into whatever material they subsequently penetrate; the microbes, moreover, suffer no damage and grow as abundantly as ever. If ordinary uninfected bullets were fired through flannel which had been previously infected with germs, they carried the latter with them. It is easy, therefore, to understand



THE CANDELABRA CACTUS.

how gunshot wounds many cause lockjaw and other diseases. The tetanus organism is widely distributed in the earth, and the bullet, either by first striking the latter and then wounding, or by simply penetrating the soiled uniform of the soldier, can thus readily become the carrier of infection.

#### Electrical Injuries to Gas and Water Pipes.

The destructive action of electric currents extends to water and gas pipes and to almost all other buried metals. The Bell Telephone Company, of Boston, has recently made a report on this subject, which embodies a large amount of useful information. The overhead single trolley system of electric railways seems to be the cause of most of the corrosion. The heavy currents appear to follow the cable sheaths of telephone cables as conductors. The lead of the cable sheaths is corroded wherever the current leaves the cable and passes into moist earth or the moist air of the ducts or manholes. The destruction has occurred in some places where the potential was less than half a volt. As long as the single trolley system is in use similar results to those obtained in Boston may be expected. The injury to water and gas pipes is as serious as that done to telephone cables, as may be seen by the photographs which accompany the report.

#### Rose Growing and Pressing in Saxony.

The experimental rose plantations started two years ago in the neighborhood of Leipzig have given such brilliant results that they are, the Belgian consul states, being extended. The plants have thriven well through the long and severe winter of 1892-93, and their condition in May left nothing to be desired. It has been shown that it was a false idea to suppose that these flowers require Oriental heat to prosper and acquire a delicate perfume; the experiments at Leipzig having proved that a cool temperature, and even a little damp, is the first condition of a good yield, while great heat is the enemy of roses. A special factory has been established in the middle of the plantations by the house which made the first experiments, and it is to be put in operation this summer. Provision is made for dealing each day—we quote the consul—"with 50,000 kilogs. of leaves, producing, at least, about 40 kilogs. of oil, water, and pomade of roses, valued at 40,000 to 50,000 marks. To start with, the factory will have three boilers providing 300 square meters of heated surface, and the roses will, immediately they are plucked, be transferred to the macerating jars, where, thanks to this procedure, they will deposit their perfume in all its freshness and delicacy. Only the quantity of leaves required at the moment will be collected, a few minutes sufficing to transfer the leaves from the plant to the machines." *Commerce* of the 26th July adds: "This expedition is favorably contrasted with the procedure followed in Turkey and in France, where frequently the roses plucked in the morning are only distilled in the evening. As to the oil of roses produced in Saxony during last year, it is claimed that not only did it not fall short on comparison with the Turkish product, but that it was better than its rival in delicacy and strength, and the lasting character of its perfume."

#### Compulsory Paper Money.

The proposal to return to the old plan of paper money and State banking brings to mind the paper money scheme of Rhode Island.

In the year 1776 Rhode Island tried that experiment to her heart's content. The historian (McMaster's History of the People of the United States) tells us that "in the course of the debate which preceded the passage of the paper bill in the legislature, it was noticed that the speakers on the affirmative were invariably from the country districts, and the debaters on the negative as invariably from the rich seaboard towns. Newport, Providence, Bristol, Westerly, each sent up men trained in the great school of commerce and trade, familiar with all questions of finance. . . . But no argument which they could advance could turn the votes of men who had come up for the express purpose of abolishing taxes, suspending the excise, and emitting a currency which was, in their belief, to flow into their pockets much faster than it could possibly flow out."

"A call was made for a forcing act, which the legislature quickly passed. Every one who should, according to this act, refuse to take the bills in payment for gold, or should in any way discourage their circulation, was to be fined £100 and lose the rights of a freeman."

"The effect of the law was to make worse the matter it was designed to mend. The merchants denounced it iniquitous, and declared they would pack up their goods and set off for another State before they would submit to so wicked an act. Indeed, they refused, almost to a man, to make any sales. The traders followed their example and closed their shops or disposed of their stock by barter. For a time business was at an end, and money almost ceased to circulate except among the supporters of the bank. Rent was paid in grain; nor was it by any means, in some towns, a rare thing to see cobblers exchanging shoes for meat and shopkeepers taking cords of wood for yards of linen."

#### Butt-Welded Steam Pipes Not Safe.

Assistant United States Inspector of Boilers Lyman Howard, reporting on the cause of the explosion on Mr. Coggeswell's yacht Feisen in the Lower Bay, September 9, found that one of the 2,000 pipes in the Feisen's patent "safety" boiler had burst near the base of the furnace on the port side. The pipe was what is known as a "butt weld," and was defective in the weld. The assistant inspector calls attention to the fact that "butt weld" pipes are not considered safe in high pressure boilers.

**Gold in Ocean Water.\***

The waters of the ocean contain gold. In 1851, Malaguti and Durocher determined the occurrence of silver, but did not extend their inquiries into the question of the presence of gold in sea water. This fact was first accurately determined by Sonstadt in 1872. His experiments were not quantitative, but he stated, in parenthesis, that the amount was "certainly less than one grain in the ton." More recently, however, Munster found an average of five milligrammes per ton. In endeavoring to arrive at an approximate estimate, it must be remembered that local conditions, such as the temperature of the water, will affect the amount in solution. Sonstadt's researches were made with water obtained near Ramsey, in the Isle of Man, while Munster got his from the Kristiania Fjord. In each case the sea water was that of a northern latitude. In warmer regions it is probable that precipitation, due to the presence of putrescent organic matter, may diminish the amount of gold held in solution. Let us, however, take five milligrammes (equivalent to one-thirteenth of a grain) as an approximation. This, though in itself a minute quantity, will be found to represent an enormous total amount of gold in the waters of the ocean. From the results obtained from the careful soundings carried out by the Challenger and similar scientific expeditions, it has been computed that the ocean has an average depth of 2,500 fathoms, and that it contains four hundred million cubic miles of water. This is equivalent to about 1,837,030,272,000 million tons, which upon the basis of five milligrammes per ton would represent 10,250 million tons of gold. By way of contrast, it may be added that, according to Soetbeer, Leech and others, the gold production of the world, from the beginning of 1493 to the end of 1892—a period of exactly four centuries—has amounted to only 5,020 tons. The present output is equal to about 200 tons per annum.

The gold in sea water is kept in solution as an iodide. The amount of free iodine present in the ocean is very minute, but a large proportion of that element occurs combined as an iodate of calcium. From the results of a series of six experiments, Sonstadt found that a cubic mile of sea water contains about 17,000 tons of iodate of calcium, or 11,072 tons of iodine. This represents the occurrence in the entire ocean of no less than 4,428,800 million tons of iodine.

The iodine which maintains the gold in solution is obtained from the iodate of calcium. Gold is soluble in extremely dilute solutions of iodine, which, under ordinary conditions, are in turn readily reduced by organic matter. That the gold in the sea is not precipitated is due to the presence of the iodate of calcium, in which it is not soluble, but which, being readily decomposed by putrescent organic matter, liberates the iodine required to keep the gold in solution.

There is reason to believe that the sea waters of today contain much less iodine than those of former geological periods. That there is so little free iodine in the ocean is due to causes parallel to those which bring about the noteworthy absence of carbonate of lime. Marine animals abstract the latter while marine plants absorb the former. How great is the work done in this way is evidenced by the dimensions of the coral reefs and by the extent of the foraminiferous and other marine limestones.

The abstraction of iodine is no less striking. Seaweeds, and more particularly those which grow at great depths, are the chief source of the iodine of commerce. When, after a storm, such seaweeds are cast upon the shores of Great Britain, France and Sweden, they are collected and burned, and from their fused ashes, termed "kelp," the iodine is subsequently extracted by a simple chemical process. From 13,000 kilos of kelp, about 10 kilos of sodium carbonate and 15 kilos of iodine are obtained.

That iodine is not now so plentiful in the sea as during former geological periods has been suggested by chemical investigations into the composition of rocks. Certain sedimentary formations contain notable quantities of it. It has been found in some aluminous shales in Sweden and also in certain varieties of coal and turf. The saline waters of several springs contain large amounts of it. Even rain water has been known to give a recognizable iodine reaction when tested, such iodine having been obtained by the agency of winds which have been blowing over certain areas of the sea where it was being liberated by the action of organic matter upon the iodate of calcium.

**THE Romans built the first dikes in Holland.**

\* Extract from paper read by T. A. Rickard, of Denver, Colo., before International Engineering Congress, Chicago, August, 1893.

**THE MYSTERIOUS CHAPEL OF HERON.**

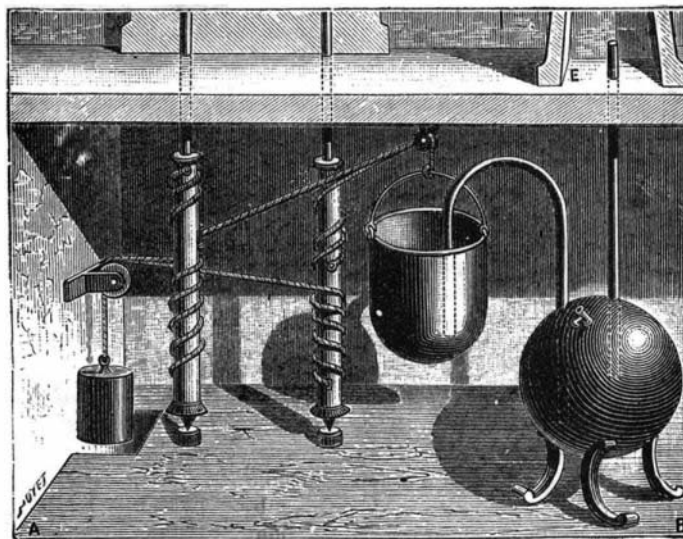
The accompanying engravings represent the construction of a chapel the doors of which are opened by kindling a fire on the altar adjacent, and which closes automatically when the fire goes out. This apparatus is described and illustrated in a work entitled "Les Origines de la Science," by Albert de Rochas, to which we are indebted for the cuts and description.



**MYSTERIOUS CHAPEL OF HERON.**

When a fire is lighted on the altar, which is hollow, the air contained within will expand and will be forced into the globe beneath, and will force the water contained therein through the bent tube into the pail, which is suspended by cords passing over a pulley and wound around two movable cylinders, which are the prolongations of the axes by means of which the doors are operated. Two other cords are wound around these same cylinders in an opposite sense, and after passing over a pulley support a counterbalance weight at their outer end. When, therefore, the water passes into the receptacle the equilibrium will be disturbed, and the receptacle will descend and the cylinders, will be rotated, thereby opening the doors with which they are connected.

This operation is reversed when the doors are closed.



**APPARATUS FOR OPERATING THE DOORS OF THE CHAPEL BY MEANS OF HEAT.**

The bent tube which connects the pail and the globe forms a siphon, the longest arm being inside of the globe. When, therefore, the fire on the altar is extinguished, the air in the altar and globe becomes cold and diminishes in volume and forms a partial vacuum, which draws the water from the pail into the globe. When all the water in the pail has been withdrawn, the receptacle will rise under the influence of the counterbalance weight, and this weight, by means of

its cords, will rotate the cylinders in the reverse direction and will close the doors of the chapel. Heron states that mercury may be substituted for water, which in some cases may be of advantage, because of the greater weight of the mercury.

**Patent—Infringement—Royalties.**

In the case of The Standard Button Fastening Company vs. Ellis et al., recently decided by the Supreme Judicial Court of Massachusetts, which was an action of contract to recover rent or royalties for the use of certain button-fastening machines which were patented by plaintiff, it appeared that while the agreement authorizing the use of the inventions by the defendants was still in force, the patent was adjudged an infringement and invalid. The defendants claimed they were not liable for the rents subsequent to the said adjudication of invalidity. The court sustained a finding for the plaintiff, saying: "So far as the invention described in the letters patent is concerned, the so-called lease was merely a license. No exclusive rights were granted thereby, and anything short of a grant of exclusive rights is a license. A license imparts no warranty that the patent is valid, and no case has been found which holds that a covenant for quiet enjoyment of the right to use the invention is implied. The analogy to a lease of land is not very close. A license to use a patented invention gives permission to make such use so far as the licensor can give such permission; that is, to use it so far as that can be done without infringing other patents. Where a grant of an exclusive right is made, if the exclusive right fails, the consideration of the grant fails. But where a mere license is given, it is held that there is no failure of consideration till the licensee is actually prevented from using the invention. The fact that the license is contained in a lease of a machine does not alter its character. No question arises under that portion of the contract between the parties which is properly regarded as a lease. The only questions are in relation to the right granted to use the patented invention. This right is a license, and is quite different in its legal effect from rights under a lease. No covenant for quiet enjoyment is implied in a license to use a patented invention. When the defendants were prevented from using the invention, they might have refused to pay for the rent or royalties and given up the use of the machine. They did not, however, do this. They continued to use the machine, and now admit that this makes it their duty to pay the rent. There being no implied covenant for quiet enjoyment, this ground of defense fails."—Bradstreet's.

**Labor Day.**

We must confess that we never hear "Labor Day" or "Labor's Holiday" mentioned without a feeling of contempt and disgust for the impudent demagogism on one side, and cowardly servility on the other, which have brought the descendants of those who prepared and defended the Declaration of Independence down to the embodiment in legislation of the idea that, instead of all men being born free and equal, there are two sorts of men in this republic, one consisting of the members of certain organizations, and the other including the miscellaneous persons who do not belong to these organizations, and that those who do belong to them are entitled to favor and recognition from the government which is not accorded to other people. In a community whose whole public system is founded upon the idea that there should be no class legislation, it is certainly curious to find, of late years, statute after statute enacted at the demand of the crafty and ambitious foreigners who control the forces of "organized labor." For several years "organized labor" has, or would have had, but for internal squabbles, things pretty much its own way in the legislatures, but just now circumstances which neither legislatures nor walking delegates can control have given a very large number of citizens more leisure than usual for thinking, and there are indications that a good many of them are reflecting whether, after all, they might not be as well off in the simple capacity of "free and equal" citizens of the republic as they are now in that of abject slaves of a foreign tyranny which dictates to them when, how, with whom and at what price they shall work, which prevents them from teaching their own business to their own children, and which forces them to sit idle and see their families suffer, when work is plenty, for the sake of "sympathizing" with some other people, of whom they never heard, and whose relations to them consist solely in a concerted scheme of their respective leaders for their private advantage. —Amer. Architect.