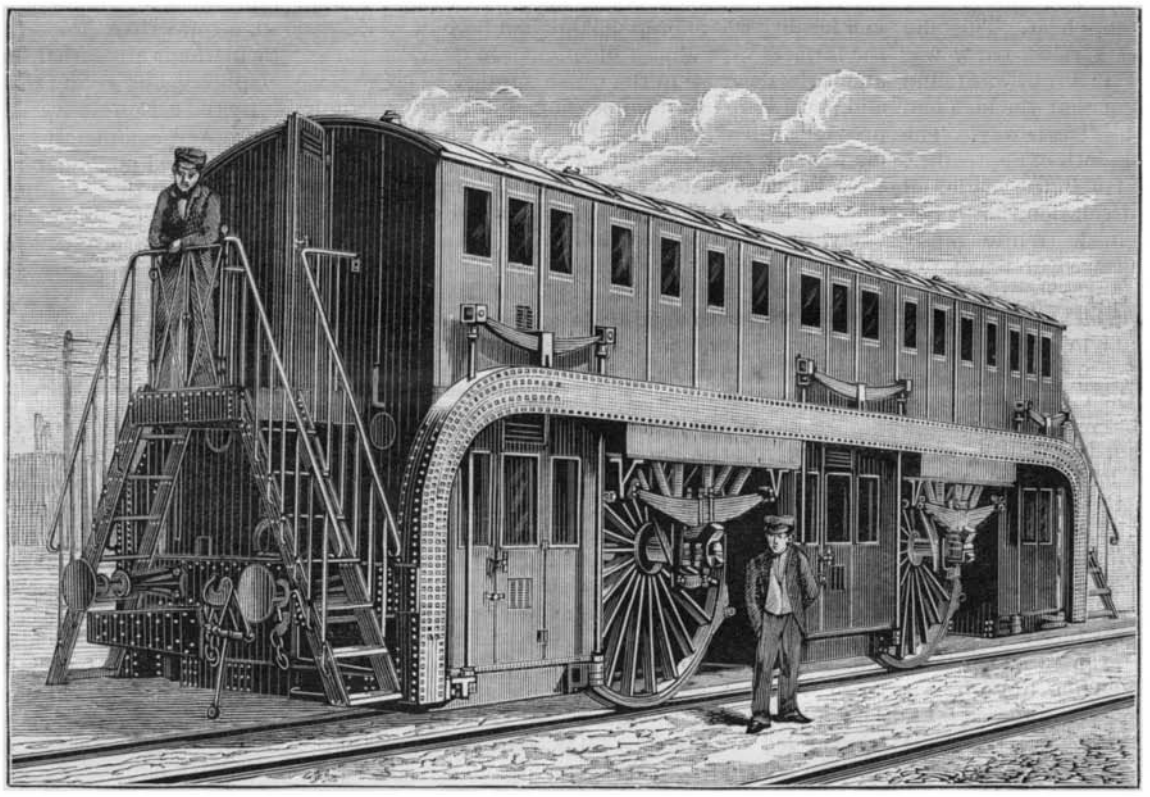
In case of an epidemic, in fact, there would be no establishment of the kind at the disposal of the capital's inhabitants, and, as for the hospital stoves, they are far from offering the proper guarantees that they will operate well, judging from the numerous negative experiments that have been made with them. Now, it is of importance that the disinfecting of soiled and contaminated articles shall not be left at the disposal of the public, for the operation is a nice one and requires apparatus that has been constructed with both a technical and scientific understanding of the question. In 1884, Mr. Siegfried, then Mayor of Havre, prompted by the example of England, decided that every time a case of cholera should be reported to the authorities, two cast iron closed vessels should be carried to the dwelling of the patient, and that in the smaller of these the evacuations should be deposited, and in the larger the soiled linen should be placed. Twice a day these vessels were carried by a wagon to a disinfecting station, and two empty vessels were left in their stead. This was a very wise measure, and one that should be adopted at all times and for all contagious diseases.

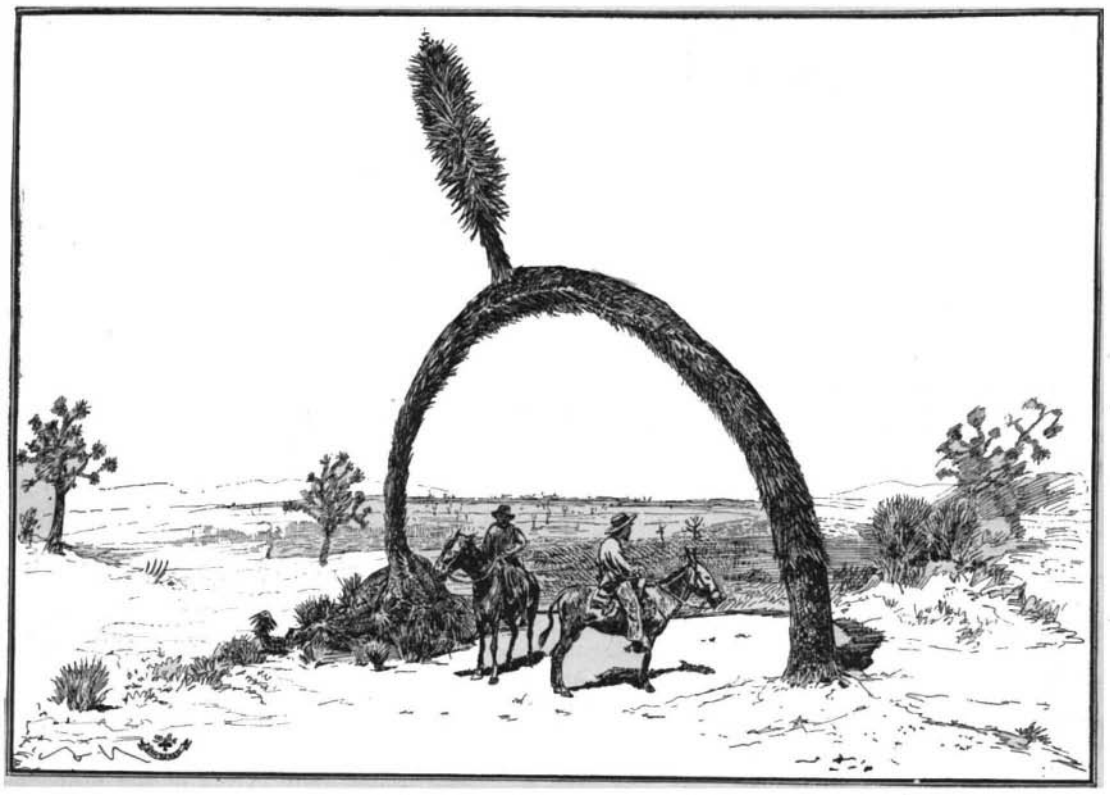
Messrs. Geneste and Herscher's disinfecting stoves are now in use in the Hyera Islands, at Port Cros and Bagau, as well as at Sidi Ferruch, in Algeria, where they are permitting the baggage and clothing of the troops coming from Tonkin to be very quickly purged; moreover, the state transports are soon to be provided with them, in order that disinfection may be effected on board during the trip. Profs. Brouardel and Proust have rightly got the government to adopt arrangements by the terms of which every large ship on which, under the guarantee of a duly commissioned physician on board, precautions of this nature have been taken, shall be admitted to practice after a simple inspection, and when no case of suspicious sickness has been found. Besides, such disinfecting arrangements would allow of passengers being detained in lazarettoes but a few hours only, without danger.

It is often of importance to destroy the micro-organisms which may have settled upon the walls of a house or the sides of a car, ship, stable, and so forth, and which would render a long stay in such structures dangerous. The vapors of certain chemical compounds are here again usually inefficacious, and cause unsightly defacements that are costly to remove. It would be necessary to have a means of placing the walls of rooms and the furniture that the latter contain under the same conditions as the objects purged in a steam stove. But steam, by condensing, soon loses its temperature at the extremity of a conduit unless it can be superheated on its passage from the boiler to the nozzle, and this has led Dr. Redard to devise a method by which this can be done on cars; and Messrs. Geneste and Herscher, taking up the subject, have invented an apparatus for the more general application of the Doctor's process. Let us suppose a movable engine or a boiler placed in the yard of the house, or near the car or other object to be disinfected. A pipe leads the steam from the boiler into a peculiar superheater (Fig. 2) consisting of several transportable parts, from whence it enters a series of conduits analogous to those used by street sprinklers. A perforated tube placed at right angles with the extremity of the conduit allows the operator to project steam of 110° C., with the greatest ease, all along the surface to be disinfected.

Finally, Messrs. Geneste and Herscher's disinfecting apparatus are completed by a stove for sterilizing the spittle of consumptives. This (Fig. 3) consists of two rectangular copper boxes placed upon a brazier or a gas or charcoal stove, according to circumstances. One of these contains a saline solution whose boiling point may be higher than the temperature necessary to destroy the tuberculous bacillus, while the other contains an appropriate lixivium designed for disintegrating the glutinous envelope of the spittle and for washing spittoons. These latter are placed in a metallic cage which is passed into the boxes alternately. After an ebullition of a few minutes, the disinfection and cleansing are complete.—*La Nature.*



ESTRADE'S PASSENGER CAR.



REMARKABLE YUCCA TREE.

Diseased Eggs.

Dr. D. F. Wright, in the *Bulletin of the Tennessee State Board of Health*, says that soon after it became the practice to transport eggs in large quantities and to long distances by railway trains, it was found on their arrival that adhesion had taken place between the membranes of the yolk and those of the shell, so that the yolk could not be turned out of the shell unbroken. On examination by experienced pathologists, this was found to be the result of true inflammation; the material of the adhesion was found to be precisely the same as that of the plastic exudation in inflammation of the lungs or bowels. It will at first seem absurd to speak of inflammation in such an unformed mass as an egg; but this arises from our forgetting that, structureless and unorganized as it seems, the egg, even when fresh laid, is a living being, and capable of disease from external causes. The cause of this inflammation is undoubtedly the shaking and friction from the motion of the cars, and it cannot but render the egg more or less unhealthy, as the products of inflammation can never be as salutary in food as those of healthy growth.

ESTRADE'S RAILWAY CARS.

In our issue of July 17 we gave a description and illustration of Mr. Estrade's high speed locomotive, the distinguishing features of which are wheels of large diameter with coupled axles and a new style of double suspension.

Mr. Estrade's cars (see accompanying engraving from *La Nature*) are mounted in the same way.

The adoption of wheels of so large a diameter has led to the necessity of giving these cars quite a peculiar form, and one very different from that of the ordinary type.

As it was necessary to raise the flooring above the axles, an endeavor has been made to utilize the space left free between the latter by the adoption of a two-story car. The upper of these stories is on a level with the top of the wheels, which are inside of the frame. In the lower portion we thus have three distinct compartments, isolated by the wheels and prolonged toward the axles by narrow passages that may be used for water closets or for the storage of luggage, and, in the upper portion, a single saloon with central passage, to which access is had by stairways at the ends of the car. In certain respects, this general arrangement recalls that of the Vidard type, with central passageway, which is met with on a few lines in the suburbs.

All the vehicles of the same train will be connected at the level of the central passage by coupled platforms provided with hand rails, so that access may be had to all parts of the train, as in American railway practice. The car thus arranged, with its two stories, contains 54 first-class seats in a total length of 43½ feet between buffers.

The double mode of suspension of the body forms one of the most interesting peculiarities of the car. The two axles, which are 16 feet apart, support, through the intermedium of elliptic springs resting upon the grease boxes, a large iron girder, which runs the entire length of the car, and is curved toward the ground at the extremities.

Each of these girders carries three elliptic springs, which support the body of the car through suspension rods connected with a lower frame.

The increase in the size of the wheels, which are 8¼ feet in diameter, will undoubtedly have the effect of reducing the tractive stress; but, with Mr. Roy, who made a judicious observation on this subject in a discussion of the Society of Civil Engineers, we may ask whether such reduction will be very perceptible. It will likely not exceed 1½ kilogramme per ton hauled, that is to say, it will reach nearly a tenth of the mean stress that the locomotive ought to develop during a normal run over an ordinary line, taking into consideration the resistance of the air, of curves, of gradients, and, in a word, of all resistances that are independent of the diameter of the wheels. However this may be, the experiment is, in every respect, of the most remarkable character, and we shall watch it with the greatest interest.

THE VALUE OF A DESERT TREE.

In approaching the to be State of Southern California from the east, a region is passed that seems arranged by contrast to intensify the beauties beyond. This tract is best known as the Mojave desert, and an equally sterile region lies to the southeast in Arizona.

Before the days of the railroad, these places had to be crossed by horses and wagons; and as in some localities a temperature of 130° has been recorded, that to pass it is a test of human endurance may well be

imagined. A horse dealer, who rode over this desert in June, informed me that even then he had the greatest difficulty in making the trip, and that the heat was so intense and terrible that the mind was often affected by it. I asked him if he expected to return this summer, and his reply was that no amount of money would induce him to take the trip so late in the season, and that he had reason to believe that two trains containing families that had started after him had fallen victims to the intense heat. They did not arrive when they should, and a relief party was sent back, but could not find them; a trail was found winding round and round, showing that the men had evidently become confused and lost their way. The writer crossed this desert in the month of September, when the thermometer indicated 110° in the shade and in a current of air. The scene of desolation that is pictured here can hardly be imagined. White sandy wastes stretch away as far as the eye can reach, not a living thing being visible, and not a drop of water or even a rain cloud. The only evidence of its presence is seen in the great washouts in the sand, dry beds of mighty streams that flow for a few hours while the rain continues, and then disappear mysteriously in the treacherous sand. While water is not to be found in this desert region, its wraith, as it might be called, is often seen leading the weary traveler for long distances from the trail, to find it a mirage, a delusion, and a snare. I was particularly impressed with the perfection of this deception in crossing the great Utah desert. Frequently large lakes would appear ahead, apparently about six or eight miles away. The water was as distinctly visible as any that I have ever seen, and even the reflections upon it appeared to be visible. This illusion was kept up until within half a mile of the supposed lake, when it would slowly fade away or take the shape of a glaring sandbank.

On the Utah desert the landscape is relieved by wonderful scenery, the general outline of the country resembling that of the Bad Lands—castles, fortresses, towers, wonderful spires, and even walled cities, being pictured in the rocks on all sides; but in the Arizona and Mojave deserts, the country is, as a rule, level. Curiously enough, the inventive genius of man has discovered a use for some sections of this country. Approaching the borders of the desert, signs of vegetation are seen, and especially, on the Arizona section, the enormous candle cactus, described in a previous number of the SCIENTIFIC AMERICAN. On the Mojave tract, the cactus seems to give place to groves of the yucca—strange, weird growths, the veritable reptiles of the vegetable world in the remarkable shapes they assume. Nature seems to have exhausted all her ingenuity in devising new forms and positions for the trees growing in the sand, as dry as the utter absence of moisture can make it. They rise from ten to thirty feet in a single stalk, and then branch out in club-like limbs, attaining every possible shape. Some appear like strange insects of gigantic stature, sprawling over the plain; others resemble candelabra, the thick, branching spires representing the charred wick; others again look like weird hands extending from the ground, as if grasping or groping after the unattainable.

One of the most remarkable positions is shown in the accompanying cut, which shows a yucca of extreme size; the top of which, too heavy for the trunk, has bent over, descended, and attached itself to the earth again, forming a complete arch, under which four or five horses could pass abreast, and twelve or fifteen feet at the highest point. From near the top of this singular arch springs a single limb, presenting the appearance of a tree of a totally different kind growing from the bent and curved trunk. Our engraving is taken from a photograph of the tree.

To the ordinary observer, these grotesque creations would seem to have little value beyond attracting attention from the barren, sandy waste, and perhaps relieving the monotony; and few tourists could be prevailed upon in crossing the desert to accept as a gift one or a thousand acres. In point of fact, most of this yucca land has been bought up, and is controlled by two or three companies, mostly English. Their organizers discovered that the trees afforded a valuable pulp that could be made into paper, so to-day every yucca tree has a certain value, and, curiously enough, the London *Telegraph* is printed on paper made from these trees of the American desert. The *Telegraph* company has been among the foremost in Europe in investigating the pulp question, and it is understood that the yucca is the most satisfactory material yet obtained, either in North or South America.

In the late Southern California Fair specimens of the pulp were exhibited at Los Angeles, showing the wood in various raw states. The paper is manufactured in England, the fiber being merely crushed in this country, and packed for shipment in bales; the ensuing conversion into paper being a too well known process to dwell upon. The supply of yucca, as far as appearances go, seems practically inexhaustible; but when it is remembered what a vast amount of paper a daily or weekly newspaper of good circulation uses, it is evident that, after a while, the slow-growing yucca will become exhausted; but, as pulp hunters are continually in the field in every country, some new material will probably be found to take its place.

That the discovery that pulp will make good paper is undoubtedly of value, no one will deny; but when the question of despoiled forests is brought up and fully appreciated, it will perhaps be found that we are robbing Peter to pay Paul. Two or three years ago I spent some months in one of the New England States, in a locality where pulp makers had been at work, and the farmers were almost unanimous in their complaints about the decrease in the water supply. The streams and pools were fast disappearing, and I was shown depressions, then perfectly dry, that my informant told me was all that was left of one of the finest trout streams in the State when he was a young man; and in this section, where the brooks had not disappeared entirely, they were reduced so in volume that their usefulness was almost totally impaired. This is merely the experience or history of a single locality, but it serves to show that pulp making is a menace to the agriculturist or farmer, and if the rag supply should fail, he would be called on to decide between trees and books.

Cremations at Pere la Chaise.

Next month the Parisians will be able to burn their dead in four crematory furnaces, which have just been finished at Pere la Chaise. These furnaces were begun last November, and have been hurried on to completion, so that by the end of August at latest, those who, in dying, express the wish to be cremated can be there reduced to ashes. There will be no first, second, and third class cremations. Poor and rich will be on a footing of absolute equality. The price charged to those who can afford to pay for the burning of a corpse will be 15 f.—or say 12s. The furnaces were constructed on plans by MM. Barrett and Formice. A large portico is in front of a dome, beneath which are placed the crematory furnaces. They have the appearance of very elegant ovens. Three hundred and fifty thousand francs was the price they cost. They are according to the Corini system, in use in Rome and Milan. It was found that the heat of the Siemens furnace was too intense. Instead of reducing the corpse to ashes, it subjected it to a kind of vitrification. The cost, too, would be 200f., instead of 15f., to cremate with a Siemens furnace. The unclaimed bodies at the hospitals which are not used for anatomical purposes will be taken to the crematory at Pere la Chaise. Sculptors, goldsmiths, and bronze casters are already busy designing urns, of which an assortment in marble, bronze, gold, silver, zinc, or lead will be kept at an office of the crematory. The relatives of the cremated dead can buy these vessels, and cause them to be removed to family vaults or to a building which the city of Paris is to erect. There could be no greater boon to a large city with overcrowded cemeteries than the furnaces of Pere la Chaise. I cannot conceive anything more disrespectful to the dead than the way their remains are treated here, even when a first-class burial can be provided, if there is not a family vault in which to place them. Buying a grave is no simple matter. The delays are endless, and the application for one must go through many bureaus before official consent is given. Then there are other formalities to be gone through. Meanwhile the corpse is in a charnel house, called a provisional vault, at a cost of 1f. a day. The removal thence to the grave, which must be in masonry at the sides, is a cause of danger to the public health.—*London Daily News.*

A New Process for Soap.

At a recent meeting of the National Agricultural Society of France, under the presidency of the distinguished father of tinctorial chemistry, M. Chevreul, the question of the utilization of suint, the natural grease found in wool, was discussed. The subject is not a new one. Half a century ago, M. Chevreul had made known the elementary composition of suint, but from that day to this, little or no use has been found for it. Flowing from wool scouring machines into natural watercourses, it pollutes them and renders the lands through which they run insalubrious. The evil is a growing one. Since his first researches, the consumption of woolens in France has doubled. Her annual clip has grown to 220 millions of pounds, and she imports at least an equal amount. Of these 440 million pounds, nearly 50 per cent is waste, of which the principal part is suint.

To utilize this enormous quantity to the profit of the soap industry has long been a favorite project, but the difficulties in the way have been too great, because the suint, in the condition in which it is extracted, has been found to be non-saponifiable.

To adapt it to the purposes of the soap boiler, and thus make it available in the manufacture of the 600 million pounds of soap annually produced in France, would at once rid the textile industries of a great and growing nuisance and cheapen the cost of one of their indispensable necessities. M. Rohart exhibited before the society above named a quantity of soap made by him on a large scale, from suint, at the works of Michaux Brothers, at Aubervilliers. He first changes the elementary composition of the suint, by the use of sulphur. This he does by simply raising the grease to its fusing point, and bringing it in contact with sulphureted hydrogen. The gas is absorbed in large quantities, as high as 100 times the bulk of the grease being taken up. At the close of the operation the sulphur has become a constituent of the fluid mass, which, like almost all other fatty matters, when simply treated, acquires new properties, permitting it to be treated by methods altogether different from those previously employed, and giving rise to products also new.

By the action above stated, suint becomes immediately and completely saponifiable in the cold. The soap formed no longer possesses the odor peculiar to suint, nor is that of sulphureted hydrogen perceptible. An intimate combination of the constituent principles of the matter formed has therefore taken place. This is further indicated by the fact that if the mixture be run into the pans to grain at 30° to 40° C., its temperature will rise in a few hours to 60° or 70° C.

In practice, the result is of uniform quality, fine grained, and perfectly homogeneous. The operation is finished in an hour, while usually the making of a batch of soda soap takes six or eight days. The claim is made that if strong, upright machine mixers be used, 100,000 pounds of soap can be made in a day, without much expense either for labor or fuel. In view of its many applications, this is a very cheap soap.

The great interest naturally felt in this discovery is enhanced by the new chemical reaction which it has revealed; a reaction as unexpected as it is valuable. Contrary to what has hitherto been known concerning the saponification of fatty matters, this can be produced completely without first rendering the alkali caustic. Alkaline carbonates serve the purpose perfectly. This new scientific fact is not only applicable to fats which have previously been converted into fatty acids, but is true of all such matters, including suint, which are not normally saponifiable, even with caustic alkalies; for in the presence of fatty bodies previously sulphurized, alkaline carbonates are immediately decomposed, even in the cold. Carbonic acid gas is so abundantly disengaged that unless the vessel be deep, a portion of its contents will froth over. If this be avoided, the result will be a soap perfectly defined.

The change undergone by the suint would seem to be due to substitution, a molecular movement which reveals the power of the affinity of the alkalies, or rather perhaps of the alkaline metals, for sulphur. This fact must be recognized in accounting for the expulsion of carbonic acid from its combinations with potassa and soda. That, under the circumstances, this gas should be expelled, is not only a surprise to the scientist, but a great boon to industry. If, in the state of the caustic alkali, a certain quantity of soda cost 46 cents, that quantity in the form of carbonate would cost 29 cents, a difference of 17 in 46, say 38·5 per cent. Where, as in Marseilles, many millions of pounds of soda are annually used in the soap manufacture, the importance of this saving is manifest. Moreover, as the result is the same with the carbonate of potassa as with the carbonate of soda, it is doubtless possible to apply the process directly to the manufacture of softsoaps, using for the purpose the crude "pots and pearls" of commerce.—*Textile Record.*

The Treatment of Rabies with Hoang-nan.

According to the *Gazette Medicale de Nantes*, twenty four cases of rabies have been treated with hoang-nan by Dr. Barthelemy and several other medical men of that city or of the department. The first case so treated was in the month of March, 1882, the last in April, 1885. Ten times, at least, the bites, which were most frequently multiple, were situated ou the hands, once on the hand and on the face. In the majority of cases cauterization was completely omitted, or practiced several hours or even several days after, with agents little active, such as liquid ammonia or a solution of carbolic acid. Two of the patients, who were closely observed by Dr. Barthelemy—viz., a man of thirty and a lad of sixteen—presented symptoms of rabic mania: persistent insomnia, anxiety, nocturnal agitation, the desire to run, hallucinations, barking, etc. However, none of these persons felt hydrophobia, nor have any of them, to this date, succumbed. The duration of this preventive treatment was, on an average, twelve days. The total dose of the powder of hoaug-nan ingested during this time varied in adults from six to eight grammes. It was scarcely necessary to go beyond one gramme per day to obtain the physiological effects of the medicine—exaggeration of the reflexes, cramps, rigidity, slight trismus. The maximum dose was arrived at progressively, and in some cases the treatment was terminated by gradually decreasing doses. From the above cases the author deduces either that rabies is communicated much more rarely to the human species than is generally admitted, or that the hoang-nan, administered progressively to the physiological effects *during the period of incubation*, sufficiently and efficaciously modifies the nervous system and the entire economy to prevent the evolution of the rabic virus.