

Another hand, *k*, representing the moon, and making exactly one revolution from one new moon to the next following, has been added.

The hour and minute hands of the different dials are independent of each other, so that one set of hands may be set, if necessary, without affecting the others; but, as has been already said in describing the differential motion, the second hands are connected, so that if either of the clocks should vary one way or the other, the seconds of right ascension would also be affected. In that case it is simply necessary to correct the second hand of that particular clock, when the seconds of right ascension are thereby also corrected.

The shaft, *h*, carries the second hand of the large

autumnal equinox. The signs of the zodiac are also engraved on the dial in their proper positions, as shown in Fig. 2.

The name differential is applied to this clock because the hands of the large dial are indebted for their motion to the difference of speed in the two separate clock movements, the mean right ascension of the sun being always the difference between mean solar and sidereal time; and the inventor's theory is that, starting the hands at zero or 24 o'clock, regulating one to sidereal and one to solar time, they will come together again at the end of the year, that is, the hands of the large dial will have made a complete revolution, and the solar clock will give the exact time to a second when the year is completed, or any portion of the year.

This clock is intended for the Observatory at Dudley, Mass., connected with Nichols Academy, where it will probably be placed the coming season.

SIXTY TON CRANE.

Shear legs, says *Engineering*, are now frequently used by marine engineers for the purpose of placing boilers, engines, and other heavy machinery on board

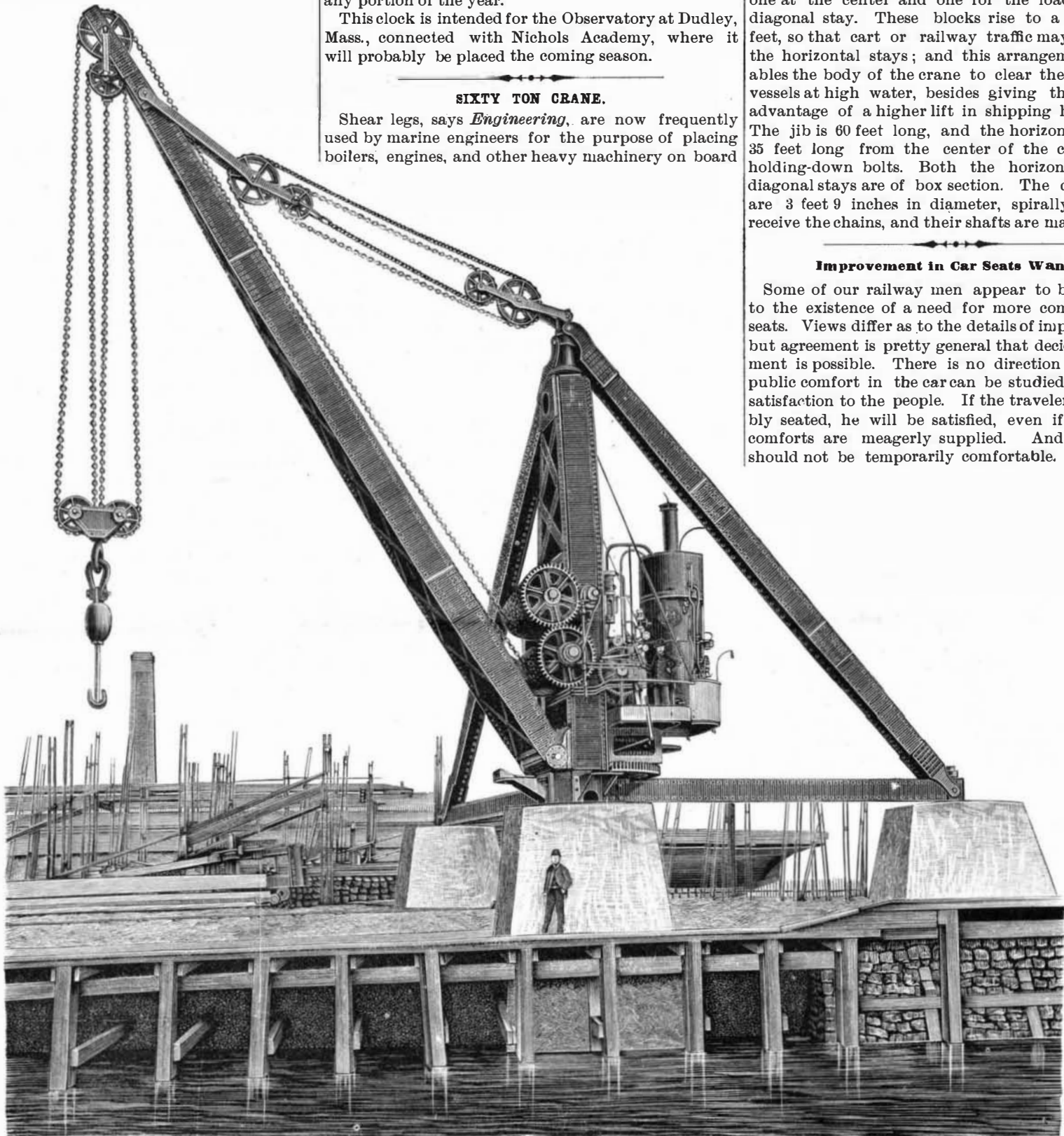
their respective places, just in the same way as when shear legs are being used.

A crane such as we illustrate herewith is free from these defects. The jib rises and falls by power, and thus secures the covering of a large area. Boilers or other loads may be stored all round the wharf, and, by adjusting the jib radius, may be placed exactly in position on board the vessel, which remains moored, or may even be aground.

The crane now illustrated was constructed by Messrs. George Russell & Co., and has been placed on the wharf in the works of Messrs. D. J. Dunlop & Co., engineers and shipbuilders, Port Glasgow. Its working load is 60 tons, lifted at a radius of 35 feet. The foundation consists of three concrete blocks—one at the center and one for the loading of each diagonal stay. These blocks rise to a height of 14 feet, so that cart or railway traffic may pass under the horizontal stays; and this arrangement also enables the body of the crane to clear the gunwales of vessels at high water, besides giving the additional advantage of a higher lift in shipping heavy masts. The jib is 60 feet long, and the horizontal stays are 35 feet long from the center of the crane to the holding-down bolts. Both the horizontal and the diagonal stays are of box section. The chain barrels are 3 feet 9 inches in diameter, spirally grooved to receive the chains, and their shafts are made of steel.

Improvement in Car Seats Wanted.

Some of our railway men appear to be awakening to the existence of a need for more comfortable car seats. Views differ as to the details of improved forms, but agreement is pretty general that decided improvement is possible. There is no direction in which the public comfort in the car can be studied with greater satisfaction to the people. If the traveler is comfortably seated, he will be satisfied, even if some other comforts are meagerly supplied. And the seating should not be temporarily comfortable. A seat may



IMPROVED SIXTY TON STEAM DERRICK CRANE.

dial, and from it an ordinary train of wheels gives minutes and hours; when the hour hand passes entirely around the dial, it indicates that the sun has passed through all the hours of right ascension, and a year of time has been exactly measured off. The hand representing approximately the moon's mean right ascension revolves 254 times in 19 years, or a lunar cycle, and passes the sun 235 times in the same period, making that number of lunations. The large dial also represents that portion of the heavens traversed by the sun and all north of the same, the center being the north pole. A number of the most useful and best known fixed stars are engraved thereon, with their names affixed. The eccentric circle represents the ecliptic; the equator and northern and southern Arctic circles are concentric, the latter being the outer one. The sun touches the outer circle on the 21st of December (the winter solstice) and the inner or northern circle on the 21st of June (the summer solstice). It passes the 24th hour of right ascension and crosses the equator on March 21, or vernal equinox, and at the 12th hour of right ascension it again crosses the equator, on September 21, the

large steamers; but inasmuch as their motions are restricted to two, their usefulness is also limited. The motions referred to are hoisting or lowering and traveling outward or inward in a straight line at right angles to the wharf on which the shear legs are erected. When a boiler or piece of machinery is to be shipped, it must be brought under the lifting block. It is then raised and projected outward until it hangs directly over the vessel, which is itself then moved forward or aft, so that the object that is being dealt with may be lowered into its exact position. It will thus be seen that shear legs of themselves only cover a line, though by moving the vessel they can be made to cover an area.

Cranes having a fixed radius of jib are sometimes used for similar purposes, and such cranes have a slight advantage over shear legs, as the boilers and pieces of machinery may be deposited upon the quay or wharf under the range of the jib, ready to be lifted on board; but in this case also a line only is covered—the only difference being that it is circular instead of straight, and the vessel must be moved forward or aft when the loads are being lowered to

be so constructed as to look inviting and luxuriously easy, and so as to be really easy for a while, but its lines may yet be such as make it very wearying when it is occupied for any length of time. The limitations in the way of the designer are not to be lightly dismissed. He must make his seat reversible, which fact bothers him not a little. He must be economical of space, and must study conditions of cleanliness in both the seat and the car. Cheapness of construction and strength must also not be lost sight of. But with all these it is yet not an insurmountable task to design a seat that will be very much more comfortable than the majority of those now in use, and we are glad to see that efforts are being made to obtain such a seat. —*The Railway Review*.

ONE of our contemporaries reports that Isabella, ex-Queen of Spain, is not only an owner of considerable real estate in Philadelphia, but is a shareholder in the Keely motor. From the same source we learn that the Motor Keely promises positively to moté very soon, but it begins to be believed that his moté is the much-quoted one which is all in his eye.

Hydrophobia Can be Cured.

If there are occasions in which the people should be taught what to do in emergencies, poisoning is one instance; and the dread disease hydrophobia is an instance of poisoning at once so peculiar, so subtle, and so generally fatal that the profession, who may only encounter it once or twice in a lifetime, and the citizen who may be far removed from a physician or druggist, should both know that, properly treated, it need not be fatal to human life, and that in more ways than one can immunity be gained. Let one thing more be understood—no quack nostrum and no "secret remedy" will be the subject of reference in this article; nor is it the purpose of the writer to take up medical terms or an analysis of causes or effects, but to put in a clearly stated way certain facts with reference to "rabies," "canine madness," or hydrophobia into plain language, so that if, by unfortunate contact, either child or man shall be bitten, the correct means may be taken to neutralize the inoculated poison, by certain and simple methods, at the earliest moment, and not wait for development and the fearful scenes so often looked upon by the physician (in the past), who has, as a rule, been completely helpless.

The clothing upon the human subject may prevent inoculation, and it *may not*; cases have been known where only a grazing of the skin has been observed, which has conveyed the poison as effectively as a dozen incisions or punctures could have done it, and in due time the person so slightly wounded died in spasms.

Cauterization of the wound *at once*, whether it be deep or shallow, even if only a graze, should be accomplished with the least delay, first washing the wound with a solution of salicylic acid, or with a saturated solution of permanganate of potash, or a solution of aqua ammonia and water, or carbolic acid and water, and then well dried with a sponge; then cauterize—and the average man need not be told that cauterize means "burn." The physician will use caustic potassa; but if the physician cannot be had, any person can wash out the wound as above, and then use a cherry-hot iron, carefully touching every part of the wound. Time is the important element, and human life "the stake." As soon as this is done, get anything possible that will maintain suppuration, or what people know as a running sore, and this should be kept up for five or six weeks, meantime cauterizing about once a week; but the utmost care should be taken to destroy all the bandages and the matter upon them, for inoculation of a dog or cat with the matter discharged from such a wound has produced the hydrophobia in from 16 to 50 hours. Hardly any case is likely to occur where a physician cannot be had in an hour or two, but let prompt means be taken, and make sure at every step.

Several drugs and plants have in years past been claimed as specifics for this dread affliction. There are two positive cures now known, and records prove that both have been relied upon by different physicians, and in different countries, with success.

If cauterization has been carefully attended to, the Turkish bath every second day has completely eliminated the poison; and a French physician, Dr. Buisson, some eighteen years ago, had an opportunity to try the vapor bath, on his own person, and was successful, yet the bath has not had credit for all it has done or might do, if we judge by accessible records.

In 1878, a remedy which has proved its efficacy was first brought to the notice of physicians in a general way, although known limitedly before, and it has continued to be not only available (for Parke, Davis & Co., of Detroit and New York, prepare it regularly), but reliable. It has been used in New York State, and the writer is not positive but in the city of New York.

The remedy is, to the writer's knowledge, in use in New Granada and Guatemala, as a positive remedy for the bites of a number of varieties of poisonous snakes, as well as scorpions, tarantulas, and other reptiles or animals; and such reliance is placed upon this remedy that the natives will not go upon hunting or exploring expeditions without they are first supplied. The remedy referred to is the seeds of a small tree of the order *Simarubæ*, indigenous to Granada, Guatemala, and Mexico. The seed are known as *cedron seed*, and the tree as *Simaba cedron*. A fruit with a single seed like the peach or olive is grown, and the seed is from an inch to one and a half inches in length, four-fifths of an inch in width or more, and half an inch in thickness; flat or concave on one side and convex on the other; hard, and when cut with a knife shows almost a metallic luster; very bitter indeed. The natives cut the seed and chew pieces, when bitten by snakes or tarantulas, and place the fragments upon the wound, and chew and swallow pieces of the bean. Sometimes, if spirits are available, they dip slices or chips of the bean in brandy, whisky, or other spirits, and then wash the wound, swallowing meanwhile other portions. When thus armed with the cedron seeds, they have a reliable antidote, and seemingly do not care much about a snake bite, if only the cedron seeds are at hand.

On the Pacific coast the virtues of the cedron seed have been proved as an antidote for the bites of the several species of the *Crotalus*, or rattlesnake, family,

that abound there, and the hunters and trappers are familiar with the virtues of the seed, and almost implicit confidence is placed in them.

The cedron seed have succeeded in hydrophobia, after all other remedies had failed to allay the spasms in the third stage; and the fluid extract of cedron seed has proved a complete remedy in not only a single case, but in other cases noted and recorded. The remedy has been used by a physician in New York, whose name cannot be cited at the moment of writing, who, called in consultation, gave cedron seed extract, after a lady was so nearly unconscious, and in spasms, that hypodermic injection was resorted to; and in less than half an hour she had stopped barking, whining, came out of the spasms, and a complete recovery was effected. Other cases are on record and can be verified, and such being the case, it seems that the fact should be spread broadcast, that the lives of those who may be inoculated shall not be sacrificed for lack of knowledge that a remedy exists.

The cedron seed has also other medical properties which need not be here discussed. The analysis of the seed has not, so far as the writer is aware, been made, but it is a somewhat curious fact that cedron seed should be so completely an antidote to the rattlesnake poison, which contains formic acid, and also for the specific virus of the rabid dog, wolf, cat, fox, or other animal, and is practically the first really reliable cure of rabies known.

The writer's attention was first called to this remedy in 1879 by a letter from a medical friend then in Guatemala, and since that date by cases in which the remedy has been completely successful, and also to the record of cases reported in which the same remedy has been made use of with the most gratifying success.

The cedron seed proves to be an arterial excitant, and effectively overcomes the sedative power of the injected poison from the fangs of the rattlesnake, which is so thoroughly put into circulation when a human being is struck, and which operates so speedily; while in the case of the graze or bite of the rabid dog, more time is required for the virus to operate on the system, owing partly to the fact of its ineffective induction.

Whatever serves to throw any protection around human life should be understood by the greatest number of the people, especially in a country so overrun with worse than worthless curs as our own, and where no one is safe from their attacks.

THOMAS PRAY, JR.

New York, Dec. 15, 1885.

Saving a Life by Telegraph.

A number of the operators in the main office of the Western Union Telegraph Company at New York are graduates in medicine or medical students who are thus working their way through college. Occasionally they have an opportunity to use their knowledge to good advantage. It recently happened that one of them had his attention attracted by a somewhat unusual message that was being elicited out from an instrument at Big Indian, near Kingston, N. Y. It stated that a certain physician at Pine Hill, three miles distant, was wanted immediately to attend a young person who had just swallowed an ounce of laudanum. The student-operator asked at once for all the particulars, and on receiving them a consultation was held at the New York office. It was decided that it would be hazardous to postpone treatment until the doctor could be found and driven three miles to attend a patient in so dangerous a condition.

The council therefore telegraphed the operator at Big Indian to see that the prescription which they sent was carried out immediately. They prescribed that powerful emetics should be administered, suggesting home made ones, such as lukewarm water and mustard and water, after which the patient was to be vigorously rubbed and whipped with switches to prevent sleep. This unexpected order was faithfully carried out, and with such happy results that the poison failed to act. The physician arrived an hour later, but his attendance would have been useless had the precious interval been wasted. Few more curious instances of frustrated suicide could be cited out of the entire library of fiction.

Dot your I's and Cross your T's.

What the compositor asks (but at present cannot obtain) is, not that the *n* and *u* be made alike, but that each have its distinctive shape; not that the *l* be made similar to *l*, but that it be crossed, or else formed after the fashion much in vogue, namely, a stroke more or less sloping, with a loop in the center on the side farthest from the letter following it; and lastly, that the *i* be dotted, an omission which seems to meet with great favor among authors, though it is very tantalizing to the compositor, since in bad manuscript the undotted *i* may be taken to represent either *c*, *e*, or *r*, or even be supposed to form part of what in reality is the letter *m*. But if the *i*'s were dotted and the *l*'s crossed, few complaints would emanate from printing offices, or, indeed, ever be heard, so great an aid is the due placing of these letter belongings in the task of deciphering.

Central Milk Factories.

The tendency toward industrial centralization for the production of purer articles, and the prevalence of more reasonable prices, is nowhere better illustrated than in the Central Milk Factory at Hanover, as described by Canon Bagot in *The Farmers' Gazette*. The milk supply of the city was formerly in the hands of several small middlemen, who often gave inferior milk, and were inattentive to the proper cleanliness of the cans and vessels employed. Twenty-four farmers in the neighborhood, therefore, formed themselves into a company, for the purpose of erecting a factory, and supplying the city with pure, unadulterated milk and its products. Very stringent rules were drawn up for their self-government, and provided for the proper economic handling of their aggregate supply, enacting at the same time heavy fines from any member who should deliver milk to the factory wanting in the proper amount of fat, adulterated, or taken from diseased animals, or within five days after calving.

These rules have been sufficiently severe to insure the supply of a superior article. The factory is open to the public to see for themselves the scrupulous attention given to cleanliness, and they are even at liberty to inspect the farms from which the milk is brought, and satisfy themselves about the condition and keeping of the animals.

The floors throughout the building are wholly of concrete, and the walls are cemented, having a dado of blue and white enameled tiles. The drainage and ventilation have also received the most careful attention. The factory is divided into three separate departments for milk, butter, and cheese, which have no communication with each other. The milk is received in a main entrance hall, where it is poured into a large receptacle, holding 90 gallons, on a weighing scale, and the weight automatically recorded. The milk is then run off in an open gutter to the various tanks, either for delivery or for separation. All of these tanks are surrounded by cold water jackets. The milk for separation is heated to 90° F., and the cream separated by means of mechanical apparatus. After ripening, the cream is churned, and the milk is taken out of the butter by a mechanical worker, washing with water being entirely avoided. The separated milk is heated to 158° F. to destroy any animalcules, and is then cooled by passing through tubular refrigerators. After this treatment the milk will keep sweet for two or three days. The greater part of it is now used for cheese making, but it is hoped that when the superior quality of the separated milk becomes better known and appreciated, it will all be sold in the city, and the cheese department will be given up. The opinion seems to prevail that separated milk contains little nourishment, but this is really not the case. Good whole milk, when fresh, contains 87½ per cent of water and 12½ per cent of solids, divided as follows:

Butter fat.....	3	per cent.
Casein and albumen.....	4½	"
Milk sugar.....	4½	"
Inorganic, including phosphorus.....	½	"

The only constituent the separator removes is the butterfat, leaving all the nourishing qualities of the whole milk. As the fat in cow's milk is largely in excess of that in human milk, fresh separated milk is safer to give to infants than the whole milk. By the addition of milk sugar, it is the best possible substitute for human milk.

Cleanliness has a money value in the dairy business, as has been shown in the success of the famous Darlington Dairy near Philadelphia and the Litchfield Farms in Connecticut. At Hanover this point is always kept in sight. All cans are first cleaned with soda and water, a jet of steam is then passed into them, and finally they are rinsed thoroughly with cold water and allowed to dry in the open air. From the time the milk enters the factory until its exit, in its various forms, no hand is allowed to touch it, the whole process of working and conveyance being mechanical and automatic. The company is its own distributor, and the same scrupulous care is given to the products while in transit, so that they shall be delivered clean and pure. Tickets for eight gallons or upward of whole or separated milk are sold at a reduction of five per cent, which with the superiority of the company's products has insured its commercial success.

About 2,000 gallons of milk are received daily, and handled at a cost of about two and a half cents a gallon. The capital invested in the enterprise is about \$30,000, and the annual expense, including interest and depreciation on stock and plant, amounts to \$20,000. Canon Bagot suggests that the advantages of such central factories can be made mutual. When managed as well as that at Hanover, the farmer can reach his customers at less expense than when dependent upon the indifferent services of the ordinary middleman, while the consumers are better served, and receive a purer and more wholesome article. He also urges that when the virtues of separated milk become known and appreciated, it may be used to good advantage in the cause of temperance reform, as it offers a beverage at once cheap, nourishing, and agreeable.

Cleaning Out Waste Pipes.

The annoyance arising from the stoppage of waste pipes in country houses, although very great, is but a small matter compared with the dangers which may follow obstructed pipes. The "sewer gas," about which so much has been written and which is so justly dreaded, is not, as many suppose, the exclusive product of the sewer. Indeed, the foulest, most dangerous, and deadly gases are not found in the sewers themselves, but in the unventilated waste pipes and those which are in process of being clogged by the foul matters passing through them. Any obstructions in the soil or waste pipes are therefore doubly dangerous, because it may produce an inflow of foul gas into the pipe, even though the entrance to the sewer itself has been entirely cut off.

The question is how to get rid of the accumulations in pipes partly stopped or already closed. Digging up and cleaning out is a costly remedy, often ineffectual by reason of careless workmen. The second is the plumber's force pump, which is usually only a temporary relief. In pipes leading from the house to the cesspool there is a constant accumulation of grease. This enters as a liquid and hardens as the water cools, and is deposited on the bottom and sides of the pipes. As these accumulations increase, the waterway is gradually contracted, till the pipe is closed.

When the pipe is entirely stopped, or allows the water to flow away by drops only, proceed thus: Empty the pipe down to the trap, or as far as practicable, by "mopping up" with a cloth. If water flows very slowly, begin when the pipe has at last emptied itself. Fill the pipe up with potash, crowding it in with a stick. Then pour hot water upon it in a small stream, stopping as soon as the pipe appears to be filled. As the potash dissolves and disappears, add more water. At night a little heap of potash may be placed over the hole, and water enough poured on so that a supply of strong lye will flow into the pipe during the night. Pipes that have been stopped for months may be cleaned out by this method, though it may call for three or four pounds of potash. The crude kind, however, appears to act as well as the best. If the pipe is partially obstructed, a lump of crude potash should be placed where water will drip slowly upon it and so reach the pipe. It is also well to fill the upper part of the pipe with the potash as before, and allow hot water to trickle upon it. Soda and potash are both used for the purpose of removing greasy obstructions, and the usual method of application is to form a strong lye and pour it into the pipe. It is better to put the potash into the pipe, because the water which it contains, instead of diluting, helps to form the lye. As water comes in contact with the potash it becomes hot, thus aiding in dissolving the grease. Potash, in combination with grease, forms a "soft" or liquid soap, which easily flows away, while the soda makes a hard soap, which, if not dissolved in water, would in itself obstruct the pipe.

When a pipe is once fairly cleaned out, the potash should be used from time to time, in order to dissolve the greasy deposits as they form, and carry them forward to the cesspool or sewer. The potash is very valuable for this purpose, because, in addition to its grease-solving powers, it is exceedingly destructive to all animal and most vegetable matters. The most dangerous and deadly gases appear to come from urinals and wash-basin pipes, these, in many cases, seeming to be more foul than those from water closets. The decay of the soap and animal matter washed from the skin

appears to be the sources of the gases. The potash will be effective in keeping these pipes clear, and in this way may lessen the dangers.—*A correspondent in the American Artisan.*

A Method for the Purification of Commercial Carmine.

BY JOHN S. ADRIANCE, A.B., F.C.S.

Of all substances used for staining in histological work, carmine is perhaps the most important, but the impure state in which it is sold prevents entire dependence being placed upon it. Commercial carmine contains many impurities and adulterations, more especially fatty matter, tyrosine, talc, carbonate of lead, vermilion, and dust. Pure carminic acid, which is the basis of carmine, is easily soluble in water and alcohol. This is taken advantage of in its purification; very often three-quarters of the commercial article is

BURMAH.

The English possessions in India have lately been augmented by the annexation of the territory of Upper Burmah. The King, Theebaw, managed to get into a dispute with the English, who hold lower Burmah, or that portion bordering on the Indian Ocean, including Rangoon and the mouth of the Irrawaddy River. The result was, the English sent a military force up the river on steamers, and the capital of Upper Burmah, Mandalay, including the King, was soon captured. Burmah is a great place for elephants.

We present illustrations from the *Illustrated London News* of the King's "sacred white elephant" and the employment of working elephants in the removal of teak, which valuable kind of timber, superior to oak for ship building, is one of the most important products of Burmah. It is sent down the river from the

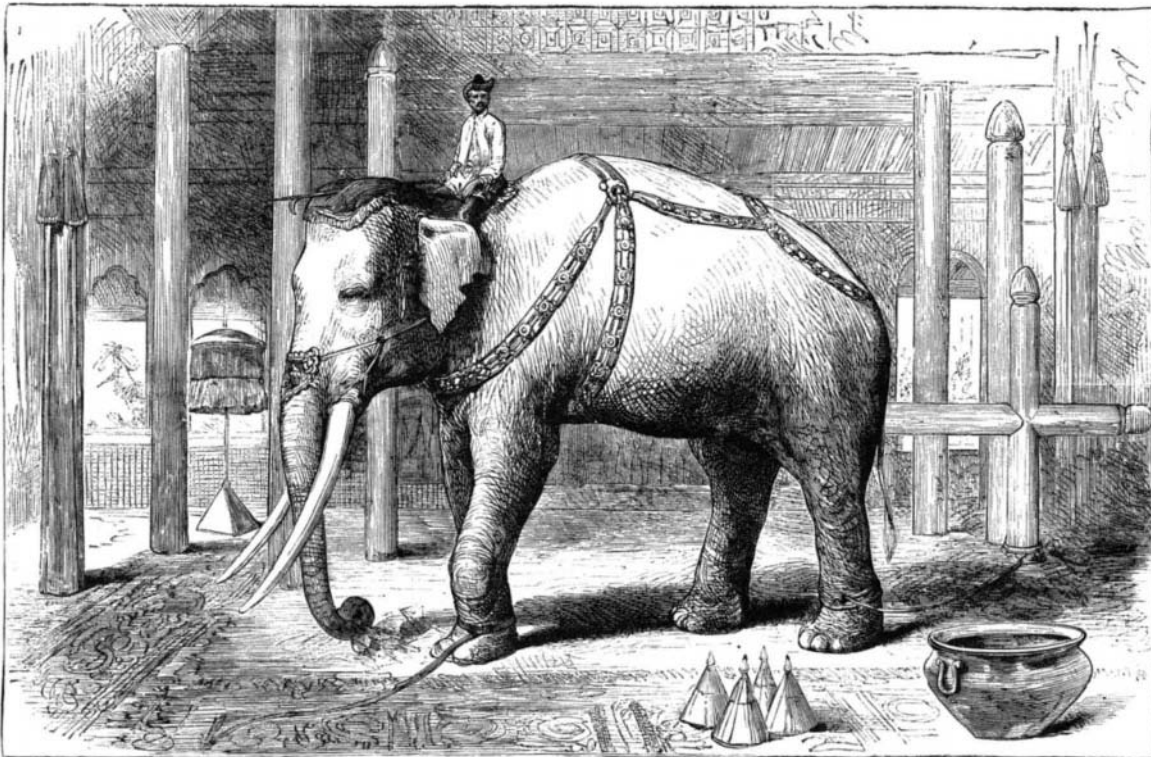
forests beyond the British frontier to Rangoon and Moulmein, whence it is mostly exported to British India; and the recent dispute between King Theebaw and the British Commercial Company in his dominions had reference to the cutting of teak.

Mandalay, the royal city and capital of Upper Burmah, with a population of 100,000, situated on the left bank of the Irrawaddy, is 350 miles above Rangoon. The city and sheltered suburbs measure four miles square. The city is three miles from the banks of the river, and is entirely commanded by the hill, on the top of which is the pagoda. The city proper is within a broad moat, on which King Theebaw had two state barges, and there are five bridges across it. Next to the moat is a high brick loopholed wall, one mile square, on which are forty-eight pagodas, and which is backed by an earth embankment to within six feet of the top. In the center of the city is the palace, occupying a space of a quarter of a mile square, and surrounded by a high stockade and inner wall, with four entrances, and another inner stockade and wall. In the palace yard are the late King's tomb, the Mint, High Court, Tower, with bell and drum, and the celestial elephant. All the buildings, including the palace itself, but excluding the Mint, are gilded, and are of wood or bamboo.

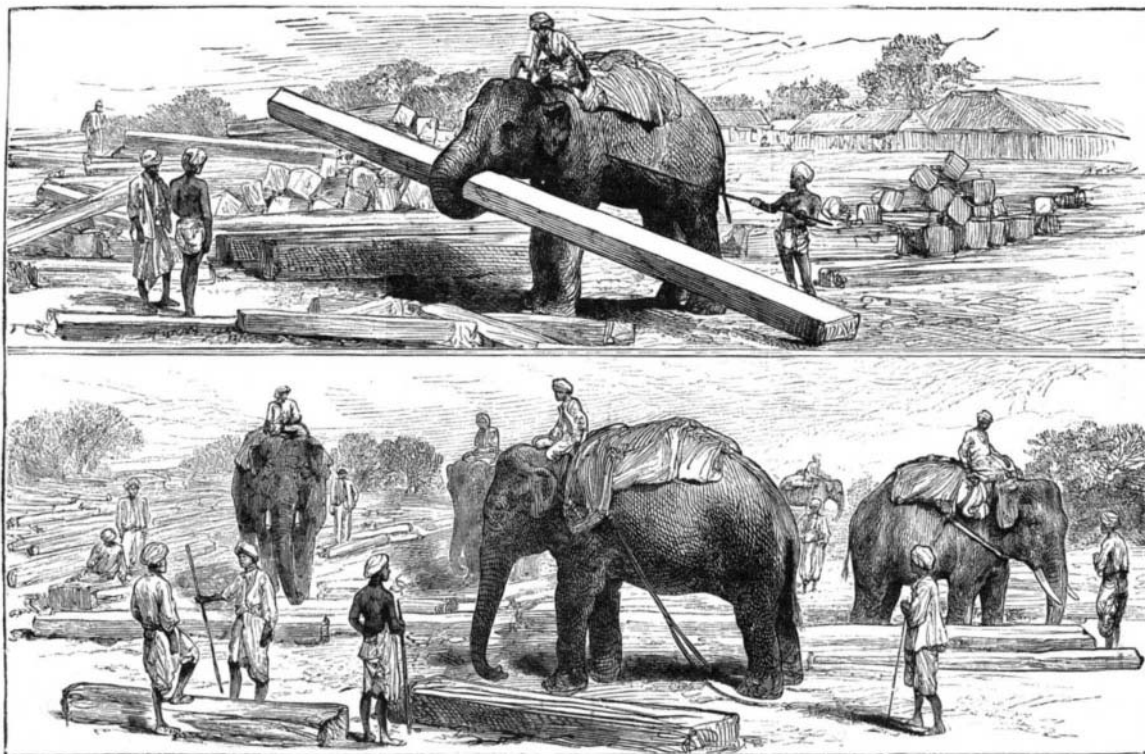
The Treatment of Frost-bitten Fingers and Toes.

Dr. Lapatin, in the *Proceedings of the Caucasian Medical Society*, advises that fingers and toes which have been slightly frost-bitten, and which subsequently suffer from burning, itching, and pricking sensations, should be painted, at first once, and afterward twice a day, with a mixture of dilute nitric acid and peppermint water in equal proportions. After this application has been made for three or four days, the skin becomes darkened and the epidermis is shed, healthy skin appearing under it. The cure is effected in from ten to fourteen days. The author has found this plan very effectual among soldiers, who were unable to wear their boots in consequence of having had frozen feet. They were, in this way, soon rendered capable of returning to duty.—*British Medical Journal.*

THE Rothschilds, it is said, invested 800,000 francs in the experiments of M. Marcel Duprez for transmitting power over long distances by means of electricity. The motive force is conveyed by a comparatively feeble current, thereby doing away with the apprehension of dangerous friction and resistance. Niagara Falls may yet be utilized to operate engines in New York or Philadelphia by electricity.



THE SACRED ELEPHANT OF BURMAH.



ELEPHANTS CARRYING TEAK TIMBER—BURMAH.

worthless for coloring. The following method may be found of service:

Extract the carmine with boiling water, washing the residue several times; treat the liquid with lead acetate acidulated with acetic acid until a drop of the solution is colored by hydric sulphide (H₂S). Wash the precipitate by decanting twice, then bring on a filter, decompose with sulphuric acid (H₂SO₄), and filter; repeat this last operation twice, the second time using hydric sulphide (H₂S) instead of sulphuric acid (H₂SO₄). Evaporate to dryness on a water bath, as the acid is decomposed at 136° C., wash with absolute alcohol, and filter; allow the alcohol to evaporate spontaneously, when crystals will be distinctly seen; wash with warm water, filter, and evaporate to dryness over a water bath. Dissolve the residue in ether, and allow the ether to evaporate spontaneously, when crystals of pure carminic acid will appear. Preserve for use in glass stoppered bottles. If your work has been accurate, an alkaline solution of iodine will entirely destroy the color.