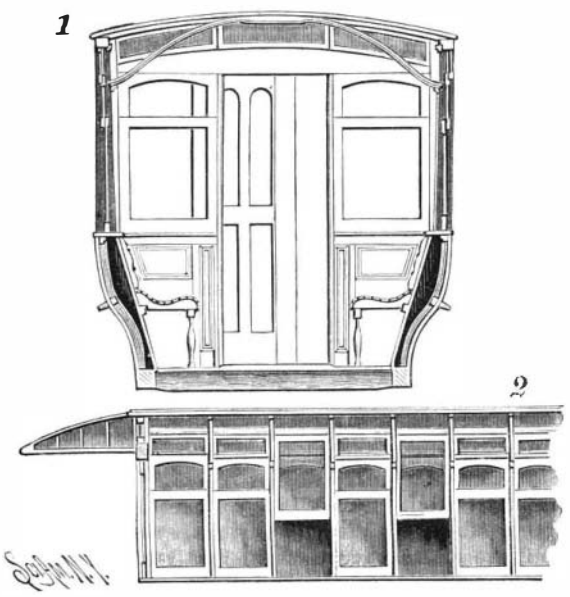
AN IMPROVEMENT IN CAR CONSTRUCTION.

The illustration represents a style of building a car body patented by Mr. John Turner, and especially adapted for horse, cable, and electric cars. Fig. 1 is a transverse section and Fig. 2 a partial side elevation showing the construction. The side pillars of the body are longer than those usually employed, and they are attached at their lower ends to side sill beams, and at their upper ends to plates on which the roof is supported, at very near the height of the car body at its center. The pillars have straight sash grooves,



TURNER'S CAR BODY.

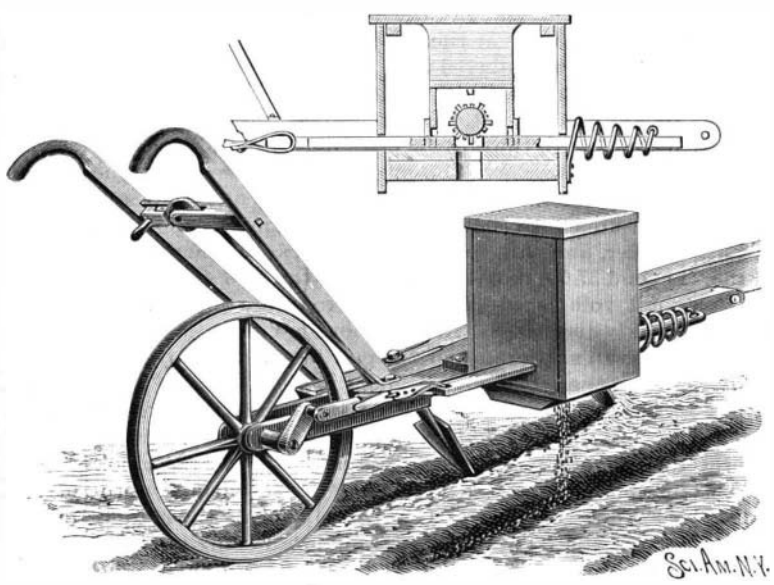
and the sashes are carried upward instead of downward in opening the car windows. A series of permanent upper sashes is provided, behind which the movable ones slide. The car at its central portion is of the standard height, and by thus elevating the roof at the sides more head room than usual is made over the seats, giving ample air space. The roof is also centrally supported by a series of trusses, the ends of which are curved downward and secured to the side pillars. The space between the back of the seats and the sides of the car body is covered by caps, which constitute window sills, effectually preventing any refuse or foreign matter from getting into the pockets which ordinarily exist behind the seats. Beneath the bonnets, in the upper framing at each end of the car, are pivoted sashes forming ventilators. By this manner of construction it is designed that the car body shall be much stronger and capable of being built at materially less cost than has heretofore been the practice.

Further information relative to this invention may be obtained of Mr. John Wimmer, No. 2187 Third Avenue, New York City.

AN IMPROVED PLANTER.

The illustration represents a simple and inexpensive form of planting apparatus, designed to be readily attached to the beam of a double or single plow, and by which any kind of seed may be dropped without portions of the seed adhering to the drop slide. Pivoted to one side of the plow beam is a bar or beam in which is journaled a supporting wheel, and upon one side of the bar is secured a laterally adjustable seed box, having a detachable cover and a central drop opening in its bottom, in which may be placed a drop tube if desired. On the upper face of the bottom of the box a drop slide is held to move beneath a housing within the box around the drop opening, as shown in the sectional view. The slide has near its center an aperture adapted to register with the drop opening on both its forward and rearward movements, thus permitting the seed to drop. By properly arranging holes in the slide relatively to the diameter of the wheel, the planting may thus be done in hills that are 18, 36, or 72 inches apart, or by another arrangement of the slide continuous drill planting may be effected, such change of slide being readily made in two or three minutes. The housing within the seed box consists of a box-like receptacle with guarded side openings through which the slide passes, and a roller is journaled in the housing transversely over the slide, there being arranged around the roller pins adapted to enter recesses in the upper face of the slide, forming a guide therefor which compels the opening of the slide to register properly at all times with the drop opening. The roller also has one or more studs, adapted, as the roller revolves, to enter the drop opening in the drop slide, and force down any seed clinging to the walls of the opening. The housing may be adjusted up or down to cause the roller to contact more or less tightly with the drop slide. The axle of the supporting wheel has a crank arm, to which is pivoted a pitman adjustably connected with the rear end of the drop slide, around the forward end of which is a coiled spring adapted to retain the slide in open position when the implement is at rest and the wheel elevated. To the cross beam between the plow handles is pivoted a lever connected by a strap with the body beam of the planter, whereby, on pressing down a knob of the lever, the rear end of the attachment is sufficiently raised to remove the drive wheel from the ground.

This improved planter has been patented by Mr. William W. Jones, of Granada, Col.



JONES' PLANTER.

The Banana a Developed Lily.

Goldthwait's Geographical Magazine says that the banana belongs to the lily family, and is a developed tropical lily, from which, by ages of cultivation, the seeds have been eliminated and the fruit, for which it was cultivated, greatly expanded. In relation to the bearing qualities of this fruit, Humboldt, who early saw the wonders of the plant, said that the ground that would grow 90 pounds of potatoes would also grow 33 pounds of wheat, but that the same ground would grow 4,000 pounds of bananas, the proportions thus being, to wheat 133 to 1, and to potatoes 44 to 1. The banana possesses all of the essentials to the sustenance of life. The savage of the sea isles and the jungle owes what he has of physical strength to this food.

Wheat alone, potatoes alone, will not do this. When taken as a steady diet it is cooked—baked dry in the green state, pulped, and boiled in water as soup, or cut in slices and fried. I do not know whose beauty I admire the most—the majestic cocoa palm, with its heavy crown of great fringed leaves, or the graceful banana, with its great leaves, which are six feet long and two feet wide.

The leaves of the banana are tender, and the strong winds of the tropics—the hurricanes—soon tear the leaves in strips, thereby adding to their grace and beauty. The banana is a fruit that beast and bird, as well as man, are fond of, and the owner, when he lives in a sparsely settled country, must needs protect his plantation by a fence of some thorn plant.

Motion by Electric Current.

BY M. D. HURMUZESCU.

A fine metal wire stretched between two supports, one of which is provided with a strainer or spring for regulating the tension, on being traversed by a *continuous* current begins to vibrate.

The amplitude of the vibrations, which is at first very small, increases as the time goes on, and quickly arrives at a maximum, which it maintains as long as the current is passing through, provided that the surrounding atmosphere remains in the same condition, or at any rate does not undergo any sudden change. The vibrations may thus continue inefinitely; they stop in a few seconds when the current is interrupted.

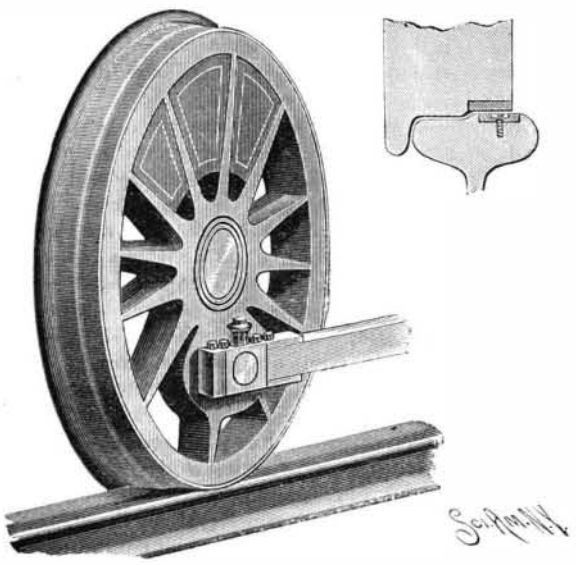
For a given tension, the amplitude of the vibrations seems to depend (according to the experiments which I have made up to the present) on the difference in the temperature of the wire and of the surrounding atmosphere. Now, as it is the intensity of the current which produces this difference of temperature in a given wire, the amplitude should vary according to the intensity.

The explanation of this fact seems to me to lie in the interchange of heat between the wire and the surrounding atmosphere; this constitutes really a *thermic motor*, in which the energy expended is supplied by the current, and the principle of the conservation of energy can be applied to it.

Any cause producing a change, in any manner whatever, in the mode in which this interchange of heat takes place will modify the phenomenon in some way or other. We can foresee that the finer the wire, the more rapid will the vibrations be; this is confirmed by experiment. I repeated the experiment with wires of different natures, and found that the phenomenon always preserves the same character. If we put the wire in a large glass tube the movement is regular, because the wire is sheltered from the movements of the air. On closing the two ends of the tube, I observed no change in the rapidity of the vibrations.

A CAR WHEEL AND RAIL TO INCREASE TRACTION.

According to the invention forming the subject of the accompanying illustration, it is designed that where a railroad track is built at a grade or is curved, or at switches, the rail shall be provided with a strip of soft, tough metal, held to the rail by countersunk



CHOATE'S CAR WHEEL AND RAIL.

screws, as shown in the sectional view, the outer edge of the rail being raised and a channel made therein for the purpose. The outer edge of the driving wheels is also smaller than it is near the flange, so that when running on the ordinary rail only the inner portion of the tread will come in contact with the rail, but the outer portion of the wheel is provided with a band of hard metal, roughened on its outer surface, adapted to come in contact with the strip of the rail at places where increased tractive power is required. When the wheels thus made reach the rails provided with the strips, the roughened band on the wheel is designed to take a firm hold on the softer metal of the strip, so that the motor will be able to haul a very large load. The bands and strips are intended to be renewed at small cost when they become worn.

This invention has been patented by Mr. Franklin W. Choate, of San Diego, Cal.

A Gigantic Relief Map of the United States.

A geographical novelty has been produced by Prof. Edwin E. Howell, of Washington, D. C., namely, a large relief map of the United States and Gulf of Mexico, with portions of the Atlantic and Pacific oceans, between the 67th and 127th meridians, modeled on the section of a globe 133 feet in diameter. This great work is prepared from data furnished by the United States geological survey, the United States coast and geodetic survey, and the United States Hydrographic Office. The horizontal scale is 1 inch equal to 50 miles; and vertically 1 inch equals 5 miles. The dimensions of the map are 6 feet 6 inches by 4 feet, and it is about 15 inches in its greatest thickness. The first copy of this important and artistic work has been secured by Mr. David Pell Secor, for the Bridgeport Scientific Society.

In this connection it may be added that Mr. Secor's previous gifts to the Society include more than 18,000 specimens, worth at least $10,000, and extremely rich in aboriginal relics, especially spear and arrow tips, fully 2,000 of the latter being made from various precious stones.

Mr. Secor has likewise purchased for the Leland Stanford, Jr.. University, California, the large and celebrated herbarium of the late distinguished botanist, Prof. William Henry Hervey, of Trinity College, Dublin, which has been received and acknowledged by the University with thanks. This immense collection is in six cases, containing 360 bundles of standard sized botanical paper, with 16,977 species from all parts of the world. As there are usually as many as four or five specimens of each species, the grand total amounts to fully 70,000 specimens. The naming of these specimens has been carefully revised according to the most approved classification, and it may safely be affirmed that there are less than half a dozen herbaria in America that rival the Hervey herbarium in size, or in authentic accuracy. The enterprise and liberality of the donor are worthy of especial commendation. Mr. Secor's residence is in Bridgeport, Conn., where he devotes most of his time to gratuitous scientific pursuits.

To make cloth that is used in lining shoes waterproof, use oiled silk or heat the linings in melted paraffin.

Culex Pipiens.

We all know the creature, but may not perhaps recognize him as readily under this name as under the more familiar, but not thereby despised, one of mosquito. We said "him," but we were wrong, for, unlike what is found in some of the higher orders of creation, it is the females that make all the trouble and do all the biting and stinging, the male being a very inoffensive and harmless insect, shunning man and getting his sustenance from the juices of plants, a few drops of which suffice for the needs of his short career. We might know that nothing good could ever come from the Culicidæ, for they start out in life in a way that no self-respecting larva could abide, swimming around, as if ashamed of themselves or of their progenitors, with their heads hanging down in the water and breathing through their tails.

A single mosquito, buzzing about on a warm summer night, can do more to keep away slumber than the uneasiest conscience that ever pricked the soul of man for his sins; yet in this part of the world, even in New Jersey, we do not think of the creature as one that can destroy life. Its limit of evil doing is as a pruritifactive and profanity-causing pest. When present in large numbers, however, they may become as dangerous to man as the rattlesnake, or as the man-eater in the Indian jungle. In an article on poisonous insects, in the "Reference Handbook of the Medical Sciences," Mr. Riley, the government entomologist, says that the pestiferous little insects "have caused the rout of armies and the desertion of cities, and the hum of an insignificant gnat may inspire more terror than the roar of the lion. The bravest man on the fleetest horse dare not cross some of the more rank and dank prairies of Northern Minnesota in June. It is well known that Father De Smet once nearly died from mosquito bites, his flesh being so swollen around the arms and legs that it literally burst.

"Those who have traveled in summer on the lower Mississippi or in the Northwest have experienced the torment which these frail flies can inflict; at times they drive every one from the boat, and trains can sometimes only run with comfort on the Northern Pacific by keeping a smudge in the baggage car and the doors of all the coaches open to the fumes."

There are said to be more mosquitoes to the cubic inch on the Magdalena River in South America than anywhere else in the known world, and it is madness to attempt a voyage up the river without a mosquito netting and some ammonia or other preparation to relieve the itching of the bites received in spite of constant care. A story is told of an Englishman who was not afraid of a mosquito or two, and scorned to take any precaution before starting up this river for Bogota. He soon had cause to repent of his foolish obstinacy, and after offering vainly all the money he had for the loan of a mosquito netting for the remainder of the voyage, he was driven mad by his tortures on the third day of the sail, threw himself into the river, and was drowned. This may be true and it may not, but any one who has ever faced one of these dense swarms without the protection of a thick net will have no trouble in recognizing the probability of its being an actual occurrence.

But one must give the devil his due, and even the mosquito has his good points, or rather let us say *her* good points, for, as we hinted before, the male has all the gentle unobtrusiveness and innocuous artlessness of his sex in other walks of life. The larvæ, wriggletails as they are usually called, swim about in stagnant pools and perform a useful service in purifying the water and freeing it from many swarms of microbes that are possibly inimical to man. But it is only in her tender youth that Culex pipiens is good, and as soon as she gets her wings and becomes capable of working mischief, her period of usefulness to the community is at an end.

In addition to the irritation which she excites by her bites, she has been accused of carrying about the germs of disease on her proboscis, and thus spreading contagion and defying quarantine. Dr. Finlay, of Havana, has been trying to turn this to good account by making the mosquito the instrument of preventive inoculations against yellow fever. He recently published the statistics of his experiments in this direction, from which it would seem that this method may really possess some efficacy. The insects that have been seen to bite patients with yellow fever are carried away carefully and made to sting newly arrived and unprotected individuals. Dr. Finlay reports the results of over fifty cases of mosquito inoculation, and of these but four individuals contracted the disease in a severe form within three years after the inoculation, one only dying therefrom. Of the remainder, some presented symptoms of yellow fever between the fourth and twenty-fifth day after inoculation, while others had no symptoms at this time, but suffered later from a mild attack of the disease. Some significant comparative statistics were obtained from the observation of sixty-five monks who, from time to time, arrived in Havana, where they all lived under similar conditions. Thirty-three of these were inoculated and thirty-two were not. Only two of the inoculated suffered from well marked attacks of yellow fever, which, however, did not prove fatal; whereas eleven of those that had not been inoculated were severely attacked, no less than five dying.

There are numerous patent preparations recommended as efficacious in relieving the irritation caused by the sting of the mosquito, some of which are possibly very serviceable, but probably not more so than oil of cloves, ammonia, bicarbonate of soda, chloroform, or thymol. When none of these remedies can be obtained, it may be well to remember that the alkali of ordinary soap is often as efficacious as anything. As soon as a bite is felt, the part should be moistened and rubbed with a piece of soap, the lather so formed being allowed to dry on the skin, and in a very short time, unless the individual be unusually susceptible to the poison of the insect, all irritation will have disappeared.

But prevention is, of course, better than cure, and most people who, for their sins, must live in a mosquito country keep off the greater number of their enemies by sleeping under a mosquito bar, although there is always one culex that manages to get in despite the utmost precaution. These bars are a great comfort, nevertheless, and even an absolute necessity in certain regions, but they are very inflammable, and serious accidents have resulted from their being set on fire by the flame of a candle or gas jet in the neighborhood of the bed. We may, therefore, fittingly bring these konopological remarks to a close by presenting the following recipe, published by the *National Druggist*, for rendering mosquito netting uninflammable:

"Make a solution of one part of ammonium sulphate to five parts of water and immerse the netting in the same. One pound of netting will require from twenty to twenty-four ounces of the solution to thoroughly saturate it. The material is entirely inoffensive, and the ease with which it is employed is not its least recommendation. After saturating the bar (or other material) with the liquid, it is necessary to pass a hot iron over the fabric to dry it and make it ready for use."—*Medical Record.*

Smokeless Powder—The New 12 Inch Gun—Firing of High Explosive Shells.

The first experience of our army officers with smokeless powder in high power cannon indicates that the day of the brown prismatic powder is now past. The results of three shots lately fired from the 8 inch gun at Sandy Hook were of the highest importance in showing to what extent the American guns can be relied upon when a proper brand of powder is secured. The powder used was smokeless powder, manufactured in Germany, and understood to be a modification of the Nobel powder. Its principal ingredients are said to be nitro-glycerine, nitro-cellulose, camphor, and benzole. The powder comes in block cubes, three-eighths of an inch on each edge. It has the appearance of black rubber when in the cube, but when pared in three pieces is translucent. The trial consisted of three shots fired from the gun, mounted on a free recoil carriage, in order to determine the velocity and pressure along the bore. In the first round a charge of 30 lb. of powder, and shell weighing 300 lb., were used, giving a velocity of 1,497 ft. and pressure of 18,000 lb. In the second shot the charge was increased to 45 lb., the velocity recorded being 1,990 ft., and the pressure 31,160 lb. In the third round, with 50 lb. of powder, the remarkably high velocity of 2,162 ft. per second was given, the pressure being about 38,000 lb. The velocities were taken 165 feet from the muzzle. The energy of the shot at the muzzle was 9,720 foot tons. The good results of the last round can be appreciated when it is remembered that with a charge of 130 lb. of brown powder, with the same weight of projectile as used in the above three rounds, the highest velocity attained with the normal pressure of about 37,000 lb. was 1,935; with a 250 lb. projectile, such as used in the navy gun, it is estimated that a velocity of 3,345 ft. can be secured with 50 lb. of the same brand of smokeless powder, and this, too, without increasing the pressure beyond 37,000 or 38,000 lb. When the gun was fired, a small volume of smoke shot from the muzzle, but quickly dissipated. Another notable circumstance was the clean appearance of the powder chamber after the firings, there being no residue whatever.

Preliminary tests of the army 12 inch steel breech-loading rifle, the first gun of that caliber completed in this country, were recently had at the Sandy Hook proving grounds, for the purpose of establishing a proper grade of powder before commencing the regular service test. The results are important only in showing that the gun is well able to stand the pressure figured upon. The unsatisfactory quality of the powder used made it impossible to determine anything else about the full ballistic qualities of the gun. Five rounds in all were fired, commencing with a charge of 250 lb. of powder and increasing to 375 lb. With the latter charge and a projectile weighing 1,000 lb., a velocity of 1,862 feet per second was obtained, with the pressure recorded at 36,500 lb. per square inch. The highest velocity obtained was in the fifth round, when the weight of the projectile was reduced to 850 lb. With a charge of 370 lb. of powder, this projectile was given a velocity of 1,952 feet, the pressure reaching 38,567 lb. per square inch. These latter figures approach very nearly to the results calculated for the full charge of 440 lb. of powder and a 1,000 lb. shot, therefore showing that a radically different powder must be adopted to secure the ballistics expected from the regulation charge and weight of projectile. The official test of the gun will be postponed until a satisfactory powder can be obtained. The breech mechanism of the gun worked perfectly.

A successful test was made at the Sandy Hook proving ground lately of the new explosive, emmensite, as an exploding charge for shells fired from powder guns, and there is every prospect that in a short time emmensite will obtain an official recognition as a leading explosive for military purposes. A shell filled with the explosive was placed in a 7 inch breech-loading rifle and fired into the water. The shell was fired from the gun intact and the experiment developed the fact that, though this substance is a high explosive of an intensity nearly, if not quite, equal to dynamite, it can safely be subjected to the shock of being fired by the expansion of powder gas and utilized as an explosive for projectiles. The next step taken will be to discover a fuse for these shells.—*Army and Navy Journal.*

PHOTOGRAPHIC NOTES.

Paramidophenol Developer.—This new developer, introduced by Messrs. Lumiere, has now been tried also by our German authorities, and their judgments are, on the whole, favorable to this reducing agent. Professor Vogel finds that the pure paramidophenol is very insoluble, so that it was impossible to prepare with it the solution recommended by Messrs. Lumiere. Dr. Schuchardt, of Gorlitz, has, however, succeeded in producing a hydrochloric preparation of this substance, which, in the hands of Prof. Vogel, proved to be more soluble than the first one, though it is said to dissolve much less readily in cold water than hydroquinone. It is, therefore, necessary to heat the water previously. The developer thus obtained is very energetic, giving, however, somewhat thin negatives, and the mixed solution soon becomes brown. If the paramidophenol solution and the sodium sulphite solution are kept separately, they will keep clear. Also Prof. Eder and E. Valenta state that the paramidophenol forms an excellent developer, giving, according to its composition, every degree of softness or intensity. The color of the negatives is grayish black, the film being free of every bluish or greenish color, even if a neutral fixing bath is used. The authors recommend the use of a dilute solution for the reason that then the paramidophenol does not crystallize out of its solution and the developer becomes less expensive. Moreover, the diluted solutions form equally excellent developers as the concentrated ones. The formulæ recommended by the authors are the following:

PARAMIDOPHENOL SODA DEVELOPER.

Water	1,000 cc.
Sodium sulphite	80 grammes.
Carbonate of soda	40 "
Paramidophenol	4 "

PARAMIDOPHENOL POTASH DEVELOPER.

Water	1,000 cc.
Sodium sulphite	120 grammes.
Carbonate of potash	40 "
Paramidophenol	4 "

The latter is specially well suited for plates which tend to give thin negatives, while the soda developer yields more delicate images. With the latter, also, transparencies on gelatino-bromide emulsion may be developed very successfully.—*H. E. Gunther, in Photo. News.*

A Bone Shedder.

Dr. Bell, of Parrottsville, Tenn., reported the case of a woman who sheds her bones, and showed some of the specimens before the East Tennessee Medical Society (*Medical Standard*). He said: "The patient is seventy-one years of age, seemingly in perfect health, a well preserved woman of medium height, average weight, and normal in every other respect. Twenty-one years ago the exfoliation of bone began in her fingers, and has during the succeeding years continued until she has twice shed ulna and radius, humerus, scapula, and part of inferior maxillary. This shedding takes place spontaneously without pain, hemorrhage, suppuration, inflammation, or inconvenience. On one occasion when churning she shed the radius. There is no deformity, sapination, pronation, extension, flexion, and circumflexion being perfect. The bones shed (about six hundred pieces) were, on careful inspection by the society, found to be entirely natural. She has given about one hundred pieces of bone away as souvenirs. The woman is conscious of the pending expulsion of a bone about ten minutes before it takes place, and a perfect bone is always left in its stead. The bone makes its way out, always on the posterior side, and the wound heals by first intention, though at the 'exit of the bones' were numerous small scars. She has always been in comfortable circumstances and is cheerful, a very interesting fact, as showing the power of the mind to adapt itself to extraordinary circumstances."