IMPROVED TRAMWAY AND VEHICLE.

We illustrate herewith an improved system of tramway, with a vehicle of peculiar construction, adapted for travel thereon. The inventor considers that his plan is applicable wherever the land transportation of heavy freight off of regular railroads is necessary, and for the running of stage coaches, etc. He believes it absurd to attempt giving a road a hard smooth surface, twenty to thirty feet in width, when but a few inches is required for the tread of the wheels. Moreover, any track reasonably hard and smooth, for the passage of the wheels of laden carriages, is unfit for the travel of horses, since in such case a yielding surface is required.

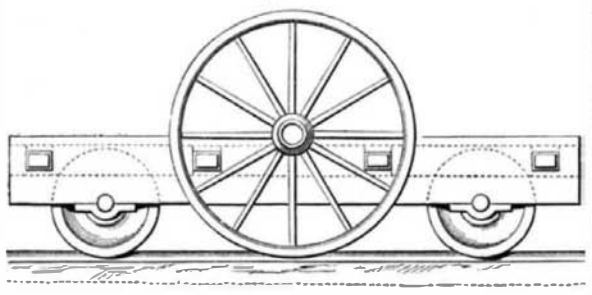
In the tramway herewith represented a longitudinal timber is simply bedded in the earth, even with the surface, and capped with a hard wood or metal rail. Each length is joined by iron sockets. It is stated that an oak or maple rail, sawn 2x4 inches, should last many years, but would require to be renewed several times before the bed timbers would be decayed. These, if of cedar, would be sound after 25 to 30 years' use.

The arrangement of cars proposed is as shown in Fig. 2. They are provided with two double flanged wheels, which may be constructed of wood sectors, having thin plate iron rims bolted or riveted to their sides. An iron arbor or axle passes through the center of the wheel, and is secured with flanges and nuts on each side, firmly screwed up. The outside courses of plank should be one inch in thickness, and project the same all around. Then the wheel is placed in a lathe and its periphery turned and trued up, making the edges of the outside courses form the flanges. A wheel thus constructed, of sound well seasoned oak or maple, will be good and durable, and will wear the track but little. Cast iron wheels should be used to run upon iron edged rails.

Each car needs a common carriage axle and wheels, bolted across for preserving its equilibrium. All should be proportioned so that these wheels should be within a few inches of the surface.

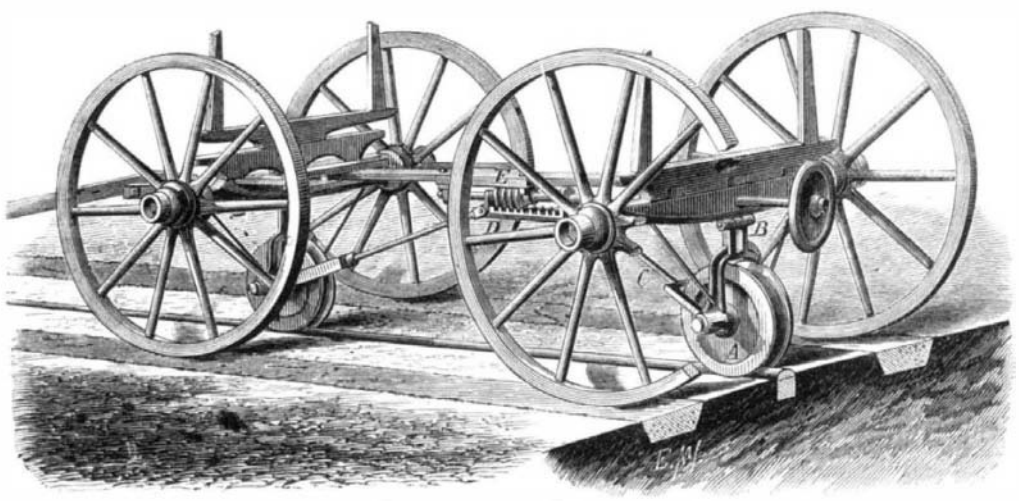
The inventor estimates the expense for these tramways, to be laid down on ordinary country roads, where no grading is required, as follows, per mile: 264 cedar logs, 20 feet, at 10 cents each, $26.40; 3,520 feet maple at $20 per M., $70.40; 1,700 lbs. cast sockets, at 3 cents, $52.80; 200 lbs. spikes, at 8 cents, $16; labor in laying and construction, $75. Total, $240.60. Such a road, it is stated, could be laid down for about $180 per mile by dispensing with iron sockets, etc. Trains of loaded wagons, whether propelled by horses or locomotive or traction engines, could be run over at a cost for transportation much less, the inventor claims, than by any other style of rail, tram, or common roads.

Fig. 2



All ordinary vehicles, stage coaches, lumber wagons, etc., are easily adapted to run upon these tramways, by means of the device shown in Fig. 1. A are the double flanged wheels, which travel upon the central rail, and are supported in hinged frames, B. To the latter are connected shafts, C, which are suitably secured to the rack, D. In the teeth of the latter engages the worm, E, the shaft of which extends to the rear of the vehicle, and terminates in the hand wheel shown. By turning the latter the central wheels, A, may be swung up clear of the ground, or may be let down upon the rail to sustain the main weight, while the outer wheels serve to balance the apparatus. The track for the carriage wheels consists in gutters filled with broken stone, so as to form an even and level surface. For stage coaches and similar vehicles, the shaft and hand wheel for adjusting the central wheels should be carried to the driver's seat for convenience. Patented July 25, 1871, through the Scientific American Patent Agency, by Mr. James F. Cass, of L'Original, Ontario, Canada, to whom inquiries for further particulars may be addressed.

Fig. 1



CASS' TRAMWAY AND VEHICLE.

A Curious Law Suit.

The Philadelphia *Ledger* gives the following account of a suit at law recently terminated in that city:

Two mill owners on the Wissahickon creek, above Chesnut Hill, engaged in a curious law suit, which was decided last week at Norristown. The mills are three quarters of a mile apart, and the stream between them has not much fall. In 1823, the owner of the upper mill brought suit against the owner of the lower mill for having backed the water into the race course of the upper mill. Under a decree of the court, the sheriff put up four permanent marks to establish the lawful surface of the water. At two places holes were drilled in fixed rocks, a marble stone was set in the tail race of the upper dam and properly marked, and a pin was driven into a buttonwood tree just thirty-one inches above the surface at the breast of the dam. The mills have changed owners since that time, but recently the race of the upper mill has been overflowed by back water, and the owner brought suit for damages. Careful surveys were made, and the water was found to be four inches above the marks in the fixed rocks and on the marble slab, but exactly thirty-one inches from the plug that had been driven into the buttonwood tree forty-eight years ago. The question for the jury to decide was whether the upper mill and rocks had sunk four inches, or whether the base of the buttonwood tree had been lifted that much. Notwithstanding ingenious arguments to show that trees only expanded in size and sent out new growths from the extremities of branches, the jury, composed of farmers or those bred in the country, decided that the buttonwood tree had been elongated, by giving a verdict for the plaintiff for $150. Counsel for the defence will file reasons for a new trial.

Propagation of Tubercle by Milk.

At the last meeting of the French Association for the Advancement for Science, M. Chauveau gave to the section what he termed a demonstration of the transmission of tuberculosis by the digestive organs. He observed that his numerous observations enabled him to state that if the healthy young of animals susceptible of tuberculosis were fed with food with which the matter of tubercle was mixed, they would all exhibit tuberculosis in various organs. In anticipation of this meeting, he had purchased some healthy calves; and, having had them fed as described, on slaughtering them the sixtieth day after the first ingestion, the lymphatic system was found extensively tuberculized, while caseous deposits existed in the lungs. This thesis he demonstrates most conclusively, and he is supported in his inferences by an apparently wholly independent series of experiments carried on by Dr. Klebs, in Germany, which he has recorded in one of the *Archiv fur Experim. Pathologie* (*Heft II*, 1873).

Dr. Klebs asserts that the milk of tubercular cows brings on tuberculosis in various animals. The affection generally commences with intestinal catarrh, followed by tuberculization of the mesenteric ganglia, the liver, and spleen, and ending in extensive miliary tuberculosis of the thoracic organs. Infection by means of the milk may be without result in vigorous organisms; and the author has even seen full formed tubercles resorb and disappear through cicatrization. It is likely, adds Dr. Klebs, that the tubercular virus is contained in varying proportions in the milk of cows which are more or less diseased, and the scrofulosis may occur, in children born without tubercle, through the milk of an unhealthy mother or wet nurse. In conclusion, the author expresses the view that the virus is contained in the serum of milk, in a dissolved state, and that it is not destroyed by boiling, which is ordinarily insufficient.

If these facts are not overstated, and they do not seem to be so, what a dangerous article must be that which is measured out in thousands of gallons daily, in all large cities, the product of phthisical cows, fed on distillery slops, and choked with foul odors! The milk of one tuberculous cow will contaminate that of the whole dairy when mixed in the cans.

The propagation of typhoid fever by milk has been only too clearly shown in London this year; and now have we not to lay to the charge of the same fluid the maintenance of a part of the terrible prevalence of phthisis among us?—*Medical and Surgical Reporter.*

LAUGH AND BE HEALTHY.—The physiological benefit of laughter is explained by Dr. E. Hecker in the *Archiv fur Psychiatrie:* The comic-like tickling causes a reflex action of the sympathetic nerve, by which the caliber of the vascular portions of the system is diminished, and their nervous power increased. The average pressure of the cerebral vessels on the brain substance is thus decreased, and this is compensated for by the forced expiration of laughter, and the larger amount of blood thus called to the lungs. We always feel good when we laugh, but until now we never knew the scientific reason why.

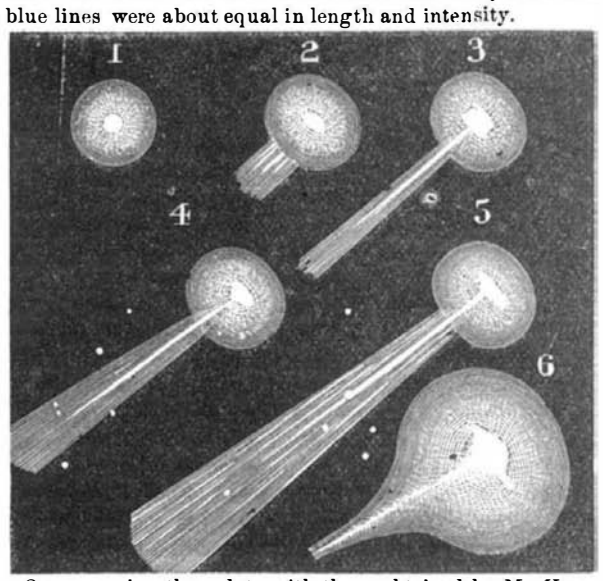
PROSPER HENRY'S COMET.

Comet IV of 1874, discovered on the 23d of August by M. Prosper Henry, at the Observatory of Paris, presents some remarkable peculiarities which distinguish it from all other and similar telescopic bodies. Its rapid changes of form, sudden elongation of tail, and its brilliancy, which became so great as to render it visible to the naked eye for some time previous to its passage to its perihelion, are considered to be phenomena which may throw light upon our hitherto indefinite knowledge regarding the constitution of comets.

On the day of its discovery, the body appeared as indicated in Fig. 1 in the accompanying illustration, the telescope showing a spherical nebulous mass, strongly condensed at the center, and exhibiting no traces of a tail. Its apparent diameter was about 4′, and it resembled a star of the 7th magnitude. There was little change in the aspect of the comet until August 26, when, as represented in Fig. 2, a tail began to appear, and the head assumed a slightly elliptical form, its diameter increasing to 6′. Three days later the tail, extending in a direction opposite to that of the sun, attained a length of 20′, and formed with the meridian, passing through the nucleus, an angle of 41°. Fig. 3. On September 2 (Fig. 4) the tail had grown to 2° in length and continued elongating. The nucleus remained nearly constant in size, although its brilliancy augmented until, on September 10 (Fig. 5), it became comparable to a star of the 4th magnitude.

The head of the comet, examined under a magnifying power of 200, times, appeared composed of three envelopes and a nucleus, the latter being situated near the summit. From the surrounding brilliancy emerged a luminous and very narrow thread, in which the tail appeared to originate.

From the observations of MM. André and Rayet, of the Observatory of Paris, and those of Mr. Plummer, at the Durham Observatory, the spectrum of the comet is found to be composed of three brilliant and very distinct bands. The first is in the yellow portion almost between D and E; the second, in the green, nearly coincides with line *b*; the third is in the blue beyond F. There was no trace of a continuous spectrum in the intervals between these lines. The green band was much the most luminous, while the yellow and blue lines were about equal in length and intensity.



On comparing these data with those obtained by Mr. Huggins from Comet I of 1868 (Wennecke's), it is concluded by Mr. Plummer that the spectra of both bodies are identical, and that the light of M. Henry's comet must be attributed to incandescent carbon, and hence the star must be self-luminous. M. Henry, in commenting upon this conclusion in *La Nature*, from which journal we extract our engraving, says that it does not accord with the fact of the variation of brilliancy of comets, which increases in luminosity as the latter approach the sun. It is also difficult to conceive that a body, of a mass so feeble as that generally attributed to comets, could retain for a long time a temperature so high as that required for the volatilization of carbon. It is, perhaps, more reasonable to suppose that the comet, illuminated by the sun, is a cold gaseous body, into the constitution of which carbon enters in the form, for example, of carbonic acid or oxide. This gaseous compound can evidently reflect only those rays which it is able to intercept, and such rays as are intercepted give only a few lines of the spectrum, among which are found those of carbon.

The polariscope, M. Henry believes, might furnish some valuable information on this point, and, used in connection with the spectroscope, he considers, must solve positively the question as to whether comets are or are not self-luminous.

A POISONOUS ANILIN COLOR.—The dye stuff called rosanilin which gives a beautiful carmine color, is, as we have stated an arseniferous production allied to arseniate of lime, and is soluble in lactic acid. It is used in lithography and for painting wooden vessels, etc. As it is very poisonous, it should never be employed in confectionery, and bright red sugar sticks should not be given to children.