

# SCIENCE

[Entered at the Post-Office of New York, N.Y., as Second-Class Matter.]

A WEEKLY NEWSPAPER OF ALL THE ARTS AND SCIENCES.

EIGHTH YEAR.  
VOL. XV. No. 372.

NEW YORK, MARCH 21, 1890.

SINGLE COPIES, TEN CENTS.  
\$3.50 PER YEAR, IN ADVANCE.

## AN IMPROVED TRUCK FOR ELECTRIC CARS.

THE improved motor-truck for electric cars shown in the illustration on this page is designed to prevent, or at least to greatly lessen, the oscillating motions of cars with short wheel-base, such as all four-wheeled street-cars must of necessity be. It is also intended to strengthen the ends of car-bodies by providing additional support nearer the ends of the car than is possible with the usual truck.

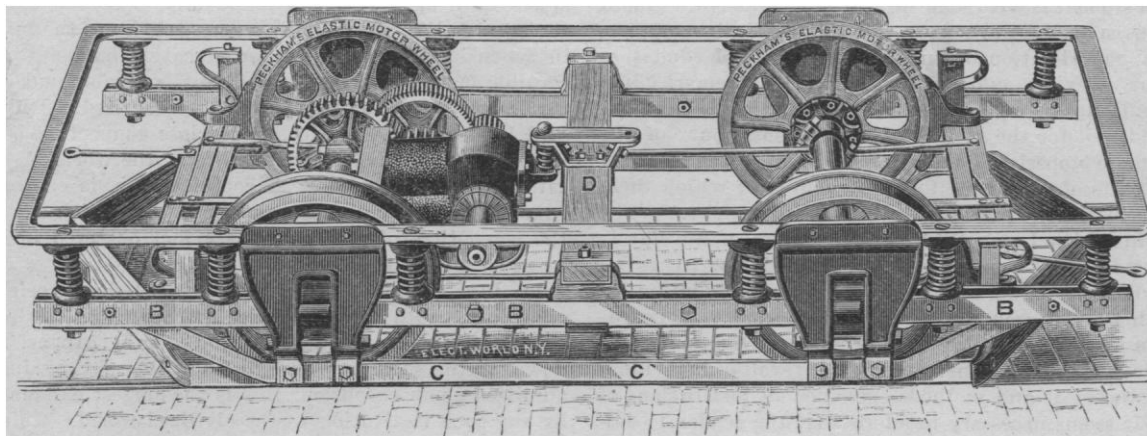
The main double side-bars, marked *B* in the engraving, support, by means of the twelve springs shown, the upper frame upon which the car-body rests. The side bars are in turn supported by the cantilever trusses *C*, which are suspended from the journal-boxes by malleable iron yokes, to which the side-bars are securely fastened. The electric motor is suspended by a bolt and spring from the hanger on the cross-bar *D*. The hanger is arranged to support either one or two motors. A part of the side-bar *B* is detachable, so that it may be unbolted and taken off

demonstrate their efficiency. The axles are made of fibrous wrought steel, and are provided with enlarged bearings and screw threaded collars.

These cantilever trucks, which are made by the Peckham Car Wheel Company of this city, are now in actual use on many electric street-railways in this country, and the companies using them are well pleased with their many points of superiority over trucks not specially made for motor service.

## THE INFLUENCE OF LEARNED INSTITUTIONS UPON THE PROGRESS OF MODERN SOCIETY.<sup>1</sup>

It is sometimes urged, as a criticism upon institutions of higher education, that many men of intellectual eminence, subjected to their training, have acknowledged small obligation to it. One recalls, as an example of this, the grotesque picture of the University of Edinburgh, drawn by the satirical humor of Carlyle in "Sartor Resartus:" "Had you, anywhere in



THE PECKHAM CANTILEVER MOTOR-TRUCK FOR ELECTRIC CARS.

when it is necessary to remove the armature for repairs. No other part of the truck need be disturbed when repairs to the motor are needed.

These trucks are equipped with compound lever brakes of great strength and simplicity, which, in quickness of action, are claimed to be much superior to the brakes generally used on car-trucks.

A peculiar feature of these trucks is that they are equipped with elastic wheels, the parts of which they are composed being interchangeable, so that worn or damaged parts may be readily and cheaply replaced. The wheels have malleable iron hubs, which are forced on the axles by hydraulic presses at a pressure of thirty-five tons to the square inch, so that there is no possibility of their ever working loose. The wheel webs can be removed and replaced by any ordinary workman, without the aid of special machinery, and without removing the motors from the axles. Tubular rubber cushions are inserted between the hub and the web, supporting the axles and motors, and relieving them from shocks, and lessening the tendency to crystallization of the iron. The journal-boxes are dust-tight and self-lubricating, and have been in use on various roads a sufficient length of time to

Crim Tartary, walled in a small enclosure; furnished it with a small, ill-chosen library; and then turned loose into it eleven hundred Christian striplings, to tumble about as they listed, from three to seven years; certain persons under the title of professors being stationed at the gates, to declare aloud that it was a university, and exact considerable admission fees, — you had, not indeed in mechanical structure, yet in spirit and result, some imperfect resemblance of our High Seminary." Mr. Darwin has furnished us a more recent instance, declaring, that, during the three years which he spent at Cambridge, his "time was wasted, as far as the academical studies were concerned," — "sadly wasted, and worse than wasted." It is not difficult to adduce unflattering estimates like these in considerable number from men distinguished both in letters and in science. Literary genius has been particularly impatient of academic methods. Acquaintance with the thought of the past, indispensable to those who would enlarge the area of exact knowledge, is less necessary to production in pure literature;

<sup>1</sup> Address delivered on the fourteenth anniversary of the Johns Hopkins University, by Professor E. H. Griffin, dean of the college faculty, Feb. 22, 1890.