

AMERICAN ENGINEERS' ASSOCIATION.

[Reported for the Scientific American.]

On Wednesday evening, March 6th, the regular weekly meeting of this association was held at its room, No. 24 Cooper Institute, this city—Thos. B. Stillman, Esq., President; John K. Simpson, Esq., Secretary, *pro tem*.

ELECTION OF MEMBERS.

Upon the balloting for the election of members, Messrs. H. H. Boyd, T. H. Lang, George Birkbeck, Wm. Watts, Thos. H. Davis and John Watts were declared unanimously elected.

ADMISSION OF MEMBERS.

The names of Messrs. E. W. Smith, James McFarland, Jesse S. Bunce, Henry Esler, Abraham Cameron, John Walker and D. Wells were, upon motion, referred to the Committee on Admission of Members.

NEW INVENTIONS.

Mortera's Steam Brake.—Dr. Van der Weyde submitted the drawings of this invention to the Association. The plan proposed by Mr. Mortera is that a piston and cylinder placed between the wheels of the locomotive, in connection with a simple mechanical arrangement as set forth and described by him, will satisfactorily work the brakes of a train of cars; the engineer of the train has it under his own immediate control. Two additional improvements were suggested in the drawings; first, that the steam could also be used to heat the cars; and second, that a mechanical arrangement, situated in front of the cow-catcher, to hook on a car to run it back or forth, thus obviating much of the trouble that is now generally experienced in moving cars, is claimed as a prominent feature.

Thomson's Gas Burner.—Mr. John K. Simpson presented to the association an improved gas burner, invented by a Mr. Thompson, of New York city. It is so constructed that it will emit sufficient light at the lowest pressure of gas, and maintain this volume whatever the pressure may be. Between the disks, a piece of leather saturated in oil is placed, and when the pressure is great, this as a valve, acting automatically, shuts it off, and doing so, secures a quantity of gas in a chamber provided for that purpose. Burning this gas relieves the pressure, when it again opens, and the same operation is observed. The adoption of this burner for the street lamps of cities is considered advisable, as under all circumstances, it is contended, a regular and sufficient light is given, while it saves large quantities of gas, which, in many of the burners now in use is wasted. During the description of this invention, Mr. Louis Koch remarked to the society that the day before, he had placed in his house, some eighteen gas burners in which the gas was raised by a pressure, and, as far as his observation extended, they had worked exceedingly well.

The above inventions were referred to the Committee on Science and New Inventions, who will duly report thereon.

REPORT.

The above committee, at this period, submitted the subjoined report on the undermentioned subjects:—

Thomas S. Davis' Piston Valve.—In regard to this valve, your committee would report that after a careful examination of the description and drawing, as also having witnessed its practical operation at the Jersey City Locomotive Works, we believe it to be a good and useful appliance, possessing qualities that will recommend it to engineers, affording a quick exhaust with short throw, is well balanced, will cause but little friction, and promising well for durability. The engine we examined has been in constant use since August last (as stated by Mr. Davis), and the valves or seats show no perceptible wear or injury; but we would here take occasion to say that valves of this description will require a fine adjustment, as also a careful operation at first starting, that is, when the valve seat (which is cylindrical) is at a low temperature.

Beach's Safety Switch.—In regard to this switch, your committee would say that they have examined it, and saw it in practical use at Jersey City. We have had an opportunity of seeing locomotives of 36 tons weight pass safely over it and keep the track—the switch having been set purposely wrong, when an ordinary switch would have conducted the engine off the track and have occasioned much trouble and perhaps great loss. For station purposes, where the train will move at a moderate speed, they believe it to be a convenient and useful plan, worthy the attention of railroad companies. Whether it would be efficient or safe at points where the trains pass at high speed, your committee are not prepared to say.

Thos. B. Stillman, Chas. H. Haswell, and Chas. McCarty, were appointed a Select Committee, to whom was referred the Act now before the Legislature of this State, to provide for the inspection of steam engines and boilers in the cities of New York and Brooklyn, for the purpose of making suitable amend-

ments, suggestions, &c. The prominent points of the Act now before the Legislature, and which was referred to them, we append: it is as follows:—

SECTION 1. No steam engine, boiler, or other steam apparatus shall be used in the city of New York or Brooklyn, without having been inspected.

SEC. 2 appoints William Broadman, George Birkbeck, Jr., and Thomas H. Faron, a Joint Board of Commissioners, to hold office for a term of five years, and who shall appoint three or more competent inspectors of steam engines, boilers, &c.

SEC. 3 makes it the duty of the inspectors to examine all steam engines and steam apparatus in New York and Brooklyn at least once a year, and furnish certificates to owners, of the condition of such engines, boilers, &c., which shall be sworn to before one of the Commissioners. The Commissioners are empowered to issue licenses to competent engineers, which shall hold good for one year, unless sooner revoked for cause. For each license issued, the Commissioners are required to hold meetings twice per week for the examination of candidates for engineers.

SEC. 4 forbids the use of any steam engine or boiler without a certificate of inspection, on pain of \$20 per day, after due notice shall have been given.

SEC. 5 provides a penalty of \$10 for each offense, to any person who shall act as engineer without a certificate of examination, and a penalty of \$20 for each offense to parties who shall employ unlicensed engineers.

SEC. 6 authorizes the Commissioners to employ all necessary assistants to the inspectors, and such clerks as they (the Commissioners) may require, to be paid out of the fees of the Commissioners. The Commissioners are authorized to demand and receive for every boiler and engine, and for every boiler used for generating steam, to be used for other purposes than the driving of a steam engine, not exceeding ten-horse power, \$6; for every one exceeding ten-horse power, \$10.

SEC. 7 provides that all fines and penalties provided for in this Act may be sued for and recovered, in the name of the people of the State, before any Court of competent jurisdiction.

SEC. 8. The Commissioners are to receive \$1,500 each, per annum, for their services (to be paid out of fees received), and shall have power to fix the compensation of all persons employed by them under this Act.

SEC. 9. In no case shall any money be drawn from the State, County, or City Treasury, to pay any person or expenses incurred under this Act.

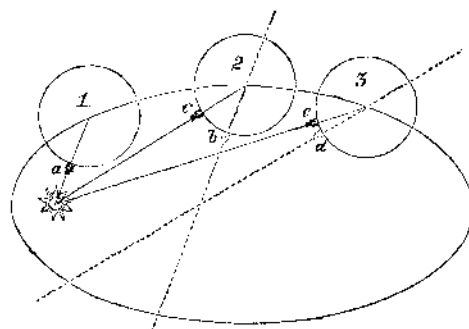
SEC. 10 requires the Commissioners to keep a record of their transactions and report annually to the Legislature; and, that after the payment of expenses, the funds, if any, remaining in their hands, shall be paid to the Alms-House Departments of New York and Brooklyn.

SEC. 11 authorizes the Governor to fill vacancies in the Commission.

Adjourned.

Mean Time.

The sun is sometimes 16 minutes too fast and sometimes 14 minutes too slow. The accompanying diagram illustrates the cause of this in a very clear



manner. The earth's orbit being in the form of an ellipse, with the sun in one of the foci, the earth moves more rapidly in that portion of its orbit which is nearest the sun than it does in the portion which is most remote from the sun. If we suppose the projection, *a*, to represent a fixed object on the earth—a tower for instance—and that the earth turns once on its axis while it is moving in its orbit from 1 to 2, this will bring the tower, *a*, to *b*, and the earth will have to turn from *b* to *c* in order to bring the sun overhead at the tower. But if, during the next revolution of the earth, it moves in its orbit only from 2 to 3, the tower will have to be carried only from *d* to *e* to bring it under the sun. Thus, while the earth always turns on its axis in the same length of time, it takes longer to bring the sun overhead at certain times of the year than it does at other times. As it would be very difficult to make clocks to correspond with these constant changes in the length of the days, the plan is adopted of making them measure the average or mean length of the days, and this is called mean time.

If atmospheric air had been a good conductor, it is probable that mankind would always have remained in ignorance of the existence of electricity. How many other forces may there not be in nature, the existence of which is not even imagined?

DURING the late terrific gale in England, the anemometer at Lloyds', London, indicated a pressure of 36 pounds on the square foot.

Iron Becoming Crystalline by Vibration.

Our unknown but invaluable friend, the Paris correspondent of the *Photographic News*, writes as follows:

The spontaneous change forged and rolled iron undergoes when submitted to continuous vibration, is productive of so much critical danger, especially in the case of railway machinery, that an investigation into the best means of remedying the resulting evils, has been viewed as an engineering question of vital importance. Among others, Mr. Schimmelbuch, of Liege, has undertaken the subject, and the following is an epitome of his investigations. A bar of pure unalloyed iron was struck by a hammer three times in a minute for six consecutive weeks; at the expiration of this time it broke into three pieces. Before the experiment the bar was a good specimen of fibrous iron; after, on the contrary, its fracture exhibited a brilliant crystallized structure, resembling that of antimony.

A bar of iron alloyed with nickel, submitted to the same treatment, underwent no change.

A very simple means exists of recognizing this changed condition of iron, so dangerous in its consequences. Pure iron, when magnetized by contact, loses its magnetic properties immediately the needle is detached. On the other hand, iron combined with minute quantities of some foreign body, such as carbon, oxygen, sulphur or phosphorus, remains magnetized. The efficacy of this simple test has been established by repeated experiments.

Specimens of iron alloyed with carbon, manganese, zinc, cobalt, tin, chrome and nickel successively tested, show that nickel is the only one that can be adopted commercially to correct the tendency to crystallize in pure iron, which it is so desirable to overcome. The quantity of nickel required to produce the desired effect varies between 1 per cent and 2-1000th part.

Mr. Schimmelbuch's experiments were directed chiefly to studying the effects of the addition of the mineral wolfram to pure iron. This addition imparts the greatest hardness, tenacity and density to the iron; invaluable qualities in axles of machinery, locomotives, steamboats, and in steam cylinders, light cannon, &c. The most inferior kinds of iron acquire an extraordinary tenacity, and a hardness superior to that of cast steel, by an addition of 2 to 5 per cent of this mineral, according to the quality of iron employed.

Phosphoric or sulphuric iron becomes very tough and strong by the addition of a half to 1 per cent of wolfram, and 3 to 5 per cent renders it extremely hard. Iron thus treated does not lose these qualities, even after a second or third fusion, and the castings are free from bubbles.

The addition of wolfram to copper and its alloys exercises the same beneficial action. The addition of one-half per cent imparts great tenacity; whilst 2 to 4 per cent render the copper very hard, without in the least diminishing its tenacity.

The most important consequences to engineering science will doubtless result from these and other investigations, conducted with the same object.

Coal Oil Lamp burners.

A few weeks since we directed attention to several defects in the common lamps for burning coal and petroleum oils. Our remarks on this subject have attracted considerable attention, and, in one case, they have been the means of bringing to our notice a new burner, lately introduced, which obviates one of the evils we had pointed out. We stated that an improvement was wanted for regulating the length of the wick above the tube, as the common spur wheel used in burners for this purpose frequently cut into the wick, so that it could neither be moved up nor down. The new burner was obtained from Briggs & Co., No. 22 Merchants' Row, Boston. Instead of the wick being moved up and down in the usual way to regulate the length of flame, the wick is stationary in it, and the tube is moved up and down by a rack and pinion, so that there is perfect certainty about the operation. This burner also embraces some other improvements, such as a spring wire-clasp for retaining the chimney in place, &c., to accommodate the expansion of the metal to that of the glass.

WEALTH OF MASSACHUSETTS.—State valuation of property, \$897,795,326; population, \$1,231,494; average age to each inhabitant, \$729.