

POLYTECHNIC ASSOCIATION OF THE AMERICAN INSTITUTE.

[Reported expressly for the Scientific American.]

On Thursday evening, the 29th ult., the usual weekly meeting of the Polytechnic Association was held at its room in the Cooper Institute, this city; the president, C. Mason, in the chair.

MISCELLANEOUS BUSINESS.

Water Filter.—Mr. Isaac W. Merchant, of Boston, exhibited a water filter to be attached to stop-cocks, manufactured by Baxter & Bro., of that city. The filter consists of a thin corrugated band of brass, closely coiled like a watch spring, and fitted into a ring. The ring is inclosed in a hollow sphere, pierced at its poles by short tubes, which serve for the attachment to the stop-cock and the passage of the water. The ring plays water-tight in the sphere, and there is a lever attached to one side of the ring by which it may be turned over, and thus cleaned when it becomes foul. Messrs. Haskell and Garvey were appointed to report on the merits of this filter.

Johnson's Gas Burner.—Mr. A. L. Bogart, by means of various interesting experiments, making use of the photometer, demonstrated the alleged advantages of Johnson's gas regulator and burner. The interior of this burner is provided with one or more metallic cones against which the current of gas impinges, re-acts, and loses its force, so that it issues at the orifice quite stagnant. The result is, that the gas burns slower and gives more light. Mr. Bogart thinks that the light of gas comes from the burning of carbon, and that, with the ordinary burner, much of the carbon is unconsumed, and passes away as invisible gas.

Mr. Seely—The light of gas is dependent upon the carbon, but not directly by virtue of its burning; in the act of burning, it gives little light. In burning, gas is decomposed, the hydrogen is first burned and heats the free particles of carbon white hot; the particles of carbon give light precisely as a hot wire does. The problem of greatest illumination requires that the particles of white hot carbon be suspended as long as possible without burning them. From the ordinary burner, the gas issues with force, mingles quickly with the air, and the carbon is burned before it can give out light; it acts like a blow-pipe. Gas flame gives most light when it is tinged with yellow, but is more intense when it is white. Professor Hendricks and Messrs. Seely and Garvey were appointed to report on the merits of this burner.

Friction Rollers.—Mr. W. J. Demorest exhibited Pratt's improved friction rollers. The journal is surrounded and bears on six or more rollers placed at equal distances and on fixed axes. But the rollers are hollow, and inclose other six or more small rollers systematically placed, with axis attached to them, and traveling around the axis of the larger roller. A large fly wheel, arranged with such a system, was set in motion, and kept revolving about two minutes. Mr. Demorest was willing and able to answer all objections. Messrs. Dibben and Serrell were appointed to report on the merits of this invention.

The President here announced the regular subject—"Modes of Conveyance to and from New York."

DISCUSSION.

Professor Mason read an able paper on the economic and general bearing of the whole subject.

Mr. Howe—Steam must take the place of horses on our inland canals; and it seems generally to be admitted that we must look for some change in the construction of boats and adoption of the best form of the propeller. The propellers especially designed for canals are Catcarts's, which is set on a universal joint, so that it may be used for steering, as well as propulsion; and an invention of two propellers inclined towards each other, to confine the disturbance of water to the center of the canal, and to give facility of steering. We may even expect that side wheels everywhere will be superseded by screws. The machinery of side-wheel steamers occupies one-third of the best room in the boat; the machinery is also heavier than that of a propeller, and consequently takes more force to move it. The side-wheel boat draws more water; at a depth of 16 feet, the pressure is 1,000 lbs., while on the surface it is only 62 lbs. The steamer *Baltic* (on Lake Erie) exchanged side wheels for a propeller, and she now makes profitable trips with less fuel than before. Experiments with propellers have failed only from faulty construction.

Dr. Van Der Weyde—Screw propellers are best for

the ocean, for they are good sailing vessels as well as steamers. Wheels and wheel-houses are very serious obstructions in sailing against the wind.

The President—The line of propellers between Hartford and Albany competes successfully with sailing vessels.

Mr. Garvey alluded to Montgomery's invention—the enclosing of a screw in a cylinder as a preventive of the washing of the banks of a canal. This cylinder will not injure the bank if it strikes, and will protect the screw. He said that Mr. Howe was in error in the assertion that the increase of pressure of water by its depth has anything to do with the power required to propel a boat.

Mr. Howe—A body moving on water displaces what is in front and what is below. If a body is sunk, it also must displace what is above.

Mr. Fisher—Is not our question conveyances in the city? that is the subject we discussed last week. The morning papers announce "City Railroads."

The president read the question as adopted.

Mr. Fisher—I perceive now how we are all at sea. [Laughter.]

The president said that, last summer, two side-wheel boats made regular daily trips of 30 miles to and from Syracuse.

Mr. Dibben—There have been successful steamers on the Delaware and Raritan Canal for six or eight years. The boats are able to compete with anything. At a speed of 8 or 10 miles an hour, and with 6 to 8 tons of coal for the trip, they carry 300 tons of freight. To carry the same freight by railroad would cost about 50 per cent more; but railroad managers are generally willing to carry for less cost if they defeat others. I believe that freight is generally carried cheaper on water than on land. The Hudson River Railroad cannot honestly take the freight from the boats which ply between New York and Albany.

The president could not agree with the last speaker. The directors of railroads are men who are the chief owners, and they conduct the business of the road as they would their own private affairs; and no man, in his business, persists in a course which he knows is ruinous. A deputation from the Central Railroad went to Albany to ask (for the road) the privilege of carrying cattle without toll. The Legislature objected, but the deputation persisted before a committee, who believed that railroads could not carry cattle with honest profit. The chairman of the committee finally, feeling worried out, said, with more emphasis than eloquence, "Let the d—d fools have their way!" Now, the men who would think of transporting cattle in any other way from Buffalo to Albany are surely the fools. The Hudson River road offered to bring cattle from Albany for the cost of the extra fodder and the changing from the boats. They found the business profitable at this rate when they had enough of it. Now they carry all the cattle. The saving by the use of coal on the Hudson River road is equivalent to a rise of two per cent on its stock. The road cost \$14,000,000; and of this, \$11,000,000 are as good to-day as when it was built. Only \$3,000,000 is liable to injury from any amount of business. Give a road as much as it can do, and we shall know how cheap its rates for freights or passengers may be. One train can carry more than any steamer. China is a prosperous agricultural country by reason of its canals, but Illinois is more so from its railroads. The Illinois farmer is in New York every day. Even in Iowa, the people daily consult the New York market. In a few years the receipts at the station of Poughkeepsie (where I reside) have risen from \$60,000 to \$120,000 per annum. The Central road is capable of doing more work than canal and road together have done. [Applause.]

Mr. Godwin—What do you think of *Pro Rata*?

The President—I think it a silly meddling of the Legislature with business which should not concern them.

Mr. Howe—The improvements in railroad business is in the direction of light engines and the proper use of coal.

Professor Hendricks—Further elementary and mathematical study of the propeller is required. The screw now stirs up the water too much; it wastes its force in this way. Let the motion be quick, and in the right direction. The force required to move a boat is measured by the quantity of water it displaces. A boat going to Albany cuts a sluice in the water, whose section is a section of the boat.

The discussion is to be resumed at the next meeting

A COLUMN OF VARIETIES.

Information has been received from J. C. Helm Esq., the United States Consul-general at Havana, of the publication of a royal decree, granting exemption from import duties on steam engines and other manufactures intended to be used in the cultivation and preparation of coffee, which privilege has been hitherto enjoyed only in relation to such articles as were imported for sugar plantations.....Mr. Thompson's process of purifying copper consists in melting 100 parts of that metal with ten parts of copper scales (black oxyd) along with 10 parts of ground bottle glass. After the copper has been kept in fusion for half an hour, it is found pure at the bottom of the crucible. Perfectly pure copper has been thus obtained from brass, bell metal, gun metal, &c., containing from 4 to 50 per cent of iron, lead, antimony, bismuth, arsenic, &c.....Sir Marc Isambard Brunel left France in consequence of the French revolution. He first went to America, where, in 1797, he made experiments with steamboats on the Hudson river, under the auspices of Chancellor Livingston, who was also the patron of Robert Fulton. Sir Marc, at that time Monsieur Brunel, also built the old Bowery Theater in New York.....Steam vessels running in hot climates require very large condensers, owing to the warmth and salt-ness of the water. The temperature of the Red Sea is about 90°, whilst it contains also a greater quantity of salt than ordinary sea water. The specific gravity of ordinary sea water being 1,026, that of the Red Sea has been found to be, in some instances, 1,080.....A cast steel shaft, made by Fred. Krupp, of Essen, Rhenish Prussia, was 30 feet long, and 10 inches in diameter. It is now in use on a French steamer. The same maker has produced a single piece of steel weighing 20,000 lbs., or twice the weight of that sent by him to the Paris exhibition.....Castings of irregular forms and varying thickness are strained in cooling, and cast iron wheels with light rims and heavy naves often break of themselves soon after being taken from the mold, unless careful provision has been made for the unequal contraction of their inner and outer portions.....In tinning copper it is first cleaned with sandstone, and then heated and rubbed over with sal-ammoniac. The tin, mixed with powdered resin, is then placed on the copper, which is made so hot as to melt the tin, and to allow of its being spread over the surface with a pad of tow.....Professor Robinson's rule for estimating the strength of cordage is to square the circumference of the rope in inches, and take one-fifth of the number for the weight in tons which the rope will bear.....No person can legally obtain a patent in Canada unless he be a resident of that province. The Canadian Parliament has appointed a committee to report, this month, a bill embodying an improved patent system.....The majority of the locomotives employed upon the Canadian railroads have been made in the United States, and exported into that province under an *ad valorem* duty of 12½ per cent.....The summit of the Copiapo Extension Railroad in Chili is 4,470 feet above the sea. The summit of a branch railroad to be built from the Copiapo Railroad will be 6,624 feet above the sea.....The greatest range ever obtained by any Armstrong gun was 5 miles 330 yards. This was the 32-pounder, fired with a charge of 6 lb., at an elevation of 35°.....In his later works of bridge construction, Mr. Stephenson abandoned the cellular system originally adopted in the Conway and Britannia bridges.....Mr. Fairbairn has found that some iron ships, built a few years ago, would, if suspended amidships, as on a sharp reef, break by their own weight.....The bells of the ornamental clocks made in Paris, have been found by analysis to contain 72 parts of copper, 26.56 of tin, and 1.44 of iron.....Of 1,089 cases of fire in London, in the 1850, 30 were from spontaneous ignition. One of these cases was that of the spontaneous ignition of coal.....The magnifying power of the diamond, in proportion to that of plate glass, ground to the same form, is as 8 to 3... Mr. Whitworth has fired from a hexagonally bored 24-pound howitzer, shells of ten diameters in length.....The browning process, in the manufacture of the Enfield rifle occupies four weeks.....It is impossible to pass the flame of ordinary fuel through a tube of any length..... A diamond point used as a drill, will perforate through the hardest file. A good hard common steel point will also drill through a file, if it has a high velocity, and plenty of cold water be used to keep it cool.....The population of Victoria numbers 384,110 males to only 191,257 females.