

## POLYTECHNIC ASSOCIATION OF THE AMERICAN INSTITUTE.

[Reported expressly for the Scientific American.]

On Thursday evening, May 31st, the usual weekly meeting of the Polytechnic Association was held at its room in the Cooper Institute, this city; Professor Mason presiding.

## MISCELLANEOUS BUSINESS.

**Refrigerators.**—The "Polar Refrigerator" was exhibited, for keeping provisions cold and fresh in warm weather. This refrigerator has two provision chambers, separated from each other by a wedge-shaped ice-box. The ice is placed on a rack at the top of this box, and the water of the melted ice falls below on a filter; thus manufacturing ice-water for drinking and other purposes. The walls of the provision chambers are of sheet zinc, and the sides of the ice-box are corrugated, in order to give a greater cooling surface and strength.

The President—A good refrigerator is now an essential piece of apparatus in a well-furnished house. In hotels, the refrigerator becomes a good-sized room. At the Fifth-avenue Hotel, the refrigerator is a capacious apartment, constructed especially for the purpose, and with all the conveniences science could suggest. The marketing is done only once a week, everything being as surely preserved in summer as in winter. By such a system, the proprietor of that establishment was able, in one season, to save the entire amount of the first outlay on the room.

**Working Steam Expansively.**—Mr. Rowell gave further details of experiments now in progress at the Metropolitan Mills, which seemed to him to show that there was no advantage in working steam expansively. The club thought best to defer a discussion of the case until the experiments are completed. In all, there will be 20 trials, of 60 hours each in duration.

The president then announced the regular subject—"Gas-burning."

## DISCUSSION.

In illustration of the subject, a great variety of gas-burners were exhibited by inventors and agents. Among these, the following were most worthy of notice:—Cole's burner, which is a tube to be slipped over the ordinary burner, the upper end of the tube terminating in a hollow sphere with a slit for the bat-wing flame or holes for the fish-tail flame. The inventor claims that, in this burner, the gas is highly heated before it issues. John Johnson's burner terminates above in a hollow vertical ring; the ring at the top is sawed through and a sliding valve, operated by a lever, fits into the saw-cut, and, by raising or lowering, closes the slit or adjusts it to the amount of gas to be used; this is believed to be the only burner which has a variable orifice. Thompson's "regulating burner" is provided at the bottom with a light hollow cone, which is raised by an excess of pressure; above the cone is a series of round weights resting on steps, which are successively lifted as the pressure becomes greater. This burner performed well. The burners which operate by simply checking the flow of gas by stuffing, &c., were also well represented.

Mr. Garvey, as the minority of the committee on "Johnson's Burner and Regulator Combined," read a report favorable to the invention. The report, at considerable length, opposed some of the positions of the majority, pronouncing them theories unscientific and absurd. Mr. Garvey finds the virtue of this burner in heating the gas before its issue.

The majority of the committee (Messrs. Seely and Hedrick) replied that they had not put their own theories, or theories of any kind, into the report; that the statements objected to were the unanimous teachings of the best authorities; that there was little advantage of the heating of gas before its issue (for the heating was at the expense of the flame); and that this burner was poorly constructed for conducting the heat down.

The discussion of these reports occupied a considerable time and was of a lively character, partly for the reason that there were a considerable number of persons present who were pecuniarily interested in the question of the utility of the burners concerned. The sentiment of the majority of the audience seemed to be unfavorable to stuffed burners, and to approve the conclusion of the majority of the committee, that there should be no check of flow of gas in the burner, unless of an automatic regulating power. Further account of the discussion of the reports is omitted for want of space.

The President—The light of sperm candles has al-

ways been more agreeable to me than the light of gas. Others agree with me in this choice; Professor Anthon, the celebrated classical scholar, has always preferred candle-light for study. The light of candles is yellowish, and similar to that of the economical gas flame. What is the reason or condition of the yellow light?

Professor Hedrick—Yellow light is produced at a lower temperature. Carbon, like other bodies when heated, passes through a series of colors, and at the highest temperature is "white hot." The white flame of gas is most intense; but the yellow flame of the same amount of gas is greater in quantity.

Dr. Van Der Weyde exhibited "Bunsen's burner," which is chiefly used by chemists for producing an intense heat. The common Bunsen burner is a gas jet, over which is placed a tube (open at the top), about six inches high and one-half inch in diameter; the tube terminates at the bottom in a foot, through which the gas passes to the inclosed jet. The lower part of the inclosing tube is pierced with three or four holes, about a quarter of an inch in diameter, for the supply of air to the gas. In this burner, the gas burns with a blue flame, giving no more light than alcohol; but if the air-holes be stopped, the light becomes whitish and smoky. When a large volume of heat is desired, two or more of these burners are combined on the same foot. The doctor also exhibited the gas blow-pipe by which the gas is burned from an annular aperture within which is an air jet. If oxygen be used instead of air, the most refractory substances—as platinum, for example—are melted with ease. The Bunsen burner and the gas blow-pipe are now in common use among chemists, and have taken the place of the spirit lamp and mouth blow-pipe wherever gas is convenient.

A gentleman in the audience here commenced addressing the club on the great merits of a method he had invented for economizing gas: but, on intimating that his method was a secret, and that he was unwilling to communicate anything of its nature, he was promptly requested by the president to take his seat. The president remarked that the club had no secrets, that the members came together to give and receive information, and that when a gentleman confessed that he had nothing to communicate he cannot be allowed to take up the time of the meeting.

Mr. Rowell—I once went to an expense of \$40 to replace my ordinary burners by some highly recommended patent burners. My gas bills were increased 50 per cent.

Mr. Godwin—On my way to this meeting, I saw in a store in Fourth-avenue some of the Johnson burners in use, and inquired about them. The proprietor of the store believed they burned more gas than the old ones.

Gen. Hall—I have used the Johnson burner about two months; the light is agreeable, but an advantage of cost is little either way. The gas bill for April was larger than that for last year, and for May, nearly the same as last year.

Mr. Seely—A great objection to the stuffed burners, is that the liberty of re-adjusting the flow is taken away when a change is needed. If the burner is stuffed to suit the maximum pressure, when the pressure is lower, you will not have enough light, and you cannot get it. A stuffed burner is as unreasonable as a stop-cock which cannot be turned.

Lieut. Bartlett—The consumption of gas is rapidly increasing; as we grow older, we need more light. People are not at all satisfied with the amount of light which contented them 40 years ago. The consumption increases, and the bills increase; but we do not observe the connection between these facts. Mr. Roome, of the Manhattan Gas Company, says people complain more and more.

After appointing the subject for next week—"The Organization of the Club"—the association adjourned.

Messrs. D. B. Dorsey & E. Matthers, of Fairmount, Va., have made certain improvements in type-setting (on which they have applied for a patent) which are worthy of notice. The principal object of their invention is to facilitate the handling of composed matter without danger of knocking it into "pi." To accomplish this object a permanent column galley is employed for setting up the type, and on this galley the type remains until they are distributed. Another very important feature in their invention is the employment of spring spaces, whereby the time and labor now spent in justifying lines is saved.

## A COLUMN OF VARIETIES.

The fiber of a single silk cocoon is 1,520 feet in length. The total length of railroads in Germany, at the close of 1859, was 7,949 miles.

Iron boiler tubes in a steamship rust out very fast when the vessel is laid up; they endure five times longer when in constant use.

The large iron pipes employed in the Glasgow (Scotland) Water-works are four feet in diameter,  $1\frac{1}{2}$  of an inch thick, and sustain a pressure from about 300 feet of head.

The population of the world is now estimated at 1,279,000,000, viz.: Asia, 755,000,000; Europe, 272,000,000; Africa, 200,000,000; America, 50,000,000; Australia, 2,000,000.

Tamarack timber, treated with creosote and covered with felt, is introduced between the iron and stone work of the Victoria Bridge, in Montreal, to impart a certain degree of elasticity at the junction of these hard materials.

The Suez Canal, to unite the Red Sea with the Mediterranean, has been commenced at Port Said, where two large moles, running out nearly a mile into the sea, are being constructed. About 1,700 European workmen and several thousand natives are employed on the works.

In the Gulf of Manaar (Ceylon) turtle are frequently found of such a size as to measure five feet in length. Sir Emerson Tennant states that, in riding along the sea-shore one day, he saw a man in charge of some sheep, who was resting under the shade of a turtle shell which he had erected on sticks to shield him from the rays of the sun.

In England there are 300 silk manufactories, in which are 2,000,000 spindles and attendant machinery driven by engines amounting in the aggregate to 4,000 horsepower. About 7,000,000 lbs. of raw silk are imported into Great Britain annually. Few persons are aware of the amount of the English silk trade.

Cranberries may be profitably cultivated on swampy ground that would otherwise be useless. Solon Robinson states that, at Cape Cod, where the cranberry culture is carried to its fullest extent, swampy lands, that were worthless a few years ago, have now "a saleable value of \$800 and \$1,200 per acre."

Great quantities of what is called "patent fuel" are manufactured and employed in England, principally on steamships. It consists of the small or fine bituminous coal pressed into square blocks, and rendered adhesive by bitumen. It can be stowed away in less space than the shapeless lumps of common coal, and it is therefore preferable for long voyages.

In common engineering practice, the combustion of a pound of coal imparts to the water in a steam boiler about 10,000 units of heat, which is equal to the evaporation of 8 lbs. of water of ordinary temperature. In the laboratory 14 lbs. of water have been evaporated with one pound of coal.

Ten parts of tin, combined with one hundred of copper, form bronze, and is the usual composition for statues. Common bell-metal is composed of three parts of copper and one of tin. For very small bells, a small portion of zinc improves the tone. Speculum metal for telescopes is composed of equal parts of tin and copper. It is white, very hard and close in the grain, and receives an exquisite polish.

Sir Macdonald Stephenson writes to the *London Times*, describing a new mortar upon which he is now engaged: "It consists of the application of high pressure steam to produce great centrifugal velocity, and the angle of discharge of the shot or shell is regulated by simple mechanism. It can be kept in continuous operation by two men. The range varies from 800 to 2,000 yards, according to the velocity, angle of elevation, and dimensions of shot. Ten shots can be discharged for every single one of the ordinary mortar."

Dr. S. S. Blodgett, of Ogdensburg, N. Y., writing to the *Dental Cosmos*, condemns the use of fine charcoal as a tooth powder. He asserts that it is as sharp as diamond dust, and soon wears off the enamel. He says:—"The great dentifrice that should be used at all times, and under all circumstances, is soap. Its alkaline properties serve to neutralize the acids contained in the fluids of the mouth, and its cleansing properties will correct the breath and remove offensive odor sooner than any article I have ever seen tried."