

THE POLYTECHNIC ASSOCIATION OF THE AMERICAN INSTITUTE.

[Reported expressly for the Scientific American.]

The usual weekly meeting of this association was held at the Institute rooms, on Thursday evening, 26th inst; Professor C. Mason presiding.

MISCELLANEOUS BUSINESS.

Lithoconia.—Messrs. Taylor, Wood & Ladd presented to the club specimens of their new plastic compound which they call "lithoconia," and which is manufactured on a large scale at Roxbury, Mass. The chief application of the material is as an artificial stone for ornamental purposes, as for cornices, brackets, statuary, &c. The exhibitors stated that it had been extensively used in Boston, for window caps, and for that use it was furnished at about half the cost of cut stone. By a variation of the proportions of the ingredients, the material is suited for picture frames. The articles exhibited were marbled table tops, picture frames, and fancy ornamental pieces. In answer to inquiry of the president, the exhibitors stated that they had made application for a patent, and were, at present, unwilling to communicate the particulars of their process.

Mr. Garvey—Artificial compounds like this on exhibition have, for a long time, been well known, and in common use. Fibrous materials, of almost every sort, are easily cemented by means of oil and glue, or solutions of gums, and make an excellent substitute for wood. An example of this class of compounds is papier maché. For artificial stone, scagliola (a mixture of whiting and glue) has been a long time in common use. It can easily be pressed into any desired form, and may be colored or highly ornamented by painting and gilding. It has been much used for outside work, but has lately given place to terra cotta, which is almost as durable as natural stone. Any artificial stone should be homogeneous in composition and colors, for the reason that if the surface is broken they will not show the cheat.

Mr. Seely—The useful qualities of these artificial compounds often depend as much upon the details of manufacture as upon the nature of the ingredients. Shellac and sawdust, under ordinary treatment, would make a compound of little value; but being thoroughly mixed of a proper consistence, and pressed, by hydraulic pressure, into steel molds, it gives the beautiful "union cases" which are so fashionable with the daguerrotypists.

The President—In Ulster county, we have lately found building stone of the very best quality; I prefer it to white marble.

Aniline and Coal Oil.—Dr. Stevens exhibited about two dozen samples of silks and delaines dyed with the above compounds. The colors are of various tints of red, purple and lilac. The Doctor remarked that aniline, the base of all these colors, is one of the products of the distillation of coal, and may always be found in coal tar and crude coal oils. The great value of these dyes, beyond their brilliancy, is the fact that they are permanent, a quality which was long sought for in vain. The famous Tyrian purple from the shellfish *murex* was considered a fast color, but its cost and its limited supply have kept it out of use in modern times.

Mr. Seely—Aniline and its compounds which are used as dyes have been known for a long time among chemists, but were regarded only as substances of scientific interest; their utility as dyes, however, is a discovery which has been developed within a year or two. Coal tar and crude coal oil are made up of about forty different compounds, acids, alkalies or bases and neutral substances. Among the acids is creosote; the alkalies, ammonia, and the neutral substances, coal oils. Aniline is one of the alkaline substances, and, according to the French chemists, in its chemical character is similar to ammonia. It unites with acids and forms salts, and it is solutions of these in alcohol which are the dyes. Thus, the *mauve* dye is a chromate of aniline, and the *solférino* is similar in its constitution to ammonia-sulphate of copper. In coal tar the aniline is in such a small quantity that it is impracticable to separate it unless at the same time, the coal tar is treated for other more important purposes. It is, however, obtained in abundance from benzole, which is the lightest of the coal oils, by a chemical process which is not difficult for a skillful chemist. The new colors are extremely popu-

lar with the ladies, and all the dyers will, no doubt, be anxious to learn the new improvement in their art.

The President—Wherein consists the peculiar virtue of coal over other oils?

Mr. Seely—I think it lies mainly in the fact that they are neutral substances. They have no affinity for oxygen at ordinary temperatures, and they will not become resinous or rancid; they are almost as unchangeable as water.

Dr. Stevens—I have found the practical difference to be that if you spill coal oil on a carpet, no harm is done; while if it be fish oil, an indelible stain is left. [Laughter.]

Electric Telegraphs.—Mr. A. E. Parks, of Williamsburgh, exhibited a model of a new recording instrument which would operate with twice the rapidity of the Morse instrument. At the suggestion of the president, Mr. Parks will bring his instrument at another time, and an examination of it will be made by a standing committee.

The president here called up the regular subject, "Expansion of Steam."

DISCUSSION.

Professor Hedrick, chairman of the committee to report on the Cherry-street experiments, said that the committee had as yet had no formal meetings, that the experiments were still in progress, and that, without doubt, next week the final report would be presented. He preferred to leave the opening of the discussion to his colleagues.

Mr. Dibben presented a mathematical calculation substantially as follows, which he considered elucidated the whole subject as far as theory could go. The mechanical value of the heat required to raise 1 lb. of water 1° is 772 avoirdupois foot-pounds. If 1 lb. of water (27.7 cubic inches) at 32° be converted into steam at 212°, the space occupied by the steam will be 46.230 cubic inches, and the heat used in raising the water into steam will be 1,170° or units. 1,170 heat units are equivalent in force to 903.240 lbs. raised 1 foot in height. The amount of heat required to convert the 1 lb. of water into steam is not affected by the amount of pressure of the atmosphere, or otherwise, except in an indirect manner. If a constant resistance of 15 lbs. to the square inch be opposed to the expansion of the 1 lb. of water into steam, the resistance overcome will be 58.956 foot-pounds, which is 74.9 units of heat force. 1,170 units in all were employed, and of these, 74.9 were realized in power, while the 1,095.1 units still remain to keep up the condition of elasticity. In other words, 74.9 units of heat did the work, were converted into so many units of mechanical available force. And these 74.9 units are all the work which can be realized in the method described. Mr. Dibben then proceeded to show that, by using the steam expansively, a much larger percentage of work will be realized, or that more of 1,170 units of heat than 74.9 can be converted into power. The basis of his calculation is given above, and by using it, those who have a little skill in mathematics will arrive at the same conclusion as Mr. Dibben does, that there is a large theoretical and practical gain by the use of steam expansively.

After Mr. Dibben had concluded, a rapid and somewhat rambling conversation took place between various members till the time of adjournment.

MACHINE FOR SAWING SHIP TIMBER.—The construction of a machine which should saw timber with all the various curved, beveled and winding surfaces required in building a ship has enlisted the efforts of the very first engineers of the world, including such men as the famous Brunel, but the difficulties of the task have baffled their powers. H. S. Vrooman, of Hoboken, however, has taken the matter in hand, and he now has a saw in operation at No. 355 Washington-street, this city, which accomplishes the work in the most perfect manner conceivable. The saw is hung in a turning and sliding frame, and is controlled by two guides, one of which determines the curve and the other the bevel. The adjustment of these guides to the form of surfaces cut have that perfect precision which is characteristic of machine work. The invention is well worth the attention of shipbuilders and furniture manufacturers, and indeed of all who are interested in novel and ingenious mechanism.

A COLUMN OF VARIETIES.

When the Croton aqueduct was in process of construction, the writer of this walked into it 440 paces, and his companion stepping into the mouth, we found that, standing thus just a quarter of a mile apart, we could converse without any difficulty in whispers.

The condensed air of a crowded room gives a deposit which, if allowed to remain a few days, forms a solid, thick, glutinous mass, having a strong odor of animal matter. If examined by a microscope, it is seen to undergo a remarkable change. First of all, it is converted into a vegetable growth, and this is followed by the production of multitudes of animalcules; a decisive proof that it must contain organic matter, otherwise it could not nourish organic beings.

Coal oil has the remarkable and very valuable property of never becoming rancid. All other oils—vegetable and animal—absorb oxygen and decay; but all the neutral oils derived from coal are permanent compounds like water, and do not experience corruption or change from time and exposure.

The orbits of the 59 asteroids that have been discovered revolving between Mars and Jupiter are so interlocked with each other that, if they were represented by iron hoops, the whole could be suspended by any one.

It has been ascertained that the heat produced by the burning of any substance is just in proportion to the amount of oxygen which enters into combination with the burning body. A pound of hydrogen, in burning, combines with eight pounds of oxygen and generates more heat than the burning of an equal weight of any other known substance.

D. W. Farr, in a recent letter to the Registrar General of England on the causes of deaths in 1857, notes that the happy decrease in the danger in child-bearing continues; 42 mothers died to every 10,000 children born alive in 1851; in 1847 the proportion was 60; in 1848 it was 61; and since that date the mortality has regularly declined year by year, leaving the average loss in ten years 51 mothers to every 10,000 children born alive. This branch of medicine, he adds, is cultivated in the present day with extraordinary zeal by men of superior ability.

Mr. Calvin Adams, of Pittsburg, Pa., has recently discovered that an important electrical change takes place when molten iron solidifies in cooling. By insulating molds, and the workman who pours in the liquid metal, the castings from common iron come out as white as silver and as hard as steel. This is another evidence of the universality of this subtle force, and though it is not yet applied to any practical purpose, such phenomena cannot fail eventually to produce useful effects.

M. Pasteur and M. Pouchet are carrying on a lively discussion in France as to the possibility of spontaneous generation. M. Pouchet positively proves that the thing is impossible, while M. Pasteur proves as positively that it is not only possible, but that he does it.

The Geographical Society of Paris offers a prize of \$1,600 to the traveler who shall first travel from Senegal to Algeria, or from Algeria to Senegal, by way of Timbuctoo.

A few weeks since a very sudden and extraordinary rush of the tide occurred on the west coast of Ireland and Scotland; most probably caused by the falling of a large meteor into the Atlantic ocean.

At the recent meeting at Dorchester of the Bath and West of England Agricultural Society, Lord Portman stated that the elm planks which were taken up out of the Thames previous to the building of the new London Bridge were quite sound, although they had been in the water 800 years.

We are acquainted with more than one intelligent inventor who, aware that in the best steam engines of the present form only about one-tenth part of the power of the fuel is utilized, are busy in devising engines of a radically different model, which they hope will yield several fold more power with the same fuel.

Chemical researches by Mr. J. Salisbury, of Albany, show that good varieties of the apple are richer in those substances which strictly go to nourish the system than potatoes are; or, in other words, to form muscle, brain, nerve; and in short, to assist in sustaining and building up the organic part of all the tissues of the animal body,