## POLYTECHNIC ASSOCIATION OF THE AMERICAN INSTITUTE.

The Polytechnic Association held its regular weekly meeting at its room at the Cooper Institute on Thursday evening, March 10th; the President, S. D. Tillman, Esq., in the chair.

The President read a summary of scientific and industrial news, as follows:—

### EXTRACTION OF ESSENTIAL OILS.

T. B. Graves' method of extracting wintergreen, peppermint, and other essential oils, is to mix with a watery solution of the essential oil some olive oil, and to make a soapy emulsion by the addition of potash. The soap is then to be decomposed by the addition of acid, when the olive oil will rise to the surface, bringing with it the essential oil, which may be separated by agitation with rectified spirits.

### NEW PLAN FOR PRESERVING MEATS.

The British Admiralty is trying a series of experiments to test Dr. Morgan's method of preserving meats. This consists in forcing brine into the arteries, veins and capillaries of the carcase by pressure. The tank of brine is placed 20 feet above the freshly killed animal, and the brine is led by a pipe into the chest, where it enters the arteries, driving before it the blood, which passes out by an incision made for the purpose. After the arteries have been thus cleaned by the first charge, a second is introduced. This consists of 6½ gallons of brine, 10 lbs. of sugar, ¾ lb. of saltpetre, with an infusion of cloves or pepper. The meat is then cut up, thoroughly dried, and packed in sawdust and charcoal. It is said that meat thus prepared will keep in any climate, and that a larger portion of its nutritive matter is preserved than in the ordinary process.

### WHITE ANTS IN JAMESTOWN.

The Admiralty is also endeavouring to find some mode of checking the ravages of the white ants in Jamestown, where this intolerable pest was introduced 20 years ago from the coast of Guinea. They have devoured the timber of the buildings with such wonderful voracity that all of the wooden houses have become uninhabitable. Mr. H. W. Bates, who has seen much of these insects in South America, recommends the use of a certain hard wood called Acapù, which it is found the ants do not eat. A paint containing arsenic is also recommended. The sleepers of the railways in India are preserved from the depredations of the white ant by creosote; but the odor of this substance precludes its use in dwelling-houses.

### LIVE AND DEAD PARTS OF THE BLOOD.

Professor Beale, in a communication to the *Quarterly Journal of Microscopic Science*, says that the white corpuscles of the blood and the small red corpuscles are the only ones that are alive. The large red corpuscles are dead. He says, also, that the red coloring matter of the blood of different animals closely allied crystallizes in different forms.

### IRON MOUNTAIN.

The President invited Dr. Stevens to give an account of his recent examination of Iron Mountain, Missouri.

*Dr. Stevens*—Mr. Chairman, the Iron Mountain of Missouri is almost exactly in the geographical center of the United States. It is an almost solid mass of specular iron ore, rising from a level plain to the hight of 260 feet, its base covering about 500 acres. Commercially, it is one of the best properties in the country. The ore contains about 67 per cent. of iron, and yields, in the large way, about one tun of pig for two tuns of ore. It costs about 50 cents a tun to quarry, little if any blasting being required. It takes about 110 bushels of charcoal to make a tun of iron. The cheapness of coal enables the pigs to be reduced to wrought iron at a low cost; and I know of no other place in the country where blooms can be made so cheaply as in Missouri. It is a fine opening for iron manufacturers. It has been claimed that Iron Mountain is a true specimen of irruptive formation; that it was thrown up in a melted state, and flowed over upon the surrounding rocks. Upon an examination of the excavations, however, I am satisfied that the ore was deposited by chemical action. Our geologists have generally held that this hill was raised in the azoic period; but the mode in which the sandstone and limestone strata rest—partly conformably and partly unconformably upon its sides and base—show that it came up after the oldest silurian deposits.

[Dr. Stevens illustrated the formation of the mountain by a sketch of its section on the black-board.]

### SURFACE CONDENSERS.

The President announced that the regular subject of the evening, "Surface Condensers," was now in order, and called upon Mr. S. H. Maynard to explain Pirsson's condenser.

*Mr. Maynard*—Previous to entering on the explanation of the principles of that, I will answer a question put by Mr. Stetson at the last meeting—"What advantage is offered to the owners of vessels to induce them to employ surface condensation, since it is admitted that the first cost of construction is greater?" It was replied that nearly the whole extra cost could be taken from the boiler, as, with fresh water, that need not be so large. I cannot agree with the gentleman, for the reason that, with any system of surface condensation with which I am acquainted, the condensing surfaces are certain to give out, and a resort to salt feed becomes necessary. Mr. Pirsson has had unusual opportunity for careful comparison with both systems on the same ships—two particularly—on the *John L. Stephens* and the *Sonora* of the Pacific Mail S. S. Co., each of which made five consecutive trips between San Francisco and Panama, using a jet condenser feeding salt water to the boilers, and five similar trips when using his patent surface condenser, the result of which, as taken from the engineers' logs, is shown in this statement relative to the *John L. Stephens*:—

With jet condenser:—Whole running time, 64 days 14½ hours; coal consumed, 2191 tuns; oil expended, 630 gallons; tallow, 625 lbs.

With patent condenser:—Whole running time, 63 days 6 hours; coal consumed 2009tuns, 511 lbs.; oil expended, 302 gallons; tallow, 205 lbs.

As the vessel was making twenty trips per annum, the money value would be as follows:—Time saved, 5 days 10 hours; coal, 728 tuns, at $25 per tun, $18,200; oil, 1312 gallons at $1.90, $2,492.80; tallow, 1680 lbs. at 12½ cents, $210; 5½ days extra supply of passengers, say average 300, at $1 per day, $1,650; total, $22,552.80.

The log of the *Sonora*, a newer vessel than the *John L. Stephens*, showed, as the money value for the year, a saving of $33,741. She carried for twelve consecutive days, in the month of June, a vacuum of 26 inches, with the temperature of the fresh feed water at 142° Fah., though, of course, it would be less in the hot well of the large air-pump.

I have here a didactic model of Pirsson's condenser, and will premise by calling to mind the fact that, in the ordinary jet condenser, about twenty-five gallons of cold injection water is required to condense the steam made from one gallon in the boiler within the time in which it was made; and the object of employing a surface condenser is to separate the one gallon, which will be hot distilled water, from the twenty-five gallons of salt injection with which the jet condenser would have mixed it, whereby the one gallon could be available to feed back into the boiler. Samuel Hall, of England, was the first to make a practicable surface condenser, though the want of it had long been known. His condenser was well explained at the last meeting, but the leading defect which forbade its introduction into general use was not then stated. It is this: that the alternate heating and cooling of the pipes, consequent upon the periodic action required, causes an alternation of expansions and contractions, which, together with the great pressure upon the tubes, soon produces fractures in the joints and seams. When such occur, the vacuum can no longer be maintained in consequence of the flowing in of the air, and also of the water, which is fatal to the correct operation. The wear of tubes so situated must necessarily be rapid, and hence the time must sooner or later arrive when they must give out. The moment at which this will occur cannot be predicted, but it will naturally be at the time when the powers of all parts are most severely tasked, as during a storm; but then the endurance of all is most desirable. The object sought by Mr. Pirsson was to be able to continue the condensation and maintain the vacuum when such fractures did occur, and he has effected this by enclosing a surface condenser, such substantially as Hall's (and represented by this cluster of pipes which I now take out in a body), within a vessel which will be capable of serving as a jet condenser, if any derangement of the enclosed surface condenser shall require it, thus insuring the continuity of the vacuum, though at the expense of the whole or a part of the fresh water which would have been furnished if the surface condenser were intact. From this construction results the ability to maintain an equal vacuum on both the outside and the inside of the tubes thus relieving those from atmospheric pressure. The danger from leaks and fractures caused by this pressure is obviated, while, as it is no longer necessary that the joints of the tubes in the tube sheets shall be absolutely tight, it is only necessary to secure them at one end, leaving the other free to slide in the tube sheet, and, hence, disruption from alternate heating and cooling does not in this condenser occur at all. The steam is brought into the surface portion of this condenser by the usual exhaust pipe, but this passes through the side of the jet portion and enters the cap which covers the ends of the tubes. These are placed horizontally in order that they may be cooled by a shower of injection water, which effects the cooling more rapidly than an immersion of them in the cold water would do, although the system admits also of that method. A cap covers the other end of the tubes, and in this the fresh water resulting from the condensation of the steam in the tubes is collected. A small air-pump, but little greater in capacity than the feed pumps to the boiler, draws off this hot fresh water, while the large air-pump removes the injection water and the air from the outside of the tubes, in the manner of the ordinary jet condenser. An opening is cut near the upper side in the cap at the end where the fresh water is collected, and any uncondensed vapor or air which came over with the steam may pass out at this opening and be removed by the large air-pump. It will now be obvious that, if a portion of the pipes should suddenly give out, say one-tenth, the condensation would still be continued, for the steam from those would escape into the jet portion or enclosing vessel. One-tenth of the fresh water would then be lost, and, if all should break, all the fresh water would be lost, the instrument resolving itself automatically into a jet condenser of the most approved kind. If the small air-pump should become deranged, a valve can be opened in the bottom of the cap where the fresh water is collected. That will then pass off by the large air-pump and be lost, but the engine would not be crippled or even impaired in its action by either of these breaks.

*Mr. Fisher*—What advantage, if any, is, in your opinion, gained by tinning the tubes?

*Mr. Maynard*—When the tubes are made of pure Spanish copper I have not known of any advantage; but if of Lake Superior copper, which contains some iron, or of brass, the durability has been considerably extended by tinning both inside and outside.

The same subject was continued for the next meeting, and the Association adjourned.

## FARMERS' CLUB.

From the several subjects discussed at the meeting of the Club on the 15th inst., we select for our columns the following:—

### RHUBARB WINE.

Mr. Robinson read a communication asking if there is a market for rhubarb wine.

*Mr. Carpenter*—A few days since I saw in a cellar in this city 25 barrels of rhubarb wine, but it did not remain there long. It was sold for 80 cents per gallon. It was of a very inferior quality.

*The President*—It was probably used for extending wine of a better quality. There is a brewery in this city which we call the vineyard; it is devoted exclusively to the manufacture of liquors for adulterating or extending wines. I know the proprietor very well, and he has told me that he could not nearly supply the demand. In most of the manufactured wines the flavor is imparted by a proportion of imported wines, but in some not a particle of grape juice is used. Some of the imported wines are extended by mere water; a little alcohol being added to keep up the strength, and some sugar to maintain the body. The best form in which the saccharine matter is found is in the white liquor of the sugar refineries. This is rock-candy just before it crystallizes, and is the purest and most delicate of any saccharine substance that can be obtained.