POLYTECHNIC ASSOCIATION OF THE AMERICAN INSTITUTE.

The regular weekly meeting of the Association was held at their rooms at the Cooper Institute on Wednesday evening, April 10th, the President, Prof. Joy, in the chair.

The half hour previous to the appointed discussion, which is usually devoted to miscellaneous business, was occupied in an examination of the process of making iron, described on page 225 of the current volume of the SCIENTIFIC AMERICAN. It will be remembered that this is a plan for making wrought iron direct from the ore. A cylinder 20 feet in length and 6 feet in diameter is hung upon journals directly over a reverberatory furnace, and is slowly rotated by machinery, making one revolution in 20 minutes. The ore is finely pulverized and mixed with semi-bituminous coal, also pulverized, in the proportion of 75 lbs. of ore to 25 lbs. of coal. This mixture is fed into the cylinder at one end in measured charges of 25 lbs. each, and as the cylinder rotates a spiral flange inside carries the ore and coal slowly along the cylinder to the opposite end, where they fall down into the puddling furnace. The rotating cylinder is heated to a dull red heat, and the ore is 6 hours in passing through it, traveling in its spiral track about 300 feet. From the puddling furnace the metal is taken in the form of wrought iron of a good quality. No flux is used.

Dr. STEVENS exhibited a model of the apparatus and explained its operation.

Prof. SEELY—I would ask if there is any evidence that the iron is reduced in the cylinder?

Mr. ROGERS—We have the apparatus in operation at Newark, and should be pleased to show it to the gentleman. It has been examined by the most scientific men we have, and it is making good iron. We claim three advantages for it—that the apparatus can be erected at very low cost, that we make wrought iron at a saving of $10 per tun, and that the iron is of a good quality.

Prof. SEELY—Have you ever tried the experiment of dispensing with the cylinder—putting your ore and coal directly into the furnace without passing them first through the cylinder? It is contrary to all the facts with which I am acquainted, to suppose that the iron can be reduced from its ore in that cylinder. Iron is decomposed by hydrogen at a low red heat, but not by carbon. If the experiment has not been tried of putting the ore and coal directly into the furnace, I suggest that it be tried.

Mr. DIBBEN—The advantage of this arrangement is that the ore and coal are partly heated for the puddling furnace by the waste heat of the furnace. But the great difficulty in all these direct processes of making iron, where no flux is used, is to get rid of the silica and other foreign substances contained in the ore.

Prof. RENWICK—I would ask if any other ore has been tried than the Dickinson ore? The Dickinson ore is very easily reduced. It can be done in a common blacksmith's forge. There is no difficulty in making a horse shoe from this ore at any blacksmith's fire. This plan of making wrought iron direct from the ore, is the oldest of all processes, and is the one now in use among all barbarians. It requires, however, a very rich ore, and has never yet been made economical.

Mr. COOPER—Ten years ago there was in operation at the Trenton Iron Works an apparatus precisely similar to this. It made good iron, but there was a practical difficulty in the cylinder warping, and it was laid aside. The iron would be reduced in the cylinder in this way. A little atmospheric air would get in with the coal and ore, and the oxygen of this air would combine with the coal at the dull red heat to form carbonic oxide; then, as oxygen has a stronger affinity for carbonic oxide than it has for iron, it would leave the iron and combine with the carbonic oxide producing carbonic acid, and leaving the iron in the metallic state. The silex would be got rid of as silicate of iron, thus reducing the yield of the ore.

[It is due to Mr. Cooper to state that he had not examined the apparatus, as had he done so he would not probably have given this explanation. Very careful provision is made for excluding all air except that which fills the interstices between the particles of the ore and coal. As it takes 33 lbs. of oxygen to burn 25 lbs. of coal into carbonic oxide, and as oxygen forms only about 23 per cent of the atmosphere, it would require 150 lbs. of air for each charge of ore and coal. This would be equal to about 2,000 cubic feet of air—enough to fill a room 10 feet wide, 10 feet high and 20 feet long. This could not be contained in the interstices of 100 lbs. of ore and coal. —EDS.]

The PRESIDENT—The time has arrived for the discussion of the regular subject selected a fortnight since. It is

NAVAL WARFARE.

Mr. DIBBEN opened the discussion in a sketch of the history of iron-plated ships.

Prof. RENWICK—There are some facts in the history of this art which were not stated in the highly satisfactory address to which we have listened. Iron-plated ships were first suggested by John Stevens, the father of Robert and Edwin. In regard to the columbiads, the first one was designed in 1803. Drawings were made by Major Williams, and a 100-pounder was cast and placed in Castle William, on Governor's Island, in this harbor. Elongated projectiles were invented by Robert L. Stevens before the close of the war of 1812. I was present at a trial of them during the war, and that trial was not successful, the shells did not explode. In 1817 there was another trial, at which I was not present, but I was informed that it was successful. A number of shells were made and placed in boxes and deposited in Castle William to be ready for use.

Mr. BABCOCK—A number of steel shot have been recently prepared for the government and placed on board the *Naugatuck*, Stevens's little boat, to be used in a 100-pounder Parrott gun against the *Merrimac* if she again ventures out. They are of solid cast steel, of the acorn form, with the point terminating in a cylinder 3 inches in diameter and about 3 inches long, with a perfectly square end, the corners being nicely finished to a cold chisel edge. It is thought that if they do not penetrate the side of the *Merrimac*, they will at least catch into the plates with sufficient hold to tear them from their places. I am told that the *Merrimac* has precisely similar shot, weighing 360 lbs. each, with which to attack the *Monitor*.

Prof. JOY—It is remarkable that 81 years ago they were discussing the very subject which is engaging our attention at this time, and in reference to the same locality. I hold in my hand an order from Washington in relation to boats at Yorktown to protect the French fleet from fire-ships. Washington wished Count de Grasse to sail up York river with his fleet, and thus make the capture of the Bri ish army certain, but the Count declined to do this unless Washington would furnish boats to prevent his vessels from being burned. This order was accordingly issued. It is dated October 15, 1781. Hostilities ceased on the 17th, and the surrender was made on the 19th; so this is among the last of the military orders issued by Washington. (Prof. Joy then read the order. It directs the officer to take the boats out of James river and place them on wheels and send them over to the headquarters of the army before Yorktown. The order directs that the boats shall be covered with boughs to prevent them from being seen by the enemy.)

The same subject was chosen for a fortnight hence, and the meeting adjourned.

The Boyden Premium.

Uriah A. Boyden, Esq., of Boston, Mass., has deposited with the Franklin Institute the sum of one thousand dollars, to be awarded as a premium to "any resident of North America who shall determine by experiment whether all rays of light, and other physical rays, are, or are not, transmitted with the same velocity."

The following conditions have been established for the award of premium:—

Any resident of North America, or of the West India Islands, may be a competitor for the premium. The Southern boundary of Mexico being considered as the Southern limit of North America.

Each competitor must transmit to William Hamilton, Actuary of the Franklin Institute, Philadelphia, a memoir describing in detail the apparatus, the mode of experimenting, and the results; and all memoirs received by him before the first day of January, 1863, will, as soon as possible after this date, be transmitted to the Committee of Judges.

Every memoir shall be anonymous, but shall contain some motto or sign by which it can be recognized and designated, and shall be accompanied by a sealed envelope, indorsed on the outside with the same motto or sign, and containing the name and address of the author of the memoir. It shall be the duty of the Actuary of the Franklin Institute to keep these envelopes securely and unopened until the Judges shall have finished their examination; when, should the Judges be of opinion that any one of the memoirs is worthy of the premium, the corresponding envelope shall be opened, and the name of the author communicated to the Institute. The other envelopes shall be destroyed without being opened.

Oriental and French Carpets—French Taste Criticised.

A late number of the *Revue des Deux Mondes* contains a cutting article on the taste of his countrymen by M. Adalbert de Beaumont. He says:—

It is impossible to devote more talent of invention than is at present employed in the production of frightful carpets. The largest carpet exhibited in 1855 (at the Paris International Exhibition) was hung in the rotunda, and represented a forest: a stone staircase rose spirally in the midst of pine trees adorned with rhododendron flowers: scattered about were monkeys, tigers and all sorts of brilliant plumaged birds. If this stuff, the color of which was even more detestable than the design, had been intended for the panels of a gallery, it might have been excused as a picture; but, it was designed and manufactured to be trodden on; the tigers were to be crushed, the paroquets smashed, and the ravines and waters walked on, and over, by fashionable boots and shoes. It is lamentable to think that the great (French) manufacturers of *Gobelins*, *La Savonnerie*, *Beauvais*, *Aubusson*, all follow these false principles. The true designs for textile fabrics which please the eye, and accord with common sense, are flat, arabesque flowers, and the geometrical patterns, of which India and Persia afford us such perfect examples. It is not only in the arts of design that the Orientals excel us; their methods of dyeing stuffs in different colors, adorning them with flowers and ornaments, prove their high degree of chemical skill. The processes described by Pliny are exactly the same as those employed at the present day. The brilliancy and purity of the colors of the woolen, silk and cotton stuffs, manufactured at Tripoli, in Tunis, and Morocco, prove that the ancient traditions have been preserved, which are very superior to the processes of modern science. The most brilliant results were formerly obtained from an attentive study of Nature. We were present, says M. de Beaumont, at the Universal Exhibition of 1855, when, at the request of the jury and in the presence of the commissioners from Lyons, the representative of the (English) East India Company opened his choicest stores, and we can testify that the manufacturers present were astounded —stupefied is the word—at the sight. In spite of their self-conceit as manufacturers, in spite of their national pride, they were compelled to admit that not only were they unable to produce similar marvels, but that they could not even understand how they were produced. The embroiderer of Lahore or Constantinople, the dyer and weaver of Broussa or Damascus, the potter of Tebriz, the carpet-weaver of Ispahan or Chiraz, the enameler of Bagdad or Teheran, know more about color and form than all our chemists, all our designers, our ornamental painters and manufacturers put together.

There is some Ruskinism in this criticism, but on the whole it is correct. There is a frightful reaching after something merely new and striking, in all branches of the ornamental art, without much regard to the laws of natural taste.

ANOTHER ASTEROID DISCOVERED.—A planet of the thirteenth magnitude was discovered on the morning of the 8th inst., at the Observatory of Harvard College, by Mr. H. P. Tuttle. It is the third which has been detected at that Observatory within the past twelve months. It has been named *Feronia*. This is now asteroid 72°.

NATURE is a great believer in compensations. Those to whom she sends wealth she saddles with lawsuits and dyspepsia. The poor never indulge in woodcock, but they have a style of appetite that converts a mackerel into a salmon, and that is quite as well.