POLYTECHNIC ASSOCIATION OF THE AMERICAN INSTITUTE.

The Association held its regular weekly meeting at its room at the Cooper Institute, on Thursday evening Jan. 12, 1865, the President, S. D. Tillman, Esq. in the chair.

THE METAL PALLADIUM.

Dr. Parmelee exhibited a coil of palladium wire weighing about four ounces, Troy, and valued at about $600. He states the sample was manufactured by Messieurs Desmoutes, Morin, & Chapuis, of Paris, and that the specimen is more interesting from the fact of its being chemically pure, while others are generally alloyed with from 40 to 60 per cent of silver. Its general characters are like those of platinum; but, while it is infusible in an ordinary wind furnace, it melts at a lower temperature than that metal. Its specific gravity is 11.5; atomic weight 53.24. It occurs chiefly in the ore of platinum, in the proportion of about one per cent; it is extracted by dissolving this ore in aqua regia, and precipitating the palladium from the solution by chloride of ammonium. After filtration the palladium is separated by cyanide of mercury, or cyanide of palladium. This is usually converted into a sulphide by heating it with sulphur; and afterward the sulphur is expelled by repeated washings. There are other processes of a more complicated character and probably less valuable. Palladium has been applied in a few cases to the construction of graduated scales of astronomical instruments. Porcelain manufacturers employ it in some instances to produce a fine silver gilt on ornamental wares. It is also used in bronzing brass for ornamental purposes. Photographers also employ the chloride to some extent for toning their pictures. The scarcity of the metal has limited the application of it to few uses. This wire is the $\frac{1}{38}$th of an inch in diameter, and is worth about $40 per foot.

Professor Seely remarked that a few years ago, at a meeting of the Photographical Society, Dr. Draper suggested that palladium might be used to advantage for toning photographs. When photographs are made the darks are silver, and the color of this metal is not pleasing to the eye; photographers therefore dip their pictures into a solution of gold, which gives them a beautiful purple color. Dr. Draper's suggestion attracted a good deal of attention, and palladium was probably inquired for at every place in the city where there was any reason for supposing that it might be found. There was none to be had, and the speaker applied to Dr. Draper, who said that a few years before there was plenty in the market at $10 per ounce. The supply had been exhausted by makers of gas fixtures and others, who used the metal for giving a beautiful bronze finish to their work.

Professor Everett stated that a few years since he obtained about four ounces of palladium from some platinum ore that he was analyzing, and he made it into a solution of chloride of palladium, to be used for bronzing. After selling three bottles it was discovered that the supply in the market was running short, and when we sold the first lot from the fourth bottle, my partner filled up the bottle with water. The solution seemed to work just as well till it became very weak, so that we got as much for the fourth bottle as we did for the other three.

Mr. Maddock stated that the bronzing of porcelain is now effected with a preparation of iron.

THREAD.

Dr. Rowell illustrated by a piece of tape that if a thread or other string is wound on a card with the right hand, holding the card in the left, a twist is put into the string at every revolution around the card; but if the card is shifted to the right hand and the winding continued with the left, the twists are taken out, or the thread is twisted in the opposite direction. The same action takes place in ordinary sewing by hand, a twist being either put into the thread or taken out at every stitch. It is for this reason that girls are taught to work button holes always in the same direction, going from left to right along the lower edge, and from right to left above when "twist" is used. The twisting is avoided in winding thread by adopting the method usually practiced by boys in winding their kite strings. To avoid kinking or spoiling the thread from the twisting in sewing, thread is cabled as it is called; that is, it is first spun into threads and then these are twisted together. In sewing on sewing machines, no twisting of the thread takes place, it is therefore not necessary to cable the cotton for this use.

SOME FACTS ABOUT PERU.

At the meeting of the Farmers' Club, on Tuesday afternoon, January 17, Mr. P. G. Squier gave an account of the ancient and modern agriculture of Peru. We select from his discourse a few of the most interesting items.

THE INCAS.

At the time of the discovery of America by Europeans, Peru was governed by the Incas, who were both priests and rulers, and they had established the most absolute despotism. The organization of society was a kind of socialism, without either poverty or wealth. On the birth of a male child a certain portion of land was assigned him, and this was increased when he reached the age of ten years, and still farther when he was married, amounting then, however, to little more than an acre. Only a small proportion of the country is arable land, and that can be cultivated only by means of artificial irrigation, as there is no rain. Under the Incas every foot of land susceptible of tillage was cultivated to the very highest degree. Canals were constructed two hundred miles in length, winding round mountain peaks to preserve the level, passing over aqueducts of masonry 60, 80 and 100 feet in hight, and finally distributing their waters into a number of valleys. These valleys were not only cultivated over their bottoms, but the mountain sides were terraced as high as the water could be led.

COTTON CULTURE IN PERU.

Within a few years the cotton culture in Peru has been greatly extended. It is carried on mostly by foreigners, generally English and Scotch, though there are a few Americans. The laborers are nearly all Chinese, who are imported by the planters. A bonus of some $400 is paid for them, and they are bound to work eight years at $8 per month. Owing to the absolute control over the moisture of the soil by the artificial system of irrigation, the cotton is of very superior quality; it is better than any raised in the United States except the Sea Island.

AGRICULTURAL IMPLEMENTS.

Among the planters, the English and Scotch who employ Chinese laborers use generally good implements, but among the natives the tools are very simple. On the coast the plow is employed to some extent, but it is a very rude implement. It is a stick of wood sharpened at the end, nothing more than a wooden wedge. It is drawn by a single ox, by means of traces attached to his horns, and he is guided by means of a cord which is passed through his nose. The plow is the same that is generally used in Europe. I have seen one just like it within ten miles of Paris. Even this plow is used in Peru only on the coast; the one implement with which the agriculture of Peru is almost wholly conducted is an iron adze, with a short handle, to be wielded with one hand.

CONDITION OF THE PEOPLE.

The mass of the people live in the most miserable and squalid condition. Their dwellings are made by piling up loosely a circle of stones some three or four feet high, and covering it with a roof of grass. Their cooking utensils consist generally of one earthen pot and three or four dried bones. Perhaps the whole furniture of the house might be worth three cents.

RIVERS LOST AND FOUND.

Some of the rivers that flow down from the mountains sink in the sand and utterly disappear. In some of the valleys the Incas had the sand excavated to the depth of several feet, so as to get within reach of the subterranean waters, and when ground was found sufficiently moist it was cultivated. The sand thrown out formed great ridges across the valley. The moist strips between these ridges are now the choice localities for the cultivation of the grape. Looking down the valley you see nothing but a succession of dry, barren ridges of sand, but if you climb to the top of one of these you look down upon a display of verdure unsurpassed on the face of the earth.

DRUNKENNESS.

The three principal crops of Peru are Indian corn, cotton and the sugar cane. The juice of the sugar cane in the United States and Cuba seldom yields more than six per cent of sugar, but in some of the valleys of Peru it yields more than fourteen per cent. A large portion of it is made into the intoxicating drink called *aguardiente*. This rum is drunk by all classes of the people, old and young, rich and poor, male and female, religious and irreligious, and at all times of the day and night. The general condition of the people of Peru may be said to be that of drunkenness.

DIFFICULTY OF COOKING.

Mr. Squier described a large lake in the mountains 12,500 feet above the level of the sea, the waters of which are some 20° warmer than the surrounding atmosphere. The warmth of the water so tempers the climate that Indian corn may be grown on the borders of the lake, but water boils at so low a temperature at this high altitude that it is difficult to cook any kind of food properly. It is customary, therefore, to soak corn several months before the attempt is made to cook it in the lukewarm boiling water of that altitude.

THE LAW OF SUCCESSIVE SPECIES.

Of the many thousand species of plants and animals that existed in the early geologic ages, not a single one remains. The patient study of that wonderful history, which has been engraven by the hand of the Creator in the everlasting rocks, revealed that one species of animals came forth, slowly developed to perfection, and then slowly decayed, to be followed by another, and another, and another, in long succession of generations of species.

It is curious to observe that the same great law which governed the creation of animal life through the immeasurable ages of the past, applies at the present day to the coming forth of those microscopic organisms, whose existence is so brief that the growth and decay of a whole species may be watched in the compass of a week.

Professor J. Nickles, writing from Nancy, France, to Silliman's Journal, gives this account of an experment recently made by Professor Montegazza at the University of Pavia.

Two female frogs were quickly killed, by the destruction of the spinal marrow, and placed in two glass vases each of which contained 115 cubic centigrams of well-water perfectly transparent and free from all foreign bodies. One of these vases was left in diffused light, the other was placed in a box which did not permit a single ray of light to reach it.

The experiment was continued seventeen months. It is necessary, before giving the results of this long trial, to state that every time that the two vases were compared, they remained exposed to the air for an hour or more, and that the air was renewed at each observation. Germs could, then, easily fall in; and yet the results were very different in the two cases.

The following are the observed results:

1. Two identical bodies exposed to free air may present very different phenomena of putrefaction, according as they are exposed to the influence of the light, or shut off from it.

2. The chemical and biological phenomena of the two forms of putrefaction are very different, that is, we have in each case some special chemical products, and some peculiar animal and vegetable productions.

3. In darkness, there was a marked tendency to the production of vegetable organisms and very simple infusoria; the frog that underwent putrefaction while shut off from the light produced only some Mucedines, Monads and Vibrios; while the other afforded a very complicated fauna—Bacteriums, Vibrois, Spirellas, Monads of different species, Amœbas, Kerones, Alysum, Enchelides, Trachelius—and, finally, Infusorians still undescribed, much resembling the Zoosperms of the Tritons.

4. The abundance and superior organization of the Infusoria depend much more upon the progress of the putrefaction than upon the amount of putrescible matter. The more simple species always appear first.

5. The production of species of Bacterium takes place many times during the course of a long putrefaction.

6, When the liquid presents a new fauna, the new species are from the outset represented by a number of individuals at once; from one day to the next, they are simultaneously produced.