its surface from the surrounding atmosphere. This would just sufficiently dim the excessive luster to render a good photographic representation possible. —*Photographic News.*

POLYTECHNIC ASSOCIATION OF THE AMERICAN INSTITUTE.

The Association held its regular weekly meeting at its room at the Cooper Institute on Thursday evening Oct. 6, 1864, the President, D. S. Tillman, Esq., in the chair.

NEW SMELTING FURNACE.

Prof. Fleury gave a description of a furnace invented some time since in Russia, and now patented all over the civilized world. It is quadilateral in form, flaring towards the top. Its principal peculiarity is the arrangement of the tuyeres, which enter on the long sides of the hearth, those on one side being opposite the middle of the spaces between those on the other side. The speaker read a long paper giving many statistics to show that these furnaces were cheaper to construct, and produced more iron in a given time and with less fuel than the circular bosh furnaces at present in use. He also stated that these furnaces are better adapted than any others to the smelting of copper and lead ores. They are called the Rachette furnace.

MAKING GLOVES.

The regular subject of the evening, glove making, was then taken up, when the President read a paper containing in the main the same facts that appeared in our last week's issue.

Dr. Richards:—Glove making was first established on any considerable scale in this country at Johnstown, in this State. When the country was new this was the frontier part of Sir William Johnson, and the Indians brought their deer skins to it for sale. The manufacture of gloves was started to utilize the skins. The gloves were cut out and distributed among the farmers of the vicinity to be sewed by the women. The business was afterwards established at Gloversville, where it was carried on in the same way. Thus for two or three generations the women of that region have been trained to glove sewing, and they have acquired a skill and proficiency that defies competition. Attempts have been made to start glove manufactories in other places, but they have failed from want of skill among the women in the vicinity of those places in this special art.

At first all of the skins were bought of the Indians, but now they are purchased in this city. Some imported cow skins are used, as well as the deer skins of this country.

Dr. Rich:—Some years ago I had a special interest in making inquiries in France into the details of the glove manufacture, and I found that the making of fine kid gloves pays very low wages even for the cheap labor of that country. I do not believe that the manufacture can be introduced into this country unless machinery can be employed.

Prof. Fleury:—I wonder that asbestos gloves are not used by firemen in this country. In Austria I have seen a man with a complete suit of asbestos walk right through a flame. His eyes were protected by plates of mica, and he carried a moist sponge over his mouth. He was also provided with bags of asbestos for carrying off valuable articles from burning buildings. I suppose a full suit might be obtained at the present time for seventy dollars.

Mr. Nieman:—Kid skins, to be suitable for gloves must be taken from the young animals before they are weaned. After they begin to live on grass the skin undergoes a change, which impairs its value for this purpose. A glove maker, or an experienced dealer, will detect the skin from a grass-fed animal as soon as he sees it.

Mr. Ely:—I have seen it stated on apparently good authority that the very finest gloves are made from the skins of kids that are obtained by killing the dam and taking the kid from her womb. I have also seen a statement of the sum which is annually paid to the French Government for the privilege of entering the sewers of Paris for the purpose of killing rats; the object being to obtain their skins to be used in glove making.

Dr. Rich:—I do not think a rat's skin is large enough to yield pieces of suitable size for gloves that are of uniform thickness and quality.

Mr. Nieman:—We sent some rat skins to Paris, but they would not sell. Even if the skins were large enough, they are spoiled by the rats biting one another so much. If you take up a dressed rat skin you will find it full of either holes or scars.

The skins of tame animals are generally better than those of wild animals, and the skins are tough in proportion to the agility of the animals.

Dr. Rowell:—The very toughest skin that saddle makers can find is a hog's skin. I do not know that the hog excels in agility.

Dr. Richards:—I was at one time interested in the manufacture of leather, and we found that calves of the most improved breeds furnished better hides than ordinary cattle.

The new mode of travel by the pneumatic tube was selected as the subject for the next meeting, and the Association adjourned.

WARREN'S DEEP-WELL OIL PUMP.

Ordinary oil wells range from 400 to 1,000 feet in depth, and when in working order the pumps therein are subjected to an immense strain from the hydrostatic pressure due to the long column of oil that has to be lifted at each stroke. This pressure is very great, and not only causes the packing to wear leaky in a short time, but it also endangers the safety of the pump barrel itself, which not unfrequently bursts from the severe strain of resisting the movement of the column. The great hydrostatic pressure referred to causes the pump piston to become so leaky in a short time that no vacuum can be maintained, and the apparatus is wholly deranged in consequence. Many rich wells have been declared dry from the failure of the pumps to act. Where such important interests are concerned, proprietors of, or others interested in oil wells, should not fail to adopt this pump, as it is devised on sound mechanical principles, and will work well if properly made. The details are as follows:—

Fig. 1.

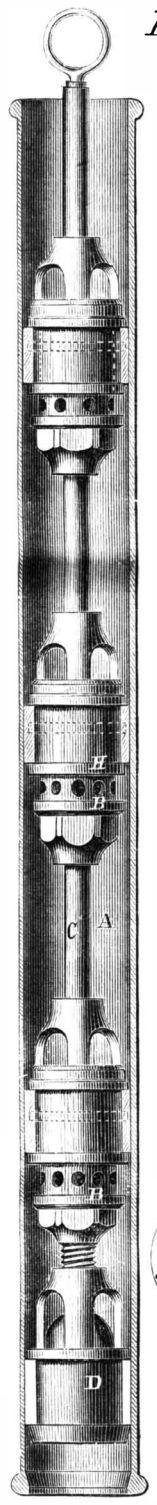

Fig. 2.

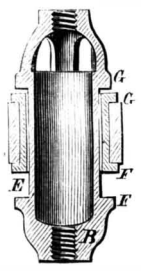

Fig. 3.

The engraving represents a long pump barrel, A, which has the pistons, B, in it. These pistons are all connected by one rod, C, and move simultaneously. At the bottom of the pump is a foot valve, D, of the ordinary kind, which opens upward, allowing oil to enter but not to return.

The pistons have a loose sleeve, E, where the packing is in ordinary pumps, (see Fig. 2) which moves up with the piston when the two flanges, F F, come together. It also moves down when the other flanges, G, come in contact. The sleeve therefore slides easily on the body of the piston. These three sliding partitions, so they may be called, virtually divide the pump barrel into as many compartments, for although the pistons move simultaneously the loose sleeves are of different lengths, so that each one moves a little in advance of the other. In this way each piston lifts only the column directly above it. So soon as the top piston moves up the flange, F, on it, strikes the loose sleeve and raises it; the oil which entered through the holes, H, is shut off from the column below, and the piston goes away from it. The second piston then meets the other loose sleeve and shuts off the oil from the openings, H, and raises its load, and so the operation goes on down the barrel. The times of lifting the load on each individual piston is regulated by the distance the loose sleeves travel on the pistons which shut off communication between one compartment and the other, earlier or later, as occasion requires. Although the aggregate load on the pump rod and bottom piston is the same as in any ordinary pump the *pressure* on the latter is far less, being only that due to the column resting upon it, as any intelligent person can see at a glance.

These pumps give great satisfaction, and can be obtained of Messrs. Hart, Ball & Hart, Buffalo, N. Y.

The invention was patented on May 10, 1864, by John Warren, of Buffalo, N. Y., from whom all further information can be obtained.

CHANGING IRON TO STEEL BY CARBONIC OXIDE

Le Genie Industriel publishes the following note recently presented to the Academy of Sciences, Paris, by M. Fred Marguerite:—

"The idea of carburation by a gas is due to Clonet, who thought that iron has such an affinity for carbon that at a very high temperature it would remove it even from oxygen. He relied for this opinion on the fact that having heated iron divided into small pieces with a mixture of carbonate of lime and clay, he obtained steel. He concluded that the carbonic acid of the carbonate of lime was decomposed, yielding its carbon to the iron.

"But Mushet, repeating the experiment of Clonet, operated with lime deprived of carbonic acid, or simply with sand, and obtained steel; thus demonstrating that the carbon was not furnished by the carbonic acid of the mixture, but by the gas from the furnace which penetrated through the walls of the crucible.

"Collet-Descotils and Marckensie proved that, in the same circumstances, the iron might be perfectly melted without its properties being sensibly altered.

"M. Boussingault, following rigorously the indications of Clonet, obtained a product which analysis demonstrated not to be steel, but the silicide of iron.

"Later, M. Leplay gave his ingenius theory of the treatment of minerals in high-furnaces, which he summed up thus:—

"Carbonic oxide reduces all the compounds, and carburets all the metals which can be reduced and carburetted by cementation.

"But in the researches followed in common by MM. Laurent and Leplay, the action of carbonic oxide was found absolutely null, and their experiments had for conclusion that carburetted hydrogen is the cause of the cementation and the carbonic oxide of the deoxydation.'

"Thus it appears that this has not to the present time received solution. The aim of this note is to present the evidence of the direct carburetting action of carbonic oxide on iron.

"Here is the way the experiments were made:—

"Care was taken in the first place to protect the iron which was to be converted into steel from all extraneous action, by placing it in a porcelaine tube varnished on the exterior and interior. These tubes are absolutely impenetrable to the gases of the furnace.

"The carbonic oxide employed was obtained by decomposing pure oxalic acid by means of sulphuric acid equally pure. This gas was separated from the carbonic acid which accompanied it by traversing several flagons filled with a solution of potassa, and was afterwards tested by passing it through a solution of baryta which did not become turbid.

"The carbonic oxide, retaining no further trace of carbonic acid, was passed through tubes containing potassa, and then through others containing pumice stone saturated with sulphuric acid, from which it came out absolutely pure and dry to enter the porcelain tube heated to a lively red. The iron submitted to the current of the gas was a fine wire which had been carefully brightened (*decape*). At the end of two hours of calcination, the cementation was complete, and during all the time of the experiment carbonic acid was disengaged; showing that the iron had decomposed the carbonic oxide. In acquiring all the properties of steel it had fixed carbon, augmenting its weight, and had eliminated oxygen which had produced the carbonic acid.

"Notwithstanding, M. Caron has made an observation very important on the decomposition of the carbonic oxide by the silicium contained in the iron. He demonstrated that silicide of iron, over which was passed a current of carbonic oxide at the temperature of fusion of cast-iron, decomposes that gas, producing silica, which floats on the surface, and carbon, which combines with the iron, so that the cementation would be proportioned to the silicium which the iron contained, and would be null if the iron were pure.

"I have made with care an analysis of the silicium contained in the iron on which I have operated. I obtained from 10·29 grammes of iron only $0^g,009$ of silica, of which the silicium, in decomposing the carbonic oxide, would have been able to deposite only $0^g,00356$, and of carbon $0^g,00035$, while the deposite of carbon amounts to $0^g,0048$, considering only the augmentation of weight. This steel also has been analyzed:—3·010 grammes were heated during four hours in a current of moist hydrogen. It lost $0^g,014$, and after a new treatment of four and a half hours $0^g,0015$, making for eight and a half hours a total loss of $0^g,016$, which represents $0^g,0053$ of carbon, in the place of $0^g,0048$ indicated by the augmentation of the weight.

"It follows from these numbers that the influence of the silicium on the cementation by carbonic oxide, though very real, has performed in the specimen treated a part nearly insignificant.

"It is necessary then to admit a direct action between the carbonic oxide and the iron.

"Furthermore, to dissipate all doubts on this point, I have operated on some pure iron prepared in accordance with the directions of M. Peligot by heating oxalate of iron in a current of hydrogen. There was calcined for about three hours in presence of carbonic oxide 1·318 grammes of this iron which increased in weight from $0^g,00265$ grammes to $0^g,0035$, and carbonic acid was constantly disengaged. Admitting—which was not the case—that this iron contained silicium or foreign metals, the two simultaneous facts of the carburation and the production of carbonic acid would be impossible, since these metals would fix oxygen in place of eliminating it, and it would be necessary to explain the considerable deposit of carbon ($0^g,00265$) to suppose them in such quantities that their presence could not fail to be detected in the analysis.

"From these results, the cementatioon of iron by carbonic oxide cannot be doubtful, and the conditions in which it has been made have permitted the author to ascertain if nitrogen is indispensible to the production of steel. I caused a current of hydrogen to pass for a very long time over iron reduced to excessively fine sheets and properly heated to remove from it any nitrogen that it might contain, as indicated by M. Fremy.

"This iron after this long treatment was heated during three hours in an atmosphere of carbonic oxide: carbonic acid was disengaged and the iron was converted into steel. As the operation was made under shelter from the external atmosphere, and the carbonic oxide employed contained no nitrogen, I believe it safe to conclude from this cementation, as well as from that by the diamond which I have heretofore communicated, that nitrogen is not indispensable either to the production or the constitution of steel."

Poisoning by Calabar Beans in Liverpool.

From forty to fifty children were poisoned by calabar beans in Liverpool on the 11th of August. The circumstances of this remarkable case are fully detailed in the following report of the inquest held upon the body of Michael Russell, the only child who died from the effects of the poison. The inquest was held by Mr. P. F. Currey, the borough coroner, on the 19th ult. Jane Russell, the first witness, said the deceased was her son, and at the time of his death, was $6\frac{1}{2}$ years old. On the day in question he went out to play, and shortly afterwards returned crying, and fell on the floor. She asked if any one had hurt him, and he said he had eaten some nuts that he had found on some waste ground near the school in Greenland street. She took him to the Southern Hospital, where he died twenty-five minutes afterwards. Thomas Costain, overlooker for the company of African merchants, whose place of business is in Walmer buildings, Water street, and who were the owners of the barque *Commodore*, now lying in the Queen's Basin, said the barque was discharged eight or nine days ago, of a cargo of palm oil, calabar beans, and ebony. Had seen some of the beans scattered about, and had told the porters and lumpers to pick them up, as they were valuable. Inspector Moore, of the Fire Brigade, said he was in Jordan street on Thursday last week, when he saw several children, several women carrying children, some of whom were vomiting, going towards the Southern Hospital. He followed and made inquiries, and then went to a piece of waste land, between Greenland street and New Bird street, where Police-constable 802 and several other people were searching a quantity of rubbish for the beans, which he produced. Sent for a spade and broom and riddles, and had the rubbish cleared of the beans. He also took beans from several children. Then he had all the rubbish removed in a cart to the night-soil yard, Vauxhall-road. Police-constable 802 afterwards brought a carter named Samuel Price to Jordan street Bridewell, and the carter stated that he had been employed by the overlooker of the *Commodore* to remove the rubbish from the vessel. He was to have two shillings for doing so. He took the rubbish to the waste land in Greenland street. He had been told to take it to the North End. but could not afford to do so for so small a price. Mr. James Irvine, general merchant, No. 31, The Temple, Dale street, said the beans produced were calabar or esery beans, the botanical name of which was *Physostigma Venenosum*. They were highly poisonous, but scarce. They had as yet been found only in the Calabar river, and had been brought here lately as part cargo. In Calabar they were used only for poisoning, but in this country they were employed to make an eye lotion. Sometimes half a bean would poison a man, but twenty would not, because they would cause vomiting.

Cotton Supply of France.

Accounts from the cotton-manufacturing districts of France state that the cotton crisis which has created so much distress among the operatives there is fortunately almost at an end. The consumption of raw cotton in France during the first three months of the present year amounted to 20,138,537 kilogrammes, being a third more than during the corresponding period of last year, and only one-third less than during the first three months of the year 1860. Previous to the year 1861 American cotton formed more than 60 per cent of what was used by French manufacturers; at present it does not form 2 per cent of the total amount of that received from other quarters. The attempt made to cultivate cotton in Algeria, Guyana, and the West Indies, together with the encouragement given to it by the Government, leads the manufacturers to hope that in a few years there will be sufficient cotton grown in the French colonies to supply all their requirements.

FARMERS' CLUB.

The Farmers' Club of the American Institute held its regular weekly meeting at its Room at the Cooper Institute, on Tuesday afternoon, Oct. 11, the President, N. C. Ely, in the chair. We make the following selections from the proceedings:—

MULCHING IN DRY WEATHER.

Mr. Robinson read a communication from Alton, Ill., stating that the drought this year in that vicinity was so severe that the potato crop was a complete failure except on the farm of William Tucker. He planted his potatoes by laying them on the top of the ground and covering them to a depth of 16 inches with straw, and obtained a good crop.

IVY AND DOGWOOD POISON.

James B. Alcott, of East Greenwich, R. I., wrote a letter on several subjects, and stating among other things, that if persons coming in contact with poison ivy or dogwood, will wash their hands and faces soon afterwards thoroughly in cold water, they will experience no ill effects from the exposure. The sooner the washing is done the better, but it is sometimes effectual if delayed half a day.

Mr. Quinn:—We have found washing in hot water soon after exposure a perfect preventive of the action of the poison.

The President:—It is not understood by all that there are two kinds of ivy, one poisonous and the other harmless. The poisonous variety has three leaves only; the 5-leaved ivy, or Virginia Creeper, may be handled by any one with perfect impunity.

Mr. Robinson :—After the poison has taken effect I think the best remedy is tea of sweet fern taken internally and also applied as a wash.

MULCHING A REMEDY FOR CURCULIO.

Dr. Ward;—I have found that my pears, where the ground was thoroughly mulched with salt hay are almost entirely free from stings of curculio,, and I would suggest that this remedy should receive a trial from our fruit growers.

Mr. Robinson:—I suspect that the effect is to be attributed to the salt in the hay.

Dr. Ward :—That may be. But I think any one who will try the experiment will find good effects from the mulching enough to pay for the trouble and expense, eveh if it should not prevent the depredations of the curculio. If you cover hard-trodden ground with straw three or four inches deep and let it lie through the summer, it is surprising how light the soil will become. Then it keeps the ground moist and prevents the growth of weeds. I am satisfied that we do not fully appreciate the beneficial effects of mulching, especially under trees. Efficient mulching requires two or three tuns of straw to the acre, and for economy I use the same straw repeatedly. In order to get manure upon the ground in the fall I rake off the straw, and to prevent it from rotting during the winter I put it up in small stacks.

HEDGES OF OSAGE ORANGE.

Mr. Quinn:—I never was more gratified in my life than by a recent visit to the farm of Mr. Bell, in Monmouth county, N. J., in seeing his hedges of Osage orange. He has his farm completely fenced with these hedges from two to eight years old. All that are five years old and upward are completely impassable by man, beast or bird. I was very much surprised at their success.

Mr. Robinson:—And there is another thing that would surprise Mr. Quinn quite as much. If we should have a cold night, with the thermometer 20 or 30 degrees below zero, these hedges would be utterly destroyed, so that there would not be a vestige remaining. This has been repeatedly experienced on the Western prairies.

Dr. Ward:—I have had hedges of the Osage orange growing since 1850, and have never known them to be injured by cold except the extreme ends of the limbs. My latitude is about the same as that of Monmouth county—the latitude of this city. I have tried a great many things for hedges, and have come to the conclusion that the best for a fence is the Osage orange, while for ornament I decidedly give the preference to the Norway spruce.