great value in allowing a thorough drying of the converter bottoms before being put in place, for upon this depends their length of life. While a few have lasted for 80 and 86 blows, and quite a number for 60, the average life is about 45 blows. The lining of the body of the converter lasts about six months. No salamanders are formed on the sides, as the metal is tapped, in place of being poured. The loss from pig to ingot is about 11 per cent.

The low cost of erecting a Clapp-Griffiths plant is an essential part of the success of the process. It varies, of course, with the locality. Under ordinary circumstances, a two 3-ton converter plant can be put in running order, with all necessary accessories, for from forty-five to sixty thousand dollars. Compared with the hundreds of thousands necessary for the erection of a Bessemer plant, this is a very small sum, and will bring the process within reach of smaller iron works throughout the country. At the present time seven Clapp-Griffiths plants, in addition to the one at Pittsburg, are either in course of construction or have recently been completed. The one at Pottsville, shown in our illustration, has been planned to allow an output of 250 to 300 tons a day. The converters are similar in size and style to those in use at Pittsburg, but the more ample facilities for handling the product will permit a much larger output. At the Oliver Mill, the converters are blown alternately, and are out of blast Saturday afternoon and Sunday. The entire cost from pig iron to ingot steel is here $5 a ton. It was calculated that the cost would be $6 at mills and $4 at blast furnaces where the pig metal could be run directly from the furnace into the converter, and the men formerly employed at the pig bed transferred to the steel department. This, it is thought, will in time largely change the product of our blast furnace plants from pig to steel ingots, dispensing entirely with the puddling process and substituting a soft steel for wrought iron.

At the Pittsburg meeting of the American Institute of Mining Engineers, in the middle of February, the Clapp-Griffiths process was, as at the New York meeting of the year before, one of the chief subjects of discussion. The majority of the metallurgists present were very favorably impressed with what they saw of the operation of the process, and expressed themselves as having great confidence in the important role which it is henceforward to play in American metallurgy. From this verdict a few gentlemen dissented. As the process, however, will soon be in actual operation in at least eight different localities, it will undoubtedly receive extended and careful study, and will be judged from the dispassionate standpoint of whether it is or is not proving a success in the hands of those who have embarked their faith and capital in its practical working. For the present, it is sufficient that the results already obtained encourage a belief in the value of the process and its applicability to the present wants of American iron masters.

Alaska Gold.

A correspondent of the Marquette *Mining Journal* writes glowing reports about the prospects of Alaska as a gold field. He states that the mill on Douglas Island is running to its full capacity, and is turning out bullion at the rate of $100,000 a month, not counting the concentrates, which are rapidly accumulating for the want of sufficient roasters in the chlorination works. The capacity of the mine must not, however, be judged even by the value of both the bullion and concentrates now turned out; it is large enough to supply rock for half a dozen such mills, and the foundations for a second mill of the same size as the one now in operation are already laying. It is estimated that there are at least twenty million tons of quartz above the tunnel level. Concerning the Silver Bay (Fuller) claims, there is nothing new. In the Silver Bay District there are some very rich mines, and all that has been lacking until now has been a reasonable amount of capital to be honestly and judiciously applied in their development. The success of the Douglas Island venture will, it is thought, assure the erection of more stamp mills in Alaska during the next five years than were ever in operation in California and Nevada at one time.

Game Obtained by the Greely Expedition within the Arctic Circle.

In an appendix of Greely's "Three Years of Arctic Service," just published by Messrs. Charles Scribner's Sons, appears the following list of game obtained by the expedition within the Arctic circle in the three years from July, 1881, to June, 1884: One bear, 6 wolves, 32 foxes, 8 ermines, 8 lemmings, 103 musk ox, 57 hares, 35 seals, 84 brent geese, 91 ducks, 702 guillemots, 172 dovekies, 2 ravens, 18 owls, 178 skuas, 12 gulls, 99 ptarmigans, 99 turnstones, 28 knots, 1 sandpiper, 1 sanderling, 21 Arctic terns, 2 gray phalarope, 49 eider ducks, 1 red-throat diver, and 1 salmon. We should have thought the fish caught would have figured for more, especially as one of the illustrations is of Esquimau boys fishing with a line through a hole cut in the ice.

Correspondence.

A Paint to Preserve Ties.

To the Editor of the Scientific American:

I have what I call a "century paint," for posts, railroad ties, etc., made of linseed oil, resin, and charcoal dust. To one gallon of oil put two lb. of resin and enough coal dust to make the mixture the consistency of thick paint. Get the cross ties out of good timber well seasoned. Then dip them about one minute in a large vat of the paint, hot. Wipe off the ties, and they are ready for use. Bore an auger hole in the tie, fill it with the paint, then drive the spike home. I will guarantee *all* the ties treated in this manner to last 20 years. Fifty per cent will last 35 years, and 25 per cent will last 50 years sound. F. M. SHIELDS.

Coopwood, Miss., Jan. 25, 1886.

The Late Mr. Werdermann's Electro Magnetic Drills, Planers, and Lathes.

To the Editor of the Scientific American:

At a late meeting of the Electrical Section of the Franklin Institute, of this city, I made the accompanying statement, the subject matter of which caused some surprise; and as I have never noticed any public mention of it, or of the work having been attempted elsewhere, and as the members of the section could give no solution thereof, I am induced to make the communication to you, for you to make such use of as you may desire, with the view of eliciting from your correspondents, if deemed of sufficient importance, a true solution.

The statement was as follows:

While in London, in 1873-74, on telegraph business, I formed an acquaintance with Mr. Karl S. R. Werdermann (whose late death has recalled some very pleasant hours spent in his company).

On our New Year's Day I received the following note:

"LONDON, 1st January, 1874.

"DEAR MR. CHAPIN:

"I shall be happy to meet you to-morrow (Friday) at 2 o'clock P.M., at your hotel, to go with you to Bermondsey, where you will see some experiments with the magneto electric chucks, which will be, I hope, very interesting to you.

"My best wishes for all your family in the new year. Yours truly,

"R. WERDERMANN." *

The next day, in company with Mr. W. and a party of gentlemen who had also been invited, I visited a large factory at the place named.

On entering, our attention was first directed to a large drilling machine. This was arranged as usual, but the bed plate was cut into two parts, which formed the heads of a large pair of magnets. A piece of iron, about 4 inches thick by 10 wide and long, was placed on the bed plate, and the current being switched on, became firmly secured.

A one-fourth inch drill was then screwed down and the iron drilled through.

No lubrication was used. The particles of iron cut away assembled upon the drill, leaving the hole perfectly smooth—they being removed with the drill; and when the drill was withdrawn, *it*, as also the cuttings, *was found to be perfectly cool, no heat having been* (apparently) *created.*

To satisfy the company, the work was repeated several times, until each person felt assured of the fact stated.

We were then shown the planing machine, which was similarly arranged. A large piece of iron was lying upon the bed plate perfectly secured, although without any bolts or other usual fastening. As the planing tool passed along the face of the iron, we found that the surface was cut smoother than usual, and that there was no heat in cuttings or tool. We were told that the cutting point of the planer required much less attention or repair than in ordinary work.

We were then shown the lathe, the chuck of which was arranged as in the bed plates of the other machines, the current reaching the ends of the revolving magnets by sliding connections.

An iron T connection, weighing about forty pounds, was handled by two men and placed against the face of the chuck. When in right position, the current was switched on, and the iron was held firmly in place.

Change of position was made by striking the iron a sharp blow with a hammer. After one portion of the T had been turned off, it was released by switching off the current and put in a new position, as before.

Here again no heat was apparent, and the tools required very little repairs.

The currents for the work were furnished by a large Gramme magneto machine, the patents of which, for England and America, were owned by Mr. Werdermann.

Mr. W. informed us that he intended to introduce the work into the English Government factories, where cutting tools were kept cool by running water; but whether he succeeded in doing so I never heard.

* Mr. W. always used his baptismal name of Richard.

Mr. Werdermann's solution of the matter was simply: It was supposed that the heat of the cutting tools was absorbed by the magnetized condition of the iron which formed the keeper of the heads of the magnets.

Was this the true solution?

CHAS. L. CHAPIN,

formerly Supt. Fire Alarm Telegraph, New York; lately Gen. Supt. Am. Dis. Tel. Co., Philadelphia.

No. 29 Carlisle Sq., Philadelphia, Pa., March 11, 1886.

The Roosen Fish Preserving Process.

M. August Roosen, of Hamburg, has brought forward a process for preserving fish and meat which depends upon the well known antiseptic properties of boracic acid. The acid is perfectly harmless, and can be taken in quantities of fifteen grammes or more every day without danger to the human system. It is favorably known as a preventive of disease, being strongly recommended in times of cholera epidemic. M. Roosen's experiments covered a series of years. He finds that in the case of small fish, such as herrings, a sprinkling of boracic acid and salt between each layer will keep the fish fresh for a certain length of time if the temperature be kept low. With higher temperature, however, and larger fish the process is not quite so simple. In order to make it complete, steel barrels are employed, which are filled one-third with sea water, in which the antiseptic compound is dissolved. After filling the barrel with fish, the manhole is closed and a pressure pump connected. An additional quantity of water is then pumped into the barrel, the air escaping through an opening which is afterward hermetically sealed. A pressure of six atmospheres is put upon the contents of the barrel before it is closed. This makes the solution penetrate the fish, and prevents the air from finding access to the contents. No blood is drawn out of the fish, and the solution remains clear and pure all through. By the use of boracic acid, mutton has been kept thirty-three days, and still bled freely after that length of time, and fish after several days were found perfectly fresh and sweet.

A High Speed Engine.

During the last last year or two, it has come to be generally understood that large machines, driven at a comparatively low speed, were the best for electric lighting purposes; but the lighting at the Lincoln's Inn dining hall and library must be considered as an exception to this rule. The dynamo here is driven at no less than 12,000 revolutions per minute, by a Parsons high speed engine, which justifies its title by running at the same rate. It requires some mental effort to take a statement of this kind seriously; yet there is no reason to regard the Parsons motor as a toy. It was shown in action at the Inventions Exhibition, running with unimpaired steadiness from the commencement to the close of the show. It is, in reality, a combination of turbines driven by steam, and consists of two series of parallel flow turbines to the right and left of a central steam inlet, the steam exhausting directly from the first turbine into the second, from the second into the third, and so on through 20 turbines in each series. The steam parts with a portion of its energy in each turbine, and finally escapes at a pressure not much above that of the atmosphere. It is claimed that this is the first motor that has ever been made to work at the actual velocity of the steam as it escapes from the boiler.—*Engineer and Iron Trades Advertiser.*

A Powerful Gas Light.

At a recent meeting of the Dublin Royal Society, Prof. F. W. Barrett gave an account of experiments which he had made to test the penetrative power of the Wenham double quadriform burner in fogs. This burner consists of four superposed 88-jet gas burners placed alongside of four similar superposed burners. The eight burners are in one plane, parallel to which, and at the proper focal distance, are eight annular lenses on one side, and a similar set of lenses on the other. The lights blend into one at a distance of 1,500 feet from the lighthouse. The experiments were made on two foggy evenings, on the second of which the fog was so dense as to cut off a powerful revolving light at half the distance, and to silence a fog siren driven by a gas engine and placed beside the Wenham light. The latter was easily seen by the naked eye, and its position determined, at six miles distance. The revolving light in that case was cut off at something under three miles distance. The Wenham burner will be found illustrated in our SUPPLEMENT, No. 526.

A Fire Banked for Sixteen Months.

One of the blast furnaces of the Kemble Iron and Coal Company at Riddlesburg, Pa., was banked up in November, 1884. After being out of blast nearly sixteen months, it was recently opened for the first time, and the fire found still burning. The coke glowed brightly, and on the admission of the blast soon became hot enough to melt cinder. The furnace was started with as little difficulty as if it had only been standing a week.