Correspondence.

How to Break Bowlders.

To the Editor of the Scientific American:

In your issue of April 26 a correspondent asks how to break large bowlders.

Some ten years ago I superintended the sinking of a large well in which we got great quantities of very hard granite bowlders, varying from 100 lb. to 1,500 lb. in weight. The heaviest sledge we had brought to bear on them by a powerful man had little or no effect on them, but we broke them easily by means of giant powder without drilling holes into them.

We placed from one to eight sticks of ⅞ giant on a bowlder, according to the size, and put a shovelful of moist earth on the powder, just to keep it in position, fired the charge, and never failed to break our bowlder. If the pieces were too large to handle, and would not yield to the sledge, we repeated the operation until they were small enough. ALEX. BOWIE.

Monero, N. M., April 30, 1890.

Bricks from Coke.

The use of coke, coke dust, or graphite from gas retorts in the manufacture of refractory bricks for lining iron furnaces seems like a contradiction of nature; but it appears from several communications to a recent meeting of the Society of German Iron Manufacturers that an industry in the manufacture of such bricks for ironworks is actually established, and is growing. Hitherto nothing has been found capable of withstanding the corrosive action of blast furnace slag, which is alternately acid and basic, and carries away the lining of the hearths of the furnaces as though it possessed no resistance, although, as a matter of fact, everything is done to prevent this action.

The best refractory materials, if placed in the way of a current of slag, will completely melt away in an hour or two. The observation that slag runs best in a channel of coke or coal ash turned attention to this material for lining furnaces; and Mr. F. Burgess, of Gelsenkirchen, states that in his first experiments, in 1883, he tried a combination of coal, coke dust, graphite, and clay, moulded in the form of bricks. Unfortunately, in the process of burning these carbon bricks, the carbon largely burnt out; but even so, they gave satisfactory results. The process could not be patented because it is on record that furnaces in the Hartz Mountains have been lined with a similar combination of coke, dust, and clay.

It appears, also, from a paper by M. Purcel, that in a certain district of France the hearths and bottoms of furnaces have for some years been lined with graphite brick.

The raw material of these bricks was gas retort graphite ground and mixed with tar and then calcined. Part of the tar is coked, and binds the graphite into hard and durable bricks. Coke, poor in ash, treated in the same way, yields good results. These bricks give satisfaction in furnaces which are severely pushed. The cost is about £5 per ton in Germany.—*Journal of Gas Lighting.*

Chemical Exhibition at Manchester.

A permanent chemical exhibition has lately been inaugurated at Manchester, England, which already contains a large number of interesting objects, and it is expected the collection will constantly grow in value and extent. Among the novelties is a show of ozonized products from the St. Helen's Ozone Works, Plaistow. Among them is esparto pulp bleached by ozone. Where this agent is employed there is said to be absolutely no "going back:" in fact, an imperfectly bleached material will become whiter by standing, as though some residual ozone were slowly spending itself, and thereby gradually bleaching the fibers. Ozonized water, suitable for killing microbes, and for sterilizing purposes generally. Ozonized oil. This is available either for medical or manufacturing purposes. Ozone ammoniated lime, the peculiarity being that a considerable quantity of nitrogen is said to be fixed in combination with the lime. Ozone oxidized mangan, a high oxide of manganese, formed by the action of ozone on a lower oxide. A bleached solution of sugar. Before treatment with ozone this liquor was jet black. The bleaching may be performed either before or after boiling. It is also applicable to dry sugar of all grades.

Secrecy and Silence.

Aristotle, when asked the most difficult thing to execute, replied: "To be secret and silent."

It has so happened, sometimes, that the secrets of great discoveries have been so carefully guarded that for a season the most curious eye has been defeated in its efforts to pry into the shops and laboratories where the process of manufacture was executed. But seldom do manufacturers nowadays trust their secrets to the protection bolts and locks give them. They have found out that the best protection is a patent, which gives them a weapon with which to defend their interests which secrecy fails to do.

A New Helper in Photography—Acid-Sulphite.

We have now presented to us in a very convenient form a very strong solution of acid-sulphite of sodium, that in the compounding of developers will prove extremely useful. The material is in the form of a pale, yellowish fluid, smelling strongly of sulphurous oxide gas, with which it is saturated, and containing over fifty per cent of acid-sulphite of sodium in solution. That is to say, it contains half its weight of acid-sulphite of sodium, while ordinary sulphite of sodium in crystals contains half its weight of normal or neutral sulphite of sodium. From the nature of the two salts the acid-sulphite solution contains therefore twice the amount of the preserving element, sulphurous oxide, which the ordinary sulphite crystals contain. This would be true if the ordinary sulphite crystals were pure, but it is next to impossible to make them so, for they usually contain from four to six per cent of sulphate of sodium, and two or three per cent of carbonate of sodium. The new acid-sulphite solution contains a little sulphate of sodium, but the excess of sulphurous oxide gas with which the fluid is charged compensates for this.

Such is the new material placed in the hands of the photographer. Now a few words as to its uses.

The first important application of the new fluid is in the fixing bath. If to a quart of fixing bath (1 to 4) we add about 2 ounces of the acid-sulphite solution, the bath is rendered acid, but no change takes place otherwise. In this bath any negatives can be fixed, and with a rapidity and clearness that is really startling. Some of the slow varieties of plates are remarkably long in the ordinary bath before they are fixed nicely; but in the new acid-sulphite and hypo bath they fix in about one-fourth of the amount of time ordinarly taken. And what is yet more pleasant to note, they are remarkably clean and free from stain. In fact, they look exactly like plates developed with ferrous oxalate after they come out of the new bath, although they may be badly stained before fixing. The new fixing bath is beyond question the best remedy for stained plates from organic developers. One thing must certainly be remembered at all times, the fixing bath must be kept acid by the addition of new acid-sulphite solution from time to time, in order to have it maintain its efficiency as a clearing bath. If the proper care is exercised, the use of the alum clearing bath can be entirely omitted when the new acid-sulphite solution is used; thus eliminating a step in the present negative process when clear, crisp, and quick negatives are desired.

We must now say something about the application of the acid-sulphite to the developer. With pyrogallol the application is very simple; to every grain of pyro in solution add one drop of the acid-sulphite solution as a preservative. Thus, you may take—

Pyrogallol	1 ounce.
Acid-sulphite	1 "
Water to make	10 ounces.

This solution contains five and a half grains of pyro to the fluid drachm and will keep a long time. To develop: In one ounce of water use from one-half to one fluid drachm of the above solution, with from one and a half to two fluid drachms of alkaline solution, made as follows:

Sodium carbonate (crystals)	5 ounces.
Water to make	10 "

In the case of eikonogen it works equally as well as with pyro. In this case the formula becomes:

Eikonogen (finely powdered)	1 drachm.
Acid-sulphite	1 " (fluid).
Water to make	10 ounces.

Dissolve the eikonogen first, then add the acid sulphite. This solution contains three-quarters of a grain of eikonogen to the fluid drachm, and keeps as well as the pyro mixture above. In developing, if sodium carbonate is used, to every ounce of the eikonogen solution add from one to two drachms of the solution given above for pyro, and no water. If carbonate of potassium is preferred, use one to two drachms of the following solution:

Potassium carbonate (dry)	3 ounces.
Water to make	10 "

In each case the negatives come up clear and full of detail, without any tendency to fogging. Judged by experience with the ordinary developers, these new mixtures with acid-sulphite work a little more quickly; and if the negatives are fixed in the acid-sulphite fixing bath, the results leave nothing to be desired as to quality.

With hydroquinone we have not yet obtained any desirable results, the mixtures tried working much too slowly to be of practical use.

As the developers given above work more rapidly than those ordinarily employed, care must be taken in regard to the light used in the dark room, that it is of the proper non-actinic quality. It is best to use as little light as possible under any circumstances, but always enough to see what you are doing.

We are sure that those who use the new acid-sulphite of sodium will find it a great help to the production of clean, stainless negatives, closely resembling those of wet plate days.—*Anthony's Photo. Bulletin.*

Science and Hamadryads.

The dividing line, says the *American Analyst*, between vegetable and animal life is sometimes hard to distinguish, but the difference between average intelligence and scientific knowledge is easily enough detected. An illustration is offered in the following sapient extract from a recent letter to the Boston *Transcript:*

"What are you going to designate as the point which distinguishes animal from vegetable? Locomotion has been suggested, but that is no test. Certain small seaweeds have power of locomotion, while, on the other hand, the animal creature known as the ant's cow, from which that ingenious insect obtains its supply of milk, cannot move a particle. The more deeply science dips into the subject, the more inevitable does the conclusion become that life in the animal and the plant is precisely the same thing, and that vegetables possess in the fibers of their roots the same sort of intelligence that yourself and other human beings have in their brains. How do these root fibers know precisely which way to look for water? Plant instinct, perhaps, you will say. But instinct is only a vulgar term for inherited experience, which in itself implies consciousness. Oh, yes, vegetables have minds; at all events, scientific men have pretty generally come to that conclusion."

The Edison Phonograph in the Preservation of the Languages of the American Indians.

The present state of perfection of the Edison phonograph led me, writes J. Walter Fewkes, in *Nature*, to attempt some experiments with it on our New England Indians, as a means of preserving languages which are rapidly becoming extinct. I accordingly made a visit to Calais, Maine, and was able, through the kindness of Mrs. W. Wallace Brown, to take upon the phonograph a collection of records illustrating the language, folk-lore, songs, and counting-out rhymes of the Passamaquoddy Indians. My experiments met with complete success, and I was able not only to take the records, but also to take them so well that the Indians themselves recognized the voices of other members of the tribe who had spoken the day before.

One of the most interesting records which was made was the song of the snake dance, sung by Noel Josephs, who is recognized by the Passamaquoddies as the best acquainted of all with this song "of old time." He is always the leader in the dance, and sang it in the same way as at its last celebration.

I also took upon the same wax cylinder on which the impressions are made his account of the dance, including the invitation which precedes the ceremony.

In addition to the song of the snake dance, I obtained on the phonograph an interesting "trade song," and a "Mohawk war song" which is very old. Several other songs were recorded. Many very interesting old folk tales were also taken. In some of these there occur ancient songs with archaic words, imitations of the voices of animals, old and young. An ordinary conversation between two Indians, and a counting-out rhyme are among the records made.

I found the schedules of the United States Bureau of Ethnology of great value in my work, and adopted the method of giving Passamaquoddy and English words consecutively on the cylinders.

The records were all numbered, and the announcement of the subject made on each in English. Some of the stories filled several cylinders, but there was little difficulty in making the changes necessary to pass from one to the other, and the Indians, after some practice, were able to "make good records" in the instrument. Thirty-six cylinders were taken in all. One apiece is sufficient for most of the songs and for many of the short stories. The longest story taken was a folk-tale, which occupies nine cylinders, about "Podump" and "Pook-jin-Squiss," the "Black Cat and the Toad Woman," which has never been published. In a detailed report of my work with the phonograph in preserving the Passamaquoddy language, I hope to give a translation of this interesting story.

Floating Batteries for Harbor Defense.

The proposition of the Pneumatic Gun Company is to utilize the two old monitors, the Wyandotte and Nantucket, in demonstrating the merits of the system. These monitors are useless as they now stand, and are a dead expense to the government. The gun carriage company's plan is to remove the turrets and utilize the weights saved by putting in the hold high power 8 and 10 inch guns mounted upon pneumatic disappearing carriages. The guns are to be loaded, trained, and sighted below deck, and, upon command, to be thrown above deck and fired, the recoil sending them back in the loading position. The officers and crew are never exposed to fire of the enemy, and the guns but for a moment, when being fired.

The disappearing system of carriages has been adopted by the Board of Ordnance and Fortifications, and the plan of the company is to make these monitors moving forts, with the same system of disappearing carriages that has been adopted by the War Department for its fortifications.