[For the Scientific American.]

On Priming in Steam Boilers.

I have read the valuable paper of M. Battel, in your columns, on the subject of steam boilers. In the main points of his article, I heartily concur, especially as it relates to the proper construction, and the management of boilers; also as to the non-mysterious cause of explosions. I will, however, present my experience with boilers, which, in some features, differs from his especially in regard to foaming or priming.

He says that he has used in his boilers gutter water, snow water, &c. He knows that steam is made of pure water only, and leaves the residue a sediment—either to go to the bottom or to coat over the fire surface and flues with scale. It is very commonly known to engineers that snow water is the very best to use in a boiler; pure rain water does not excel it; I have frequently taken a thin scale off my boilers by this means alone, and have never seen snow water foam.

Mr. B. seems to have overlooked the important fact, that boilers will foam when dirty as well as when new, and especially if the dirt be soft mud or clay, but that this can be prevented I do not deny, if engineers have the means to do it.

Now I will give you my own case for the last two months, as an instance. I have charge of an engine 325 horse-power, driven by two eight-feet shell 26 feet long boilers; we take steam for warming from the same boilers through four-inch pipe, at 40 lbs. per square inch on boiler, per (Ashcroft) gauge, and the piston travels 448 feet per minute, 7 feet stroke, cut-off 17 inches; these are as per indicator, and no guess work. I have only one pump (*i. e.* force pump) to the boilers, and runs 224 feet per minute, or half stroke of cylinder, and by running so fast, it sometimes fails, as the valve stems break, but I have others always on hand to prevent stops. There is a city water pipe attached, and when there is plenty of water it will run in at 30 lbs. pressure; this we use to wash out with. Our injection is taken from the Chenango canal, which is constantly yellow with mud or clay; and to use it four weeks without blowing out, it gets so thick in the boiler that it will stop up the gauge cock, and I am obliged to leave them open a very little that the steam may have a passage.

For two months previous to the late great thaw, we were very short of water, and could not blow the boilers out, so we were obliged to run with dirty water, and in consequence of this the boilers foamed, and oftentimes so violently as to lower the water from the upper to the lower cock in a few minutes; this I could always tell sooner in the engine room than my men in the fire-room, and I took the only means I had at hand to stop it, viz., throttling the steam and increasing the pressure.

But it may be asked, why did I not blow off from the surface, as in salt water, once an hour or so ? I had no surface cock on, and one could not be put on while steam was up; and I also had as much steam to make as the boilers could well generate, so that I had no chance to pump an overplus of water to be blown away. And, besides, this would have increased the consumption of fuel, and very likely some of our directors would next ask the reason for it; this latter, however, would have made no difference to me, for if I had had the opportunity to blow off I should have done so.

But some of your readers may say we have run boilers when dirty, and no foaming had occurred; then I must refer them to the velocity of my piston, and ask, "Does yours run 448 feet per minute ? I have run boilers very dirty, but not with such a velocity of piston, without priming. I have also put perforated plates over the mouth of the steam pipes with good effect to stop priming, but have never been guilty of putting "substances" into the boiler to stop priming and foaming.

J. J. Killingworth,
Engineer Utica Steam Cotton Mill.
Utica, N. Y., Feb. 26, 1857.

Chimney Walls.

Messrs. Editors—In the article in the Scientific American, of Feb. 13, on building chimneys, you have given the true theory (keep inside hot), and recommend a thick wall to keep out damp and cold; I would suggest a hollow wall for that purpose, which I have found, from experience, to insure a good draft. Build the chimney straight inside, and plaster smooth, leave an air space of about two inches, tied occasionally; taper outside, or batter one-quarter inch to the foot; this looks well. Then run both walls into one, at about eight or ten feet below the top. Such chimneys we are building for steam mills to factories, and think the same plan would do well for houses.

L. Hatfield.
Cuyahoga Falls, Ohio, 1857.

[Our correspondent's information is correct and useful; hollow walls are undoubtedly the best, as there is no better non-conductor than an air space between two walls. We hope soon to see this correct principle of building brick walls applied to all buildings—it is now, to some extent, used in Boston at least.

The Lost Arts.

Messrs. Editors—In the Scientific American, (page 170,) there is an article referring to that mooted question, or topic, "The Lost Arts," in connection with what Bayard Taylor is believed to have stated. Now Wendell Philips, Esq., lectured in this city, this winter, on this very subject, and said many strange things. I give a few:—

Swords were made of such a nice temper and quality that the finest threads of silk were thrown from the point of the sword and cut asunder in the air with ease—being much nicer than our best razors now are. Tools were made of copper better than our finest steel. This could not be done now. Paintings which had been buried for centuries came out with all the freshness and beauty of a new work; while, at the present time, paintings fade and become old within the memory of a middle-aged man. Glass was made into the most various and beautiful forms two thousand years ago—the like of which cannot be done now! Ancient engineers were far in advance of moderns: immense masses of stone were raised to great hights by what means is not now known, neither can modern engineers do such work with all their improvements.

And lastly, steam and its uses were not unknown to the ancients. Most mechanics suppose steam and the steam engine are modern inventions or discoveries; but this is not so. What conceited fellows we moderns are!

A. M. S.
Lowell, Mass., Feb. 26th, 1857.

[We are perfectly willing and ready to give the ancients credit for every art in which they excelled the moderns, but at the same time Wendell Phillips gives them credit for that which they never possessed. In architecture and sculpture, and massive works of civil engineering, they have left positive proof of their genius, energy, and power, and in many other things, when we moderns compare ourselves with them, it takes some of the conceit out of us.

The copper tools of the ancients were inferior to modern steel tools; and if they carved stone now too hard to be worked, it was because, like many kinds of stone now quarried, it worked easier when fresh from the earth. The ancients knew as much about the steam engine, as the boy who drives his toy wind-mill made of wooden slats, by steam issuing from the spout of his mother's tea kettle. Our moderns can paint in as enduring colors as the ancients. Mr. Phillips should have stated that the exhumed ancient pictures to which he referred, were not painted on canvas but on stone, or slabs of pottery ware. We have engineers who will contract to build works as massive as the pyramids of Egypt, if they are paid well for it—but "there's the rub." The swords possessing the fine temper boasted of by Mr. Phillips can be imitated now: they can be made as sharp in the edge as a razor, and in the hands of a skillful person, the feat of cutting a silk thread in the air could be performed easily.

Chinese Sugar Cane.—How to Economise in Planting it.

Messrs. Editors—I perused with much interest the article in a late number of the Scientific American by Mr. H. G. Bulkley on his experiments with the Chinese sugar cane. Mr. B., like myself and many others, did not regard the article as worth much attention.

Last spring I obtained a small quantity of the seed in Philadelphia; although well recommended I regarded it of no consequence, and planted only a little, for the curiosity of it, and hence little attention was paid to it. I distributed the balance of the seed among friends, who, like myself, regarded it as nothing more than an ordinary variety of the broom corn family. But in September and October we all discovered the canes contained an immense quantity of rich sweet juice, capable of being converted into a fine syrup.

At the end of the row, where it had room, I found it tillered out, producing four canes from a seed. I examined some planted by Mr. William Chorlton, at New Brighton, Staten Island. In some hills, several canes were left to grow just as they came up, and others were thinned out to one plant in a hill, these tillered out, and produced from six to a dozen fine canes, all about the same hight.

Mr. J. R. Thomas, of Waverly, Ill., says he planted the seed I sent him, one seed in a hill, three feet each way, and it tillered out and produced a dozen good canes to the hill; he is so well pleased with it that he intends to plant about thirty acres of it this year. As he is an old resident of New Orleans, and understands sugar-making, he knows the value of this new plant.

Many of my canes weighed 1 3-4 lbs. each; they will certainly average 1 1-2 lb. each. An ounce of seed will plant 1,400 hills, one seed in a hill, and produce from 5,000 to 15,000 canes. The ground should be plowed or dug deep, made rich, and in good order, and the hills three feet apart. If two or three seed are put in a hill, the plants should be thinned out to one; it roots well, and there is no danger of it blowing down. It wants light and air, and should not be planted too thick, or it will prevent the perfecting of the saccharine juices of the plant.

J. C. Thompson.
Tompkinsville, Staten Island, N. Y., 1857.

[This is useful and seasonable information to those who intend to plant the *Sorgo Sucre* during this season.

(For the Scientific American.)

Experiments on the Motions of Bodies.

I have recently made some experiments to demonstrate what I believe to be the law of motion in bodies, and will briefly describe them, as they may be of interest to many mechanics.

I first used a heavy iron weight, suspended as a pendulum by a string, and an iron ring resting on a steel point; the length of the apparatus was about nine feet. I allowed it to swing gently till it ceased moving of itself. After moving a short period of time the motion always became slightly elliptical, and this was sufficient to cause the weight to rotate on its axis; of course, a ball so suspended could only make half a rotation. Next I suspended a piece of tin on a steel point, so constructed as to be entirely free to rotate, and a slow circular motion was communicated to this apparatus. Subsequently I used a still more simple apparatus, viz., a pail with water in it, suspended by a string, and made to move in a circle. In all these experiments the rotary motion invariably accompanied the circular or elliptical motion. If the apparatus moved from west to east, the rotary motion was from west to east, or contrary when the primary motion was from east to west, the rotary motion was in the same direction.

If in these experiments the rotation was in consequence of friction against the air of the part making the largest circle, it would be in a direction contrary to the primary motion, but the rotation was invariably in the contrary direction against the air.

Suppose a body three inches in diameter revolving in a circle—its extreme edge having a radius of 24 inches, and its inner edge 21 inches—now it will not be questioned that the momentum of the part having a radius of 24 inches is greater than that having a radius of 21 inches. This is the theory, and it is found to hold true in a variety of very dissimilar experiments, the resistance of the air and friction of bearings being insufficient to counteract the momentum of the part having the greatest velocity, and the result is, the body rotates on its axis.

Now on what principle of sound philosophy can it be asserted that the planets are not governed by the law here stated, when they certainly are subject to all its essential conditions? If it be admitted that the globe, as a whole, is governed by the same laws to which its various parts are subjected, then we can solve several interesting philosophical problems.

C. Dowden.
Newark, N. J., Feb., 1857.

Antimony, Bismuth, and Cobalt.

In a lecture recently delivered before the Royal School of Mines, England, on the property of these metals, the lecturer (Dr. Percy) remarked as follows:—

When copper was mixed with antimony in excess, it formed a regulus of beautiful violet color, which by the old alchemists was denominated regulus of Venus. Antimony entered largely into the composition of type metal; a good mixture for this is three parts of lead and one of antimony, and sometimes a small quantity of tin is added. He did not believe there was any specific standard for type metal, as, in many cases, the several founders had each a formula of their own. When antimony was alloyed with copper it was found brittle; the specific gravity of this alloy was greater than the mean of the two metals. It had been proved that antimony had been used in the composition of bells, and a work was published in Madrid, in 1567, which stated that several bells in Spain contained that metal. The Chinese had likewise used antimony for the purpose of making mirrors. This composition consisted of copper, 80·33, lead, 9·71, antimony, 8·43, and of iron a mere trace.

A patent metal had been invented by Mr. Wetterstedt, for the purpose of sheathing ships. He had not heard much of this, and, therefore, presumed its application had not been so successful as had been anticipated. This metal was composed of antimony, 4·3, lead, 4·4, mercury, 1·3.

Bismuth had been known for the last three hundred years. At first it was mistaken for lead, and as such often used in cupellation. Its ore occurs with several other metals, more especially cobalt.

Commercial bismuth was never pure, and sometimes it contained as much as sixty ozs. of silver to the tun, and this he wished to be publicly known. According to Scherer, the specific gravity of the crude metal was 9·783, while that of the pure metal was 9·779. Its melting point was 264°. It did not sensibly oxydize when exposed to moisture.

Berthier had stated that an alloy of 66 parts of lead and 34 parts of bismuth was more tenacious than lead, possessing a color between tin-white and lead-grey. This could be beaten out into thin foil, and was fusible at 166°. Bismuth could be mixed with mercury without the latter losing its fluidity. Lead and bismuth were often used for the purpose of adulterating mercury, and bismuth was likewise employed for the purpose of silvering glass.

Cobalt had been used as a coloring matter in ancient times; but the blue glass and the enamels in the British Museum which he had examined, had received their colors from copper, not cobalt. In Saxony and Norway, where there are large establishments for the reduction of cobalt, the operations are carried on with great secrecy.

Cobalt sold some years since for £2 2*s.* per pound, now it only realised 18*s.* The mode of separating cobalt from nickel could be found in Gmelin's Handbook of Chemistry, and other works. The oxyd of cobalt had been found in Missouri, accompanied with oxyd of manganese. The introduction of artificial ultramarine had greatly lessened the price, it now being used in several instances in lieu of cobalt.

There is said to be an oak tree near Raleigh, N. C., which, at the sun's meridian, overshadows a space of 9000 feet. It would afford a shelter for 4500 men.