



Prof. JOY—It was shaken from the end of a whip stock into a retort in such a manner that one grain was burned at a time. The gases were drawn by an aspirator into tubes from which the air had been expelled, and the tubes were sealed until the gases could be examined.

Prof. SEELY—Bunsen's analyses are exceedingly interesting and instructive, but they do not prove that our old notions of the combustion of gunpowder, when burnt in the usual way in a cannon, are erroneous. The mode in which he burnt his powder would necessarily give different products. As there was no pressure in his retort, the temperature was very much lower than that at which powder is burnt in a gun. It is a well known law that the products of decomposition by heat vary with the temperature, and the higher the temperature the simpler the compounds. If the quaternary compounds of Bunsen's list were produced at the low temperature of his retort, we should naturally expect at the higher temperature of the gun the binary compounds usually described. That there is bisulphide of potassium left in the gun we know by the smell and taste. We should certainly not find at this degree of heat so unstable a compound as the carbonate of ammonia.

Mr. ROWELL—It is necessary to understand the office of the several ingredients of powder before we can obtain substitutes for either. The use of the sulphur is to kindle the mass. It burns at a low temperature and gives out little heat in burning, but sufficient to ignite the charcoal. Then the heat from the charcoal completes the combustion and expands the gases. In this friction match you know there is on the outside a little phosphorus, beneath that a little sulphur, and beneath the sulphur the stick of pine wood. The phosphorus in burning generates but little heat, the sulphur some more, and the wood more still. In this cup I have a little alcohol of 95 per cent. If I light the match and dip it immediately into the alcohol while the phosphorus only is burning, you see that the alcohol is not ignited, but the match is extinguished. But if I wait till the sulphur gets to burning then you see the alcohol is set on fire. The wood in burning generates more heat than the sulphur, and I have found that in lighting an oil lamp it is necessary to wait till the wood portion of the match begins to burn, the sulphur flame not being sufficiently hot for this purpose.

Prof. SEELY—Mr. Rowell's experiment is a very beautiful one, and demonstrates in the most satisfactory manner the fact that the flame of phosphorus is less intense than that of sulphur. At first sight this fact might seem to form an exception to the general law that the heat generated by the burning of any substance is in proportion to the oxygen which it consumes; for, a given weight of phosphorus in burning combines with one-eighth more oxygen than the same weight of sulphur. The equivalent of phosphorus is 32, and in burning it forms phosphoric acid, P_2O_5 . The equivalent of sulphur is 16 and in burning it forms sulphurous acid, SO_2 . So that while 32 parts by weight of phosphorus combine with 40 parts of oxygen, 16 parts of sulphur combine with only 16 parts of oxygen. The explanation is to be found in the fact that the phosphorus flame is diffused through a larger space than the flame of sulphur; and, consequently, though the quantity of heat is greater, it is less intense. The power of heat to set any substance on fire depends upon its intensity.

SEA BIRDS.—The question is often asked where do sea birds obtain fresh water to slake their thirst? But we have never seen it satisfactorily answered till a few days ago. An old skipper, with whom we were conversing on the subject, said that he had frequently seen these birds at sea, far from any land that could furnish them with water, hovering round and under a storm cloud, clattering like ducks on a hot day at a pond, and drinking in the drops of rain as they fell. They will smell a rain squall at one hundred miles, or even further off, and scud for it with almost inconceivable swiftness. How long sea birds can exist without water is only a matter of conjecture; but probably their powers of enduring thirst are increased by habit, and possibly they can go without for many days, if not for several weeks.—Wilson.

Masses of platinum, weighing 53 ounces, are frequently smelted in 13 minutes by the oxhydrogen blow pipe, by Dr. Roberts, Dentist, New York.

Trial of Warlike Inventions.

MESSRS. EDITORS:—It must be truly gratifying to many of the inventors of warlike weapons to have noticed in the SCIENTIFIC AMERICAN of the 25th inst. your opportune and pertinent remarks and suggestions under the above caption. Now that the Cabinet makers at Washington are being stirred up by the stern realities of war, and are busy in the manufacture of bureaux in the several departments, it is to be hoped that you will continue, through the SCIENTIFIC AMERICAN, to advocate and press the measure suggested, until Congress shall be induced to take up the subject and appoint the commission referred to. It is suggested, as an auxiliary in the furtherance of this object, whether the inventors themselves should not unite in concert of action, by petition or otherwise, to bring the subject tangibly before Congress. As pertinent to this question I have observed recently in some of the public papers the representation made by Charles Ellet, Jr., Civil Engineer, of the various and repeated attempts made by him to enlist the attention of the government in reference to his proposed plans and propositions for the construction of steam battering rams. While he has been knocking for admission at the several doors of the War and other departments, until his knuckles have become callous, and has abandoned the effort in despair, we find similar plans and purposes have been adopted in several European governments, and carried out for practical demonstration. The English government is rapidly augmenting its navy with iron-clad steam battering rams, and it is possible, unless the appearance of things now visible in the political horizon should change considerably, that some of these improved war vessels may be used to perform a new feat in naval tactics, viz., to charge bayonet, on some of our own (in this particular) defenceless navy. Is it not a little curious, to say nothing worse about it, that many very important and useful American inventions must become exotics before they can be relished and appreciated at home? Like the solanum of the aborigines of this country, their merits are not discovered until planted and raised in a foreign soil. Stevens's iron-clad battery, I believe, was originally devised and commenced several years before the English iron clad *Warrior* or the French *La Gloire* was thought of. The secretive and go-it-blind policy, however, adopted by the government in reference to the mode of constructing this vessel, has tended to place the navies of several foreign governments, in this particular, considerably in advance of our own. Had a commission, as proposed in the article above-referred to, existed years ago, whose duty it would have been to examine and test the plans and suggestions for the construction of this vessel in its incipiency, can we reasonably doubt that the final result would have been a vast saving to the government and an honor to the country? In many of the European governments large premiums are frequently offered to stimulate the inventive genius of the whole country. The difficulties encountered by Mr. Ellet, as above mentioned, is doubtless the experience of most of the inventors of warlike inventions in these troublous times of civil war and rebellion. All the departments at Washington, and especially the Ordnance and War Departments, are overwhelmed with business in the usual routine of their offices, and have no time to spare to investigate new plans or projects, however important and useful the same may be to the government in the prosecution of the present war. This state of affairs, we think, is a solid argument in favor of the propriety and necessity of the appointment of a commission, as suggested.

The improvement in projectiles, as described in the SCIENTIFIC AMERICAN, Nos. 25 and 26, Vol. V., I have thought contained the germ of novelty that might probably lead to some useful results in the science of gunnery. To project shot or shell to the greatest possible distance, or, in other words, to have guns, the range whereof should far exceed those of the enemy we supposed to be a great desideratum. Desires that the United States Government might have the advantage of this improvement, should it, on a practical examination, be found valuable, the plan and descrip-

tion thereof have been communicated to several of the departments at Washington, but, I presume, as Mr. Ellet and a hundred others are before me, and as these departments may have adopted the barber shop rule—first come first served—I shall have to wait a little longer before I shall have the pleasure of hearing from them. The difficulty in testing my proposed improvements myself is the want of a suitable place where ample range for the purpose can conveniently be obtained. Around Trenton we have no place where a range of several miles could be obtained without great risk to life and property.

CHARLES POTTS,
Civil Engineer.

Trenton, N. J., Jan. 31, 1862.

The Expansion Question.

MESSRS. EDITORS:—I was much pleased to receive Mr. M'Elroy's reply, on page No. 5, this volume, SCIENTIFIC AMERICAN, to this question, but, although admitting the correctness of his figures in general I cannot bring myself to the belief that there would be a saving of 48 per cent by using the larger cylinder, as he has attempted to show. There is one point which Mr. M'Elroy seems to have entirely overlooked, viz., the difference in the displacement of the cylinders. The difference in the area of a 14-inch and a 22-inch cylinder is 244. This multiplied by 300 feet will give 508 cubic feet of steam of 15 pounds pressure, or 152 cubic feet of steam of 50 pounds pressure per minute required by the larger cylinder over and above that required by the smaller one for displacement. This 152 cubic feet of steam added to the 165.79 cubic feet required by Mr. M'Elroy's figures, gives 317.79 cubic feet against 322.25 required by the smaller cylinder, showing a saving in favor of the larger cylinder of 1½ per cent only, and then not charging the larger cylinder with the increased cooling surface, friction of piston and its liability to a larger amount of leakage than the piston of the smaller cylinder.

If I have committed any error in this I should be glad to have it corrected, but, as it is, I think the question still remains open.

JOHN WEST.
Norristown, Pa.

Sorghum in Ohio.

On the 7th ult. a sorghum convention was held at Columbus, Ohio. Fifteen splendid samples of sugar were presented, beside enough molasses to load a dray. The sugar was of very fine color and handsomely crystallized. From the discussions, it would seem that large numbers of cane growers had succeeded well in making sugar upon the Cook Evaporator, and, it is said, all the samples in the Convention were made on this evaporator. About 3,000,000 gallons of sirup were made in this State last fall, which has been sold at an average of 60 cents per gallon, or about \$1,800,000! Many of those who tried succeeded in crystallizing their sirups in about 24 to 48 hours. One gentleman, Mr. Myers, of Springfield, said he had made 160 barrels, another 50, and so on. Mr. Myers also presented a specimen of wine equal to Madeira. A Committee was appointed to compile the most valuable information obtained for publication.

Silver Smelting in San Francisco.

Several American capitalists have invested largely in Mexican silver mines, and large quantities of silver ores have been imported into San Francisco where they can be smelted at less cost than in Mexico. Heretofore these ores have been admitted duty free, but lately the custom-house officers have adopted a new rule, and levied a duty of ten per cent upon them. This has drawn out a remonstrance from those who are engaged in smelting the ores. They state that while bar silver is admitted duty free, it is very unwise to levy ten per cent on the ore, as it gives employment to capital and a large number of persons in San Francisco; whereas, if they were smelted in Mexico their product would be admitted free. The amount of silver smelted from Mexican ores in San Francisco is about 16,000 ounces per month.

The Japanese government has officially signified its intention to forward articles to the great exhibition which is to be held at London next summer. The Ministers of Foreign Affairs, Koodze Gamatonskami and Ando Tsou Tsosima Nokami, have written to the English Consul that "it would be a matter of great joy to cause the glory of Japan to sparkle in a foreign country."