Explosion of a Blast Pipe.

MESSRS. EDITORS—You inquire, in a late number of the "Scientific American," "what was the cause of the bursting of the blast pipe of the Crane Iron Works, Pa.?" I will endeavor to answer. I am not aware of the circumstances of the explosion, but I believe you will find the cause as I shall describe it. If I am correct, the explosion was not caused by the blast, nor while the blast was in operation, but in putting on the blast, just as a boiler explodes when putting on the pumps. The cause of the explosion was gas from the furnace, the pipe having become filled with it while the blast was off. When the blast is put on, the gas is forced back into the furnace or rather explodes on the first turn of the current to the furnace instead of from it, as it was before the blast was applied.

You will observe that the draught, as I have stated, is, in the first place, from the furnace, sometimes caused by the wind blowing down the chimney; sometimes I have noticed quite a strong natural draught into the pipe. The tuyeres are placed low, near the bottom of the furnace, a reason why the gases have not been more consumed when entering the pipe. Furnaces ought all to have an opening of about two or three inches in diameter, and at the end of the bend, where the pipes ascend or descend from the tuyeres, with a slide or cover, which should always be open when the blast is not on the furnace, this causes a draft into the furnace, and prevents any from it.

As we are on explosions, I ask the scientific world,—"did you ever see our foundrymen pouring melted iron into a pailful of water to warm it in winter, often causing a steam explosion on a small scale; here is a pail of water without any power, into which you can pour melted iron to a certain extent in perfect safety, but the instant this is exceeded the pail is dashed into a hundred pieces without any warning whatever; where is the utility of safety valves, false alarms, &c., for this kind of explosion, when the top of an open pail won't do? pour your water from engine pumps on red-hot iron, and the same result ensues. I have often seen men scalded more or less in this way; a little experience, however, soon teaches a man how far to go with safety.

Troy, N. Y., 1853. J. T.

[The following is another letter on the same subject:—

"The blast-pipe which exploded, as mentioned in the "Scientific American," must have been charged (by stopping the blast) with di-carburet of hydrogen, formed by the distillation of coal in the furnace. It being nearly one half as light as air, would find its way into the pipe, and as it ($C.H^2$) requires only about two volumes of oxygen, or a little more to render it highly explosive, when they started the blast it passed off like thunder.

Salem, Mass., April, 1853. E. L. N."

The Ray Premiums—A Shameful Act.

MESSRS. EDITORS—I see by the Scientific American that the judges of the "Ray Premiums" have at last made their report,—and what is it? Why, they have awarded a premium for a brake that was patented November 25, 1851—six weeks before the premium money was offered, and more than two months before it was advertized in your paper. The advertisement reads thus:—"The premiums will be open for competition from this date [Jan. 1, 1852] until the next Annual Fair of the American Institute, when they are expected to be on exhibition; and no invention already introduced to the public will be entitled to compete for the prizes."

Regardless of these specific terms, they have given a premium to an invention which had been patented at least six weeks before Mr. Ray made his offer with the above stipulations.

Now this Mr. F. A. Stevens, of Burlington, Vt., is no more entitled to a premium, if the advertisement means any thing, than the man who first made a railroad brake. I think the whole business has been conducted, from beginning to end, in a very unfair and ungentlemanly manner. And as one of the competitors, I do most decidedly object to the award being given as it has been, not because he had not the best brake, but because he was not a lawful competitor. T. S. I.

[The conduct of the American Institute has been very blameable in this matter, and that of Mr. Ray none the less so. He made the conditions, the committee were only appointed to carry them out.

These conditions have been set aside. Was this act done by the authority of the maker of these conditions; if not, he should not pay over the money. The whole business has been a disgrace to all those concerned in offering and deciding on the prizes. Let the competitors meet in this city, this summer or fall, and express *their* opinions respecting the conduct of the "Institute."

Railway Tunnels.

Much interesting knowledge in this caption was lately given by James Hayward, engineer, on the examination before the Massachusetts Committee respecting the Hoosac Tunnel. He has visited Europe, and examined as many as thirty tunnels. During his visit he made the acquaintance of several eminent engineers and supplied himself with profiles of several tunnels. The Marseilles tunnel, located at Nerthe, near Marseilles, is three miles (15.153 feet) long, and has twenty-four shafts. The material in this tunnel is a very hard limestone. The height of the ground over it is a little over 600 feet. The aggregate length of all the shafts is 7,589 feet; the deepest shaft is 610 feet. The cost per yard down is $43. The shafts are nine feet in diameter, and are lined with masonry, at a cost of $19·40 per yard down.

Mr. Hayward obtained from the engineer in charge of the work, the prices which the work cost. The deepest shaft cost $73 per yard down, entirely completed. The entire cost of all the shafts, for the masonry, amounted to $47,000; and $150,000 for the whole cost of the tunnel. The entire cost of the tunnel to the contractor was $125 for the lineal yard; this includes shafts. The tunnel was lined with masonry of different thicknesses, which cost $423,000. The cost of the tunnel, exclusive of the masonry was $705,000. The contractor, however, gave Mr. Hayward a less price, about 4 per cent., as having been the actual cost.

The Woodhead Tunnel between Manchester and Sheffield is a little over three miles long, and the hill over it is 600 feet high. It has five shafts, 10 feet in diameter, which vary from 400 to 600 feet in depth. The character of the rock is granitic, not so hard as our granite; it is called there "mill stone rock." The tunnel was about five years in construction, and its whole cost was $1,026,705.

The Box tunnel is one of the earliest as also the largest and most expensive tunnel ever constructed, it is 39 feet high and over 30 feet wide. The tunnel is on the Great Western Railway, about 100 miles from London. The shafts were 25 feet in diameter, its length is 9,576 feet. Over some third of it is through the solid rock.

In England there are on the canals some forty miles of tunnels—the one on the Huddersfield canal being over three miles in length, and through a substance much more flinty than the Hoosac Mountain. A tunnel is being constructed under Mount Cenis, in the Alps, which, when finished, will be about seven miles in length; and another of equal distance under the Appenines, on the route of the railway from Turin to Geneva. There are numerous tunnels on the Baltimore and Ohio Railroad, and the branch road to Parkersburg. The highest cost of excavating the tunnels on the Baltimore and Ohio Railroad, which penetrates mica rock, was three dollars eighty-seven cents per yard, and at this rate it will cost over one million three hundred thousand dollars to perforate the Hoosac Mountain.

The proposed tunnel will be about four miles and a half in length, and the number of cubic yards of stone to be removed some 450,000.

Yellow Shower.

After a shower of rain which extended over several of the Western States, on Friday the 25th ult., a substance resembling sulphur was observed in various localities, especially in the neighborhood of Louisville. The Courier of that city says: "On Saturday morning the streets and all the pools of water for miles around were discovered to be covered with a fine yellowish dust, which many have supposed to be sulphur; in fact, we are informed that some of the dust was gathered, and upon fire being applied it burned the same as sulphur. We, however, are not inclined to any such opinion, but believe the substance to have been no other than the pollen of plants or trees and scattered by the winds.—Its appearance on the waters is a thing of common occurrence at this season, particularly in those parts of the State of Louisiana and Mississippi where the pine and cypress abounds." The Cincinnati papers also notice the phenomenon as it was observed in that city.—[Exchange.

[It was doubtless the pollen of plants and trees blown across the continent, which is of common occurrence in the southern part of the Union at this period of the year.

[For the Scientific American.]

Anthracite Coal Locomotives.

The Mulholland locomotive has been so improved that now a full train of passenger cars is regularly run from Philadelphia to Pottsville, 94 miles, with two tons of Schuylkill coal, working up to fast time, viz., four hours, including 18 stoppages.

The superior adaptation of hard coal to road engines is now conclusively established to the satisfaction of this railway company. The Norris factory is now constructing five Mulholland locomotives for the Camden railroad, and the Reading Railroad Co. is adding to this large number now in use as fast as it can get them built; intending, in two years, to have no others in use. They find them superior to wood engines in power and steadiness, for heavy freight at ten miles per hour, and manifold cheaper, of course. And after an experience of nearly two years, they are enabled to assure us that they are entirely free from the unusual burning out of the firebox, formerly thought incurable. Copper boilers also, which were supposed alone capable of resisting the destructive heat of anthracite, are dispensed with, common iron being found to answer fully in the Mulholland locomotive. J. *. *.

Philadelphia, 1853.

Navy of the United States.

According to the "Navy Register" for the current year, the following is the naval force of the United States:—

Eleven ships of the line, carrying eight hundred and sixty guns. Of these, three are in ordinary, four on the stocks, and one preparing for sea. The Independence, a razee, carrying fifty-four guns, is also preparing for sea.

Twelve frigates of the first and one of the second class, carrying five hundred and sixty-four guns. Of these five are in commission, four in ordinary, two on the stocks, and two preparing for sea.

Twenty-one sloops of war, carrying four hundred and two guns. Of these, fifteen are in commission, one in ordinary, and one preparing for sea.

Four brigs, carrying forty guns. Of these, three are in commission, and one of them is preparing for sea. Also, four schooners, carrying seven guns, two of which are in commission, one in ordinary, and one preparing for sea.

Five steam-frigates, carrying forty guns, all in commission; four steamers of the first class, carrying eighteen guns, two of which are in commission, one repairing, and one preparing for sea; and seven steamers less than first class, carrying five guns, three of which are in commission, two preparing for sea, and two employed as tenders.

Five store ships, carrying twenty-four guns; three of them are in commission, and one preparing for sea.

This gives a total of seventy-five vessels of all kinds, carrying two thousand and fourteen guns.

Weaving of Brocatelles.

It is said that a factory at Humphreysville, Conn., is the only one in the world where silk brocatelles are woven by power looms. At all other places where they are made, the weaving is done by hand, and, previous to the successful operation of this establishment, it was deemed impossible to construct machinery ingenious enough to weave in silk the complicated patterns of the brocatelles. The use of machinery is the only thing which enables American makers to compete with the German and French manufacturers in this branch of industry, as the foreign establishments have greatly the advantage in the cheapness of labor. The artist employed in this factory to execute designs and draw new patterns, is one of the best order, and was educated at Napoleon's celebrated school of design at Lyons.

The Aurora Borealis and the Electric Telegraph.

On the House, Morse, and other Magnetic Telegraphs, the effect produced by the aurora is generally to increase or diminish the electric current used in working the wires; sometimes it neutralizes it, so that in effect no fluid is discoverable on them. The Bain, or Chemical Telegraph is, however, much the best adapted for observing the precise effect produced by the Aurora. In this system, the main, or line wire, is brought into direct contact with the chemically prepared paper, which lies on a metal disc, connected with the ground; any action of the atmospheric current is therefore immediately recorded on paper.

During a thunder-storm, the atmospheric electricity attracted by the wires passes over them to the ground, and as it passes from the wire to the paper it emits a bright spark, and produces a sound like the snapping of a pistol. Atmospheric electricity never remains for any length of time on the wires; it will, however, sometimes travel many miles before discharging itself, sometimes as much as forty or fifty miles. The effect produced by the aurora borealis on the wires, and the record on paper, is entirely different from that of the atmospheric current. Instead of discharging itself from the wires with a flash and report, and without the aid of a conductor, as is the case with the latter, it glides along the wires in a continuous stream, producing the same result on paper as that produced by the galvanic battery. It is well known that only the positive pole of the battery produces the colored mark on the paper,—the negative having the contrary effect of bleaching it; the same is also true of the two currents from the aurora. The current usually commences lightly, producing a blue line just perceptible on the paper, and gradually increasing in strength, making a dark blue, and then a black line, till finally it becomes so strong as to burn through several thicknesses of it, until it gradually disappears, and is followed by the bleaching process, which entirely neutralizes the current from the batteries.

The aurora borealis seems to be composed of a vast mass of electric matter, resembling in every respect that generated by the electro-galvanic battery; the currents from it change, coming on the wires, and then disappearing—as the mass of the aurora rolls from the horizon to the zenith—sometimes so faintly as to be scarcely perceptible, and then so strongly as to emit one continuous blaze of fire—yet very different from what is termed atmospheric electricity, placing ground wire conductors in close proximity to the line wires being of no avail in this instance.

Invention of Chess.

A Mr. Basterot, of France, has recently edited a work upon the game of chess; and among other particulars, he informs his readers, upon good authority, that this game was invented during the sixth century, by an Indian Brahmin, called Sisla, who presented his invention to the reigning monarch, Sirham, requesting as a reward, one grain of wheat for the first square, two grains for the second, and four for the third, and so on, in geometric progression, up to the sixty-fourth; to reach the amount of this humble request, the author informs us, would require the entire wheat crop of France during 140 years!

[Instead of 140 years, it would take over 360,000 years for the purpose, allowing the annual wheat crop of France to be 100,000,000 bushels.

A design for a prize medal is wanted in New York by the Directors of the Association of the Industry of all Nations. They offer $200 for it.