SCIENTIFIC MUSEUM.

For the Scientific American.

On the Forces.

In the Scientific American, No 13 and 14, there is a communication over the signature of H. R. Schetterly, which I think deserves some notice. The writer, inadvertently no doubt, has fallen into some errors of terms, if not of ideas. He remarks that "forces are either impulsive or constant, or both combined. An impulsive force puts a body in motion, and then lets it move by its own inertia." "A constant force continues to act upon the moving body after it has put it in motion, causing it to move faster and faster every moment; and this is called accelerated motion." Is not an impulsive force a constant force, causing accelerated motion, whilst it is acting? How long must a force act to be a constant force? And how short a time to constitute it an impulsive force? Is not a constant force an impulsive force acting a longer time? I can conceive of no difference in forces, only so far as one acts with a greater less intensity, or a longer or shorter time than another. Multiply the time of action, by its intensity, into the mass acted on, and the velocity will result in all cases. There can be no motive force without time—it must have time to act; and although the length of time of its action be ever so short, yet it will be an accelerating force while in action; it will, during that time, move the body on which it acts with accelerated motion, from a state of rest, up to the velocity communicated. It is impossible to conceive of a force acting without time. If it acts during no time, it is no force.

I will pass by the inconsistency of calling the action of wind and water constant forces, instead of a succession of forces, and the statement that "when an impulsive and a constant force act on a body, conjointly and simultaneously, they produce curvilinear motion around the centre of the constant force," and leave the writer to start a vessel to sail around the wind, whilst I pass on to the errors which I at first took up my pen to correct.

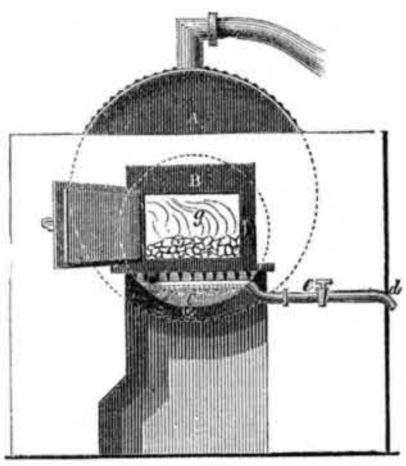
After illustrating the central forces, by whirling a weight tied to one end of a string, while the other is held in the hand, around one's head, he remarks—"now, in the case of the string and weight, the impulse is communicated to the weight by the hand, and the momentum generated by this impulse is manifestly decomposed into the centrifugal force of the weight, and the force with which the weight would strike an obstacle in its orbit, and each of these two forces must therefore be less than the force which first moved the weight, because the sum of the two former is only equal to the latter." So Esq. Andrew's machine is no humbug after all! Mr. Schetterly has given him all he wants—a force equal to that with which a body in circular motion strikes. For I understand him to suppose that the centrifugal and striking forces are equal; and, as the striking force will always equal the impulsive force, whatever the amount of the centrifugal force is, must be a clear gain—which we hand over to esquire Andrews.

If the string should break whilst the weight was being whirled around the head, it would fly off from its orbit in a tangent, with a velocity equal to that with which it moved in its orbit, plus the centrifugal force. Will Mr. Schetterly estimate the plus, and pass it over to esquire Andrews? If the sun should lose its attractive force, and the earth fly from its orbit with a velocity increased by the centrifugal force; how much faster would it move than it now moves in its orbit? Not any; for there is no such force as centrifugal,—you can make nothing of it; for, if a body that is moving in a circle be let to fly off in a tangent, its velocity will be no greater, and it will strike with no greater force against a fixed obstacle, than when it was moving in a circle. What is termed centrifugal force is nothing more than the inertia of the moving mass; its resistance to having its course changed from a right line to a curve, by a centripetal force; and so long as the centripetal force acts laterally to its motion, or radial to the curve of its direction, it can neither retard nor accelerate it. It is somewhat strange that men, otherwise intelligent, should hold these notions;—that men who are able to instruct persons in the natural sciences, should, in some important things, err, and thus lead their followers astray, is unfortunate. J. B. CONGER.

Jackson, Tenn., Jan., 1852.

On Boilers.---No. 12.

FIG. 21.



STEAM AND FUEL.—The accompanying fig. 21, represents the mode of obviating dense smoke, and for using steam as a heat generator. It was invented by Mr. R. Evans, of London, in 1824. A is an end view of the boiler; B is the internal fire-place contained in a large tube denoted by the dotted circle lines; C is the ash-pit; *d* is a branch from the exhaust pipe of the steam engine; *f* is the feeding tube, pierced with numerous small holes through which the steam escapes in little jets, diffusing itself over the surface of the under part of the fire, and in passing through the fuel is decomposed. The fuel employed was coke, which gave off no flame except when the cock, *e*, was open and the steam used, when it gave off a flame as represented by *g*. This apparatus was successfully used for at least five years in London, and upon a trial made by Mr. Evans, he found that it reduced the expense to about one-half that which he incurred when using coal. Until he applied the exhaust steam he had to relinquish the use of coke, which of itself as a fuel, was not able to raise enough of steam. After he applied the steam, he had no trouble in raising a plentiful supply of steam, without an extra expense of fuel. A considerable quantity of water was formed after passing to the chimney, by condensation, and this required a cistern at the bottom of the chimney to collect it. It was also observed that the grate bars were soon destroyed by oxidization. We regret to state that for want of a general knowledge of this invention, the same thing has been re-invented a number of times, not long since, in our country.

FURNACE FOR ANTHRACITE COAL.—When this kind of fuel was but little known, and as little estimated, Mr. B. Howel, of Philadelphia, took out a patent in 1828 for boilers, the principle of which was to generate steam, and use the anthracite without bringing it in contact with the boiler. He also claimed the application of the artificial blast, upon the anthracite, "to increase the intensity of the heat, and giving it the necessary direction through the communicating flues of the furnace." The idea embraced in the invention, was to generate steam, the boiler being out of contact with the fire. He also claimed the plan for heating kilns for making pottery and earthenware; also for burning brick. A description of it will be found in the Franklin Journal of 1828.

A great number of patents have been taken out for furnaces, and the application of the heated products to useful purposes. It is but a short time since a case was tried in the U. S. Circuit Court, Philadelphia, the parties being Detmold versus Reeves, for the infringement of a patent of a foreign invention, namely, the application of the heated products of smelting furnaces. A patent was secured by that veteran inventor Dr. E. Nott, many years ago for a like invention.

Smoke cannot be said to be a nuisance in this part of the world, for very little bituminous coal is used here; but there are other places in our country where the smoke consuming furnaces we have described and illustrated may be of great benefit. A great number of patent furnaces are described in "Galloway and Hebert's History and Progress of the Steam Engine," Ure's Dictionary, and especially in the work of William West, chemist, of Leeds, Eng.

(For the Scientific American.)

Galvanic Plating with Metals.

As your paper is the medium through which the public receive knowledge of nearly all the improvements in the arts and sciences at the present day, I have taken the liberty to make known a new and, said to be, valuable discovery in chemistry, for gold and silver plating, by one R. J. Huygens, a practical chemist.

GOLD—For gold take 1½ pints rain water, dissolve one ounce of cyanide of potassium; when this is all dissolved, add 60 grains, or four bottles of chloride of gold and sodium,—mix the compound well, and add 8 or 10 grains of carbonate of potash, and after it has settled it is ready for use. To use this it will be necessary to have a strip of zinc about 1-8th of an inch wide, and longer or shorter, according to the size of the article to be plated, and laid in the liquid so as to connect with the article: too much will blacken it.

SILVER—Dissolve a twenty-five cent piece in an ounce of nitric acid by a gentle heat; add a quart of rain water, and throw in a large spoonful of salt; the silver will settle to the bottom. Carefully pour off the water and fill the vessel as before, again pour off; continue this until you cannot taste salt or acid, and add an ounce of cyanide of potassium, and it is fit for use.

TO PREPARE GERMAN SILVER FOR PLATING.—Dissolve a five-cent piece in one-quarter of an ounce of nitric acid, and add three-quarters of an ounce of water; add as much cream of tartar and alum (equal parts) as the water will dissolve; rub the article with this and dissolve at once. L. A. DUNHAM.

[Many of the readers of our present volume—our new subscribers—may not be acquainted with the electrotype; or, like Mr. Dunham, may have heard of some such a person as Mr. Huygens having made the discovery. To those who are not acquainted with the electrotype, the above receipts may be new, but all who desire to become acquainted with the best account of the art, should read Vol. 6, Scientific American—the articles by George Mathiot, the best Electrotypist in our country.—ED.

Old Time Winters.

The river Tiber used to be frozen over in the days of old.

In 1664 the cold was so intense, that the Thames was covered with ice sixty-one inches thick. Almost all the birds perished.

In 1695 the cold was so excessive, that the famishing wolves entered Vienna and attacked beasts and even men. Many people in Germany were frozen to death in 1695, and 1696 was nearly as bad.

In 1709 occurred the famous winter called by distinction the "Cold Winter." All the lakes were frozen, and even the sea for several miles from the shore, The ground was frozen nine feet deep. Birds and beasts were struck dead in the fields, and men perished in their houses. In the south of France, the wine plantations were almost destroyed, nor have they yet recovered the fatal disaster. The Adriatic sea was frozen, and even the Mediterranean, about Genoa; and the citron and orange groves suffered extremely in the finest parts of Italy.

In 1716 the winter was so intense that people travelled across the Straits from Copenhagen to the province of Sema, Sweden.

In 1726, in Scotland, multitudes of cattle and sheep were buried in the snow.

In 1740 the winter was scarcely inferior to that of 1709. The snow lay ten feet deep in Spain and Portugal. The Zuyder Zee was frozen over, and thousands of people went over it. All the lakes in England froze.

In 1744 the winter was very cold. Snow fell in Portugal to the depth of twenty-three feet on a level.

In 1754 and 1755 the winters were very severe and cold. In England the strongest ale, exposed to the air in a glass, was covered with ice one-eighth of an inch thick.

In 1771 the Elbe was frozen to the bottom.

In 1776 the Danube bore ice five feet deep below Vienna. Vast numbers of the feathered and finny tribe perished.

The winters of 1774 and 1775 were uncommonly severe, and during the Revolution cannons were drawn on the ice from this city to Jersey City.

From 1800 to 1812 also, the winters were remarkably cold, particularly the latter, in Russia, which proved so disastrous to the French army.

In the winter of 1819, heavy loaded teams used to cross between New York and Jersey City

Cost of Luxuries.

The aggregate value of wines imported into the United States, annually, is $2,000,000 brandy, $3,000,000; beer, $1,750,000; snuff and segars, $1,750,000; tea, $5,000,000; coffee, $12,000,000; figs, almonds, raisins, &c., $1,000,000—total, $35,500,000. What do those nations take in return, from whom we import these articles? This is an important question.

Tunnel in the Hoosic Mountain.

The rock through which the tunnel is being cut through the Hoosic Mountain, Vermont, is a soft mica slate and can easily be cut with a knife.

LITERARY NOTICES.

PERKINS' PLANE TRIGONOMETRY, WITH TABLES OF LOGARITHMS—This is a new work by George R. Perkins, A. M., Principal of the State Normal School at Albany, and, as might be expected from his abilities and high character, it is a most excellent and able one. It treats of the application of Plane Trigonometry to Mensuration and Land Surveying; it contains full Logarithmic Trigonometric tables; and one thing we like about it is, that all the figures in the tables are in the old-fashioned type which adorns our old friend Hutton; this type is not so fatiguing to the eye. We have had many inquiries about a good work on Trigonometry, this one we can heartily recommend. It is published in excellent style by those great publishers, D. Appleton & Co., New York City.

LITTELL'S LIVING AGE—No. 404 of this work is a capital number: "Mount Blanc," "Leaves from the Note Book of a Naturalist," and a number of other most excellent papers, are embraced within its interesting leaves.

GODEY'S LADY'S BOOK, for February.—Some few months ago, in noticing a number of this serial, we stated our opinion that it did not come up to Godey's usual excellence. This honest opinion, expressed with kind feelings towards the enterprise, was sufficient cause to cut us off from its regular monthly visits, as we suppose, for, from that time (with one or two exceptions), we have not received a copy. The gentlemanly agents here, Messrs. Long & Bro., 43 Ann st., we do not charge with remissness. They know we have always spoken well of the work, and would gladly furnish us, if supplied from the fountain head.

Simply because we receive the work by favor, is no reason why we should not speak of it as belongs to our high privilege as independent Editors; therefore, if Mr. Godey wishes to send the Lady's Book in future, he may do so, and we shall speak of it as we please. We can get along without it, but will take it in and notice it out of respect to the publisher. Those wishing to obtain the "Book" can find it at 43 Ann street, as above stated.