SCIENTIFIC MUSEUM.

Scientific Memoranda.

SNOW-BALLS MADE BY WIND.—Nature sometimes amuses herself by rolling up the snow, as it descends, into balls, like those formed by children in their play. An extract of a letter from West Rutland, Vermont, dated January 29th, and published in the Hartford Courant, gives an account of one instance of this kind:

"The weather of last week was most severely cold, the thermometer varying from ten to thirty-five degrees below zero; but on the 25th it came up to ten degrees above zero; and on the morning of the 26th ult., at dawn, there was a brisk snow storm from W. S. W., the snow falling to the depth of two inches on a hard but not very smooth crust. About sunrise the snow-squall ceased, and a violent wind arose from the southwest, and commenced forming the new snow (which was very light) into balls; and in half an hour I could see, as far around me as the fields extended, balls in any quantity, varying from three inches in diameter to some as large as a common pail, or twelve to fifteen inches in diameter; and at this moment they can be traced several rods by their track. Although much fallen to pieces, they are now to be seen by thousands. I saw them forming, and should judge by appearances that they were all made within the space of half an hour."

THE PLAGUE.—It is very certain, from accounts received both here and in England, that the true plague has been introduced into Madeira, and the work of death has been appalling. The question has been agitated, will that dreadful disease ever reach this continent? There is reason to believe it will; the wonder is, why it has not been here already. Our commercial intercourse is extensive with various parts of Africa and the Asiatic shore of the Mediterranean, where this greatscourge is never dead or dying, but simply reposing from one period to another, like a fatigued giant, to gather strength for a renewal of slaughter. Should it come, it may be hoped that there will be found more science and a stronger barrier of medical skill to meet and disarm it of its terrors, than has been exhibited in tropical climates, or in the filthy scourge-inviting regions of Moslem Turkey.—[Boston Medical Journal.

DEPOSITIONS OF RIVERS.—An interesting paper from Baron Humboldt, upon the Mississippi river, has been recently read at the Academy of Sciences at Paris. The paper states that at Memphis, the river rolls away at the rate of 13,709,006,232,791 cubic feet a year. The 2,950th part, or 4,600,000,000 cubic feet of this volume is mud. In this mud are found 82 different kinds of microscopic creatures. The volume of the Mississippi is nearly as large as that of the Ganges at high water, and two and a half times as large as that of the Nile. Organic life enters in the turbid portions of these rivers in the following proportions:—In the Ganges, animal microscopic life forms from one-third to one-fourth of the mud—giving from 139 to to 186 cubic feet of animalculæ in a second. In the Nile it forms from one-twentieth to one-tenth, giving from six to thirteen cubic feet of worms in a second. In the Mississippi, it forms from one-fiftieth to a thirty-third, giving the Father of Waters from two to four cubic feet of animated mud, which it rolls by Memphis, every second of its life.

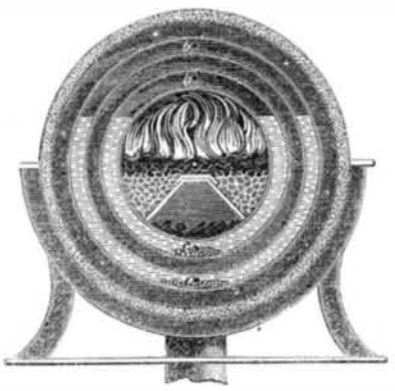
HOW TO BURN COAL.—The art of burning coal is not yet properly understood as it ought to be. Too much coal is usually placed in the stove, by which the draught is destroyed and the gases are imperfectly consumed. The Miners' Journal, of Pottsville, says there are two other errors in the way we burn coal, by which more than one half is wasted,—1st. We have to shut the door of our stove or furnace, to make a temporary over-combustion at one time, and at another time we have to leave to open the door and let in the cold air to cool off. 2d. The gas that ascends our chimneys carries with it a deal of coal that is unburned, merely coal in vapor, which gives out little heat for want of air to consume it.

We lose the most of this unconsumed vapor of coal when the door is shut. When it is open, the vapor is consumed, but the heat is reduced by a flood of cold air and carried up the chimney. What is required then is an air-tight door over the ash-pit, through which you can let in just what air is necessary for quick or slow combustion, as desired. The door that admits the coal should be tight, and should never be opened except to put coal in. A small flue should admit a stream of air heated by contact with the stove. If you find that the stove or furnace door must be left open when you want to moderate your fire, reject it; for it is essentially wrong in its construction and will consume three tons of coal where one would answer if the draught door was air-tight.

[In speaking thus, it must not be forgotten that the above applies more to bituminous than anthracite coal, and it only applies to anthracite when there is a strong draught, and when the fire is newly supplied with fresh coal. There are some stoves with holes in the front above the fuel, which, by a slide, can be opened or closed to accomplish the objects referred to above.

On Boilers.---No. 16.

FIG. 29.



ANNULAR BOILER.—Fig. 29 is a transverse vertical section of a boiler invented by a Wm. James, of Holborn, Eng., and patented in 1826. A series of annular tubes of equal capacity and diameter are placed side by side and bolted together, so as to form, by their union, a long cylindrical boiler, in the centre of which the fire place is situated. The flat sides of the chambers are connected by means of long bolts passing through the end plates of the cylinder, where they are screwed up firmly by nuts on the outside. A cylinder of distinct annular tubes being thus formed, a communication from one to the other is opened by making two perforations in them lengthways of the cylinder, on the upper side, for the free passage of the steam, and one on the lower for the free passage of the water. The entire circles of only two of the tubes (one of each series) are brought into view.

The upper perforations, or steam passages, are shown at *b b*, and the lower perforations, or water passages, at *c c*. The water is maintained at a certain level by the action of a float in a regulator, which is of a peculiar construction.

The situation of the furnace is obvious in the figure, the bars or grating of which form two inclined planes. The flames and heated air take the direction through the centre, as shown, previously to their being diffused in every part, and the vapor finally escapes downwards, by the chimney or flue, *e*. This flue is made to slide in and out of its place; the whole furnace is likewise constructed so that it may be easily drawn out of the cylinder. The entire boiler turns upon an axis, and rests upon rollers fixed in a circular frame or stand. Every tube is furnished with a few shot, mixed with angular pieces of metal, so that when it is desired to cleanse the boiler from any deposition, it is only necessary to draw out the furnace, the chimney tube, and to unscrew the several pipes, when a few turns with a winch causes the shot to roll, and the angular pieces to scour the angular chambers clean; the operation being similar to that of the scouring barrel employed at Birmingham for brightening iron work.

To prevent the loss of caloric by any considerable radiation through the sides of the boiler, the cylindrical casing to it is made double, of sheet-iron, with the space between the internal and external coats closely filled up with a mixture of charcoal and clay, or other materials that are slow conductors of heat.

In 1824, Mr. Jacob Perkins, the well-known American inventor, residing in London, took out a patent for a steam generator, which had thick cast-iron bars five inches square, with circular holes perforated longitudinally through them of 1½ inches diameter. These were arranged in three tiers, and their extremities connected together to make them one continuous vessel. By a force-pump the water was injected into the upper tiers to keep them always full, under a heavy valve. The lowest tier of generators contained no water, and were kept red-hot; a certain quantity of water, at 700°, was injected into the red-hot generators at every stroke of the engine, which was to flash at once into steam. It was a complete failure, and a dangerous invention. In 1826, Mr. Goldsworthy Gurney, an inventor of steam carriages for common roads, and a very ingenious man, took out a patent for an improved boiler for his steam carriage; it had both vertical and horizontal tubes, the water passing through the tubes, like that of Dimpfel's Boiler—which will be described in a future paper. Mr. Gurney proposed, in his patent, to remove incrustations, by employing 1 part of muriatic acid to 100 of water, which solution was to be left a sufficient time in the boiler to remove the incrustations. Many have supposed that, by forcing jets of water on a block of red-hot iron, in a strong vessel, a small boiler would answer as well as a large one, and steam would be generated faster. This is not correct, for red-hot surfaces reduce water to a spheroidal state, and prevent the generation of it into steam but at a slow rate, in point of time.

Insect Builders.

M. Reaumer states that for a period of twenty years, he endeavored, without success, to discover the materials employed by wasps in forming the blue, gray, papery substance, so much used in the structure of their nests. One day, however, he saw a female wasp alight on the sash of a window, and it struck him, while watching her gnawing away the wood with her mandibles, that it was from such materials as these she formed the substance which so long puzzled him. He saw her detach from the wood a bundle of fibres, about one tenth of an inch in length, and finer than a hair; and as she did not swallow them, but gathered them into a mass with her feet, he had no doubt but that his opinion was correct. In a shoat time he saw her shift to another part of the window, and carry with her the fibres which she had collected, and to which she continued to add. He then caught her and began to examine her bundle, and found that it was neither yet moistened nor rolled into a ball, as it is always done before used by the wasp in her building. He also noticed that before detaching the fibres, she bruised them into a kind of lint with her mandibles. All this he imitated with his penknife, bruising and paring the same wood till it resembled the fibres collected by the wasp; and so he discovered how wasps manufactured their paper; for these fibres are kneaded together into a kind of paste, and when she formed a round ball of them, she spreads it into a leaf, nearly as thin as tissue-paper; and this she accomplishes by moving backwards, and levelling it with her mandibles, her tongue, and her teeth. And so the wasp forms paper, placing layer upon layer, fifteen or sixteen sheets deep, and thus preventing the earth from falling down into her nest.

Sunk Rock, in the Java Sea.

Lieut. Maury gives an account of a dangerous reef, hitherto unknown, in the Java Sea, lat. 6° 44′ S., long. 121° 30′ E. The rocks lie S. E. from Tiger Island. The ship George Brown, from San Francisco, for Calcutta, struck and become a perfect wreck on the 15th April last. Mariners are warned to beware of this reef.

Great Speed.

Two new locomotives, lately put on the Hudson River Railroad, made two very extraordinary trips two weeks ago, viz., one to Albany (144 miles) in three hours twelve minutes, and the other the same distance in four minutes less, viz., one hour eight minutes. The latter trip was an average of 46 miles per hour within a fraction.

Earthquake in France.

A French paper of the 26th January, states that a shock of an earthquake was felt at Bordeaux, at a quarter past two, on the morning of that day. It lasted from seven to eight seconds. Persons who were in bed fancied that some heavily-laden wagons were going along the streets, or that a heavy piece of furniture was being pulled about above their heads. The shock was preceded by a kind of detonation; two distinct oscillations were felt at about three seconds' interval; the direction appeared to be from the south to the north. The degree of violence of the shock varied in the different quarters of the city; it was more felt in the high houses. On the side of the Quinconces it was felt very severely; the pictures hanging on the walls were agitated; light articles of furniture were thrown down, and windows were broken. In some of the churches the painted glass windows flew into pieces, the church of St. Pierre and the cathedral suffered most severely in this way. Persons who happened to be in the streets at the time were seized with the greatest alarm; they suddenly felt the ground tremble under their feet. The sky at the time was of a dark reddish color, as if from the effect of a tremendous fire at a distance. In the country the cattle in the fields partook of the general alarm, and uttered moans and cries. From accounts received at Bordeaux, from other parts of the Gironde, it appears that the shock was general throughout the whole department. At Libourne the people were awakened by a violent shock; at La Suave the shock was very severe, and several houses were damaged; at Gradignan the same phenomenon was felt; everything appeared to be dancing about in the houses.

LITERARY NOTICES.

SARTAIN'S MAGAZINE, for March.—The embellishments in this number are chaste, and worthy of the art. It contains, among the number, a portrait of Berzelius, one of the most eminent chemists the world has ever produced. The number is one of much elegance and excellence, and deserves a liberal patronage. Dewitt & Davenport, New York; Sloanaker & Sartain, publishers, Philadelphia.

NYSTROM'S CALCULATOR—We have received a copy of Nystrom's Calculator, which accompanies his machines, and without which it is of no practical utility, but with one it would be of great value.

THE INTERNATIONAL MAGAZINE, for March, contains several spirited illustrations, and an able contents of orginal and selected miscellany. It is intrinsically one of the brightest and most interesting American periodicals, and covers a wide range. We believe it is well supported and highly appreciated.

We have received from Messrs. Stringer & Townsend part third of "Self-Deception, or, the History of a Human Heart." If the publishers will send us parts one and two we shall be able to speak of its merits much better. The head is generally examined to ascertain impressions of character.