SCIENTIFIC MUSEUM.

India Rubber.

Since the art of vulcanizing india rubber—an American discovery—was first made, its use has become almost universal. It is used for almost everything in the shape of an air-tight and elastic material. The vulcanizing of india rubber is due to sulphur combining with the india rubber, and then submitting the material to a great heat, high pressure steam, or an oven heat. The elasticity of the india rubber is maintained, while it is rendered water-proof, and remains unaffected by heat; while in its unprepared, unvulcanized state, it is easily affected by the weather.

Mr. Hodges, an Englishman, proposes to employ this enormous elastic power to the raising of heavy masses. Short pieces of caoutchouc, called by the inventor "power purchases," are successively stretched and attached to the burden to be raised; when a sufficient number of these power-purchases are fixed to the weight, their combined elastic force lifts it from the ground. Ten of these apparatus raise, together, 1000 lbs. This power, though obedient to the common law of mechanical forces, yet differs sufficiently from known forces to be distinguished as a new power. The same principle is applicable to the towing of vessels; it can equally be made use of for raising the anchor, &c.

By an inverse principle, the power-purchases may be employed as a power for projection. Thus a certain number ot these agents might be attached to a cannon tube constructed for throwing harpoons. This new process has been tried with success. An eighty-pounder thus charged has thrown a ball 150 yards.

To be Invented.

In the coal region of Schuylkill County, Pa., the waters are so impregnated with sulphur and iron, that it is no uncommon thing to burn out two sets of boilers at a colliery in one year: the iron is completely eaten up by the water. The only way of giving partial defence to the boiler is to put on the inside a monthly coat of tallow or of Silver's mineral paint, made into almost a paste with oil. Some simpler and less troublesome way of precipitating the sulphur, commends itself to the notice of inventors, as something that will pay.

QUERE.—How would it answer to put a coat of enamel inside of boilers? Or is it not possible to substitute something for iron?

SHUTTERS, as at present in use, afford very little protection and still less beauty. Can we not improve both qualities by using sheets of hooked or woven wire, to roll up like a window shade? At least they would be knife-proof.

The Safe of William Penn.

The editor of the Cincinnati Nonpareil has had the gratification of beholding a dilapidated specimen, in the shape of an iron safe, that eclipses all the antiquities that ever before came under his supervision. It passed through that city the other day on its way to St. Louis, at which place the antiquity is to receiva a prominent location in the Museum. This identical safe is the veritable one that Wm. Penn brought from England, and it was on the ground where he treated with the Delaware tribe of Indians on the Delaware river. The safe is singularly and ingeniously constructed, and contains several compartments which, he says, would puzzle the ingenuity of any person living in this age to ascertain their whereabouts. The name of Wm. Penn is prominently engraved upon one of the inward plates, the letters carved in an awkward form.

The Effect of the Rotation of the Earth upon the Flight of a Projectile.

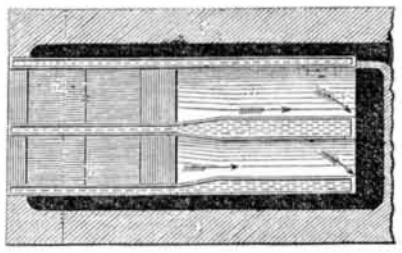
Capt. Boxer, of Woolwich, Eng., has recently been investigating with regard to the rotation of the earth, viz:—

The amount of its effect upon a projectile in causing it, during its flight, to deflect from the object to which it is directed, or more correctly speaking, the object to alter its position with regard to the path of the shot. He finds by calculation based upon data taken from actual practice, that in latitude 52 deg. a ball projected due south 5,600 yards, whose time of flight was 34 seconds, would fall 10·914 yards to the north; the shot will fall nearly the same distance east of the object, but still to the right of the direction.

Capt B., by a process of reasoning, shows that the same amount of effect would be produced if the ball were projected due east or west, and finally arrives at the conclusion that the deviation of the shot will be the same in amount in the same latitude, or nearly so, whatever may be the direction of the range, and that the deviation will in all cases be to the right of the object. He does not consider it of any practical importance in the present state of gunnery, yet, he further remarks, perhaps at some future time such perfection may be obtained in the machine from which the shot is propelled, as well as in the projectile itself, as to make it worth while taking into account the rotation of the earth.

On Boilers.---No.6.

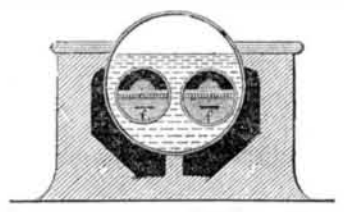
FIG. 12.



FAIRBAIRN'S DOUBLE-FLUED BOILER.—This boiler was patented a number of years ago by Mr. Fairbairn, of Manchester, Eng., the well known engineer and joint inventor of the Britannia Tubular Bridge. Figure 12 is a horizontal section or plan of the boiler and flues and figure 13 is a transverse section. A boiler of this kind was put up by Mr. Armstrong, the well known author of the work on boilers, to drive a 60 horse-power Bolton and Watt engine.

The cylindrical part of the shell, as well as the flat ends of the boiler, are made of 3-8 inch iron; it is 9 feet in diameter by 20 feet long, and contains two flue tubes, each 3 feet 4 inches diameter, but rather deeper at the front ends, which contain the two furnaces. which are of low or moor iron, and only 3-8 thick. There is sufficient space between the flues, which are 13 inches apart, for a man to get through. The flat ends are braced together as usual, and also have four additional oblique stays at each end, radiating to different points of the upper half of the boiler; these, together with the two flues, *f f*, in the lower half, pretty well equalize the internal strain on the different parts of the boiler. It was

FIG. 13.



intended to work at about 15 or 16 lbs. per square inch, therefore it was proved at 30 lbs., that being about 1-3rd of its maximum strength, which it stood without any deflexion, and which is only about 1-10th of the ultimate or bursting strength of the boiler.

This boiler contained 54 yards of effectual heating surface, and it was found to work most economically at 50 nominal horse-power, that is, evaporating 50 cubic feet of water per hour; the evaporation at that rate was 8 lbs. of water to 1 of coal. The boiler was made to work under 20 lbs. pressure. It was a very short boiler in comparison to its diameter, namely 9 feet to 20 feet, and this is rather opposed to the Cornish system of boilers. This boiler was compared with one of the same diameter and same size of flues, but 28 feet long, that is its working economy. The result was that it was found to be as economical, and Armstrong states that the facts proved conclusively the truth of a rule he adopted, namely, that nothing is to be obtained by a boiler of this kind longer than three times its diameter.

He also asserts that the current notions about the danger ot explosion, by having boilers of large diameter, and ot loss of fuel for want of length, are mere prejudices: the danger ot explosion he believes, is more to be dreaded from bad materials, bad workmanship, and small boilers which a man cannot get properly into to clean and keep in repair, than all other causes put together. The weakest part of a boiler constructed on this principle of Fairbairn, is the internal furnace or flue tube which is liable to collapse if made of thinner iron than the shell. It is held by Tredgold that the mathematical stress applies to the external pressure on the flue tube, as to the internal pressure against the shell; therefore ½ inch thick is sufficient for a six foot shell and ¼ inch is enough for a three foot flue to sustain the same pressure so long as the latter retains its true circular figure. It is not possible to do this in a wrought-iron boiler, therefore, boiler makers make the flue tube 3-8 of an inch thick. Armstrong believes that the flue should be made of as thick if not thicker iron than the shell. He believes that of high pressure boilers, for steam navigation, Oliver Evans's plan ot small water tube boilers is the best. The most judicious way of strengthening the large internal furnace flues of boilers is by rivetting on them a series of ribs of angle or T iron at short distances apart, similar to those used for the tops of locomotive fire boxes.

Cold Weather.

The weather, during the past two weeks, has been unusually severe in this city, more so than it has been at the same period for ten years. The sleighing for some days was good and the air bracing, cold, clear, and crisp.

We see, by the accounts from various places, that severe cold has been very general throughout our country. In Europe they have also had an early winter. Many people among us state that they believe we are going to have a long and severe winter. The reasons they give are, "we have not had a severe winter for a long time, and we may expect one now." All we have to say is, if the weather continues for the next two months as severe as it has for the past two weeks, we shall have a winter to speak about for this latitude. In connection with this, let us say that, for fifteen years past, the winters in New York have been exceedingly mild, in comparison with what they used to be; and old people say "we know nothing about cold now." It used to be no uncommon thing to cross on the ice from this city to Governor's Island, and in the winter ot 1820 heavy teams crossed for some weeks on the ice from Jersey City to New York. If, as some geologists affirm, the dry land is drifting somewhat up to the North Pole, how comes it that the winters are milder now, both in this part of our continent and in various parts of Europe, than what they were in days long gone by.

Death of the Water Cure Founder.

Priessnitz, the celebrated founder of hydropathy, died at Graefenberg on the 26th of Nov., at the age of 52. In the morning of that day Priessnitz was up and stirring at an early hour, but complained of the cold, and had wood brought in to make a large fire. His friends had for some time believed him to be suffering from dropsey of the chest, and at their earnest entreaty he consented to take a little medicine, exclaiming all the while, "it is of no use." He would see no physician, but remained to the last true to his profession. About 4 o'clock in the afternoon of the 26th he asked to be carried to bed, and upon being laid down he expired.

The Prometheus arrived at this port on Monday last, with $568,000 in gold. The gold mines yield more than ever.

LITERARY NOTICES.

THE ILLUSTRATED LADIES KEEPSAKE.—Edited by A. Abbott, published by John S. Taylor, 122 Nassau street, New York. It embraces twelve fine steel engravings of the following celebrated women of the Bible, with descriptive sketches of each:—Jepthah's Daughter, Esther, Ruth, Miriam, Bathsheba, Sarah, Rahab, Judith, Herodias, Martha, the Woman of Samaria, Mary Magdalene. It is an octavo of 380 pages, elegantly bound in gilt, and contains much original matter, prose and poetry, of a character eminently calculated to inspire noble and elevated thought. We commend this work to the patronage of ladies especially, and to the gentleman who gives, with discriminating taste, nothing more appropriate or acceptable to refined sense could be selected. Sent by mail, free of postage, bound in cloth $2, imitation Turkey $3; morocco, full gilt, $4.

DREAM LAND BY DAYLIGHT.—Messrs. Redfield, Clinton Hall, have just issued a pretty holiday token of 425 pages from the pen of Caroline Chesebro. Miss Chesebro is an authoress of merit well known to the magazine world for her piquant stories. Published and for sale as above.