SCIENTIFIC MUSEUM.

Scientific Memoranda.

ARSENIC EATERS IN AUSTRIA.—A poisoning case at Chili has procured the publication of some interesting facts respecting the arsenic eaters of Lower Austria and Syria. In both of these provinces it appears to be a common custom among the peasantry to consume every morning a small portion of this deadly poison in the same manner as the eastern world consumes opium. Dr. Tschudi, the well known traveller, publishes an account of several cases which have come to his knowledge. The habit does not seem to be so pernicious in its results as that of opium-eating. It is commenced by taking a very small dose, say somewhat less than half a grain, every morning, which is gradually increased to two or three grains. The case of a hale old farmer is mentioned, whose morning whet of arsenic reached the incredible quantity of four grains. The effect it produces is very curious. The arsenic-eaters grow fat and ruddy, so much so that the practice is adopted by lovers of both sexes, in order to please their sweethearts. It relieves the lungs and head very much also when mounting steep hills and entering into a more rarified atmosphere.

[It is well known that Napoleon, for fear of being poisoned, it is said, by the same process as that practiced by the Austrian peasants, became inured to take a quantity at once which would kill three men. Some have inured themselves by degrees to take as much prussiac acid as would kill four or five men. Tobacco is a poison, and if a person who never took a chew in his life, was to use for one half day as much as some of our old chewers do, his coffin would have to be purchased before the sun went down. We do not believe a single word about the useful and good effects of the arsenic mentioned above, it is untrue in essence and principle. The writer of this has inhaled no small amount of arsenic in his litetime, and with it an equal amount of injury to the system; of this he has no doubt, although he has always been able to snap his fingers at the doctors.

PROFESSOR GORINI.—This gentleman, who is professor of natural history at the University of Lodi, made, before a circle of private friends, two nights ago, a very remarkable experiment illustrative of his theory as to the formation of mountains. He melts some substances known only to himself, in a vessel, and allows the liquid to cool. At first it presents an even surface, but a portion continues to ooze up from beneath, and gradually elevations are formed, exactly corresponding in shape with those which are found on the earth Even to the stratification the resemblance is complete, and M. Gorini can produce on a small scale the phenomena of volcanoes and earthquakes. He contends, therefore, that the inequalities on the face of the globe are the result of certain materials, first reduced by the application of heat to a liquid state, and then allowed gradually to consolidate.

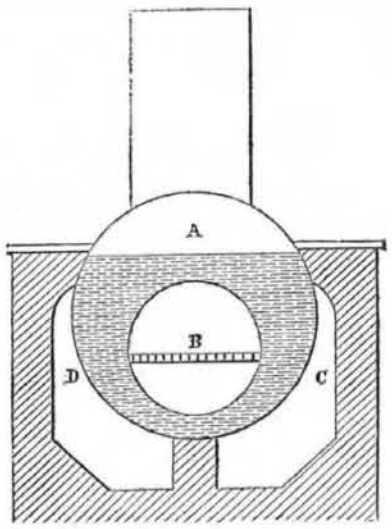
In another and more practically useful field of research the learned professor has developed some very important facts. He has succeeded to a most surprising extent in preserving animal matter from decay without resorting to any known process for that purpose. Specimens are shown by him of portions of the human body which, without any alteration in their natural appearance, have been exposed to the action of the atmosphere for six and seven years; and he states that, at a trifling cost he can keep meat for any length of time, in such a way that it can be eaten quite fresh. The importance of such a discovery, if on a practical investigation it is found to answer, will be more readily understood when it is remembered that flocks of sheep in Australia are boiled down to tallow, their flesh being otherwise almost valueless, and that in South America vast herds of cattle are annually slaughtered for the sake of their hides alone.

[The theory stated above to be practically demonstrated by Gorini, respecting the elevations and depressions of the earth, is the same as that of our oldest philosophers who have written upon the subject. They believed that our earth was at one time a comet, or a part of one, and was a hot molten mass.

His discovery of the preservation of meats, is perhaps the use of purified coal oil—naptha—the nature of which is asserted to be preservative. The meat, however, has not a very good flavor, and is inferior for true usefulness to the meat biscuit of Mr. Gail Borden.

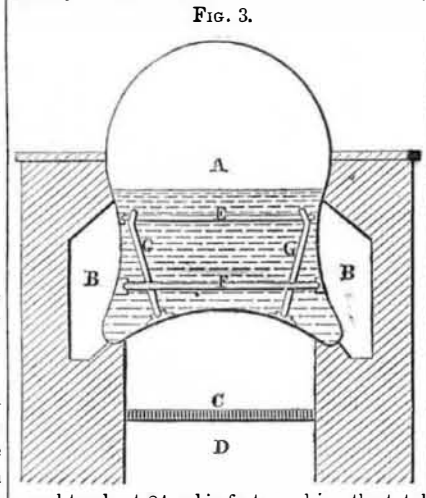
On Boilers.---No. 2.

Fig. 2.



SMALL CORNISH BOILER.—The accompanying figure 2 is a transverse section of a small *Cornish Boiler*. A is the boiler; B is the furnace; C D are the flues, and E the steam-dome. The shell of the boiler is 5¼ feet in diameter and 9 feet long; it has a cylindrical fire tube flue running through it, and in this respect is different from figure 1 (last number). The flue is 2 feet 10 inches in diameter and contains the furnace and grate-bars, like all Cornish boilers. The fire grate consists of 25 bars, 7-8ths of an inch thick on the top surface, and there is 3-8ths of an inch space of draught between each two. The bars are 4 feet long, and the width of the grate is 2 feet 9 inches, or 11 square feet of area. It is so made with a removable brick bridge that the whole or less area may be used. The current of flame and hot air first passes from the fire through the flue tube, to the back of the boiler, whence it returns under one side of the shell to the front, round to the other side, D, through which it proceeds to the chimney in a continuous, or what is termed the "wheel-draught;" it has a steam dome in section, 2½ feet by 3 feet 2 inches and 3 feet 10½ inches,

Fig. 3.



equal to about 24 cubic feet, making the total capacity of the boiler 170 cubic feet. The heating surface is 2·8 × 3·1416×9½=83·55 square feet. Taking the upper half only as the effective heating surface, it is equal to 41·77. In measuring the side surface in all boilers set up in this way there is a difficulty in fixing the proper line where the proper surface ends and the side begins. But as the side flues are gathered in about 6 inches above the central line of the boiler, it appears fair to consider the side to extend to the same distance below as would make it equivalent to so much vertical surface; the sides, therefore, will be 1 foot deep by 2×9½ long, half of which being effective, amounts to 9·5 square feet. The bottom surface, therefore, consists of all the rest of the shell exposed to the heat, except that portion occupied by the central supporting wall, or 5·25×3·1416÷2—1·75×9·5=61·718 square feet, which, added to the tube and side surface, gives the total effective heating surface equal to 112·988, which, divided by 9, gives 12·55 square yards.

The general results of this comparison with figure 1 (in last number) show that while the Cornish boiler is very little larger than the cylindrical boiler, it has 50 per cent. more of area in heating surface, with a great deal less water—a little over half. The economical results, in practice, are therefore found to be much greater—it saves half as much fuel. In places where wood is burned as fuel, this boiler is vastly superior to the plain cylinder boiler. This boiler being only 3 inches wider and 6 inches longer than the cylindrical boiler of last week, is of much greater horse-power—evaporative utility. If we allow 6 square feet of heating surface for a horse-power, the comparison will stand thus:—cylindrical boiler, fig. 1, 5×1·5×9÷6=9·75, horse-power; Cornish boiler, figure 2, 5·25×2·8×9·5÷6=12·7 horse-power.

WAGON-SHAPED BOILER.—Fig. 3 is a transverse section of the Wagon-shaped Boiler; it is a view of one 20 feet long, 5 feet wide, and 6 feet 8 inches deep. Such a boiler is capable of supplying steam for a 20 horse-power engine, with a moderate consumption of fuel. A is the boiler; B B are flues, with a wheel-draught, made the same way as that described in figure 2. C is the grate; D is the ash pit; E F and G G are stays and straps, which are always required for strengthening this kind of boiler, which, owing to its form, is much inferior to the cylindrical boiler. The fire-grate is 5 feet long and 4 feet wide. The grate-bars are about 2 inches thick on the upper face; the spaces between are about 3-8ths of an inch wide. The grate is set with a fall of three inches to the back, and is about 21 inches from the boiler bottom at the front, and 24 inches at the back. The upper part of this boiler is a semi-cylinder, containing 5²×20÷2=250 cylindrical feet, ×·7854=196·35 cubic feet. (This rule, used to find the cubic contents, is, squaring the diameter, 5² feet, and multiplying by ·7854 for the area, and that by 20 feet, the length for the cubic contents of a cylinder, which, divided by 2, gives the cubic contents of the semi-cylinder of the boiler). The lower part is made with straight sides, and if it had a flat bottom it would be equal to 4·166×5×20=416·66 cubic feet; but the small concavity of the bottom reduces this about 1-6th, which makes its contents to be =347·22 cubic feet, which, if added to the above, makes 196·35+347·22=543·57. If this is divided by a cubic yard, 27 square feet, we have 20·13 cubic yards of boiler—its capacity. A little less than half this space is allowed for water and the remainder for steam.

A rule for finding the depth of water in this boiler, when the steam and water chambers are of equal capacity, is as follows:—Take half the difference of capacity between the lower and upper part, and divide it by the area of the water surface, then deduct the quotient from the depth of the lower part of the boiler, and the remainder is the depth of water, taken perpendicularly over the seating plate, at the bottom of the boiler, when the capacity for water is equal to that for steam, and which it ought never to exceed. In this case—

Capacity of the lower part	347.22	cubic feet.
Ditto of the upper part	196·35	do.
	2) 150·87	
Area wat. surface, 5×20=100)	75·43	=half diff
Quotient	·7543	
Subtract from depth of lower part	4·1666	
Remainder in feet .	3·4123	
	12	
And inches . . .	4·9476	

Hence 3 feet 5 inches nearly is the depth of the water.

The brickwork of the side flues is gathered in 3 inches below the surface, hence the depth of the side surface is about 3·25 feet, or measuring by the curved surface, about 3·5 feet, and the total area of both sides=3·5×40=140 square feet. The total area of the two ends of the boiler below the tops of the flues is about 28 square feet—less by the area of surface covered by the brick arch over the furnace mouth (about 3 square feet), and by the brickwork at the back, which divides the "uptake" from the side flue (about 2 square feet), leaving about 23 square feet, which, added to the side surface, gives 163 square feet, for the total area of vertical surface; but, as we have already seen, only one half of this can be considered as effective heating surface—it is only equal to 81½ square feet, or little more than 9 square yards.

The area of the boiler bottom, measured by the curved surface, amounts to 94 square feet, or about 10½ yards, which is all effective; hence the total effective heating surface of the boiler is about 19½, or say nearly 20, square yards.

Volcanic Eruption in the Sandwich Islands.

A paragraph in a San Francisco paper says, that the Crater in Manua Loa, Sandwich Islands, had emitted a vast amount of lava, which was flowing off in a southwest direction, at the rate of about three miles in twenty-four hours. From the course taken by the stream, it is thought it will reach the sea somewhere to the southward of Kealakekua.

LITERARY NOTICES.

THE EXPOSITOR—A weekly illustrated Recorder of Inventions, Design, and Art Manufactures, published by Joseph Clayton, Jr., Fleet street, London, at $5 per annum. We have received the first 52 numbers of this publication; the first 26 numbers are, in our estimation, the most beautiful specimens of a scientific journal we have ever seen; we anticipated its arrival on this side of the Atlantic with much pleasure, especially during the progress of the Great Exhibition; but we are sadly disappointed, for, ever since the Crystal Palace opened its gorgeous display, this paper has been filled with the most nauseating and useless trash, wholly devoid of interest to a scientific mind, but tolerably agreeable for children, a sort of cross-breed between an illustrated primer and a comic almanac. Every number contains an engraving of a piece of cabinet ware, jewel case, stuffed bird, monkey, cat, rabbit, or some other subject, "stale, flat, and unprofitable," and far inferior, in point of real merit, to what we see every day in show-windows along our famous Broadway. We may reasonably complain of the bare-faced impudence of the proprietor in raising the price of the journal and then sponging the subscribers, out of that which, under a lower price, rendered the work interesting, viz., good illustrations, good paper and good matter; surely this is rather ahead of us Yankees, for we would rather miss the figure by such tricks. If the Expositor has succeeded to a paying position, we might reasonably inquire of what materials are our transatlantic friends composed? If it has not, we would imagine that our cotemporary might become remunerative whenever balloons succeed in supplanting the iron horse, a sort of airy dream, requiring for its feasibility a great stretch of imagination.

NATURAL HISTORY OF THE HUMAN SPECIES.—This is a re-print of Lieut. C. H. Smith's work, with an introduction by L. Kneeland, Boston. The publishers are Messrs. Gould & Lincoln, of Boston. The introduction is long and very interesting; but we think the views of the editor, which are the same as those of Agassiz, are not borne out by stout facts or strong reasoning. The Natural History of Man is a very interesting subject, but satisfactory conclusions will never be arrived at respecting the two views held by different writers on this very difficult subject. These views are, 1st, "that all mankind have descended from one pair:" Pritchard, Dr. Smythe, of S. C., hold to this doctrine. 2nd. That mankind are descended from various original pairs—all human." Agassiz, Kneeland, &c., entertain the latter opinion. For an exposition of the various views on both sides; we commend this work to all readers.