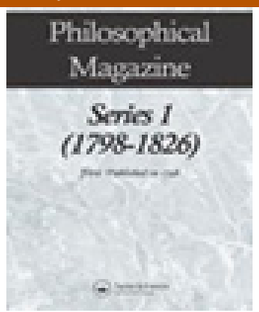

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XI. Description of an air and a water-vault employed to equalize the discharge of air into a blast-furnace

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one of the moſt eſſential parts has been taken away. Now ſuch foſſil or burned bones can no more be regarded as bone, than charcoal can be conſidered as the vegetable of which it retains the figure and fibrous ſtructure.

Bones which keep their figure after combuſtion reſemble charcoal made from vegetables replete with fibre; and cartilaginous bones which loſe their ſhape by the ſame cauſe may be compared to ſucculent plants, which are reduced in bulk and ſhape in a ſimilar manner.

From theſe laſt experiments I much queſtion if bodies conſiſting of phoſphat of lime, like bones, have concurred materially to form ſtrata of limeſtone or chalk; for it appears to be improbable that phoſphat is converted into carbonat of lime after theſe bodies have become extraneous foſſils.

The deſtruction or decompoſition of the cartilaginous parts of teeth and bones in a foſſil ſtate muſt have been the work of a very long period of time, unleſs accelerated by the action of ſome mineral principle; for, after having, in the uſual manner, ſteeped in muriatic acid the os humeri of a man brought from Hythe in Kent, and ſaid to have been taken from a Saxon tomb, I found the remaining cartilage nearly as complete as that of a recent bone. The difficult deſtructibility of ſubſtances of a ſomewhat ſimilar nature appears alſo from the piercing implements formed of horn, which are not unfrequently found in excavations of high antiquity.

XI. *Deſcription of an Air and a Water-Vault employed to equalize the diſcharge of Air into a Blaſt-Furnace. By Mr.* DAVID MUSHET.

FIG. 1. (Plate XI.) repreſents a vertical ſection of the elevation of an air-vault 60 feet long and 30 feet wide, conſiſting of four arches of regularly progreſſive ſizes. This building is generally conſtructed under the bridgehouſe, where the materials are daily collected for filling the furnace. AB, repreſents the acclivity to the furnace top. The ſpace betwixt the arch-tops and the level of the floor is filled with materials as denſe as can be procured. The walls of the under part

Fig. 2.

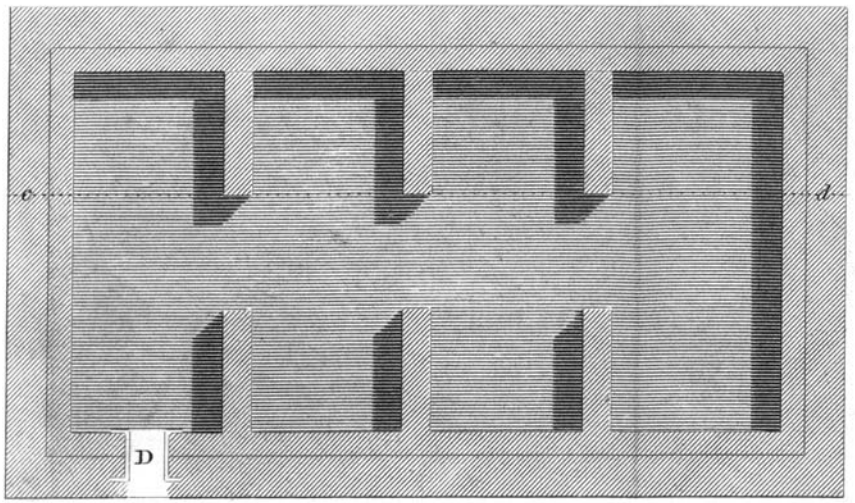


Fig. 1.

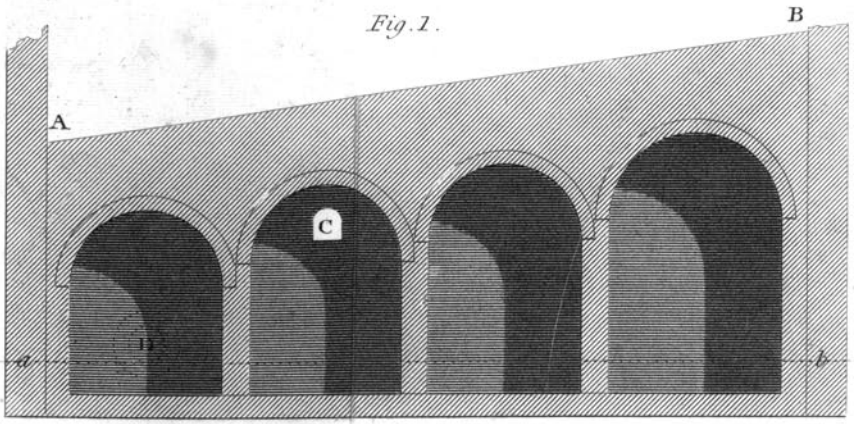


Fig. 4.

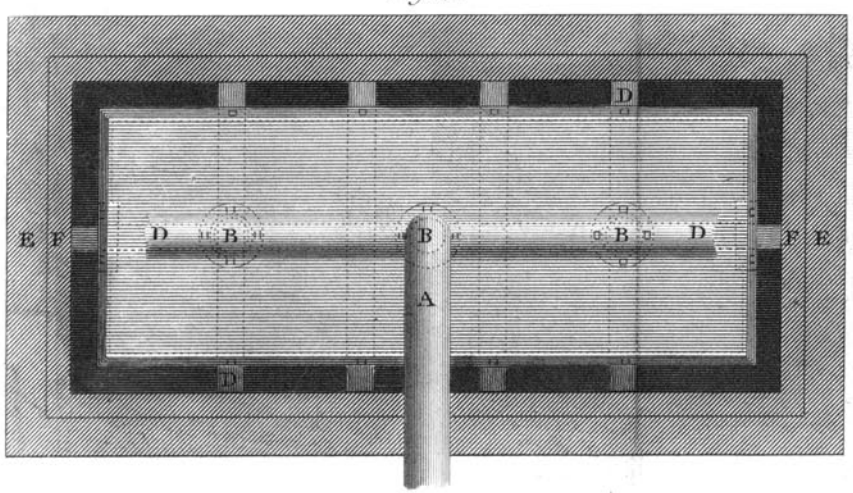
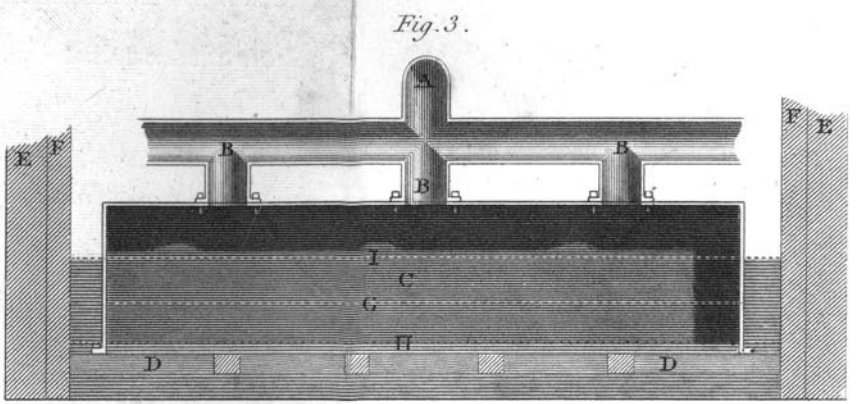


Fig. 3.



50

Lowry sculp.

part are three feet thick, beſides a lining of brick and plaſter from 18 inches to two feet. Still further precautions are neceſſary, and alternate layers of pitch and ſtout paper are requiſite to prevent the eſcape of the compreſſed air. C, a view of the arched funnel which conveys the air from the cylinder to the vault. Large iron pipes with a well fitted door are preferable, and leſs apt to emit air. D, an end view of the pipe by which the blaſt is carried to the furnace.

Fig. 2. is a horizontal ſection of Fig. 1. at the dotted line *a b*, repreſenting the width of the croſs arches, which are thrown in each partition to preſerve an eaſy communication betwixt the vaults. D, is a ſection of the firſt range of pipes, meant to conduct the air to the furnace. In like manner pipes may be taken off from any part of the vault for the different purpoſes of blowing furnaces, fineries, hollow fires, &c.

Fig. 3. repreſents a vertical longitudinal ſection of what is generally called the water-vault. The walls of this building may be erected to the height of eight or nine feet, their thickneſs ſimilar to thoſe of the air-vault. A brick lining, and even puddling with clay betwixt it and the ſtone building, is neceſſary to prevent the water from oozing by the accumulated preſſure. A, is an end view of the horizontal range of pipes which conveys the blaſt from the blowing cylinder to the inverted cheſt. BBB, the range which conducts the air to the interior of the inverted cheſt, and conveys it to the furnaces, proceeding along the extremities of the columns broken off at BB. C, an inverted cheſt made of wood, iron, or even of well-hewn flags ſet on end and tightly cemented, is 54 feet within in length, 18 feet wide, and 12 feet high. The dimenſions, however, vary at different works. When the cheſt is made of wood or iron, it is generally bolted by means of a flange to the logs on which it is ſupported, leſt the great preſſure of air ſhould overcome the gravitation of the cheſt, and diſplace it. DD, view of the centre log, and ends of the croſs logs, on which the cheſt is laid. Theſe ſhould meaſure 18 inches in height, ſo as that the mouth of the cheſt may be that diſtance from the ſurface of the floor, and the water allowed to retreat from the interior of the cheſt with the leaſt poſſible obſtruction. EE, the out-

ſide walls of the building. FF, the brick-work, made perfectly water tight. The dotted line G, repreſents the ſurface of the water when at reſt. Let the depth of the water, outſide and inſide of the cheſt, be eſtimated at four feet. When the engine is at work, ſhould the preſſure of the air have forced the water down to the dotted line H, 3½ feet diſtant from the line G, and only ſix inches from the mouth of the cheſt, it follows, that the water muſt have riſen in the outer building, or cheſt, 3½ feet above G, and have its higheſt ſurface nearly at reſt at I. In this caſe the ſtrength of the blaſt is reckoned equal to ſeven feet of water, or nearly ſix inches of mercury. The ſpace betwixt the cheſt and outſide building is three feet. When the engine is at reſt, and the water has aſſumed its level, the quantity of water within the cheſt ſhould be equal to that without.

Fig. 4. is a ground plan of Fig. 3. The croſs logs on which the ciſtern is ſupported are dotted within, but drawn full in the ſpace betwixt the flange of the cheſt and outer building. The breadth of the flange-tops of the binding bolts, and thickneſs of the metal of the cheſt, are alſo drawn. The letters bear a reference to thoſe in No. 3.

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