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XXX. A letter to Mathew Maty, M. D. Sec. R. S.; containing some observations on a singular sparry incrustation found in Somersetshire

Edward King, Esquire, F. R. S.

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XXX. *A Letter to Mathew Maty, M. D.
Sec. R. S.; containing some Observations
on a singular Sparry Incrustation found
in Somersetshire. By Edward King,
Esquire, F. R. S.*

John Street, Dec. 18, 1772.

S I R,

Read March 25, 1773. **T**HE summer before last, when I was in Somersetshire, I received a present of a very curious fossil from the Rev. Mr. Catcott of Bristol, a gentleman who has taken much pains to collect the fossil bodies of that County, and is very indefatigable in his researches. And as some few singular observations occur to me with regard to this extraordinary mass, I take the liberty to trouble you with them; and request, if you think them at all deserving any consideration, that they may be laid before the Society, together with a drawing of the fossil, (Tab. X.) and with the very exact account I received of its production from Mr. Catcott.

In the parish of High Littleton, in the County of Somerset, situated about midway between Bristol and Wells, are several Coal-mines; and about the end of the year 1766, a new shaft (or pit) was
opened,

for the purpose of conveying air into an adjoining work, called Mearn's coal-pit; but when this shaft was finished, the water that flowed in from the sides, and which at first was taken up by buckets, greatly incommoded the under-works; and therefore, to prevent this inconvenience, the miners, at about the depth of ten fathom, and just below the place where the water broke in, affixed to the four sides of the pit some wooden shoots (as represented at Fig. 2.), about four or five inches wide, and as many deep; all of them a little inclined towards one corner, where was a hollow perpendicular pipe or trunk of elm, nearly a long square (as represented at A), being about seven inches and an half one way, and four inches and an half the other; and through this the water, that fell into the lateral shoots, was conveyed down to the level (or passage out); which being about seven fathoms lower than the shoots, the hollow perpendicular trunk was about fourteen yards in length.

This trunk having been thus fixed up, in the latter end of the year 1766, was in about three years time, or rather less, found to be much obstructed, and stopped up; so that, in August 1769, the miners were obliged to take it up: and then, on examining it, and taking it to pieces, they found the whole cavity, from one end to the other, nearly filled with a sort of sparry incrustation, somewhat softer than marble, but harder than alabaſter, and which therefore I shall venture to call a species of marble. And the specimen now laid before the Society, and represented by the drawing (Fig. 1.), and also another specimen of the like sort, presented to the Society,

are merely transverse sections of the substance, with which the pipe was filled.

The water, that flowed into the pit on all sides, issued from a stratum of hard brown and reddish sand-stone, replete with shining sparry *micæ*, and some ocherous matter; and had, in its passage through the trunk, regularly filled up the cavity, by slow degrees, with solid incrustations; insomuch, that the increase of the marble is marked much in the same manner as the increase of the growth of a tree appears to be, when the trunk of it is cut horizontally: and at last the water had left only the cavity, which now appears in the middle of the block, and which was uniform in its figure from one end of the pipe to the other, and nearly similar to the original cavity; but which, at last, not being large enough to let all the water pass, occasioned the discovery. Since that time, in order to prevent the inconvenience (if possible) a new trunk has been made, larger than the first; and yet, in June 1771, this new trunk also was so far filled up with the sparry incrustation, that there was but just room to thrust four fingers into the central cavity; and the lateral shoots, or troughs, also have filled so fast, that they have been obliged, every now and then, to clean them out.

This, Sir, is the history of the specimen now laid before the Society, and of the Mine from whence it came; and the observations I would beg leave to make, are the following.

1st, As the water flowed in from the shoots, on two sides of the square trunk or pipe, it is manifest that the streams must have stricken against each

other, at the corner of the pipe where they first met, and also at the opposite corner. And, as it is a known principle of mechanics, that a body, which is acted upon by two forces moving in different directions, will describe the diagonal of a parallelogram, of which the directions of those forces shall be the sides; so here, the line in which the two streams met, and impeded each other's motion, has plainly, as the marble increased, gone on in the diagonal of such a parallelogram from both the corners; viz. from that where the pipe joined the shoots, or troughs, and from the opposite one: but it is also very remarkable, that there is such a diagonal line, not only at these corners, but in like manner at the other two; which can be accounted for no otherwise, than by supposing that each of the two streams, dashing against the opposite side of the pipe, formed continually, the whole way down, another stream, in a contrary direction, as represented in Fig. 3; and so, both together, produced the same effect throughout the whole pipe, as if there had been four streams flowing over the four sides. Upon examining the block, however, very strictly, it appears, that the lines in the diagonal one way, are stronger than those in the diagonal the other way; and indeed the specimen of the pipe, presented to the Society, has even broken in halves, exactly in one of the diagonals, though the block here described remains entire, and has the appearance of having had its sides joined accurately, in the manner in which a skilful workman would fit four boards to be glued together.

2dly,

2dly, At the place marked B, Fig. 1, there seems to have been, by some accident or other, the point of a small nail projecting into the pipe; and here, it is very remarkable, that, either by the dashing of the water, or rather perhaps by an effect which iron has been observed to have of hastening and increasing petrification, the incrustation has gone on faster than in other parts of the same side; but so regularly, that, from the point of the nail to the inner cavity, there is a swelling, or protuberance, so uniform, that it makes throughout nearly the same segment of different circles, of which the point of the nail is the common center; and that not merely directly opposite to the nail, but throughout this whole block and even further downwards.

3dly, The regular increase of these segments of circles is visible in each *lamina* of the block (if I may be allowed that expression), and in each *lamina* the diameter of the circle increases in due proportion; so that it is still nearly the same segment; though, if there be any difference, it is rather a smaller portion of a larger circle; as, from the cause which occasioned it, one would be led to expect. And with regard to these *laminæ*, it is worth observing, that as they mark the increase of the marble uniformly all round, as the growth of a tree is marked (only the marble increased inward, whereas a tree grows outward) so they seem to have become visible, and to have been thus distinctly marked, by means of the water bringing, at different times, more or less oker along with the sparry matter: and this is the more probable, as the whole country all round abounds

with beds of oker, and the waters are sometimes much tinged with it.

4thly, The cavity left in the middle of the block is not perfectly similar to the original cavity of the trunk, or pipe; because the water did not flow quite uniformly over the edges, at the ends of the shoots or troughs, in consequence, probably, of their not lying exactly horizontally: whence, more water fell upon and against one part of the sides of the trunk, than against the other.

5thly, The outside of the block has taken off impressions of all the roughnesses, knots, and shivers of the elm boards, which composed the trunk or pipe, even more accurately than they could have been taken off by wax, plaister of Paris, or almost any composition whatever, and certainly much more durably: which impressions, although they are not so well represented in the drawing, in consequence of their fineness, yet appear sufficiently plain, both on the specimen here described, and on that presented to the Society, and are exceedingly well deserving of notice.

There is in the Philosophical Transactions (Vol. LX. p. 47.) a very curious paper, from our learned foreign Member R. E. Raspe, concerning the production of white marble in a similar manner; in which paper he mentions the taking off impressions of medallions, by means of petrifying waters. And I remember a paper was read at the Royal Society some time ago, containing an account of several impressions, actually so taken off in a short time, in durable marble, by means of a petrifying water, near Bologna in Italy: when some of the impressions were also sent, both to
the

the Royal Society, and to the British Museum. And, as this block here described, and the whole contents of the pipe, of above forty feet in length, were formed in less than three years, there is reason to conclude, that the water of this Mine in Somersetshire is as capable of being improved to the purposes of a new manufactory, as either that near Bologna, or those of Germany and Bohemia. And it is perhaps worth mentioning, that something of this sort has actually been attempted, with good success, in Peru; for we are told by P. Feuillée (who made several curious observations in South America, both physiological and astronomical, in 1709), that he saw many statues and beautiful vases (or holy water pots), in the churches at Lima, which were simply cast in moulds, by means alone of a petrifying water near Guankabalika, or Guankavelika. And this circumstance is also mentioned (p. 236.), in a Description of Peru, published in 1748, a great part of which is taken from Feuillée's account.

6thly, This block of marble takes a very fine polish, as appears by the specimen, the sections of which are polished; and if casts of medals, or other things, were taken in smooth moulds, well formed, their surfaces would, therefore, probably appear well polished, as those of the medals did, which came from Bologna.

7thly and lastly, I would only add, that Dr. Pococke, in his Travels (Vol. II. p. 264.), describing a very curious grotto in the island of Candia, or Crete, which exceeded all others that he ever saw in beauty, and the slenderness of the pillars, one of which is near twenty feet high, and even transparent, says,

[248]

says, “ As I had seen stones of this kind hewn out
 “ of a rock at Mount Lebanon, which were used as
 “ white marble, and appeared to be alabaster, this
 “ made me imagine, that when these sorts of petri-
 “ factions are hard enough to receive a polish, they
 “ then become the oriental transparent alabaster,
 “ which is so much valued, and of which there are
 “ two curious columns at the high altar of St. Mark
 “ in Venice.” Perhaps Dr. Pococke does not here
 sufficiently distinguish between marble and alabaster;
 but I add his remark, merely to shew how valuable
 these incrustations may become, and how much they
 deserve not to be neglected.

I am,

S I R,

Very respectfully,

Your most obedient,

humble servant,

Edward King.

Fig: I.

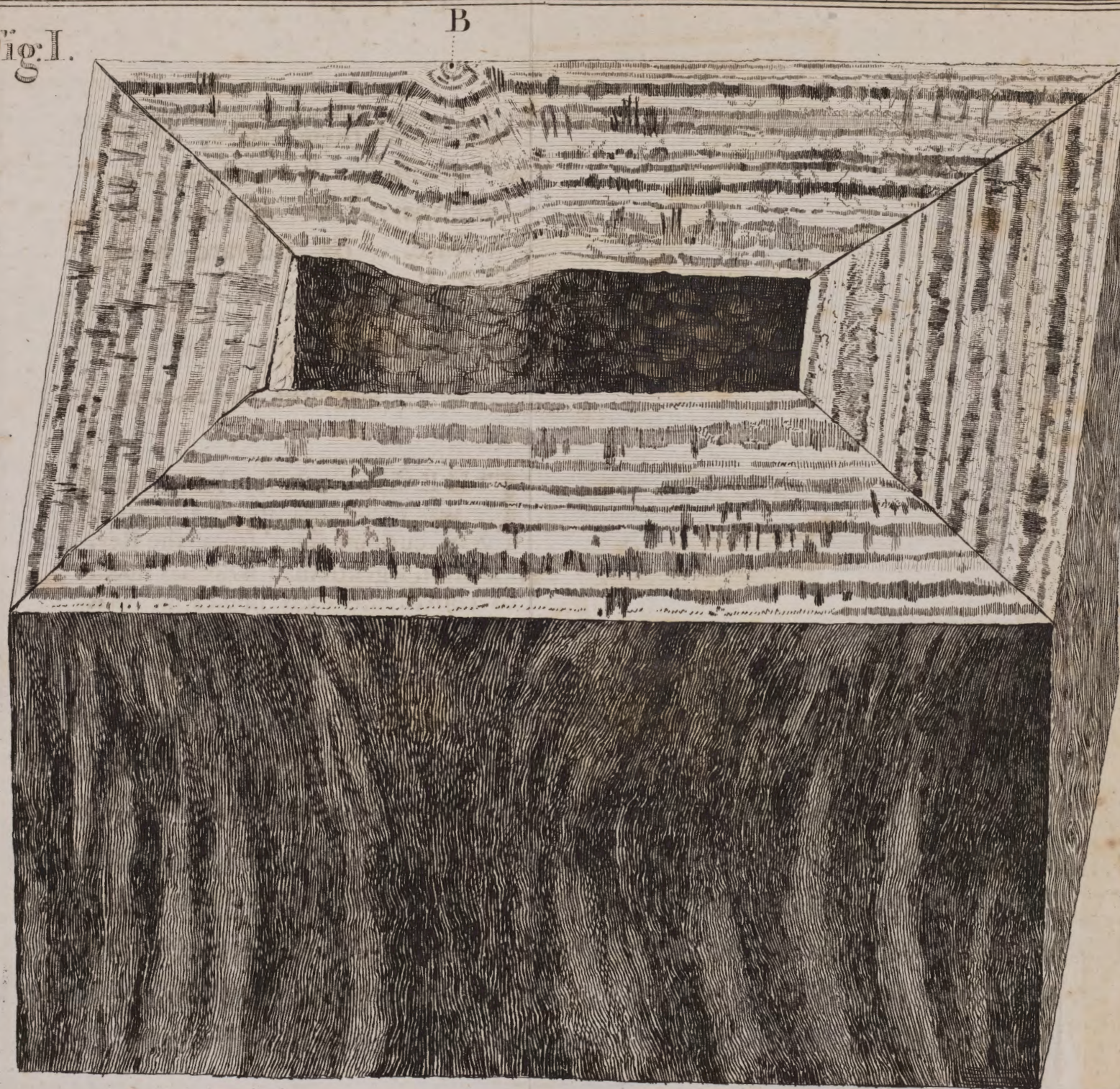


Fig: II.



Fig: III.

