At the bottoms of the crucibles in which the ſmalt is manufactured we generally find a regulus of a whitiſh colour inclining to red, and extremely brittle. This is melted afreſh, and when cold ſeparates into two parts ; that at the bottom is the cobaltic regulus, which is em­ployed to make more of the ſmalt ; the other is biſmuth.

SMARAGDUS, in natural hiſtory. See Eme­rald.

SMEATON (John), an eminent civil engineer, was born the 28th of May 1724, O. S. at Auſthorpe, near Leeds, in a houſe built by his grandfather, and where his family have reſided ever ſince.

The ſtrength of his underſtanding and the originality of his genius appeared at an early age ; his playthings were not the playthings of children, but the tools which men employ; and he appeared to have greater entertain­ment in ſeeing the men in the neighbourhood work, and aſking them queſtions, than in any thing elſe. One tlay he was ſeen (to the diſtreſs of his family) on the top of his father’s barn, fixing up ſomething like a windmill ; another time, he attended ſome men fixing a pump at a neighbouring village, and obſerving them cut off a piece of bored pipe, he was ſo lucky as to pro­cure it, and he actually made with it a working pump that raiſed water. Theſe anecdotes refer to circum­ſtances that happened while he was in petticoats, and moſt likely before he attained his sixth year.

About his 14th and 15th year, he had made for himſelf an engine for turning, and made ſeveral pre­ſents to his friends of boxes in ivory or wood very neatly turned. He forged his iron and ſteel, and melted his metal; he had tools of every sort for working in wood, ivory, and metals. He had made a lathe, by which he had cut a perpetual ſcrew in braſs, a thing little known at that day, which was the inven­tion of Mr Henry Hindley of York ; with whom Mr Smeaton ſoon became acquainted, and they ſpent many a night at Mr Hindley’s houſe till day-light, converſing on thoſe ſubjects.

Thus had Mr Smeaton, by the ſtrength of his ge­nius and indefatigable induſtry, acquired, at the age of 18, an extenſive ſet of tools, and the art of working in moſt of the mechanical trades, without the aſſiſtance of any master. A part of every day was generally oc­cupied in forming ſome ingenious piece of mechaniſm.

Mr Smeaton’s father was an attorney, and deſirous of bringing him up to the ſame profeſſion, Mr Smeaton therefore came up to London in 1742, and attend­ed the courts in Weifminſter hall; but finding (as his common expreſſion was) that the law did not suit the bent of his genius, he wrote a ſtrong memorial to his father on that ſubject ; whoſe good ſenſe from that mo­ment left Mr Smeaton to purſue the bent oſ his genius in his own way.

In 1751 he began a courſe of experiments to try a machine of his invention to meaſure a ſhip’s way at ſea, and alſo made two voyages in company with Dr Knight to try it, and a compaſs of his own invention and ma­king, which was made magnetical by Dr Knight’s arti­ficial magnets : the ſecond voyage was made in the For­tune ſloop of war, commanded at that time by Captain Alexander Campbell.

Jn 1753 he was elected member of the Royal So­

ciety ; the number of papers publiſhed in their Tranſactions will ſhow the universality of his genius and knowledge. In 1759 he was honoured by an unani­mous vote with their gold medal for his paper intitled " An Experimental Inquiry concerning the Natural Powers of Water and Wind to turn Mills, and other Machines depending on a Circular Motion.”

This paper, he ſays, was the reſult of experiments made on working models in the years 1752 and 1753, but not communicated to the Society till 1759; before which time he had an opportunity of putting the effect of theſe experiments into real practice, in a variety of cases, and for various purpoſes, ſo as to assure the So­ciety he had found them to anſwer.

In December 1755, the Eddyſtone lighthouſe was burnt down : Mr Weston, the chief proprietor, and the others, being deſirous of rebuilding it in the moſt ſubſtantial manner, inquired of the earl of Macclesſield (then president of the Royal Society) whom he thought the moſt proper to rebuild it; his Lordship recommend­ed Mr Smeaton.

Mr Smeaton undertook the work, and completed it in the ſummer of 1759. Of this Mr Smeaton gives an ample deſcription in the volume he publiſhed in 1791 : that edition has been sold ſome time ago, and a ſecond is now in the preſs, under the reviſal of his much eſteemed friend Mr Aubert, F. R. S. and governor of the Lon­don assurance corporation.

Though Mr Smeaton completed the building of the Eddyſtone lighthouſe in 1759 (a work that does him so much credit), yet it appears he did not ſoon get into full busineſs as a civil engineer ; for in 1764, while in Yorkſhire, he offered himſelf a candidate for one of the receivers of the Derwentwater eſtate ; and on the **31st** of December in that year, he was appointed at a full board of Greenwich hoſpital, in a manner highly flattering to himſelf ; when two other perſons ſtrongly recommended and powerfully ſupported were candidates for the employment. In this appointment he was very happy, by the aſſiſtance and abilities of his partner Mr Walton one of the receivers, who taking upon himſelf the management and accounts, left Mr Smeaton leiſure and opportunity to exert his abilities on public works, as well as to make many improvements in the mills and in the estates of Greenwich hoſpital. By the year 1775 he had ſo much busineſs as a civil engineer, that he wiſhed to resign this appointment ; and would have done it then, had not his friends the late Mr Stuart the hoſpi­tal ſurveyor, and Mr Ibbetson their ſecretary, prevailed upon him to continue in the office about two years longer.

Mr Smeaton having now got into full busineſs as a civil engineer, performed many works of general utili­ty. He made the river Calder navigable ; a work that required great ſkill and judgment, owing to the very impetuous floods in that river: He planned and at­tended the execution of the great canal in Scotland for conveying the trade of the country either to the Atlan­tic or German ocean ; and having brought it to the place originally intended, he declined a handsome year­ly ſalary, in order that he might attend to the multi­plicity of his other bufineſs.

On the opening of the great arch at London bridge, the excavation around and under the ſterlihgs was so conſiderable, that the bridge was thought to be in