imagined that other carbonaceous substances were oxides of diamond; and Sir Humphry Davy himself supposed, on the contrary, that diamond, as a non-conductor of electricity, probably contained oxygen, and afterwards that it contained some new principle of the same class with oxygen.

Having, however, lately made some direct experiments on the combustion of the diamond in oxygen gas, by means of the great lens belonging to the Academy at Florence, his results have not differed from those made by Mr. Tennant, and subsequently by Messrs. Allen and Pepys, respecting the quantity or quality of the gas produced; and he acknowledges that the general tenour of his experiments is opposed to the conjectures that have been entertained by himself and others respecting the existence of oxygen, either in the diamond itself, or in carbonaceous substances. His experiments likewise, so far from supporting the hypotheses of Messrs. Biot and Arago as to the existence of hydrogen as a constituent part of diamond, showed that a minute quantity of hydrogen was really contained in each of the other carbonaceous substances employed for comparison, not excepting plumbago. The presence of hydrogen in these bodies is most distinctly shown on heating them in chlorine, by white fumes that are immediately perceived in consequence of the production of muriatic acid; but when diamond is heated in the same gas, no such vapour appears. In the course of these experiments the author notices a phenomenon which *he* had not before *seen*, namely, that diamond when once ignited in oxygen, continues to burn till it is consumed.

Some Account of the fossil Remains of an Animal more nearly allied to Fishes than any of the other Classes of Animals. By Sir Everard Home, *Bart. F.R.S.* Read June 23, 1814. [*Phil. Trans.* 1814, *p.* 571.]

The bones here spoken of, are from the cliff between Lyme and Charmouth in Dorsetshire. The cliff, says the author, is composed of limestone, upon which is a stratum of blue clay two or three feet thick, in which these bones were deposited.

A drawing has been made of these bones to accompany the paper, which supersedes the necessity of a very particular description. Their magnitude is such, that the head alone measures four feet. The upper and under jaw are very distinct, set with small conical teeth, as in the crocodile; but the lower jaw is not articulated as in that animal, but connected by an intermediate flat bone, as in fishes. The sclerotic coat of the eye is also, as in fish, bony, but is subdivided, as in the eyes of many birds, into a number of separate plates. The intervertebral cavities of the spine likewise prove, that this skeleton is that of a swimming animal; since the form of each cavity is that of an oblate oval, much wider in its transverse diameter than in the direction of the spine. The mode of articulation of the lower jaw, which admits of its being opened to a great extent, seems to show the animal

to have been voracious, as would appear also from the structure of the teeth; but the points in which it differs from any one animal, and resembles others belonging to classes extremely remote, occasion the author to view it, with the singular productions of New South Wales, as one of the connecting links in the creation, formed for the purpose of preventing any void in the chain of imperceptible gradations, from one extreme of animated beings to the other.

On an easier Mode of procuring Potassium than that which is now adopted. *By* Smithson Tennant, *Esq. F.R.S.* Read June 23, 1814. [*Phil. Trans.* 1814, *p.* 578.]

The process originally discovered and described by Messrs. Gay-Lussac and Thenard for obtaining potassium by means of iron, requires that the iron should at first be intensely heated, and afterwards that the alkali should be applied to it in the heated state. For this purpose a gun-barrel is required of such a length as to pass through a furnace purposely constructed, having at its extremity a second short portion of barrel neatly fitted to it by grinding, for the purpose of containing the alkali; and from which it may be made to flow by means of a separate fire, to be applied by the attendant operator at such a stage of the process, and at such a rate, as is judged to be most advantageous.

Since in this method, though the alkali is, in fact, soon mixed with the iron, the process nevertheless requires the heat to be continued for nearly an hour, the author conceived that nearly the same effect might be produced merely by mixing the same ingredients previously, and distilling them in the following simple apparatus.

A straight gun-barrel, coated well at its lower part with Stourbridge clay, is filled to about one half its length with a mixture of iron turnings and potash. Into the upper half of this barrel is inserted a smaller and thinner tube of iron, contracted at its lower extremity to a small orifice, sufficient to admit the vapour of potassium to pass, and of such a length that its upper extremity may project a little beyond the end of the gun-barrel; and then both are covered at the same time by a cap, which fits the gun-barrel sufficiently to be closed with cement. In the top of this cap is a cork, with a tube of safety for passage of gas that escapes during the operation.

The advantage of the inner tube, in which the potassium is received, consists not merely in the facility with which the product is withdrawn, but in preventing an admixture of potash, with which it is otherwise liable to be contaminated.

On the influence of the Nerves upon the Action of the Arteries. *By Sir* Everard Home, *Bart. F.R.S.* Read June 30, 1814. [*Phil. Trans.* 1814, *p.* 583.]

The object of this paper is to show that the nerves which accompany the arteries regulate their actions, and occasion different pro-