as a certain proportion of sulphur communicates the same quality to iron, so are the effects of phosphorus found to be; phosphoret of iron being, in this respect, much the most powerful, at least when considered comparatively with sulphuret of iron.

8; and lastly. That as carbon, sulphur, and phosphorus, produce, by their union with iron, many chemical effects, of much similarity, so do each of them, when combined with that metal in certain proportions, not only permit it to receive, but also give it the peculiar power of retaining the magnetical properties; and thus henceforth, in addition to that carburet of iron called steel, certain sulphurets and phosphurets of iron may be regarded as bodies peculiarly susceptible of strong magnetical impregnation.

Among the observations which are subjoined to this paper, we find some remarks on the vitriolization of pyrites; from which we collect, that, contrary to the opinion of Mr. Proust, who thought that only those pyrites in which the proportion of sulphur is very small are liable to this change, the vitriolization is not so much owing to the proportion as to the state of the sulphur in the compound; and that this state is probably the effect of a small portion of oxygen, previously combined with a part or with the general mass of the sulphur at the time of the original formation of the substances; so that the state of this ingredient is tending to that of oxide.

It is, no doubt, remarkable, that the magnetical properties of the sulphuret of iron, which forms the principal subject of this paper, should never have been adverted to by any of the writers on magnetism. The few who observed it in the natural magnetical pyrites chose to ascribe it to particles of common magnetical iron interspersed in the ore: but from what has been stated, it is evident that this opinion must be relinquished; since there are certain known proportions of sulphur, as well as of carbon and phosphorus, beyond which the magnetical property will not be obtained, though the proportions beyond this maximum would by no means exclude the interposition of particles of iron. How far the combinations of magnetical sulphurets, carburets, and phosphorets may contribute towards the making artificial loadstones of greater strength than those hitherto known, is a subject recommended to the attention of future observers.

Remarks on the voluntary Expansion of the Skin of the Neck, in the Cobra de Capello or hooded Snake of the East Indies. *By* Patrick Russell, *M.D. F.R.S.* *With a Description of the Structure of the Parts which perform that Office.* *By* Everard Home, *Esq. F.R.S.* Read June 14, 1804. [*Phil. Trans.* 1804, *p.* 346.]

The information we gather from this paper is, that the remarkable expansion of the skin of the neck, which constitutes a principal character in this species, is a voluntary action, distinct from that inflation which all serpents, when irritated, are more or less capable of: that it is owing to a particular set of ribs situated at the neck of the

animal, and hence called cervical ribs. These ribs are about twenty-five in number, and gradually lengthen from the upper end to the tenth or eleventh pair, and then successively shorten to the last. They extend in lateral directions, having only a slight curvature; and when depressed, lie upon the side of the spine, one on the other. They are raised by four sets of muscles; and another large set of very long muscles has the power of bringing the skin forward, thus forming the appearance which has been called a hood. Besides these muscles, there are three other sets, by which the hood is depressed, and the parts are restored to that state in which the neck of the animal does not appear disproportionally protuberant. These descriptions are illustrated by accurate drawings; but no conjecture is here given as to the probable uses of this singular mechanism, except that it does not appear to promote in any way the play of the lungs, but that the expansion it produces may perhaps facilitate a dilatation of the gullet, for the purpose of allowing the snake to swallow its prey more easily.

Continuation of an Account of the Changes that have happened in the relative Situation of double Stars. *By* William Herschel, *LL.D. F.R.S.* Read June 7, 1804. [*Phil. Trans.* 1804, *p.* 353.]

In the former part of this paper, Dr. Herschel mentioned the changes he had noticed in the situation of six double stars; and in investigating the causes of those changes, he declared that he had recourse to the most authentic observations he could find of their motions in right ascensions and polar distance, especially in the instance of the double star Castor: but finding in the tables which have been lately published in the last volume of the Greenwich Observations, which give the proper motions of thirty-six stars, that (especially in the instance of the above-named star,) the motions are somewhat different from those he assigned to them in his former communication, he now undertakes to review the arguments he there used, in order to ascertain what will be the result of these new motions. As this investigation, which forms the first part of the present paper, has a continual reference to the contents of the preceding one, it will be in vain to attempt an abridgement, which could not be rendered intelligible within our usual limits. Nor can we enter here into a detail of the sequel of Dr. Herschel's observations on the changes in the situation of a great number of additional double stars; this second part of the paper, in which they are fully detailed, being itself a minute of his proceedings, in which he is at particular pains to point out that these changes of situation are not the effect of parallax.