no regular interval between the shocks, which sometimes followed so quickly as not to be counted, while other animals could scarcely be provoked to give any shock.

The electric discharge was mostly accompanied by an evident muscular action in the animal, with an apparent swelling of the superior surface of the organs, and by a retraction of the eyes.

Two of these fish being placed in different buckets of water, one, which was irritated so as to give frequently repeated shocks, soon became languid, its shocks diminishing rapidly in intensity, and it soon died; but the other, not being irritated, continued living to the third day. And this was universally observable, that those which parted with shocks most freely soonest died.

A Torpedo, in which the nerves proceeding to the electric organs had been divided, seemed to have no power of giving shocks, but appeared just as lively as another Torpedo taken at the same time, and placed in a separate bucket of water uninjured.

Of two Torpedos taken at the same time, one had the electric organs divided. They were then both irritated equally, so that the perfect animal was soon exhausted of all power, and died; but the other, which had lost the power of giving shocks, appeared as vivacious as before, and lived to the second day.

An animal, from which one electric organ had been removed, was found still capable of giving shocks, though possibly not so strong as before.

Another fish, in which only one nerve to each organ had been divided, was also able to give shocks as before.

When they were held only by the tail or by the extremity of their lateral fins, they appeared to have no power of giving shocks.

Mr. Todd infers from these experiments,

That the electric discharge is a vital action.

That it is perfectly voluntary.

That frequent action is injurious to life, and may soon exhaust it.

That an animal deprived of this power is more vivacious, and lives longer than one which exerts this means of exhausting itself.

That both organs are not necessary for giving the shock.

That all the nerves of one organ are not necessary to be entire.

That a most intimate relation subsists between the nervous system and the electric organs.

Direct and expeditious Methods of calculating the Excentric from the Mean Anomaly of a Planet. By the Rev. Abram Robertson, *D.D. F.R.S. Savilian Professor of Astronomy in the University of Oxford, and Radcliffian Observer. Communicated by the Right Hon. Sir* Joseph Banks, *Bart. G.C.B. P.R.S.* Read February 15, 1816. [*Phil. Trans.* 1816, *p.* 127.]

Each of these methods, says the author, is to be considered as direct, although it proceeds through the medium of Cassini's approximation, which, as here used, can only be regarded as a first step

in the computation. No hypothesis is introduced into the process, and therefore no correction of error by trial is requisite.

Of three methods proposed, one combines the advantages of Keill's series and Cassini's approximation together, and is regarded by the author as the most simple in theory, and most expeditious in practice, which has yet been proposed.

Demonstrations of the late Dr. Maskelyne's *Formulæ for finding the Longitude and Latitude of a celestial Object from its Right Ascension and Declination; and for finding its Right Ascension and Declination from its Longitude and Latitude, the obliquity of the Ecliptic being given in both cases. By the Rev.* Abram Robertson, *D.D. F.R.S. Savilian Professor of Astronomy in the University of Oxford, and Radcliffian Observer. Communicated by the Right Hon. Sir* Joseph Banks, *Bart. G.C.B. P.R.S.* Read February 15, 1816. [*Phil. Trans.* 1816, *p.* 138.]

Dr. Robertson conceives that no full demonstration of these formulæ has yet been published; and hence no one has hitherto remarked two oversights with respect to their application to certain particular cases, which had escaped the notice of their author. Their value, however, has been duly appreciated by those most competent to judge of their merit, especially by M. Delambre, who remarks upon their conciseness, as well as precision, in comparison even with the formulæ given by Lalande.

Some Account of the Feet of those Animals whose progressive Motion can be carried on in opposition to Gravity. By Sir Everard Home, *Bart. V.P.R.S.* Read February 22, 1816. [*Phil. Trans.* 1816, *p.* 149.]

The power which flies have of crawling upon a ceiling is well known, but the mode in which this is effected, says the author, has never been explained. It was not till lately he learned that there are animals of a larger size which have the same power, and in which, from their size, the construction of their feet will admit of more accurate examination.

The *Lacerta Gecko* of Java walks up and down the smoothly polished chinam walls in quest of flies, and runs upwards to its retreat in the roofs of the houses, although the weight of a specimen given to the author by Sir Joseph Banks was as much as $5\frac{3}{4}$ ounces.

On the feet of this animal are five toes, armed with a very sharp and curved claw; and there are also on each sixteen transverse slits, with serrated edges, with pouches between them, which are considered by the author as the striking peculiarity in the foot of this lizard. When these are closed, the under surface of the foot bears a considerable resemblance to the upper part of the head of the sucking fish, the surface of which is furnished with two rows of moveable plates attached by one edge, and serrated at the other, and