frogs and toads, the whole Eft order is unknown in those regions.

Our question "What is a Frog?" has now been somewhat further answered; but it cannot be completely so until the organisation of the animal has been more fully surveyed, and not only the relation of the frog to other Batrachians thus more clearly seen, but also the relations and affinities borne by the several orders of Batrachians and by the whole class to the other orders and other classes of the Vertebrate sub-kingdom.

Accordingly, we have now to make an acquaintance with more than those obvious and external characters which are found in the Frog, and to penetrate into its inner anatomy, surveying successively its bony framework and the various parts and organs which subserve the several actions necessary to its continued existence.

At the same time the more noteworthy resemblances presented by the Frog to other creatures will be pointed out. Thus we shall become acquainted with the relations existing first between the Frog and other members of its order; secondly, between the members of its order (*Anoura*) and its class fellows—*i.e.* other Batrachians; thirdly, we shall comprehend the degree of relationship existing between the Batrachia and the other classes of the Vertebrate sub-kingdom; and fourthly, we shall come to recognise certain singular resemblances which exist between the various groups of Batrachians (the Frog's order of course forming one), and some of the orders into which other vertebrate classes—especially the class of Reptiles—have been divided.

The skeleton of the Frog, both external and internal, naturally comes first as the support and foundation of the other structures. The internal skeleton (or *endo-skeleton*) will include the bones of the head, *i.e.* the skull, backbone (already referred to), and the bones of the limbs. The external skeleton (*exo-skeleton*) will consist of the skin only.

ST. GEORGE MIVART

(*To be continued.*)

ASTRONOMICAL ALMANACS*

V.—*The "Connaissance des Temps" under the continued direction of the old Academy*

LET us return to the *Connaissance des Temps* of the old Academy.

Jeaurat, who succeeded Lalande in 1775, adopted exactly the same principles as the latter; he, however, extended considerably the ephemerides of the moon, giving its declination for every six hours, to facilitate the calculation of the altitude, when at the same time only the distance could be observed. Méchain succeeded Jeaurat in 1788; he followed the example of his two predecessors, and like them, continued to take from the "Nautical Almanac" the distances of the moon, which Maskelyne had the kindness to send him even in manuscript.

Moreover, besides the ephemerides and the lunar distances, the *Connaissance des Temps* still contained observations, memoirs on various astronomical topics, an abridged notice of new books likely to be of interest to astronomers and navigators, and a brief history of astronomy during the past year, due to the skilful and well-informed pen of Lalande. This state of things continued until 1794, the year when Méchain left Paris, to take part in the meridian work. Soon after, the suppression of the academies having dispersed the astronomers, the *Connaissance des Temps* for 1795 was compiled and published by the temporary Commission of Weights and Measures. Finally, on June 25 of the same year, 1795, the publication of this work was placed under the eminent direction of the Bureau des Longitudes. Here we may conclude the first part of our account of the *Connaissance des Temps*—a work at first completely independent, then published with the approbation of the Academy, which included at the time nearly all those who were occupied with astronomy; and afterwards entrusted to the care of the Bureau des Longitudes, a commission which still continues to be charged with its publication.

* Continued from vol. viii. p. 531.

VI. *The "Connaissance des Temps" under the Bureau des Longitudes*

The first care of the Bureau was to entrust one of its members with the publication and direction of the *Connaissance des Temps*, thus showing, from the first, the true course which ought to have been adopted from the beginning, that a work of this kind demands strictly personal superintendence. Its choice fell upon Lalande, then Astronomer of the Observatory of *l'Ecole Militaire*. As to the calculations, however, the superintendence of this astronomer was more nominal than real; he was occupied mainly with the *Additions* which he had commenced in 1760, and towards which the bent of his mind,—"more of a collector than an inventor"—carried him. Thanks to the great quantity of material which he had acquired, he made of these additions a work really useful, for at this time periodic scientific publications were very rare. His *Journal d'Astronomie* (history of astronomy during the preceding year), contains a mass of information of great value, even at the present day, to all who take an interest in the history of the science of astronomy.

As to the calculations, they were made partly by Bouvard, whom Laplace had appointed adjoint to the Bureau des Longitudes, and partly in the bureau of the *Cadastre*, under the direction of Prony, its chief. It was in the office of this celebrated engineer that the distances of the moon from the sun and from the principal stars were calculated, distances which ceased from that time to be taken from the *Nautical Almanac*. Let us, however, add, that up to the year 1806 the greater part of the other calculations of the *Connaissance des Temps* were drawn from the *Nautical Almanac*, "with the view," according to the preamble, "of accelerating the publication." Despite this assistance, nevertheless, this work appeared only about a year and a half or two years in advance; it was then, at that time, completely useless to navigators who had to make a long round. The attention of the Bureau des Longitudes was not however turned in this direction. Its president was then the illustrious Laplace, one of the glories of the mathematical sciences, and who first knew how to deduce from the great discovery of Newton, all the consequences which it was calculated to yield.

Pierre Simon Laplace was born March 23, 1749, of a family of poor farmers of Beaumont-en-Auge (Normandy, Calvados). It is not known where he got the elements of his education, for when later he was raised to the highest honours, he had the weakness to wish to conceal his humble origin. Appointed in 1770, on the recommendation of d'Alembert, Professor of Mathematics at *l'École militaire* of Paris, he became in 1772 adjoint member of the Academy of Sciences, next succeeded Bezout as examiner of the pupils of the royal corps of artillery, and in 1785 was made titular Academician. During this time, his beautiful memoirs on which he founded his *Mécanique céleste*, succeeded each other almost without interruption. Finally, in 1795, he was nominated president of the Bureau des Longitudes, a position which he held till his death, March 5, 1827.

Under his leadership the Bureau was occupied mainly in perfecting and re-constructing the tables, by means of which are calculated in advance the positions of the different stars. The tables of Delambre (the sun, Jupiter, Saturn, Uranus and the satellites of Jupiter, 1792), of Mayer (corrected by Mason, 1787), for the moon, of

Lalande for Venus and Mercury, showed with the observations very great errors which the theory of Laplace promised to eliminate, or at the very least to diminish. It was to the solution of these questions that Laplace directed the forces of the Bureau, and it was to their practical execution that he applied the resources which the budget granted him.

"To accelerate the work, the different parts were distributed to various members of the Bureau. The tables of the moon, on account of the constant use made of them in astronomy and navigation, were those which it was of special importance should be completed promptly; but the length of the researches, the magnitude of the calculations, which so complicated a theory required, only permitted the hope to be cherished that in the distant future errors might be made to disappear which had gone on increasing from day to day. This was the occasion of making an appeal to all astronomers, national and foreign, who might have sufficiently advanced works upon the lunar tables. With this object the Bureau des Longitudes was authorised to offer a prize."*

This prize of 8,000 francs was awarded by the Bureau to an astronomer of Vienna, Bürg, whose tables, based upon 2,500 observations, made at Greenwich from 1765 to 1795, were deemed the most accurate and convenient. At the same time, Delambre published new tables of the sun; Bouvard, pupil of Laplace, whom he had assisted in the publication of the *Mécanique céleste* (Laplace resigned to him entirely the detailed investigations and astronomical calculations), published *Nouvelles Tables des planètes Jupiter et Saturne* (1808), a new edition of which he brought out in 1824, to which were added tables of Herschel's planet, Uranus; Delambre published his *Tables écliptiques des satellites de Jupiter* (according to the theory of Laplace and the totality of the observations made from 1662 to 1802); Burckhardt, a German astronomer, whom the conquests of Napoleon had given to France, published new *Tables de la lune* (1812), which, in the estimation of some astronomers, took the place of those of Bürg.

However, the impulse given by the splendid works of Laplace was not confined within the French frontiers. In Italy, a celebrated astronomer, Francisco Carline, published, in 1810, new tables of the sun, which were soon employed everywhere except in France.† In Germany, a man of Science, who was at one and the same time an eminent lawyer, a distinguished captain, and an excellent astronomer, Bernhard von Lindenau, published, according to Laplace's theory, tables of Venus, Mars, and Mercury.‡

Unfortunately these excellent works, due to the powerful initiative of Laplace, were not made use of in the publication of the *Connaissance des Temps*.

In 1808, Delambre, one of the most eminent French astronomers, undertook the direction of the *Connaissance des Temps*. No essential change was made in the work till 1817; at that time the right ascension of the moon, which had until then been calculated only to a minute, was given to a second for noon and midnight. Sailors could thus determine the longitude of their ships with more exactness; and astronomers, instead of finding in the *Connaissance des Temps* only the indication of the time at which they ought to observe our satellite, could thus compare the results of their observations with those which the tables gave, and prepare the material for their improvement. Finally, in 1820, were introduced the differences in right ascension and in declination of the sun, differences useful in calculating the preceding co-ordinates at an hour other than that of noon. This was still another advantage to sailors.

But these improvements were of very little consequence in comparison with those which astronomy, geography, and navigation demanded. Germany was the first to set an example in this direction, and the Royal Astronomical Society of London, after a long and learned discussion, came to the conclusion that they were necessary. Moreover, besides being incomplete, the *Connaissance des Temps* was full of errors from beginning to end, errata being found even among the errata themselves. Radical reforms were indispensable; but to make this clearly evident, we must return to the history of the "Nautical Almanac" and the Berlin "Jahrbuch."

(*To be continued.*)

* Report of the Bureau des Longitudes, 1800.

† "Esposizione di un nuovo methodo di construire le Tavole Astromische applicato alle Tavole del Sole" (Milan, 1810).

‡ "Tabulæ Veneris novæ et correctæ ex theoria gravitatis, *clarissimi de Laplace*, et ex observationibus recentissimis in specula astronomica Seebergensi habitis erectæ" (Gotha, 1810). "Tabulæ Martis novæ et correctæ ex theoria gravitatis, *clarissimi de Laplace*, et ex observationibus recentissimis erectæ" (Essenberg, 1811). "Investigatio nova orbitæ a mercurio circa soli descriptæ, accedunt Tabulæ Planetæ ex Elementis recens repertis et theoria gravitatis, *illustrissimi de Laplace* constructæ" (Gotha, 1815).

MAN IN THE SETTLE CAVE

UNTIL the appearance of Mr. Tiddeman's paper in NATURE, vol. ix. p. 14, I had not fully realised the important issues which, according to him, depend upon the proper identification of the fragment of bone from the Victoria Cave to which he refers; nor was I aware that he was about to commit me in such very absolute terms to the opinion that it was human, but of this, as it turns out, I have no reason to complain.

Looking, however, at the apparent gravity of the statement, and knowing, also, that opinions might, and as I believe did, differ as to the origin of the bone, I have been induced to go into the matter again, and am now in a position to affirm that there is no room for the slightest doubt on the subject.

Mr. James Flower, the excellent and estimable articulator to the College of Surgeons, to whom I am under many obligations for assistance in such questions, and who at one time suggested, and had almost convinced me, that the bone was elephantine, has, after much search, found amongst the Museum stores of human osteology, a *fibula* which places the question beyond all doubt, and fully confirms the opinion I had come to, especially after seeing the Mentone skeleton, that the Victoria relic, pre- or post-glacial as it may be, is human. It is further important as showing that bones of the same conformation may occasionally be met with at the present day.

GEO. BUSK

Harley Street, Nov. 14

NOTES

DR. A. DEW-SMITH and Francis M. Balfour of Trinity College, Cambridge, have been nominated by the Board of Natural Science Studies, in accordance with the grace of the Senate (May 1, 1873), to study at the Zoological Station at Naples under Dr. Dohrn, until the end of July 1874.

AT the General Monthly Meeting of the Royal Institution to be held on Monday first, a President will be elected in the room of the late Sir Henry Holland, Bart.

PROFESSOR TRAQUAIR, of the Royal College of Science in Dublin, has been appointed to the Keepership of the Natural History Museum in the Edinburgh Museum of Science and Art. This gentleman was formerly one of the Demonstrators to the Professor of Biology in the University of Edinburgh, and is the author of several important contributions to Science.

MR. W. F. BARRETT, F.C.S., has been appointed Professor of Physics to the Royal College of Science, Dublin, in succession to the late Professor W. Barker. We feel sure that this appoint-