

lopment and distribution of organic life as on the other hand the often considerable aid meteorological researches may obtain from purely biological facts, render it desirable that these two sciences, which may appear very different, do not become strangers to each other but mutually come into closer alliance with the object in view, to contribute to the scientific solution of the many yet unsolved physical and biological problems.

(To be continued.)

### OUR ASTRONOMICAL COLUMN

THE BINARY STAR  $\xi$  BOOTIS.—Dr. Doberck, of the Markree Observatory, has published elements of this revolving double-star, which appear to represent very satisfactorily the measures up to the present time, allowance being made for some obvious errors of observation. The orbit, which differs materially from those calculated upon shorter series of measures by Mädler, Herschel, and Hind, is as follows:—

Peri-astron passage, 1770.44. Period, 127.97 years.  
 Node ...  $12^{\circ} 1'$  Inclination ...  $37^{\circ} 53'$   
 Node to peri-astron, on orbit ...  $130^{\circ} 54'$   
 Eccentricity ... ..  $0.6781$   
 Semi-axis major ... ..  $4''.813$

At the epoch 1782.28 these elements give the position  $24^{\circ}.1$ , distance  $3''.64$ ; and for 1804.25, position  $352^{\circ}.5$ , distance  $6''.53$ ; for Dembowski's epoch 1870.87 the errors are  $+0''.3$  and  $-0''.11$ . The following figures are deduced from Dr. Doberck's elements:—

1876.0, Pos. $283^{\circ}.7$	Dist. $4''.29$	1892.0, Pos. $224^{\circ}.7$	Dist. $2''.35$
1880.0, ,, $274^{\circ}.5$	,, $3''.84$	1896.0, ,, $188^{\circ}.2$	,, $1''.82$
1884.0, ,, $262^{\circ}.8$	,, $3''.36$	1900.0, ,, $111^{\circ}.9$	,, $1''.31$
1888.0, ,, $247^{\circ}.1$	,, $2''.86$		

Dr. Doberck has now investigated elements of  $\sigma$  Coronæ Borealis,  $\tau$  and  $\lambda$  Ophiuchi,  $\mu^3$ , 44 and  $\xi$  Bootis,  $\gamma$  and  $\omega$  Leonis,  $\eta$  Cassiopeæ, and several other stars, thus greatly adding to our knowledge of the orbits of the binaries, his discussions being at the same time conducted in a very exhaustive manner, to date.

VARIABLE STARS.—In No. 2,119 of the *Astronomische Nachrichten* are observations of a number of variable stars, made in 1875 by Mr. Chandler of New York. There was a well-marked minimum of that irregular variable  $\alpha$  Herculis on August 21; the observations of W and X Sagittarii are worthy of note, as they support the results previously given by Prof. Schmidt, of Athens, and are stated to have been made without any "pre-occupation of mind in the observer," who had no previous knowledge of the character of the light variations. Schmidt's period for W, is 7.5933 days, and for X, 7.0119 days; another star in the same constellation, U Sagittarii of the last catalogue by Prof. Schönfeld, is assigned a period of 6.7452 days. The three stars were added to the variable star list by the indefatigable director of the Observatory at Athens, in the summer of 1866.

Mr. J. E. Gore (Umballa, Punjab) writes, suggesting the variability of Lalande 42360. The place in the catalogue depends upon an observation made August 7, 1793, when the star was rated 7m. Argelander ("Bonn Observations," vol. vii. p. 181) identifies this star with No. 42383 of the catalogue, observed as an 8m., September 29, 1791. Considering that there is an error in the record of the time of transit; the declinations closely agree.

DAMOISEAU'S TABLES OF JUPITER'S SATELLITES.—Independent extensions of these Tables, which run out in 1880, have been made in Europe and America. Prof. Coffin, superintendent of the American Ephemeris, notifies an extension to 1900, which has been carried into effect by Mr. D. P. Todd, we believe under the superintendence of Prof. Newcomb. The work will be sent to any library or astronomer possessing a copy of the

Tables, on application to the office at Washington. Before the time named it may be hoped that both as regards theory and observation, the laborious operation of forming new Tables may be justified by the certainty of obtaining results which will enable us to predict the phenomena of the satellites, with considerably greater accuracy than can be effected by the use of Damoiseau's Tables. And we may also express the hope that as regards systematic observations, the Astronomer-Royal's urgent recommendation will not be lost sight of.

BESSEL'S TREATISES.—Volume iii. of the reprint of the more important of the many papers by Bessel on astronomical and other subjects, which completes the work, was issued a short time since by Dr. Engelmann, and comprises geodesy, physics, and general astronomical subjects, as the libration of the moon, shooting-stars, the mass of Jupiter, and the theory of eclipses. Speaking of the work as a whole, it will prove a very valuable aid to the student of Astronomy, affording him without the labour and difficulty of consulting a number of publications, the means of acquainting himself with the principal memoirs of the illustrious Professor of Königsberg, who may be said to have revolutionised the practice of astronomy. Dr. Busch's "Verzeichniss sämmtlicher Werke, Abhandlungen, Aufsätze, und Bemerkungen, von F. W. Bessel," printed in vol. xxiv. of the Königsberg observations, and subsequently in a separate form, contains 385 articles, and we believe, with only one or two exceptions, Dr. Engelmann's three volumes will be found to contain all that are of more permanent interest and value.

### BIOLOGICAL NOTES

THE ELECTRIC EEL.—Since Humboldt's discovery of the electric eel and his observations of its peculiar properties, carried out unfortunately before the discovery of the voltaic pile, strange to say, no attempt has been made to study this remarkable reptile in its natural surroundings. In view of this fact, the Berlin Academy of Sciences sent the well-known histologist and physiologist Dr. Carl Sachs, last September, to the scene of Humboldt's former activities, well equipped with an ample supply of electro-physiological apparatus, and means for carrying out an extensive series of observations. In the last session of the Academy a letter dated December 7 was read from Dr. Sachs, in which he stated that he had safely performed the journey from Caraccas, over the Cordilleras, to the Llanos. The gymnotus had disappeared from the neighbourhood of Rastro, where Humboldt's investigations took place, but at a distance of a few miles from the city of Calabozo, a river was found fairly alive with the dreaded *temblador*. In the five days which had elapsed since the discovery of the locality, many valuable results had been afforded by the observations, and there was every prospect that the expedition would yield a large number of new and important additions to our knowledge of the electro-motive organs.

EARLY DEVELOPMENT OF SPONGES.—At a meeting, on February 8, of the Société Vaudoise des Sciences Naturelles, Prof. Forel spoke on an interesting occurrence of an early development of sponges in the Lake of Geneva, due to the unusually mild winter of this year. The fluviatile sponge of the lake consists of a horny skeleton with very fine siliceous spiculæ, covered with a sheet of soft, perforated animal matter. Usually, in autumn, this soft matter leaves the exterior ramifications and condenses under the form of small gemmulæ, half a millimetre in diameter, in the deepest interior parts of the horny skeleton. There it remains until the spring, when it expands anew upon the ramifications, and covers them with a sheet of living animal matter. But this year M. Forel observed on February 2, besides many sponges in their hibernal state, a colony of other sponges which had already reached their full summer development, differing only by a somewhat paler colour