

PROCEEDINGS

OF THE

ROYAL SOCIETY OF LONDON.

From January 11, 1866, to May 23, 1867, inclusive.



VOL. XV.

LONDON:
PRINTED BY TAYLOR AND FRANCIS,
RED LION COURT, FLEET STREET.
MDCCLXVII.

each other at more or less acute angles according to their depths, the anterior fibres, as a whole, crossing the posterior or homologous fibres as a whole. While, therefore, the fibres, in virtue of their twisted looped arrangement, antagonize each other individually, the aggregation of the fibres in any one region check, antagonize, and coordinate a similar aggregation of fibres at an opposite point; the anterior fibres, *e. g.*, acting on the posterior, and the right lateral upon the left lateral. This arrangement, which is productive of great strength, ensures that the external and internal fibres shall act in unison or together, and fully explains the views of the older anatomists, who described the bladder as consisting of fibres crossing in every direction, and forming an intricate network. It likewise accords with the more modern opinion, that the fibres of the bladder may be divided into strata or layers.

The fibres, when their points of attachment are taken into consideration, can only contract spirally from above downwards, and from without inwards; they in fact converge, or close spirally in the direction of the cervix, which may be said to diverge or open in an opposite direction as the contraction proceeds. As a result of this twisting movement, the urine, like the blood, is projected spirally*.

Finally, the fibres of the bladder, urethra, and prostate pursue at least seven well-marked directions; the fibres crossing with remarkable precision at wider and wider angles, as the central portion of either is reached, as in the left ventricle of the vertebrate heart †. In fact, the fibres of the bladder and heart have a strictly analogous arrangement, and the author is inclined to believe that functionally also they possess points of resemblance. Very similar remarks may be made regarding the structure and functions of the stomach and uterus.

XI. "Results of the Magnetic Observations at the Kew Observatory. —No. III. Lunar Diurnal Variation of the three Magnetic Elements." By Lieut.-General EDWARD SABINE, P.R.S. Received June 21, 1866.

(Abstract.)

The subject of this paper is the lunar-diurnal variation of the magnetic declination and of the horizontal and vertical components of the magnetic force, derived from a seven years' series of photographic records obtained at the Kew Observatory between January 1, 1858 and December 31, 1864.

The discussion which it contains has for its objects—1st, to exemplify the consistent and systematic character of the lunar-diurnal influence thus derived; and 2ndly, to serve both as a guide and as an encouragement to the several establishments at home and abroad which have adopted, or are

* *Op. cit.* p. 794.

† "On the arrangement of the Muscular Fibres in the Ventricles of the Vertebrate Heart," by the author, *Phil. Trans.* part iii. 1864. p. 451.

adopting the Kew methods of magnetic investigation. The completeness of the photographic process is shown by the fact, that of 175,344 hourly positions which should have been recorded in the interval under notice, there were only 1497 failures from all causes whatsoever; and even of these few a considerable portion is shown to be due to the employment of the instruments in other experimental investigations. The paper contains a full statement of the processes of tabulation from the photograms, and of the different stages of reduction through which the tabular results were passed, for the purpose of deriving from them the facts connected with the lunar influence on the terrestrial magnetic elements. A lunar-diurnal variation is shown to exist in each of these elements,—of very small amount, but having peculiar and well-marked systematic characteristics. It is further shown that these characteristics present a similarity and accordance, which it is impossible to regard as accidental, with the results obtained at several other and widely-separated localities in the middle latitudes of both hemispheres, as for example at Hobarton, Toronto, Philadelphia, Pekin, and the Cape of Good Hope. A magnetic variation shown to be thus obviously dependent upon the moon's position relatively to the terrestrial meridian, and agreeing in its principal features in such various localities, is urged by the author as being ascribable with great probability to the direct magnetic action of the moon, made sensible at the surface of the earth through the production of phenomena which, in the present state of our knowledge as regards the magnetism both of the earth and of the moon, it is as yet difficult wholly to explain, but which are likely to lead to a considerable advance of our knowledge in both these respects.

The further prosecution of the investigation, both at Kew and elsewhere, is recommended as highly deserving the attention of those who occupy themselves in the pursuits of inductive philosophy.

COMMUNICATIONS RECEIVED SINCE THE END OF THE SESSION.

- I. "On the Congelation of Animals." By JOHN DAVY, M.D., F.R.S., &c. Received July 19, 1866.

In a very interesting and elaborate paper by M. Puget, entitled "Sur la Congélation des Animaux," published in the 'Journal de l'Anatomie et de la Physiologie,' the Number for January and February of this year, he refers to a statement of mine, made many years ago*, that the leech may be frozen without loss of life. The experiments which he has instituted, and which appear to have been conducted with great care, have led him to an opposite conclusion, viz. that congelation is not only fatal to the leech, but to animals generally, without a single exception. He considers the cause of death, the *vera causa*, to use his own words, to be an altered condition of the blood. In consequence of this statement, I thought it right

* Recherches, Physiol. and Anat. ii. p. 121.