PROCEEDINGS
OF THE
ROYAL SOCIETY OF EDINBURGH.

1833-4.

No. 4.

January 20.

Sir THOMAS MAKDOUGAL BRISBANE, K. C. B.
President, in the Chair.

The following Donations were presented :—

Proceedings of the Royal Society, No. 13, and Statement of the Receipts and Payments of the Royal Society between Nov. 29. 1832 and Nov. 29. 1833.—*From the Society.*

Researches on Spherical Geometry, Polar Triangles, &c. By T. S. Davies, Esq.—*From the Author.*

Bulletin de la Société Géologique de France. Tome III. Feuilles, 17-24.—*From the Society.*

Memoirs of the Royal Astronomical Society. Vol. VI.—*From the Society.*

Astronomical Observations, made at the Royal Observatory at Greenwich in October, November, and December 1832, and January, February, and March 1833. By John Pond, Esq.—*From the Author.*

Observations of Nebulæ and Clusters of Stars, made at Slough with a twenty feet reflector, between the years 1825 and 1833. By Sir J. F. W. Herschel, K. H.—*From the Author.*

On the Absorption of Light by Coloured Media, viewed in connexion with the Undulatory Theory. By Sir J. F. W. Herschel, K. H.—*From the Author.*

Supplement to Dr Bradley's Miscellaneous Works, with an Account of Harriot's Astronomical Works. By Professor Regaud.—*From the Author.*

A

Mémoire sur le Choléra-Morbus compliqué d'une Epidémie de Fièvre Jaune, qui a regné simultanément à la Nouvelle-Orléans en 1832. Par M. Michel Halpheu, Docteur en Médecine.

—*From the Author.*

Astronomische Nachrichten. Nos. 241 to 250.—*From Professor Schumacher.*

On the Influence of Colour and Heat on Odours. By James Stark, M. D.—*From the Author.*

Beiträge zur Petrefactenkunde. Von Hermann Von Mayer.—*From the Author.*

The following communication was read :—

On the Principle of Vital Attraction and Repulsion, with some applications to Physiology and Pathology. By Dr Alison.

THE object of this paper was, to state and estimate the scientific value of a variety of facts, which have been recorded by various physiologists ; and many of which have been verified by personal observation, in proof of the proposition,—That the fluids of living bodies, or in immediate contact with them, are in many instances liable to movements,—dependent on the vitality of those bodies, but independent of any vital contractions of their solids,—and which can hardly be conceived to be effected otherwise than by certain *attractions* and *repulsions*, peculiar to the living state.

Five classes of observations, perfectly distinct from one another, were stated in proof of this general proposition.

I. The first are those made on the regular progressive movements of juices (made visible by whitish globules) in many kinds of vegetables, to which the name of *Rotation* has been given in the case of the cellular plants, such as the Chara and Caulinia, and that of *Cyclose* in the case of cellular plants with emitting juices, such as the different species of Ficus,—movements which go on nearly uniformly, under considerable variations of temperature, and of other external circumstances, while life continues ; and which are not only unattended with any visible contractions of the parietes of the cells or vessels containing the fluid, but are of such a nature, as no contractions of these parietes appear capable of producing, as appears particularly from the elaborate inquiries of Schultze, Amici, Nisbet, and Cassini. This conclusion is the more important, as it is probably applicable to nearly all the movements, peculiar to life, in the fluids of vegetables,

although the observations on which it rests can be satisfactorily made on those only which contain opaque globules.

II. The second set of facts are those connected with the *visible currents*, which take place in water, in contact with many living bodies ; as ascertained, *first*, By the observations of Dutrochet and of Dr Grant on living sponges ; *secondly*, By those of Dr Sharpey, M. Quillot, and M. Raspail, on many aquatic animals, chiefly mollusca and the larvæ of reptiles ; and, *lastly*, By those of M. Raspail, and of many others, on certain animalcules, chiefly of the genus *Vorticella*. In all these instances, facts seem to be established, which are altogether inconsistent with the supposition of the movements depending merely on contractions or vibrations of any living solid textures.

III. The third class of facts adduced on this subject consists of those which show, that, in the foetal state of animals, different parts are successively developed from the semi-fluid matter of the ovum ; and the particles of that matter must therefore have been much and variously moved before the heart acts, or any contractile vessels have been formed ; and farther, that the human ovum itself, during the time when it is surrounded on all sides by the shaggy chorion, must draw its nourishment from the semi-fluid matter contained in the uterus, through the filaments of the chorion, without the aid of any contracting vessels in these filaments. These points appear established by the observations of Prevost and Dumas, Breschet, Velpæu, Raspail, and others.

IV. The author considers the existence of attractions and repulsions, peculiar to the living state, among certain of the particles of the blood of animals, to be established by due consideration of the following facts :

1. By the phenomena of the coagulation of healthy blood, and the utter absence of any contemporaneous mechanical or chemical change, adequate to explain the change of aggregation of the particles of the fibrin, on which that process depends.

2. By the great retardation of that process, when blood (although its circulation is arrested) is confined within a healthy living texture.

3. By the great acceleration of that process, when the living texture, in which blood is contained, is severely injured.

4. By the total suspension of that process, when death is produced by a sudden and violent cause, especially by a cause which at the same time destroys the power of contraction after death in muscular fibres.

5. By the different modifications of that process, which are observed in inflammation.

6. By the phenomena which are observed in those portions of blood, which are extravasated in inflamed parts.

In proof of these points, the author refers partly to personal observation, and partly to the works of Hunter, Hewson, Thackrah, Scudamore, Prater, Schræder van der Kolk, Velpeau, Gendrin, Royer-Collard, and Kaltenbrunner.

V. The last set of observations, adduced in support of the general principle, are those which, in reference to more complex questions in physiology, are the most important, viz. those which indicate that the blood circulating in the capillary vessels of living animals, and examined by the microscope, exhibit a variety of movements, and changes of movement, which no visible or conceivable vital contractions of the heart and arteries are adequate to explain.

Most of these facts, as to the capillary circulation, were accurately described, and the conclusion, which appears inevitable from them, as to the existence, in the living state, of a peculiar cause of movement inherent in the blood itself, or at least independent of any impulse from contracting solids, was stated and carefully limited by Haller. In regard to the rest, the author refers, not only to personal observations, but chiefly to the authority of Dollinger, Wedemeyer, and Kaltenbrunner in Germany, and of Quillot and Leuret in France.

The analogies which may be traced, between the principle which seems thus established, and other ascertained laws both of living beings and of inorganic matter ; and the applications which may be made of it, to the explanation of the more complex phenomena of the living body in health and disease, were reserved for a future communication.

February 3.

SIR T. M. BRISBANE, President, in the Chair.

The following Donations were presented :—

1. Transactions of the Society of Arts, Manufactures, and Commerce, vol. XLIX.—*By the Society.*
2. Entomologia Edinensis, or a History and Description of the Insects found in the neighbourhood of Edinburgh. By James Wilson, Esq., and the Rev. James Duncan.—*From the Authors.*