

are powers of a different nature would be a contradiction in terms, for it is only by its properties that any principle of action can be distinguished.

He refers, in confirmation of these inferences, to the recent investigations of Mr. Faraday, from which it appears that electricity is the agent in all chemical processes ; to the facts which prove that all the functions of the nervous influence, properly so called, are of a chemical nature ; and also to the late experiments of Dr. Davy on the Torpedo, tending to show that the electric power, peculiar to electric animals, is a function of the brain, and thus affording direct proof that the brain has the power of collecting and applying, even according to the dictates of the will, the electric power.

It farther appears, from the facts referred to in this paper, that, whenever we can trace any analogy between the functions of the living animal and the operations of inanimate nature, an agent belonging to the external world is employed ; that these functions are the results either of such agents acting on vital parts, or of vital parts acting on them ; and that the sensorial functions, on the other hand, in which no such analogy can be traced, are the effects of vital parts acting on each other, and influencing each other by their vital properties alone.

In the concluding part of the paper the author considers the various functions of the living animal as forming two systems, in a great measure distinct from one another, in each of which all its powers are employed, but in very different ways : the object of the one of these systems being the maintenance of the body itself ; of the other, the maintenance of its intercourse with the external world. The manner in which the different powers of the living animal are employed in the construction of each of these systems is pointed out ; and the bonds of union which exist between them, and thus form the living body into a whole, no part of which can be affected without tending more or less to affect every other, are considered. These bonds of union consist chiefly in the employment of the same powers in the construction of both systems, and in the function of respiration, which so extensively influences all other functions both in health and disease, as pointed out by the author in his papers on the nature of sleep and death, and which differs from all the other vital functions in partaking of the sensorial as well as of all the other powers of the living animal.

5. "On the Respiration of Insects." By George Newport, Esq. Communicated by P. M. Roget, M.D., Sec. R.S.

Although a multitude of facts has been collected relating to the physiology of respiration in insects, attention has seldom been directed to the variations exhibited in this function in the different periods of their existence. The author gives an account, in this paper, of the anatomical and physiological peculiarities which he has noticed in various insects, in their three states of larva, pupa, and imago. He traces all the several changes which the tracheæ and spiracles undergo during their transformations ; describing particularly the successive development of the air vesicles in connexion with the power of flight.

The system of muscles, both of inspiration and of expiration, is minutely detailed, and their various modes of action examined. He next investigates the series of nerves appropriated to the exercise of the respiratory function, and establishes a distinction in the offices of these nerves, corresponding to the sources from which they derive their origin, and presenting remarkable analogies with similar distinctions in the nerves of vertebrate animals. The manner in which respiration is performed, and the phenomena presented with regard to this function under various circumstances, such as submersion, and confinement in unrespirable or deleterious gases, are next considered. An account is then given of a series of experiments made with a view to determine the quantity of oxygen consumed, and of carbonic acid produced, by the respiration of various kinds of insects in different states, from which the conclusion is drawn that the quantity of air deteriorated is governed by several circumstances not necessarily connected with the natural habits of the species. When the insect is in its pupa state, and in complete hybernation, its respiration is at its minimum of energy: and, on the contrary, it is at its maximum when the insect is in the imago state, and in the condition of greatest activity.

In the concluding section of the paper the author institutes an inquiry into the capabilities which insects possess of supporting life, during longer or shorter periods, when immersed in different media: and gives a tabular view of the results of numerous experiments which he made on this subject. It appears from these observations that the order in which these media possess the power of extinguishing vitality is the following: viz. hydrogen, water, carbonic acid, nitrous acid gas, chlorine, and cyanogen. Some of these agents, however, affect respiration much more rapidly than others, which, though their action is slower, are eventually more fatal to the insect.

6. "Démonstration de l'égalité à deux droits de la somme des angles d'un triangle quelconque, indépendamment de la théorie des parallèles, et de la considération de l'infini." Par M. Paulet, de Genève. Communicated by P. M. Roget, M.D., Sec. R.S.

The author demonstrates the equality of the sum of the angles of a triangle to two right angles, by the aid of a preliminary theorem, of which the following is the enunciation. A straight line forming an acute angle with another straight line, will, when sufficiently produced, meet any line, perpendicular to the latter, and situated on the side of the acute angle.

7. "Experimental Researches into the Physiology of the Human Voice." By John Bishop, Esq. Communicated by P. M. Roget, M.D., Sec. R.S.

The following are the conclusions deduced by the author from the inquiries which form the subject of the present paper.

1. The vibrations of the glottis are the fundamental cause of all the tones of the human voice.

2. The vibrating length of the glottis depends conjointly on the