

to cut the air so as to meet with the minimum of resistance; while in its descent, on the contrary, the position of its plane is reversed, so that its lower surface turns downwards and slightly backwards." During the descent

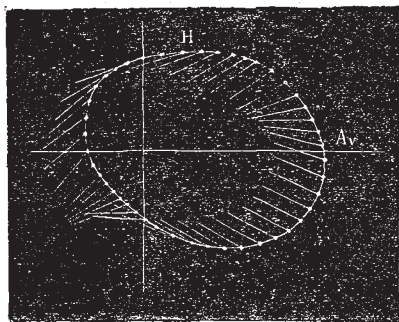


FIG. 6.

of the wing the body of the bird is carried forwards as well as upwards. The resistance of the air explains the elliptical form of the figure.

We hope that in the short glance which we have taken of some of the most important points discussed in the work before us, we have succeeded in interesting our readers sufficiently in its contents to make them curious to learn more of its subject matter. We cordially recommend it to their attention. To the student of art it gives rules and general principles which will be found invaluable in all attempts to portray the various attitudes of man and his faithful companion, the horse; and these, when understood, will direct attention to the most salient points in the locomotion of other animals.

To the student of physiology it is useful in at least two ways. It shows how invaluable is a knowledge of manipulatory details and the principles of mechanics. Prof. Marey, in the period of his studentship, must have learnt more than the simple routine facts of a medical education. The mechanical Cardan universal joint and Wheatstone's kaleidophone rod are as familiar to him as is the valvular mechanism of the heart; it is his control of method which is one of his most marked characteristics. It shows how elaborate are some of the phenomena which at first sight seem so simple, and how much the science of physiology is within the domain of physics.

The translation, as far as we have had the opportunity of judging, seems a good one, except in one or two cases, where improvement would not be impossible.

OUR BOOK SHELF

The Protoplasmic Theory of Life. By John Drysdale, M.D. (Baillière, Tyndall, and Cox, 1874.)

THE author of this small book is one of the editors of a work on Pathology, by Dr. John Fletcher, of Edinburgh, whose "Rudiments of Physiology" contains much speculative biology of no mean quality. As a disciple he enters into an analysis of the philosophy of his master, discussing its details in connection with the light thrown upon it by modern research, especially the bioplasm theory of Beale. Fletcher argued thus:—The peculiar property, vitality, does not reside in the tissues of the living body indiscriminately, but in one anatomical element alone; because, as the various tissues differ

extremely in their physical properties, and these latter are almost exactly the same after as before death, it is hardly to be expected that the living matter can rearrange itself on death, in a short time, into a number of different forms, which shall possess exactly the same physical properties in the vital as in the ordinary state of combination. The concordance of this idea with the theory of Dr. Beale, which divides all tissues into a living forming material (bioplasm), and a dead formed material, the composition of the latter of which alone varies to any extent, must be evident to all; and the working out of its minutiae occupies several chapters of the work before us. The author also enters fully into the muscle and nerve theory of Dr. Beale in a manner which we do not think will throw much light on either subject. He remarks that the insulating power of the medullary sheath of the nerve-fibre is not demonstrable, therefore "the nerves are not fitted for simple conduction of electric currents; and these have no reason to choose the nerves as their channels, so they spread through the moist tissues almost uniformly." With this opinion we think there are few or no physiologists who will agree, as there is not the least doubt that it is through nerve-fibres that electric stimulation will most readily and most powerfully affect muscular fibres at a distance; otherwise, what is the peculiar value of the "nerve-muscle preparation" of the physiological laboratory? In his remark that Dr. Sanderson is premature in arguing with regard to the *Dionæa* "that because the contraction of the plant-leaf depends on changes, apparently in the contents of the cells, the muscular contraction of the higher animals is of the same nature," the author is, we think, more fortunate; we have never been able to see that the two phenomena have anything in common. From the consideration of the less speculative protoplasmic theory of the origin of tissues, such points as the nature of life, the connection of force with life and mind, consciousness, and materialism, subjects beyond the pale of precise knowledge, are treated of in a manner which will quite repay perusal by those who are fond of speculating on those precarious topics.

Out of Doors: a Selection of Original Articles on Practical Natural History. By the Rev. J. G. Wood, M.A., F.L.S. (London: Longmans and Co., 1874.)

MR. WOOD is well known as one of the most successful popularisers of natural history. He has himself an extensive and thorough knowledge of his subject, as well as a genuine love of it, and his genial enthusiasm cannot fail to infect the minds of the fortunate boys and girls into whose hands his books may fall. The present volume consists of a number of thoroughly readable papers which have already appeared in various periodicals. They are written in an easy, graceful, chatty style; and while apparently trying only to amuse his readers, he manages to convey a great deal of valuable information about animals and plants, especially about such as anyone who likes to take the trouble may observe for himself. Some of the papers are concerned with exotic animals, as in that describing "A January Day at Regent's Park," in which are contained many facts concerning the inhabitants of the Zoological Gardens. Most of them are, however, about the "common objects of the country," as is indicated by such titles as "A Sand Quarry in Winter," "Under the Bark," "My Toads," "The Children of the New Forest," "The Repose of Nature," the last concerned with hibernating animals. In "Medusa and her Locks," and "Life on the Ocean Wave" (describing a visit to the Crystal Palace Aquarium), "The Green Crab," &c., we are introduced to the denizens of the ocean. The book is an excellent one to give to a boy or a girl, who, we are sure, would enjoy it, as indeed would many whose boyhood or girlhood is only a sad memory.