

zebras even at moderate distances, although there was nothing to hide them, the black and white stripes blending so completely that the animals assume a dull brown appearance quite in harmony with the general colour of the locality in which they are found, and in which, for instance, Rooi Rehbok (*Pelea capreolata*) is also well protected on account of its peculiar brownish coat. A member of our party, who on another occasion gave proof that he is possessed of excellent eyesight, and who has frequently hunted in similar localities, saw a zebra which was wounded in one of the front legs at a distance of about 400 yards, and strange to say he mistook it for a big baboon. In a letter which I received from him a few days ago, he said, "It galloped like a baboon from me, and I could only see that the colour was greyish-brown. At about 500 yards from me it ran on to a little krantz, and mounting the highest rock, drew its body together just as a baboon does when its four feet are all together on the summit of a little rock." His remark as to the greyish-brown colour of the animal is the more valuable, as I believe this gentleman, Mr. Wrench, A.R.M. of Cradock, is quite unprejudiced. In my own letter to him, which drew forth these remarks, I had only asked him for the distance at which he saw the zebra, and I did not ask him how it was that he mistook a black and white zebra for a brown baboon on a perfectly clear South African day. My own observations also confirm that the stripes of the zebra are of protective value. Riding along a slope I suddenly saw four zebras within 100 yards above me. They were galloping down the hill, but stopped when they caught sight of me. As soon as they stopped I saw their stripes pretty distinctly. After I had fired and wounded one of them, they started again galloping down the hill round me in a semicircle at a distance of about 70 yards. All this time they presented a dull brown appearance, no stripes being visible, although I had my attention fixed on this point. They disappeared beyond a ridge, went down a little valley, and I heard afterwards that they ascended the next slope, which was not more than 1500 yards away from where I stood with a native servant. Yet even this lynx-eyed native could not see them going up this slope. They had vanished from us.

Perhaps it may interest some of your readers that zebras are still fairly plentiful on the rugged hills west of Cradock. A troop of forty-one individuals was seen, on the very ground over which we hunted, a short time before we arrived. Our party saw eleven in two days, but I believe three were seen on two if not on three different occasions. This would reduce their number to eight, if not to five. They are protected by Government, and also by the farmers themselves, but I am afraid that in spite of that their days are numbered. They are said to be very destructive to wire fences, and as the inclosing of farms with wire fences is steadily on the increase in this colony, many a farmer will have, though perhaps reluctantly and in defiance of the law, to take up his gun and clear them off his property. There will then probably be an outcry by people who know the difficulties of South African farming only from books written by travellers who hurry through South Africa in a first-class railway carriage; but those who really know South Africa well will say it is a great, great pity, but it cannot be helped, unless Government provides speedily an abode for these and other animals threatened with extinction. The first step in the right direction would perhaps be the establishment of a Government Zoological Garden, but I hope others who are more competent than I am will stir the people of Cape Colony up before it is too late, so that something more than mere game-laws may be done to preserve them.

Albany Museum, Grahamstown.

S. SCHÖNLAND.

The Protective Device of an Annelid.

IN September last I forwarded to NATURE the description of an effectual protective device adopted by a small tubicolous Annelid which had been sent to me from Jersey; the device consisting in the coiling-up of the end of the tube. I have recently been able to submit specimens to Prof. W. C. McIntosh, of St. Andrews, who has kindly identified the builder as *Sabella saxicava*, a form which he tells me is common in the Channel Islands, and occurs also on our southern coast. So far as I can learn, this peculiar and interesting habit of an Annelid had not previously been observed.

ARNOLD T. WATSON.

Sheffield, May 1892.

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The General Circulation of the Atmosphere.

IN that excellent lecture by Dr. Pernter, delivered before the Scientific Club at Vienna, published by you in NATURE (vol. xiv. p. 593), the theory of the trade winds being occasioned by the rising of the rarefied air at the equator causing an upward current, while cold air from north and south flows in to supply its place, coupled with the earth's rotation to the east, is attributed to Dr. Dove. "Dove was the first person . . ." But that theory will be found distinctly enunciated by Sir John Herschel in his "Treatise on Astronomy" (1833), where he attributes it to Captain Basil Hall, "where this is distinctly, and, as far as I am aware, for the first time reasoned out." Herschel was not aware that it had been distinctly reasoned out by George Hadley, F.R.S., in the thirty-ninth volume of the Philosophical Transactions, a century before Basil Hall.

J. CARRICK MOORE.

THE SURFACE-FILM OF WATER, AND ITS RELATION TO THE LIFE OF PLANTS AND ANIMALS.¹

IT is necessary to the exposition of my subject that I should begin by reminding you of some well-known properties of the surface of water. These are familiar to every student of physics, and are set forth in many elementary books. They are well explained and illustrated, for instance, in Prof. Boys's deservedly popular book on "Soap-bubbles." But there may be some persons here who have not quite recently given their thoughts to this subject, and it will only cost us a few minutes to repeat a few simple experiments, which will establish some fundamental facts relating to the surface-film of water.

The following experiments were then shown:—

(1) Mensbrugghe's float. Proves that the surface-film of water offers resistance to the passage of a solid body from beneath.

(2) Aluminium wire made to float on water. Proves that the surface-film of water offers resistance to the passage of a solid body from above. The resistance is proportional to the length of the line of contact of the solid with the water.

(3) Copper gauze made to float on water. Here, a number of intersecting wires are employed instead of a single wire, and the consequent increase in the length of the line of contact greatly increases the weight which can be supported.

(4) Frame with vertical threads, carrying a light plate of brass. The threads hang vertically at first, but when the whole is dipped into soapy water, the adhering film exerts a pull upon the sides of the frame, draws the threads into regular curves, and raises the brass plate. When the film is broken, the threads resume their previous vertical position, and the plate falls.

(5) Aluminium wire supported by vertical copper wires. Each end of the aluminium wire forms a loop, which fits loosely to one of the copper wires. When the apparatus is dipped into soapy water, the contraction of the film draws the aluminium wire upwards. After pulling it down with a thread, the wire can be again drawn up. This is another illustration of the tendency of the film to contract. We use soapy water, because the film lasts for a considerable time, but the surface-film of pure water, though less viscous than that of soapy water, is even more contractile. We have already seen that the surface-film clings with considerable tenacity to any solid body introduced into it, and that its hold increases with the length of the line of contact. It is for this reason that fine meshes offer so great a resistance to the passage of the surface-film. Air can pass through the meshes with perfect ease; water also, if not at the surface, can pass through readily enough, but the surface-film in contact with air will only pass through with

¹ Lecture given at the Royal Institution, March 4, 1892, by L. C. Miall, Professor of Biology at the Yorkshire College, Leeds. Some passages were omitted in delivery, for want of time.