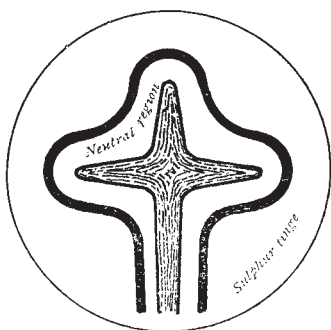


figures; and from subsequent experiments it would seem that the resin serves the purpose *almost* as well as ebonite as far as clearness of definition is concerned. A metal plate, which may or may not be insulated, formed a base for the resin. I mention these details since the ebonite rods and plate are not so well within every one's reach, on the score of greater expense and the necessity of having them specially constructed for the experiments. A plate machine of some size (18-inch plate) seems necessary, as I find that, unless the Leyden jar is charged to rather high potential, no shadow is formed, and, further, that the sharp definition of the shadows increases with the charge of the jar. The screen used was a design, cut out in cardboard and tinfoil pasted over it, very similar in shape to that given in Fig. 2 in Prof. Thompson's paper, and the shadows obtained were substantially similar to that in Fig. 3. But here a small point not before recorded came out:—If the pin, from whose point the discharge is made to take place, be slanted in any direction, which is easily done with the sealing-wax holder by simply heating, the shadow of the object then lengthens out curiously, just as do the shadows formed by an object intercepting light rays as the obliquity of incidence is increased.

The new feature, however, which appeared from my experiments, and which is not recorded by Prof. Thompson, although very likely the experiment may have been done before, is as follows:—Instead of starting with the resin plate in a neutral condition, I gave it a rather strong negative charge by rubbing it vigorously with a fox's brush and discharging the Leyden jar as before on to the pin, using precisely the same object to cast the shadow as before. Its character now, however, was completely altered, appearing as I have endeavoured to represent it in the figure. A simple cross, having little resemblance as to outline



with the object, was the result. The red-lead of course was picked out by the negatively-charged resin under the object and piled up to form the cross, which was much more strongly red, as one would expect, than the former shadow. There was also a rather wide neutral region around the cross, considerably more than in the former experiments. It seems to me that this effect is something more than the attenuation of the shadow spoken of by Prof. Thompson, where the screen is electrified independently. Since the subject is one of considerable interest, perhaps it may be useful to show that any one having access to a fairly good electrical machine can repeat and possibly extend Prof. Righi's investigations.

W. F. SMITH

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#### Cosmic Dust

I FOUND in the *Nieuws van den Dag* of December 28, 1883, that a violet sand had been found in the dunes (probably near Scheveningen). The paragraph runs as follows:—When seen under the microscope (feeble magnifying) the ordinary yellow sand seemed to be composed for the greater part of almost white transparent grains, among which were a few light yellow, and pink, and single black grains. The violet sand, however, showed almost all the grains imbibed by a light violet tint, and moreover it contained a very great number of black glittering grains. An idea which occurred to me made me take up a small magnet, and on stirring with it in a glass full of the sand, the ends were covered by feathers formed by the black grains quite the same as the feathers which are formed on putting a magnet into filed dust. Probably I had there grains of a combination of iron; of the latter there was a great deal in it. Now this is the question: Are these grains of the same kind as those which the

naturalists have found and gathered on the snow-fields in the Polar regions, thus called cosmic dust?

Stuttgart, January

E. METZGER

#### Diffusion of Scientific Memoirs

I THINK it would promote scientific information if it were more the custom for those who need copies of papers to make direct application for them. Authors are usually provided with separate impressions for distribution, but are often much in the dark as to how to turn them to the best advantage. The bulk of such copies usually find their way to men of established scientific position who have worked at the subject of the paper in past years, but have perhaps ceased to take interest in it; while those who are actively engaged upon the subject, if they do not happen to have already published matter of importance, are left unprovided for.

I believe that most authors would willingly send copies of their memoirs to younger men, known to be engaged in scientific work, who should make application. But there is one rule which must be observed with the utmost stringency—otherwise I should feel that the evil of the present suggestion outweighs the good—*viz. the applicant must never expect a written answer.*

Cambridge

R.

#### Weather on Ben Nevis and Snowdon

I WAS much interested with the account of a visit paid to the Ben Nevis Observatory on December 26, 1883, described in *NATURE* of January 3 (p. 219), more particularly as the weather experienced on the summit was almost identical with that on Snowdon at the same time. I ascended Snowdon on December 23, 25, and 26 from the west, east, and north, and a neighbouring mountain, Glyder Fach, on the 24th. The views from the summit on the 25th and 26th can be best described by the following quotation from *NATURE* (p. 219), referring to Ben Nevis:—"The view from the summit was magnificent. All round there floated a billowy ocean of white mist" (extending from the slopes of the mountain to the horizon north, south, east, and west), "through which rose here and there black mountain peaks." "Overhead the sky was blue," and the sun shone brilliantly. The upper surface of the ocean of clouds was on the 25th about 2000 feet, and on the 26th 1000 feet, above sea-level.

On the 24th I ascended Glyder Fach through about 2500 feet of mist, and, to again quote from *NATURE* (p. 219), on reaching the ridge "suddenly emerged from the gloom of the mist into the brightest of daylight. Overhead the sky was blue, a fresh light breeze was blowing" from the north-west. I here noticed a curious phenomenon. I became suddenly aware, whilst standing in the sunlight on the ridge, that the air was full of an exceedingly minute dust driven by the wind from the north-west and descending at an angle of about 40°. The fall ceased quite suddenly one or two minutes after I noticed it. The impression left on my mind was that anything popularly spoken of as dust would be exceedingly coarse compared with it. There was no snow on the ground.

The phenomenon known under the name of the "Brocken Spectre," mentioned by Mr. Chrystal, may frequently be seen from the summit of Snowdon by any one not afraid of a little mist.

T. SINGTON

Kersal Moor, Manchester, January 7

#### Teaching Animals to Converse

J. S. B. seems to have misunderstood Sir John Lubbock's idea. It would be no great test if drawings were made, as the dog would see so little difference. Thus a dog of mine knows instantly whether he may go out with my housekeeper or not according to whether she wears her hat or her bonnet. In the first instance he knows she is going where he may go, and he is on his feet barking with joy as soon as she appears. If she has the bonnet on, he knows it to be church, or a visit to friends in the country, where he cannot go, and, like the "eldest oyster" (I quote from memory), he "winks his eye, and shakes his hoary head." If drawings of hat and bonnet were made, he would know them at once.

Some years since I had a remarkably clever Skye terrier, whose wisdom was at the time shown in a letter to the *Times*. This dog I taught as follows. When I went out it was quite sufficient to say "Yes" or "No" in an ordinary tone; but wanting to take him beyond that, I taught him very quickly to

know the two words when printed on cards, YES or NO, and after a few weeks' teaching he never mistook them. I have no time now for much teaching; if I had, I am sure it could be done with the dog I now have. The intelligence of cats is greatly underrated. My wife's favourite cat follows her everywhere, and comes when called wherever she may be. Cats, too, are very grateful for kindness. When I went into the Malakhoff I found a cat on whose paw a bayonet had fallen and pinned it to the ground. I released it and took it home, and it always followed me all over the camp till the end of the war. And this cat did as follows. I took her to a doctor of the nearest regiment for two mornings to have her foot dressed. The third morning I was away on duty before daylight, and the cat went herself to the doctor's tent, scratched the canvas to be let in, and then held up her paw to be doctored. The intelligence that can be developed in almost any animal depends in most cases on our treatment of it.

H. STUART WORTLEY

South Kensington Museum, S.W., January 14

### Circling to the Left in a Mist

ONE generally reads that persons walking without landmarks perform a large circle and cut their old tracks again. This circling, as far as my present knowledge goes, is to the left.

My present theory is that in most persons the right leg is the stronger and the more forward to step over any obstacles, and hence that it slightly outwalks the left; this theory involving as further consequences that those in whom the left leg is the stronger would circle to the right, while those whose legs are of equal strength would either keep straight on or would wander either way indifferently. I imagine this "outwalking" of one leg by the other to be similar to the manner in which a body of troops wheels to one side or the other.

In the following I use the expression "*right-legged*." By this I mean that the right leg is that chosen to kick with, jump from, &c.

My negative evidence is as follows:—

1. I myself am right-legged, and in a mist I always circle to the left. I have only come across cases similar to my own in these respects. On the other hand, my left arm has been trained (by always rowing on the bow-side) to be stronger than my right for rowing purposes; and in sculling I always circle to my right side.

2. Those savages of whom I have read that they could keep a straight course without any landmark were also represented as using both arms (and legs?) impartially.

I have given the above evidence chiefly to show how weak it is, in the hope that some of your readers will try to collect data of the following nature from any of their acquaintance who have had experience in the matter:—

(a) To which side, if any, do they circle?

(b) Are they right- or left-armed, right- or left-legged? or are the two sides equally strong?

It might also be interesting to learn from boating friends if they have observed any connection between the side on which they have been accustomed to row and the side to which they circle in sculling; such connection as that indicated above.

Finally, I may suggest that more might be known on the question of the heredity of right- or left-sidedness; and as to whether persons are often right-armed but left-legged, &c. But it must be remembered that tendencies of this nature are often "educated out" in childhood.

W. LARDEN

Cheltenham College

### THE PORPITIDÆ AND VELELLIDÆ

PROFESSOR ALEXANDER AGASSIZ has quite recently (July) published an important contribution to our knowledge of the morphology and embryology of these families of marine Hydrozoa. This appears as one of the quarto memoirs of the Museum of Comparative Zoology at Harvard College, and is illustrated with twelve plates. While at the Tortugas, during March and April, 1881, examining the structure of the coral reefs, Prof. A. Agassiz took advantage of every possible opportunity of exploring the surface fauna of the Gulf Stream, and when not otherwise occupied he devoted his time to completing the notes and drawings which he accumulated regarding

Porpita and Velella under less favourable circumstances at other points of Florida, at Newport, and on board the *Blake*. These notes are now published as forming the principal points in the natural history of a small and limited group of oceanic hydroids, interesting from their affinities on the one hand to the Tubularians, with which Vogt, Kölliker, and Agassiz were inclined to associate them, and on the other hand with the Siphonophoræ proper, with which they have, however, but little in common. Mr. C. O. Whitman was sent this spring to Key West to complete this memoir, and especially to investigate anew the whole subject of the structure and functions of the so-called yellow cells; but although he spent six weeks at Key West, he was unable to accomplish the object of his trip, as not a single Velella appeared at Key West during the whole of his visit. Under these circumstances Prof. A. Agassiz thought it advisable to at once publish his drawings and notes, completing the descriptive part when the necessary preparations can be finished. The Florida species of Velella (*V. nutica*, Bosc) is much larger than the Mediterranean form (*V. spirans*); specimens measuring nearly four inches in length are not uncommon. On plate 1 is figured in profile and from above and below a huge Velella nearly five inches in length, and in all the glories of its metallic colouring. Thousands of this species are brought by favourable winds and tides into Key West Harbour; they are usually seen in large schools, and although capable of considerable independent movement by means of their tentacles in a smooth sea, yet are they practically at the mercies of the winds and currents. Even moderate waves destroy them in vast numbers. When kept in confinement they soon die, and are rapidly decomposed. The dead floats are thrown ashore in enormous numbers. The large central polypite of the system is the main feeding mouth, but the smaller lateral polypites feed also to a limited extent. All these are connected at their base with the general vascular system, through which as in the polypites the fluids are rapidly propelled by the action of ciliæ lining the inner walls. At the base of the polypite there are, according to its size, from five to eight clusters of Medusæ buds: the small ones already contain the peculiar yellow cells so characteristic of the free Medusæ. The young Medusæ have a very striking resemblance to such Tubularian Medusæ as *Esuphysa* and *Ectopleura*. It has like them a row of lasso cells extending from the base of the tentacles to the abactinal pole. The yellow cells are arranged in clusters along the sides of the four broad chymiferous tubes, as well as on the surface of the short, rounded, conical, rudimentary proboscis. The young Medusæ move with considerable activity by sudden jerks. The air-tubes branch much less frequently than is the case in the Mediterranean species. All the Velellæ floats examined were left-handed.

The Florida species of Porpita (*P. linneana*, Less.) is nearly related to but is larger than *P. mediterranea*. It is capable of a considerable control over its movements, and is not stranded at all in the same numbers as is Velella. If upset by wind or waves it can, by the great size and power of its numerous long marginal tentacles force itself back again into its normal position. It does this by bringing its tentacles together over the disk and throwing up the free edge of the mantle slowly in a given direction, then expanding the tentacles of one side far over in the opposite direction beyond the central part of the disk, it readily changes the centre of gravity, and so tilts the overturned disk back again. Round the base of a large central polypite are five to six rows of small, stout, flesh-coloured, feeding and reproductive polyps; these have a slightly rectangular head capable of considerable expansion, with four clusters of lasso cells. At their base are to be found Medusæ buds in all stages of development. When the clusters of these are well developed they completely fill the space between the small