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. mutica*, 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 Medusa 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

polypites, giving to the ring which they occupy on the lower surface of the float, a dark yellowish tint from the colour of the yellow cells, found along the rudimentary proboscis of the Medusæ buds, as well as along the chymiferous tubes. The large marginal tentacles are of a bluish tint, their knobs of a darker colour. The smaller polypites occupy on the lower surface that portion of the mantle which covers the ring formed by the so-called white plate of Kölliker round the base of the single central polypite. Sometimes these polypites are seated in cavities of the white plate, and sometimes projections of this latter will be found to extend far up into the lower part of the small polypites. This white or pinkish plate consists of an irregularly anastomosing system of needles and spurs, or of bars of greater or smaller size, leaving a series of narrow openings for the passage of the tubules. Prof. A. Agassiz suggests the alliance of Porpita with the Hydrocorallinæ, basing this suggestion on the presence of the white plate, and of its peculiar structure, which reminds him of the porous structure of the corallum of Sporadopora, Allopora, Millepora, and although, of course, not having the regular horizontal floors of the latter, yet possessing, like these genera, large pits, the whole mass being riddled with passages and openings, forming the spongy mass of the white plate. If this homology be correct, it shows far-reaching affinities in the Porpitidæ. The Plates, twelve in number, give a great number of anatomical details, and there are full-sized and coloured representations of the two species described.

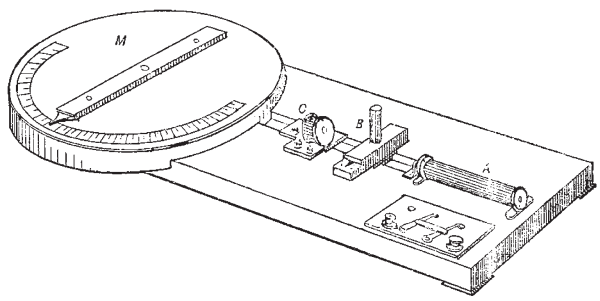
HUGHES' NEW MAGNETIC BALANCE

A NEW magnetic balance has been described before the Royal Society by Prof. D. E. Hughes, F.R.S., which he has devised in the course of carrying out his researches on the differences between different kinds of iron and steel. The instrument is thus described in the *Proceedings of the Royal Society* :—

"It consists of a delicate silk-fibre-suspended magnetic needle, 5 cms. in length, its pointer resting near an index having a single fine black line or mark for its zero, the movement of the needle on the other side of zero being limited to 5 mms. by means of two ivory stops or projections. When the north end of the needle and its index zero are north, the needle rests at its index zero, but the slightest external influence, such as a piece of iron 1 mm. in diameter 10 cms. distant, deflects the needle to the right or left according to the polarity of its magnetism, and with a force proportional to its power. If we place on the opposite side of the needle at the same distance a wire possessing similar polarity and force, the two are equal, and the needle returns to zero ; and if we know the magnetic value required to produce a balance we know the value of both. In order to balance any wire or piece of iron placed in a position east and west, a magnetic compensator is used, consisting of a powerful bar magnet free to revolve upon a central pivot placed at a distance of 30 or more cms. so as to be able to obtain delicate observations. This turns upon an index, the degrees of which are marked for equal degrees of magnetic action upon the needle. A coil of insulated wire, through which a feeble electric current is passing, magnetises the piece of iron under observation, but, as the coil itself would act upon the needle, this is balanced by an equal and opposing coil on the opposite side, and we are thus enabled to observe the magnetism due to the iron alone. A reversing key, resistance coils, and a Daniell cell are required."

The general design of the instrument, as shown in a somewhat crude form when first exhibited, is given in the figure, where A is the magnetising coil within which the sample of iron or steel wire to be tested is placed, B the suspended needle, C the compensating coil, and M the magnet used as a compensator, having a scale beneath it divided into quarter degrees.

The idea of employing a magnet as compensator in a magnetic balance is not new, this disposition having been used by Prof. von Feilitzsch in 1856 in his researches on the magnetising influence of the current. In von Feilitzsch's balance, however, the compensating magnet



was placed end-on to the needle, and its directive action was diminished at will, not by turning it round on its centre, but by shifting it to a greater distance along a linear scale below it. The form now given by Hughes to the balance is one of so great compactness and convenience that it will probably prove a most acceptable addition to the resources of the physical laboratory.

WINTER LIFE AT SPITZBERGEN

THE following is an extract of a report by one of the *personnel* of the Swedish Meteorological Expedition of the wintering at Spitzbergen :—

One of the deepest fjords of Spitzbergen is the Ice Fjord on the west coast. On a map of the islands it will be seen, some fifteen miles from the mouth, to split into two smaller ones. The promontory which divides the two is Cape Thordsten. It is formed of slate rocks some 2000 feet in height, from which in some places precipices descend perpendicularly into the sea, and in others valleys slope down into the plain. The latter is furrowed by streamlets and deep ravines, while the rocks around are the breeding places of every sea bird of the Arctic fauna, as, for instance, the seagull, the auk, the rodge, and the *Uria grylle*. In the plain reindeers graze, and on the mountains ptarmigans and snow-sparrows breed. The plain is covered with grass, rather strongly interspersed with moss, but here are to be found many plants and flowers, such as *Polymonium pulchellum, Dryas ortopetula*, the white and red saxifrage, the Spitzbergen poppy, and the common buttercup.

In the plain close to the mountain the huts are situated which now bear the name of "Smith's Observatory," from the munificent equipper of the expedition. The buildings were erected here some ten years ago by the Ice Fjord Company, which was formed for the utilisation for guano of the coprolite deposits found in the adjacent mountains.

On July 21, 1882, the vessels of the expedition arrived here, but it was at that period doubtful whether we should establish our station here, as the mountains around contain a large quantity of hyperite, a mineral which it was feared would affect the magnetical instruments. We found on landing a line of metals up the hill, with a gradient of 45°, a winch being fixed at the other end for its working. Here was also, still intact, the little dwelling house on four poles, alongside which we found the material required for the building of a new house as stated in works on Spitzbergen. Near to the house is a cross raised with the following inscription : *Her hviler Stövet af* 15 *Mænd, som döde her i Foraaret* 1873. *Fred med deres Stöv.* This is the epitaph to the Norwegian fishermen who sadly perished here ten years ago.