### Locomotion of Medusidæ

I DO not think that the following remarkable observation has hitherto been made—or at least recorded—by anyone; but as I am at present deprived of access to books, it is possible that I may be mistaken upon this point. It will be observed that it tends experimentally to confirm the opinion of Agassiz, M'Crady, and Fritz Müller, as to the presence of ganglionic centres in the situations they describe.

*Slabberia conica* is, as its specific name implies, a medusid of a conical form, and its size is about that of a fully-developed acorn. Its polypite, which is of unusual proportional length, is highly contractile; and its swimming-bell (*nectocalyx*) supports four short slender tentacles, which are likewise highly contractile. These tentacles take their respective origins from four minute vesicular-like bodies (*marginal vesicles*), which are so situated in the margin of the nectocalyx as to mark off this circular margin into four exact quadrants. If any one of these vesicular-like bodies be excised, immediate and total paralysis ensues in the segment of the cone in which it is situated; *i.e.*, a fourth part of the entire animal ceases to contract. If two adjacent vesicles are excised, one half of the entire animal becomes paralysed, the loss of motion being quite as decided, and the area of its occurrence quite as well defined, as in the case of hemi-section of the spinal cord. If two opposite vesicles are removed, cross paralysis results; if three of these bodies are cut out, only one quarter of the cone continues to contract; and lastly, if they are all taken away, every vestige of contractility immediately disappears, not only in the nectocalyx, but also in the polypite. Now, as the bodies in question are not so large as are the dots over the letter "i" in this printed description, the extreme localisation of stimulating influence thus shown to exist cannot but be deemed a highly remarkable fact, more especially as no amount of mechanical or chemical irritation will cause the slightest contraction in any part of the animal subsequent to the removal of these four almost microscopical points; while, contrariwise, so long as any portion of tissue (no matter how small) is left united to one of these points, it will continue its rhythmical movements for an indefinite period of time. Thus, for example, when a section is made through the equator of the animal, while the upper half at once ceases to move, the lower half—now converted into an open ring—continues its contractile motions for days with unimpaired energy, notwithstanding the thus mutilated organism is, of course, unable to progress.

It is well known that when the entire margin of the nectocalyx of a medusid is removed, the contractility of the remaining portion is destroyed. This fact is usually explained by supposing that the severance of all the contractile fibres produces what may be called mechanical paralysis, just as a man could not move his arm if all its muscles were divided. Experiments I have made on other species of *Medusidæ* have led me to doubt the truth of this explanation—at all events as the whole explanation; but it is unnecessary to detail these at present. The instance above given is enough to show that in the case of this species, at any rate, such an explanation is clearly insufficient, and my object in now writing is to request that if any of your readers are acquainted with observations (whether published or not) similar to those described, they should kindly let me know, either through your columns, or by writing to Gonville and Caius College, Cambridge. GEORGE J. ROMANES

Dunskaith, Ross-shire

### Suicide of a Scorpion

I SHALL feel obliged if you will record in NATURE a fact with reference to the common Black Scorpion of Southern India, which was observed by me some years ago in Madras.

One morning a servant brought to me a very large specimen of this scorpion, which, having stayed out too long in its nocturnal rambles, had apparently got bewildered at daybreak, and been unable to find its way home. To keep it safe, the creature was at once put into a glazed entomological case. Having a few leisure minutes in the course of the forenoon, I thought I would see how my prisoner was getting on, and to have a better view of it the case was placed in a window, in the rays of a hot sun. The light and heat seemed to irritate it very much, and this recalled to my mind a story which I had read somewhere, that a scorpion, on being surrounded with fire, had committed suicide. I hesitated about subjecting my *pet* to such a terrible ordeal, but taking a common botanical lens, I focused the rays of the sun on its back. The moment this was done it began to run hurriedly about the case, hissing and *spitting* in a very fierce way. This experiment was repeated some four or five times with like results, but on trying it once again, the scorpion turned up its tail and plunged the sting, quick as lightning, into its own back. The infliction of the wound was followed by a sudden escape of fluid, and a friend standing by me called out, "See, it has stung itself; it is dead;" and sure enough in less than half a minute life was quite extinct. I have written this brief notice to show (1) That animals may commit suicide; (2) That the poison of certain animals may be destructive to themselves.

Bridge of Allan, N.B., Oct. 23 G. BIDIE

## THE AMÚ EXPEDITION

WE give some extracts from a letter relating to the hydraulics of the Amú, sent us by an English engineer who was with the expedition; the letter is dated "Nukus, at the head of Amú delta, Sept. 10, 1874:"—

The expedition only arrived in the delta at the end of June; it is impossible, therefore, to say at what date the first spring flood of the river takes place, but probably between the 1st and 15th of May. The level of the river on June 23 was what may be called a low-level full river: it fell about twelve centimetres till June 29, and then rose rapidly till July 11, when it was 145 centimetres above the level of June 23. It then fell fifty centimetres up to July 17, and rose again to nearly the previous height on Aug. 4. Since that date the river has fallen steadily, and is to-day some fifty centimetres below the level of June 23. I judge the heights of July 11 and Aug. 4 to be the extreme flood level of the Amú. At that flood level, the discharge at Toyu-boyin, "The Camel's Neck," 160 miles above the head of the delta, cannot be far short of 140,000 cubic feet per second. It is difficult to say what the low-water discharge is, but I should think it is at least 70,000 cubic feet per second.* On Aug. 25, by a rough observation, it was 110,000 cubic feet a second, the river then being 25 centimetres above the level of June 23. At Toyu-boyin the river has cut its way through a bed of shelly limestone of the age of the chalk. The limestone is very compact and hard, full of small shells, turritella and bivalves. Here the river is 1,000 ft. broad. The height to which the limestone bed has been tilted is about 25 ft. The river expands in breath immediately afterwards to 2,000 ft. or more, for about five miles; it then begins to contract again, having on its left a high bank of hard clay passing almost into an argillaceous schist. This high bank extends for above five miles, and ends in an eminence of 50 or 60 ft. in height, crowned with sand. From Toyu-boyin downwards on the right bank, are ridges (of clay, I imagine) crowned with sand: no cultivation on that bank, but opposite and downwards from Toyu-boyin irrigation canals are taken off, excepting where the high clay bank occurs. At the eminence spoken of the river immediately widens to 5,000 ft. or so; this is caused by the first *large* irrigation canal Polwán. As these canals have a great effect on the river all the way down to the delta, I will here try and explain my theory on the subject. As the Amú runs in a soft soil from the south to north nearly in the direction of the meridian, I imagine what the Russians call the law of Bär (from his observations on the Volga) comes into action. The stream has therefore the tendency to run along the right bank, and, as a matter of fact, the deep-water channel is there found. If, then, an irrigation canal be opened on the left bank, the stream is disturbed and a subsidiary deep channel is formed towards the head of the canal (Fig. 1.) The head of the canal is only open during flood, say half the year. When it is shut, the river will run as in Fig. 2: silt will be found at the shaded parts. The river by Bär's law will edge away to the right and become broader, and if this process is continued

* Perhaps this is too high—I cannot make out from Wood's "Oxus" more than 45,000 cubic feet or so per second for winter discharge.