salinity between 1889 and 1893 which would have then allowed the crabs to pass.

The migration over the 162 kilometres from Suez to Port Said took at least five years (1893–1898), not a rapid rate of travel, since the swimming powers of Neptunus are considerable. Dr. Borradaile informs me that he has seen numbers of the nearly related *Polybius henslowi* at the surface of the Atlantic, 200 km. from Brest. Even *Cancer pagurus*, which progresses much less rapidly than the swimming crab Neptunus, can move 160 kilometres in 100 days. A marked specimen has been found to travel thus along the East coast of England (W. B. Hardy, 12th Report of the Development Commissioners, 1922, p. 69).

*Neptunus pelagicus* has now spread along the Mediterranean coasts to right and left of the Port Said mouth of the Canal. To-day it is commonly fished at Alexandria, 260 kilometres to the west of Port Said, for sale on the market, and at Haifa, 315 km. to the north-east. The crab seems to be unknown at Beyrouth, so that Haifa is perhaps near the limit of its extension in this direction. The extreme point of its westward migration is unknown, but it has been reported from Mersa Matruh, 260 km. west of Alexandria. Dr. Calman has been kind enough to examine specimens from Alexandria and from Suez, and informs me that the Mediterranean specimens do not differ morphologically from those of the Red Sea.

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April 25.

### The Brightness of Scintillations from H-particles and from α-particles.

IN a letter to NATURE (September 22, 1923, p. 435) Messrs. L. F. Bates and J. S. Rogers suggest that the particles found by G. Kirsch and H. Pettersson (NATURE, September 15, 1923, p. 394) to be expelled from lithium, magnesium, and silicon under bombardment with α-particles from radium C are really long-range α-particles from the source itself, which the authors first named claim to have found. In their reply (NATURE, November 10, 1923, p. 687) Kirsch and Pettersson point out that the very considerable difference in brightness between scintillations from H- and from α-particles make such a mistake improbable. This raises the question of the relative brightness of scintillations from particles of different kinds, which does not as yet seem to have been made the subject of direct measurements.

By means of a "Vergleichsokular" from Messrs. Reichert in Vienna (designed for comparing the images from two microscopes), in combination with two Watson holoscopic objectives, we have found a way of comparing the scintillations produced on two identical zinc-sulphide screens by, on one side, "natural" H-particles (from hydrogen gas or paraffin exposed to radium emanation), on the other side, α-particles from polonium. The ratio in brightness could be determined quantitatively by introducing light-absorbing screens of known absorption in the way of the light-rays from the α-scintillations until they and the H-scintillations appeared equally bright. The ratio in brightness, given by the absorbing power of the requisite light-filter, was found to be from 1 : 2·7 to 1 : 3·0. Similar measurements made with the particles expelled from quartz (as a quartz capillary charged with radium-emanation or as an extremely thin plate of ground quartz bombarded with the α-particles from a powerful preparation of radium C) gave the same ratio in brightness, referred to the α-scintillations from polonium. It appears therefore as highly probable, that the particles from quartz are really hydrogen nuclei expelled from the silicon atoms by the bombarding α-particles, a result which receives further confirmation from recent experiments by Sir E. Rutherford and Dr. J. Chadwick (NATURE, March 29, p. 457).

It may be added, that the ratio given refers to the surface-brightness ("Flächenhelligkeit") of the two kinds of scintillations. The ratio in integral light-emission is considerably greater, owing to the much greater surface which radiates with α-scintillations than with H-scintillations. The latter ratio has so far not been measured.

The same method is being used for studying the relationship between the velocity of the different particles and the brightness of their scintillations. It may also be of service as a simple means of identifying other unknown particles from the brightness of their scintillations, say the hypothetical $X_3$-particles, in case they are found to exist. It can also be used for distinguishing between the fragments from disintegrated atoms and the α-particles scattered through 90° by the new method for observing atomic fragments of very short range which has been developed in this Institute by Kirsch and Pettersson and described in a letter to NATURE of April 26, p. 603. The details of the experimental arrangement used by us are being published in the Sitzungsberichte of the Vienna Academy of Science.

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April 7.

### The Cardio-Inhibitory Centre.

IN a recent article (*Journ. Physiol.*, vol. lviii. p. 168, 1923) on the localisation of the vaso-motor centre, J. M. D. Scott and Ff. Roberts refer to a paper by Bowman and myself (*Amer. Journ. Physiol.*, vol. xxxix. p. 149, 1915) on the cardio-inhibitory centre, and, by their remarks, indicate that they have not clearly understood our meaning. I desire to emphasise the fact that the other writers studied mainly vaso-motor effects, whereas we were concerned solely with cardio-inhibitory manifestations.

Bowman and I were the first to prove, by the method of unipolar faradisation, that the cardio-inhibitory centre is located in the dorsal vagus nucleus or *ala cinerea*. In a fresh specimen of the medulla oblongata of the dog, the dorsal vagus nucleus is easily recognisable as a translucent-looking ridge, forming the lateral margin of the calamus scriptorius. Its position and appearance, as shown in Fig. 1 of our paper, are identical with those indicated by Ellenberger and Baum in Fig. 165 in their "Anatomie des Hundes."

In localisation experiments, like those described in our paper, it is essential that the excitability of the medulla oblongata be carefully maintained and that the current applied by the stigmatic electrode be of threshold value. Such a current yields definite cardiac inhibition from the dorsal vagus nucleus, but fails to yield it from points 1 mm. or less mesially or laterally to the nucleus. Slightly stronger currents applied to the nucleus elicit complete inhibition (cf. Figs. 1, 2, 3, and 4 of our paper).

The view expressed above, that the dorsal vagus nucleus is the source of the cardio-inhibitory fibres, is held by the following authorities: Kohnstamm, van Gehuchten and Molhant, Herrick, Ranson and Tigerstedt (the latter in "Physiologie der Kreislaufes," vol. 2, p. 424, 1921).

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