Investigations of the Scattering of Light.

PROF. C. G. DARWIN, in his interesting account in NATURE of Oct. 20, 1928 (p. 630), makes a reference to recent work on the scattering of light. It appears desirable in this connexion to point out that the existence in the light scattered by liquids and solids of radiations of modified wave-length was established so early as 1923 by investigations made at Calcutta. Dr. K. R. Ramanathan showed (*Proc. Ind. Assn. Sc.*, vol. 8, p. 190; 1923) that when violet rays pass through carefully purified water or alcohol there is an appreciable quantity of radiations in the green region of the spectrum present in the scattered light. Further studies of the effect in other substances are described by Mr. K. S. Krishnan in the *Phil. Mag.* for October 1925 and by me in *Jour. Opt. Soc. Am.* for October 1927. These investigations were of course well known to workers in this field.

In a lecture delivered at Bangalore on Mar. 16, 1928, and published and distributed on Mar. 31, investigations were described showing *first*, the universality of the effect, namely, that it is observed in the widest variety of physical conditions (gas, vapour, liquid, crystal, or amorphous solid) and in the largest possible variety of chemical individuals (more than eighty different substances); *secondly*, that the modified radiation is strongly polarised and is thus a true scattering effect; *thirdly*, that each incident radiation produces a different set of modified scattered radiations; *fourthly*, that the scattered radiations consist in many cases of fairly sharp lines in displaced positions; and *fifthly*, that the frequency differences between the incident and scattered radiations represent the absorption frequencies of the medium. These observations established and emphasised the fundamental character of the phenomenon in a manner which any isolated observation with a single substance would have quite failed to achieve.

The Russian physicists, to whose observation on the effect in quartz Prof. Darwin refers, made their first communication on the subject after the publication of the notes in NATURE of Mar. 31 and April 21. Their paper appeared in print after *sixteen* other printed papers on the effect, by various authors, had appeared in recognised scientific periodicals.

C. V. RAMAN.

210 Bowbazar Street,
Calcutta, Nov. 13.

A Fresh-water Medusa in England.

THE first record of a fresh-water jelly-fish in England was made by Sir Ray Lankester in a letter to NATURE, June 17, 1880. This little jelly-fish was found in the *Victoria regia* tank of the Botanical Society in Regent's Park, and is most widely known as *Limnocodium Sowerbyi*. By a deplorable decision of the Commission on Zoological Nomenclature, however, some modern writers have changed the generic name to *Craspedacusta*.

I have now to record the occurrence of another fresh-water medusa in a private aquarium in England. The discovery was made by Mr. Vernon Poulton, of Boscombe. With great skill and patience he succeeded in finding not only the free-swimming medusæ but also the very minute fixed hydrosome stage, and he has allowed me to see his preparations of both.

The medusæ undoubtedly belong to the genus *Microhydra*, which has hitherto been recorded only from North American waters, and I see no reason for suggesting that they differ from the type species *M. Ryderi*.

Among the water-weeds in the aquarium in which the medusæ were found were some plants of the American genus *Salvinia*, and it is possible that the *Microhydra* was imported into England attached to this weed; but according to Mr. Poulton's observations, the hydrosome stage was always attached to grains of sand and not to the *Salvinia*.

I wish to appeal to persons who cultivate *Salvinia* or other American water weeds in England to examine the water in their aquaria from time to time to see if these medusæ make an appearance. They are colourless and almost transparent, and the diameter of the bell is about 1 mm., or $\frac{1}{25}$ inch. The number of tentacles varies according to the age of the specimen, but there may be as many as twelve.

The medusæ of *Microhydra* may appear in large numbers and then disappear for a long period, just like the medusæ of *Limnocodium*, so that several observations should be made at different times of the year before abandoning the search.

In conclusion, I may say that, notwithstanding the opinion expressed by Mr. F. Payne in a recent paper, I am convinced that *Microhydra* is generically quite distinct from *Limnocodium*.

SYDNEY J. HICKSON.

Cambridge,
Dec. 10.

The Instability of a Single Vortex-Row.

SIR CHARLES SHERRINGTON, in NATURE of Sept. 1 last, directs attention to the eddy effect which in a heart valve "prevents extreme eversion of the valve, and facilitates closure of the valve without delay or hindrance so soon as the diastolic check of the stream current ensues."

It may interest readers of NATURE to know that this effect was described very clearly by Prof. George Britton Halford, the founder of the Medical School in Melbourne, the first in Australia. His views were published in the *Lancet* and in a local medical journal, but perhaps most fully in a book, "The Action and Sounds of the Heart" (Churchill, 1860), from which I quote the following: "A bullock's heart was obtained, and the auricles cut away nearly as low down as the auriculo-ventricular openings; the cavities of the ventricles were well washed out, and the coagula carefully removed. A vulcanised india-rubber tube of like diameter with the pulmonary artery was then attached by one extremity to the vessel, and by the other to a common forcing pump; water was then thrown into the pulmonary artery, and the semilunar valves tightly shut down, gentle pressure being maintained, in imitation of what takes place in life. The right ventricle, being empty, was in the same state as when the auricle is about to inject it. On pouring water into the ventricle the flaps of the auriculo-ventricular valve rose upon the surface of the fluid, until (the ventricle becoming fully distended) the valve formed a perfect septum between it and the auricle. The left side of the heart was tested in the same manner, and with results perfectly the same, notwithstanding the greater thickness of the valve, the larger size of the musculi papillares, and the stronger chordæ tendineæ."

I find that it is not absolutely necessary to have the emergent artery closed under pressure. The experiment in this simple form is made by my students individually—we call it Halford's Experiment—and always excites interest.

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