No special attention was paid to the absolute measurement of the expansion, but a knowledge of the dimensions of the apparatus enables a rough comparison to be made with Meehan's results under corresponding conditions. The percentage linear expansion found by us to be caused by an atmosphere pressure of carbon dioxide works out at about 0·101 at a temperature of 30° C. Meehan found the percentages at 28° C. and 36° C. to be respectively 0·1292 and 0·1100 in the case of the pinewood charcoal used by him.

It will be observed that the quotient $\sqrt{\eta}/s$ is, on an average, rather more than three times greater for carbon dioxide than for water, so that the expansion caused by the sorption of any given number of molecules is between ten and eleven times as great in the one case as in the other. The difference is quite out of proportion to the difference of molecular size, whatever method is used as a basis of comparison.

While it is scarcely likely that the square-root relationship will prove to be of general application, it is at least significant that two substances so different in their general behaviour towards sorbents as carbon dioxide and water should both show this simple regularity. Experiments with other sorbents and sorbates are being proceeded with.

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Hamilton-Buchanan's Drawings of Indian Fish.

IN NATURE of May 12, p. 770, the following statement was made under "Research Items" in directing attention to my recent work on the MS. drawings of Indian Fish (Ham.-Buch. Collection): "In the first volume there are 22 plates of fish illustrations, representing 51 species, and the rest of the plates are of mammals; the second and third volumes are drawings of birds made by Mr. Gibbons; and the fourth are those of fishes, representing 150 species." I am afraid the writer of these notes has given wrong information. In the first volume there are only twenty plates of fish, and while in the second and third volumes there are some drawings by Mr. Gibbons, the majority of the plates are Buchanan's. The fourth volume contains delineations of 144 species.

I have now examined Buchanan's fish drawings preserved in the libraries of London with interesting results. Through the kindness of Lieut.-Col. R. B. S. Sewell, I have with me the Zoological Survey set (copies recently made) of the drawings in the Asiatic Society of Bengal. There is no doubt that the original drawings, of which Buchanan was deprived at the time of his departure from India in 1815, are those now in the possession of the Asiatic Society of Bengal. I have found a statement in Buchanan's own handwriting that he was not allowed to bring with him drawings of 144 species of fish. It seems to me certain that only 138 out of the 146 drawings listed by Day in vol. 4 (*Proc. As. Soc. Bengal*, pp. 195-209; 1871) are the originals which Buchanan left behind him. Drawings Nos. 34, 53, 62, 63, 64, 70, 71, 84 have been added afterwards to this set. The drawings of *Cyprinus chola* (Pl. LVIII, Fig. 3) and *C. dancena* (Pl. LV, Fig. 4), figured by McClelland, were missing when Day examined the set in 1871. There are four drawings in vol. 1, the originals of which are missing from vol. 4, namely, *Cheilodipterus panijus*, *Mystus chitala*, *Cyprinus curchius*, and *Cyprinus chagunio*. This gives us the original number of drawings belonging to Buchanan's collection—138 + 2 + 4 = 144.

In the library of the India Office are now preserved the originals of the drawings reproduced in the "Gangetic Fishes." In the same volume are five other drawings which were not used by Buchanan. These represent the following species: *Macrognathus armatus*, *Cyprinodon cundinga*, *Clupea purava*, *Mystus kapirat* and *Cyprinus sarana*.

In the library of the Linnean Society there are nine original drawings of Buchanan (probably out of a set of ten, one missing now), accompanied by the descriptions of ten species in Latin. These were sent by Buchanan to his friend Smith, the founder of the society, in 1799. All these nine drawings are figured in the "Gangetic Fishes," no doubt from the replicas of these very drawings.

The set referred to by Günther in the *Zool. Rec.* for 1869 is nowhere to be found in the British Museum (Nat. Hist.). It is probable, however, that Günther was referring to a large number of copies of Buchanan's manuscript fish drawings in the Calcutta and the India Office collection made by Major-General Hardwicke, and bequeathed to the Museum. Identifications in Günther's handwriting are to be found below some of these drawings, while the others bear references to "Gangetic Fishes" in Hardwick's handwriting. Some of these have been published, unfortunately without acknowledgment, in Gray's "Illustrations of Indian Zoology." Attention may also be directed to two or three copies of Buchanan's drawings among a set of Day's fish delineations, now preserved in the library of the Zoological Society of London.

These drawings are of special interest, for it seems to me likely that, in his descriptions of the Gangetic fishes, Buchanan greatly relied on them for the specific characters, at least in the case of quite a number of species. Thus, in the absence of any authentic types, these drawings may be considered as the types of the species described by Buchanan.

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Life and Sea Water.

THE leading article in NATURE of Oct. 6, p. 501, and Prof. F. G. Donnan's discourse, p. 512, recall attention to the conditions under which life may possibly have originated. This provides a certain playground for our ideas, romances, and inquiries; a playground with boundaries and with regions of special interest.

If blood-heat is about 35° C., or a little more in birds, and the optimum temperature for plant life about the same, this turns our thoughts away from the chill shores of north-east England to some tropic coast where rock pools may lie in hot sunshine between tides, evaporating and concentrating. The roughly 3 per cent solution we know as sea water is rather weaker than the 5 per cent normal saline of the physiological laboratory, where one must think of osmotic equilibrium or plasmolysis between tissue and fluid. Not that the density of the salt solution is the only thing that matters. Field and garden crops thrive best on a rather different mixture of salts demanding artificial additions of potassium, phosphates, and nitrates. How could such a nutrient solution have arisen under natural conditions?

When sea water evaporates, the contained substances are deposited, and in a certain order; some substances come out more readily, others less rapidly, than sodium chloride. Chapters of this order of deposition are recorded in the deep-sea floor, in the English Permian and Trias rocks, in the Stassfurt salt deposits, and in the terraces above the Dead Sea. There are manganese deposits in the deep sea, also