

The inner portion of the large *Ziphius* beak gave the following results:—

Moisture, . . . . .	1.14	per cent.	
Combined water, . . . . .	2.78	„	
Carbonic acid, . . . . .	6.81	„	
Phosphoric acid, . . . . .	33.30	„	= 72.69 per cent. tricalcic phosphate.
Fluorine, . . . . .	1.65	„	

Station 289, 2550 fathoms.—Three large tympanic bones, 3 to 4 inches (8 to 10 cm.) in length, apparently belonging to the genus *Balænoptera*, and two nodules with bony nuclei.

The inner portion of an earbone of *Balænoptera* was used for the following determinations:—

Moisture, . . . . .	1.61	per cent.	
Phosphoric acid, . . . . .	32.73	„	= 71.44 per cent. tricalcic phosphate.
Fluorine, . . . . .	1.61	„	

Station 293, 2025 fathoms.—One small indeterminable fragment of bone, impregnated with manganese.

Station 299, 2160 fathoms.—One bilobed tympanic bulla, with the petrous bone attached, apparently of a *Globiocephalus*.

On comparing the preceding analyses of these deep-sea bones and teeth<sup>1</sup> with analyses of recent and fossil bones,<sup>2</sup> it is found that as regards the phosphoric acid there is not much divergence, except where there is much manganese in the specimen: in deep-sea bones the percentage varies from 27 to 34, in recent bones 22 to 34, and in fossil bone 33; the same is the case with the lime: in deep-sea bones 36 to 49 per cent., in recent bones 30 to 41 per cent., and in fossil bone 48 per cent.

The most striking difference is in the fluorine, the percentage of which in recent bones is only 0.004 to 0.032 per cent., in fossil bone 1.50 per cent., while in deep-sea bones it varies from 0.65 to 1.89 per cent., and in deep-sea teeth it reaches 2.28 per cent. These deep-sea specimens of bones and teeth thus resemble fossil bones in the large percentage of fluorine they contain. This fluorine might be assumed to be the original fluorine of the bones rendered more abundant by the removal of the lime salts, but more probably it owes its origin to a continuous, though slowly progressing, double decomposition between the phosphate of the bone and the trace of dissolved fluorides in the sea-water.

Some of the bones and teeth were in a much better state of preservation than others; in some the coating of manganese was very thin, and the Haversian canals and lacunæ were but little impregnated by that substance, so that a fractured surface was greyish white; in others, not only were the bones thickly encrusted, but the canals and lacunæ were nearly all infiltrated with the manganese, as will be seen by reference to the illustrations on Plate X., so that the fractured surface was brown or black, and the bones very

<sup>1</sup> See Analyses Nos. 137 to 153, Appendix III.

<sup>2</sup> See Analyses Nos. 153A, B, C, D.