

feeble, so that the specimens require the most careful handling to prevent their breaking up into fragments. This condition appears to obtain in the highest degree in a fish allied to *Plagyodus*, and occurring in the Madeiran Sea, of which Lowe succeeded in obtaining fragments only. Specimens of this fish are sometimes caught on long lines at great depths, but before they can be hauled to the surface, the body breaks away, leaving fragments only on the hook.¹ We cannot assume that this loose connection of the osseous and muscular systems obtains whilst those fishes remain under the normal physical conditions of their abyssal abode. All are carnivorous, and some of them most rapacious creatures, which must be able to execute rapid and powerful movements to catch and overpower their prey; and for that object their muscular system, thin as its layers may be, must be as strong, and the chain of the segments of their vertebral column as firmly linked together, as in surface fishes. In coming to the surface their body has undergone a change which is merely due to their rapid withdrawal from the pressure under which they lived; it is a much aggravated form of the affection that is experienced by persons reaching great altitudes in a balloon, or by the ascent of a mountain. In every living organism with an intestinal tract there are accumulations of free gases; and, moreover, the blood and other fluids, which permeate every part of the body, contain gases in solution. Under greatly diminished pressure these gases expand, so that, if the withdrawal from a depth is not an extremely slow and gradual process, the various tissues must be distended, loosened and ruptured; and what is a vigorous fish at a depth of 500 or more fathoms, appears at the surface as a loosely-jointed body, which, if the skin is not of sufficient toughness, can only be kept together with difficulty. At great depths a fibrous osseous structure and a thin layer of muscles suffice to obtain the same results for which, at the surface, thickness of muscle and firm osseous tissue are necessary.

The singular circumstance that the first two specimens known of *Saccopteryx*, two of *Chiasmodus*, and one of *Omosudis* were picked up floating on the surface, dead or in a dying condition, with their stomach distended by a large recently swallowed prey, can be easily explained by the aid of those physiological facts. If, during the struggle which must take place between the attacking fish and its prey, the fishes are carried out of their depth into a somewhat higher stratum, the expansion of the gases will cause both to ascend towards the surface, especially if one of them be provided with an air-bladder, and the rate of speed of the ascent will increase the nearer they approach the surface, which they reach dead or in a dying condition, as witnessed and described by Lowe (*vide supra*, p. xx.). Occurrences of this kind must happen very often, as, of course, comparatively few can by accident fall under the observation of naturalists.

In a slight degree the phenomenon described is a matter of every day occurrence, well known to fishermen who fish at depths of from 40 to 80 fathoms. The fishes withdrawn from that depth come up more or less distended, if they possess a closed air-bladder.

¹ *Wieg. Arch.*, 1860, p. 123.