

XLIII.—*On the Injury inflicted on Ships by the Broad-finned Swordfish of the Indian Ocean.* By Dr. J. E. GRAY, F.R.S. &c.

THE Swordfish of the Indian Ocean, which forms the genus *Histiophorus*, on account of the large high dorsal fin, has a gradually tapering, nearly cylindrical, bony beak, covered with granular skin. These fishes swim exceedingly fast; and when they come into contact with a wooden ship, the beak pierces the timbers, which so closely embrace it that the animal can only disengage itself by breaking away from its snout; for the longer the time that it remains attached, the more firmly it becomes fixed, from the swelling of the wood and the fibres of it attempting to regain their natural position. We have a specimen of the snout fixed in the planks of a ship, in the British Museum; and I have seen two or three specimens of a similar kind, all showing the very firm manner in which the snout is fixed in the wood, and that the snout had been broken from the head of the animal, caused, I believe, by the shock of the collision.

The hole made in a piece of wood by an awl or the conical beak of a swordfish simply presses the grain of the wood aside for its passage, so that when the body is removed which formed the hole, the fibres, especially when soaked in water, strive to regain their natural position, and the hole so made is more or less completely filled up and obliterated.

It is even the same with a bullet or cannon-ball, which either forces its way through a kind of crack in the wood, or regularly breaks away a part of the wood, or crushes it, leaving a very irregular hole. The only way in which a clear circular hole can be made in a plank of wood or side of a ship is by an auger or centre-bit, which removes the wood that filled up the hole: such a hole may contract in size, but it is never filled up by that contraction, as part of the substance has been taken away.

I therefore think that we may conclude that, when a broad-finned swordfish comes into collision with the planks of a ship, it forms a hole or, rather, slit which contracts on the beak and does not allow the escape of the fish so as to leave a circular hole in the ship's side. This is important, because a few years ago there was a trial of an insurance case where a circular hole was found in one of the planks, by which the cargo was injured. It was contended on one side that this hole was formed by the beak of a broad-finned swordfish; and this view was supported by a very celebrated comparative anatomist and a popular writer on natural history, and was

supported by one of the most popular writers on astronomy and physics of the day *; and the jury adopted this explanation.

On the other side it was contended that the open circular hole observed in the timber had been made for a tree-nail, and had been left unclosed, and only covered by the copper-sheathing of the vessel; but I do not recollect that any evidence was brought in support of this view, which I believe is the true explanation; for certainly, even allowing that the sword-fish could withdraw its beak, the hole which the beak had made would not have remained circular, but would have become more or less filled up.

May not the whole case be considered an illustration of the want of practical and scientific instruction by what are called the members of several of the most instructed professions?

The swordfish which is supposed to have attacked "the good ship 'Dreadnought'" must have been a very clever fellow, much in advance of his brethren. With his conical bony beak he succeeded in making a cylindrical hole about an inch in diameter through the timbers of the ship, similar to that made by an auger; and having twisted himself into it, he managed, having done the mischief he desired in revenge for having been caught by the ship's crew, to withdraw his beak and to sail away uninjured. He did not do his swimming parallel to the surface of the water (as most fishes do), but he must have done it (judging from the cylindrical hole being found only a few inches from the keel) ascending from the depths, and working at the hole in a nearly perpendicular direction; and if I understand rightly, all this was done while the ship was sailing through the sea.

To me the more simple explanation seems to be that one of the treenail- or bolt-holes, of which there are hundreds in a wooden ship, had been left unfilled. These holes are just about the size and form which the one in the ship is described to have been.

XLIV.—*Notice of a Fossil Hydraspide* (Testudo Leithii, Carter) from Bombay. By Dr. J. E. GRAY, F.R.S. &c.

DR. LEITH has drawn my attention to the description and figure of a fossil freshwater tortoise which he discovered in the freshwater formation of the Island of Bombay, and which is admirably described and figured by my friend Mr. H. J. Carter in his account of the geology of the Island of Bombay, with a map and plates, in the 'Journal of the Bombay Branch

* See "Ship attacked by a Swordfish," Proctor's 'Light Science,' p. 358.



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