

ber, 1867.<sup>6</sup> (3) Copious discharges of fresh water into the sea have been observed to cause extensive mortality among marine organisms. Thus, during the S.W. monsoon and accompanying heavy rains, the west coasts of some parts of India are covered with dead fish thrown ashore from the sea.<sup>7</sup> (4) A sudden irruption of the outer sea into a sheltered and partially brackish inlet may cause the extinction of many of the denizens of the latter, though a few may be able to survive the altered conditions.<sup>8</sup> (5) Volcanic explosions have been observed to cause considerable destruction to marine life, either from the heat of the lava or from the abundance of ashes or of poisonous gases. (6) Want of oxygen, when fishes are crowded together in frightened shoals, or when, burrowing in sand and mud, they are overwhelmed with rapidly accumulating detritus, is another cause of mortality.<sup>9</sup> (7) Shoals of fish are sometimes driven ashore by the large predatory denizens of the deep, such as whales and porpoises. (8) Too much or too little heat in shallow water leads to the destruction of fish. Large numbers of salmon are sometimes killed in the pools of a river during dry and hot weather. (9) Considerable mortality occasionally arises along the littoral zone from the effects of severe frost. (10) Various diseases and parasites affect fish, and lead directly to their death, or weaken them so that they are more easily caught by their enemies.<sup>10</sup> Such phenomena suggest probable causes of death in the case of fossil fishes, whose remains are sometimes crowded together in various geological formations, as, for example, in the Old Red Sandstone.

Of the whole sea-floor, the area best adapted for preserving organic exuviae is obviously that belt in which life is most varied and abundant, and where, along the margin of the land, fresh layers of sediment, transported by rivers and currents from the adjacent shores, are laid down. The most

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<sup>6</sup> Q. J. Geol. Soc. xxix. p. 303.

<sup>7</sup> Denison, *op. cit.* xviii. p. 453, *Nature* (December 19, 1872, p. 124) gives another instance.

<sup>8</sup> Forchhammer, *Edin. New. Phil. Journ.* xxxi. p. 69. *Nature*, i. p. 454; xiii. p. 107.

<sup>9</sup> Sir J. W. Dawson, *Geologist*, ii. 1859, p. 1216.

<sup>10</sup> For fuller references, see an interesting paper by Prof. T. Rupert Jones, *Geol. Mag.* 1882, p. 533.