water containing carbonic acid in solution, and he has more recently conducted a series of experiments to demonstrate the truth of this view. Ten specimens of coral of different species were immersed in sea-water and allowed to remain for periods varying from 20 to 60 days. In each case a perceptible loss of material took place, varying from 0·0725 to 0·1707 of their weight, which he estimated to be equal to a rate of loss amounting to from 0·453 to 0·1860 from one square inch of surface in a year. The more areolar or amorphous corals were attacked more rapidly than the harder crystalline varieties.[267] The complex chemical changes that take place in the sea through the operation of living and dead organisms are referred to on pp. 808, 812, 824, 825.

We may judge, indeed, of the nature and rapidity of some of these changes by watching the decay of stones and material employed in the construction of piers. Mr. Mallet —as the result of experiments with specimens sunk in the sea—concluded that from $\frac{2}{10}$ to $\frac{4}{10}$ of an inch in depth in iron castings 1 inch thick, and about $\frac{6}{10}$ of an inch of wrought iron, will be destroyed in a century in clear salt water. Mr. Stevenson, in referring to these experiments, remarks that at the Bell Rock lighthouse, twenty-five different kinds and combinations of iron were exposed to the action of the sea, and all yielded to corrosion. In some of these castings, the loss has been at the rate of an inch in a century. "One of the bars which was free from air-holes had its specific gravity reduced to 5·63, and its transverse strength from 7409 lb. to 4797 lb., and yet presented no external appearance of decay. Another apparently sound specimen was reduced in strength from 4068 lb. to 2352 lb., having lost nearly half its strength in fifty years."[268] Similar results were observed by Mr. Grothe, resident engineer at the construction of the ill-fated railway bridge across the Firth of

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[267] Proc. Roy. Soc. Edin. xvii. 1889, p. 109. See also R. Irvine, Nature, 1888, p. 461; J. G. Ross, ibid. p. 462. Compare A. Agassiz, Bull. Mus. Comp. Zool. Harvard, xvii. No. 3, 1889, p. 125.

[268] T. Stevenson on "Harbors," p. 47.