line rocks. The blue or dark slate-colored mud takes its color from decomposing organic matter and sulphide of iron, frequently giving off the odor of sulphuretted hydrogen, and assuming a brown or red hue at the surface, owing to oxidation. Besides occurring in deposits of deep water, iron disulphide is met with on some coasts, cementing sand, gravel, and shells into a coherent mass.[300] The chemical changes that result in the elimination of sulphides from sea-water may be explained by supposing that the decomposing animal and vegetable matter of the sea-floor reduces the sulphates to sulphides, which in turn react on the iron and manganese minerals (principally silicates) in the mud, forming sulphides of those metals. Subsequently the oxygen of the water converts the sulphides to oxides, which gather into concretionary forms.[301] The green muds found at depths of 100 to 700 fathoms are characterized by the presence of a considerable quantity of glauconite grains, either isolated or united into concretions, and frequently filling the chambers of *Foraminifera* or other organisms. Round volcanic islands, the bottom is covered with gray volcanic mud and sand derived from the degradation of volcanic rocks. These deposits can be traced to great distances;

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[300] H. Reusch, Neues Jahrb. 1879, p. 255.

[301] J. Y. Buchanan, Brit. Assoc. 1881, p. 584. Mr. Buchanan, in renewing this investigation and obtaining many illustrations from the seas around Scotland, has shown that the mud on many parts of the sea-bottom is being continually passed and repassed through the bodies of animals which live upon it. The mineral matter is thus brought in contact with the organic secretions of the animals and is ground up with these in their milling organs. The reducing action of the secretions produces, Mr. Buchanan believes, sulphides from the sulphates of sea-water, and these sulphides, acting on the ochreous matter of the bottom, give rise to sulphides of iron and manganese, which being very unstable in presence of water and oxygen are, where they lie on the surface, soon transformed into oxides. Proc. Roy. Soc. Edin. xviii. 1890, p. 17, "On the occurrence of sulphur in marine muds." Another view of the decomposition of the sulphates of sea-water is proposed by Dr. Murray and Mr. Irvine. See papers quoted at notes 364 and 366.