applicable not only to the substance in question, but to all the concretionary phosphates found united with the olivine rock of which the islets are composed.[1]

"Some brecciated specimens of St. Paul's Rocks are coated on both sides with black bands, 7 or 8 mm. thick, presenting the mineralogical characters of manganese. Sir Wyville Thomson [2] describes this breccia. Mr. Moseley points out that MacCormick had already drawn attention to this black coating in the fissures of rock. Sir Wyville says that the coating, when triturated, gives a dirty-looking greenish-grey powder, which effervesces in hydrochloric acid, setting chlorine free, and colouring the acid in the same manner as protoxide of manganese. Moreover, Mr. Buchanan found in these breccias with black incrustation, phosphate and carbonate of lime, carbonate of magnesia, and traces of copper and iron, while the crust itself yielded water in the test-tube. I have been able to recognise traces of manganese in unaltered specimens of the olivine rock.

"With regard to the mode of formation of the rock, there are no other positive data than the lithological. Lithological constitution alone cannot always decide the question of origin, the uncertainty increases in proportion as new peridotic rocks are discovered, for fresh discoveries frequently upset views previously entertained. It may be admitted in a general manner that no objections can be raised, *à priori*, against the volcanic origin, pure and simple, of a peridotic rock; olivine can be crystallised artificially with the greatest facility by dry fusion. The igneous origin of this mineral is also proved by its presence in the lavas of active volcanoes, and in older rocks universally admitted to be pyrogenous. Not only can olivine, considered as a mineral, be unquestionably igneous, but some peridotites, if we are to judge from the investigation of competent observers, as Bonney, Hochstetter, &c., present positive characters of eruption. But while some peridotites are eruptive, it is no less true that many masses of olivine rock present characters from which an igneous origin cannot be demonstrated,[3] and it seems certain that very often true peridotites do not occur in the form of injected veins. From the data collected in the Report it is evident that one may admit for the peridotic rocks two modes of origin, and that the question of origin is on the whole to be decided rather by reference to the position of the rocks in relation to those among which they lie, than by mineralogical composition. Unfortunately, however, this very important element of the relation of the rock to those that encircle it is wanting in the case of St. Paul's Rocks. The rocks stand alone in mid-ocean, and of their connection with other rock masses we can state nothing definite.

"The reason that pleads in favour of the eruptive theory is the law of analogy. We know indeed that the small oceanic islands are either of volcanic or coral formation. May not the peridotite of St. Paul's Rocks be assimilated to the group of crystalline rocks represented by the syenite, diabase, and melaphyres forming the base of several volcanic islands of the Atlantic? An obvious argument in favour of an eruptive origin is afforded by the fact that the bottom of the Atlantic has been for long ages, in many points, the theatre of volcanic manifestations; and in particular, the region in which St. Paul's Rocks are situated has in comparatively recent times shown signs of eruptive phenomena. The isolation of these rocks might be adduced as a further proof of their eruptive origin. The soundings taken between St. Paul's Rocks and the nearest continent and other

[1] See analysis of a decomposed specimen impregnated by phosphate of lime, in Narr. Chall. Exp., vol. ii., App. B., p. 18, 1882.

[2] The Atlantic, vol. ii. p. 106.

[3] See the résumé of the results arrived at by the observers who have described peridotites found as regular intercalations in various formations, in Narr. Chall. Exp., vol. ii., App. B, p. 24, 1882.