NO. XXV.—THE DOLERITE OF ABERDOUR, WITH SOME SPECULATIONS ON THE ORIGIN OF ERUPTIVE ROCKS IN GENERAL. By J. G. GOODCHILD, F.G.S., Curator of the Geological Survey Collections in the Museum of Science and Art, Edinburgh.

[Read 26th May, 1898.]

[ABSTRACT.]

IN the course of his remarks the author stated that the dolerite of Hawk Crag, Aberdour, forms a sill which is intrusive in beds belonging to the lower part of the Oil Shales of the Lothians. It shows ophitic structure in its central portions, but passes into basalt or tachylite, where it has been chilled by contact with the cooler rock into which the mass was erupted. Near the more carbonaceous bands the eruptive rock passes into "white trap"—the "white horse" of the miners of the West of Scotland—a phenomenon probably due to the partial reduction of the iron oxides present in the cooling rock effected by the carbonaceous matter. Certain parts of the dolerite interdigitate with strips of the associated rock of sedimentary origin in such a manner as to suggest that here, as in so many other cases, the eruptive rock has replaced portions of the mass.

Many instances in which similar phenomena are to be seen were passed in review in the course of the paper, and Mr. Clough's explanation of these, as due to slow assimilation of the sedimentary rock by the eruptive magma, was referred to at some length. In further explanation of the occurrences in question, it was suggested that the difficulties met with in attempting to account for the behaviour of many intrusive masses, and most especially those of deep-seated origin, might be met by assuming that water charged with alkaline solutions, operating under great pressure, and at temperatures such as that attained by the H_2O in lavas, had slowly dissolved the sedimentary rock, equalised its composition by an equally slow process of diffusion, and had subsequently deposited the dissolved compound in the crystalline form as the temperature fell.

The employment of the term "laccolite" for any intrusive mass, except such as actually displaces the whole of the rock

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invaded, was protested against. It was contended that such phenomena are of rare occurrence, and are restricted to rocks which have been intruded under small super-incumbent pressure, such as occurs in the case of volcanoes.

The paper was illustrated by maps and diagrams.