THE WITWATERSRAND AND ASSOCIATED BEDS

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BY

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CONTENTS.

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INTRODUCTORY REMARKS.

The Witwatersrand beds comprise two formations, the Upper and the Lower Witwatersrand formation. These are conformable, and the division, being purely an arbitrary one, is placed at the base of those conglomerates known as the Main Reef series.

It is this series which contains the pay gold of the district; and which, owing to the great persistency of its average gold contents over large distances (some fifty miles along the strike) has made the Rand famous throughout the world.

Under the heading of Associated Beds, I include the Old, or Basement Granite; the Swaziland series; and the three formations overlying the Upper Witwatersrand formation, which include, enumerating them from below upwards, the Ventersdorp or Vaal River series, the Black Reef series and the Dolomite formation.

These formations may be said to be associated, because while the Upper Witwatersrand beds outcrop at the surface from Boksburg on the east to Krugersdorp on the west, a distance of thirty miles, much of the eastward extension beyond Boksburg is hidden by overlying strata including the Coal-Measures; and some distance to the south-west of Krugersdorp the extension is masked by the overlying Black Reef series and Dolomite. Hence, in

exploring for the Main Reef series on the far East or far West Rand, resource has to be made to deep boring; and a knowledge of the overlying formations becomes essential for the intelligent carrying on of such work.

The Coal-Measures alone offer a vast field for research; very much work has already been done on them; and, I do not propose here to give them more than passing notice.

I intend also to include under "Associated Beds" the New, or Red, Granite. My reasons for doing so are: that although it occupies a considerably higher horizon than the foregoing formations, yet to do so it broke through them; because certain bands of syenite encountered in the Dolomite in deep boreholes on the far East Rand have been strongly suspected (†) of being connected with the Red Granite; and, because in studying the Old, or Basement, Granite it is both interesting and instructive at the same time to compare it with the newer or Red Granite.

Before proceeding, it will be well to mention briefly the remaining formations of the Transvaal.

From the Dolomite upwards these include the following:—

1. The Pretoria formation, consisting of quartzites, frequently ripple-marked; sandstones; and ferruginous shales; and, containing numerous dykes and sheets of diabase.

2. The Plutonic series of the Bushveld, consisting of a complex of eruptive and intrusive igneous rocks including acid; intermediate and basic types, as, for

(†) F. H. Hatch, Trans. Geol. Soc. S.A., vol. VII, part II, p. 64.

example, the Red Granite; various Syenites and Granophyres; Norites, Gabbros, Pyroxenites and Peridotites. Owing to the remarkable fact that this series occupies an almost constant horizon between the Pretoria and Waterberg formations, it has been assigned by Dr. Molengraaff, late State Geologist to the South African Republic, a place among the formations of the Transvaal.

3. The Waterberg formation, consisting of quartzites, conglomerates, sandstones, and ferruginous shales.

4. The Dwyka series. This is a glacial deposit, and consists of fine sediments and coarse breccias—the remains of a former vastly extensive ground moraine. Recent investigations (†) suggest that certain seams of coal may, perhaps, be assigned to this series, and if so, are consequently of inter-glacial age.‡

5. The Coal-Measures, comprising, from below upwards the three following sub-divisions, in any of which seams of coal may occur:—

   (a) The Ecca beds, which were presumably deposited during the period of retreat of the glaciers. These consist mainly of black, grey, and white sandstones, clays, and shales. The grey sandstones often exhibit beautiful examples of false bedding.

(†) G. S. Corstorphine, Trans. Geol. Soc. S.A., vol. VI, part II, pp. 16 to 19.
F. H. Hatch, ibid vol. VII, part II, p. 61.

(‡) Personally, I am not of this opinion, and, my study of the subject leads me to the conclusion that the conglomerate sometimes found forming a roof to the coal, as at the Central Colliery, Vereeniging, or occurring interstratified with the coal, is of fluviatile origin, and consists mainly of waterworks débris of Dwyka breccia.