

OPAL PSEUDOMORPHS FROM WHITE CLIFFS,
NEW SOUTH WALES.

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(Plates vi—vii., text fig. 4).

The occurrence of Opal at White Cliffs as pseudomorphic crystals, called locally "fossil pineapples" has been known for some time; they have been described by several observers, but no agreement has yet been reached as to the species of the original mineral. Recently several good specimens have reached Sydney and were examined by Professor T. W. E. David and the authors, the conclusions arrived at being set forth in the present paper.

Occurrence.—Before proceeding to the description of the specimens themselves, their mode of occurrence, so far as known to us, may be briefly alluded to. The White Cliffs Opal-field was first geologically examined in detail by Mr. J. B. Jaquet, and it is chiefly to his report¹ that we must turn for our knowledge. The opal is found in the Upper Cretaceous or "Desert Sandstone" Series, which at White Cliffs rests on Palæozoic slates of probably Silurian age. Overlying the Palæozoic strata are (*d*) coarse grits and sandstones, succeeded by (*c*) a thickness of fine white, kaolin-like material of highly siliceous composition and containing large waterworn boulders of quartzite with Devonian fossils. Concretionary nodules, and more rarely thin beds of gypsum occur in these deposits. Above this are (*b*) conglomerates consisting of small pebbles in a white siliceous matrix similar to *c*. It is in the beds *b* and *c* that the opal occurs. It is often found replacing various organic remains as Sauropterygian bones, Crinoid calices, stems, and separate ossicles, Belemnite guards and bivalve and univalve shells, as well as coniferous wood².

¹ Jaquet—Ann. Rept. Dept. Mines and Agric. N. S. Wales, 1892 (1893), pp. 140—142.

² Etheridge—Rec. Austr. Mus., iii., 2, 1897, p. 19; Mem. Geol. Surv. N. S. Wales, Pal. No. 11, 1902, p. 10; Rec. Austr. Mus., v., 4, 1904, pp. 248, 251; *loc. cit.*, v., 5, 1904, pp. 306-316.

Pittman—Min. Res. N. S. Wales, 1901, p. 405.

Tate—Trans. Roy. Soc. S. Austr., xxii., 1898, p. 77.