

NOTE ON A GROOVED AND POLISHED GRANITE SURFACE NEAR EULO, WESTERN QUEENSLAND.

ARTHUR WADE, D.Sc., A.R.C.Sc., F.G.S.

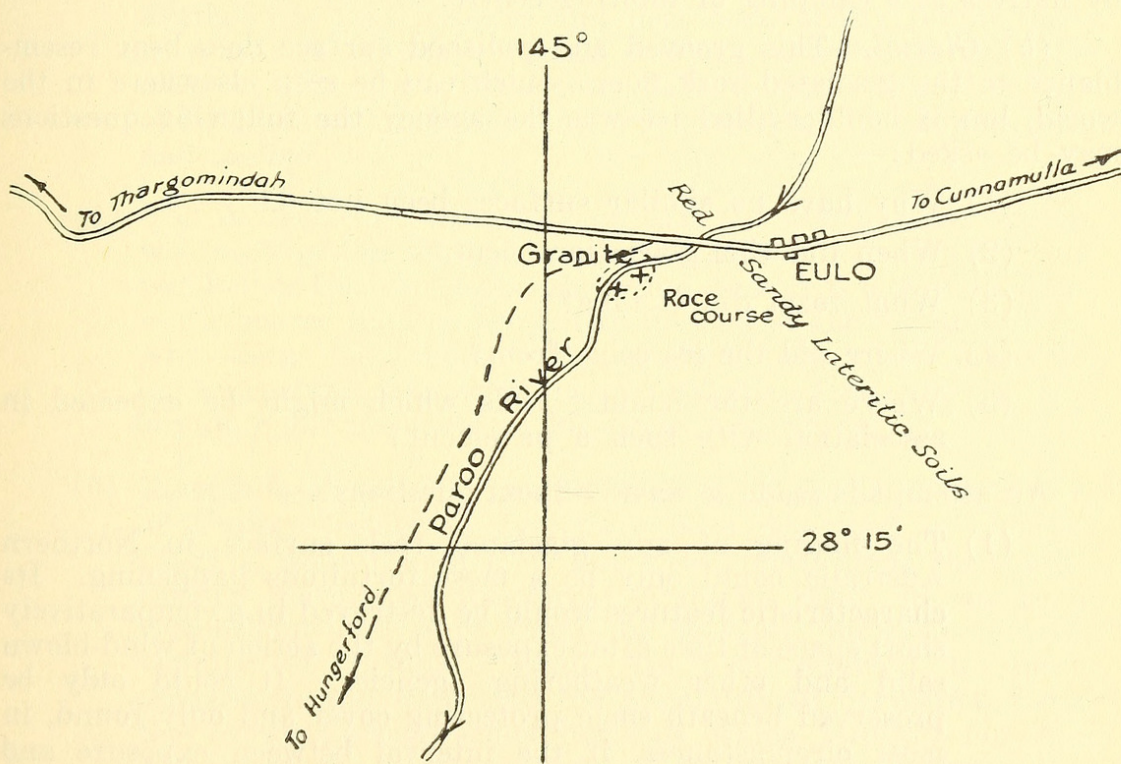
(1 TEXT FIGURE.)

(*Read before the Royal Society of Queensland, 30th June, 1941.*)

1. LOCATION.—The village of Eulo stands in the midst of red sandy plains with occasional low, flat-topped mesas or ridges consisting of rubbly ferruginous laterite, pale yellow ironstone, brown porcellanitic and quartzitic layers. A measured section exposed about 40 feet of these materials. They are the remnants of a sheet which was formerly much more extensive in this part of Queensland.

At Eulo the broad shallow valley of the Paroo River cuts through the plains and, at a distance of about $1\frac{1}{2}$ miles to the south of the village, exposes underlying granite. The granite outcrops occur on both sides of the shallow depression through which the Paroo River runs and are near the western margin of the racecourse. They form a bar in the bed of the river at this place.

2. DESCRIPTION.—The outcrops take the usual form—low hog-backs and rounded boulder-like masses. Evidence of decomposition or weathering, other than exfoliation due to exposure, is slight. The surfaces look as though they had been uncovered in comparatively



Scale 2 miles = 1 inch.

TEXT FIGURE 1.

recent times by the scouring action of flood waters. They are becoming more exposed as the cover of soft material is removed. The general old granite surface seems to be one of peneplanation.

One of the hog-backs near the river on its eastern bank is of interest because on its surface are the remnants of a grooved and polished surface. This can be clearly seen in the accompanying photograph. The grooves are broad, shallow, parallel, and maintain a constant direction which, according to the Author's notes, run north-west to south-east (subject to more accurate determination). The polished surface, when examined in the vertical sections provided by its fractured margins, is imposed on a thin white layer of rock flour formed by the powdering of the granite surface below.

3. AGENTS.—How this granite surface came to be grooved and polished in this manner must be a subject for speculation but the occurrence is certainly of scientific interest. Only two agencies seem possible—human or glacial.

(a) *Human*.—It is possible that the grooving and polishing has been caused by aborigines in the course of manufacturing and sharpening stone implements. If this be so the matter can be left to students in another field. The Author has seen a number of rock surfaces which have been so used by natives in various parts of Australia but none seem to have had such regularity as appears in this case. Grooves tended to be narrower and deeper and, in some cases, they were observed to cross one another. To wear down and polish a granite surface in the manner shown would take very many years of work. On the other hand, the locality is, perhaps, one which would be regularly frequented by natives as a camping or hunting centre.

(b) *Glacial*.—This grooved and polished surface does bear resemblance to the glaciated rock floors which can be seen elsewhere in the world, but if boulder-filled ice was the agency the following questions may be asked:—

- (1) Why have no similar surfaces been noted?
- (2) When did this glaciation occur?
- (3) What form did it take?
- (4) Where did the ice come from?
- (5) Where are the boulder beds which might be expected in association with such a pavement?

An attempt is made to answer these questions:—

- (1) The finding of any glaciated rock surface in Northern Australia could only be a most fortuitous happening. Its characteristic features would be destroyed in a comparatively short space of time after exposure by the action of wind-blown sand and other weathering agencies. It could only be preserved beneath some protecting cover and only found, in most circumstances, if the interval between exposure and discovery was relatively short.
- (2) While the preservation of a glaciated floor of Permo-Carboniferous age so far north as south-western Queensland may be within the bounds of possibility since boulder beds

of this age are known to occur in regions further north, considerations of probability suggest more recent origin. Several Australian geologists have submitted evidence, based chiefly on occurrences of erratics, of a Cretaceous Ice Age in Australia. Woolnough and David (1926), however, in marshalling part of this evidence, cannot be more certain with regard to the age of the beds from which erratics noted in Central Australia are derived than that they "may range from about Middle Cretaceous to the base of the Miocene." Howchin (1923), on the other hand, considered that some of these erratics could have been derived from Pre-Cambrian tillites or even tillites of Permo-Carboniferous age, exposures of which had been recently found at no great distance from the principal area described by Woolnough and David.

Large boulders of Devonian limestone found in the Cretaceous sediments of north-western New South Wales suggest transportation by ice (Dun. 1898).

Evidence of glacial action farther to the west in Western Australia, not far from Laverton, have been described by Talbot and Clarke and ascribed to a Cretaceous glaciation but Maitland, in discussing the paper, leaned towards a Permo-Carboniferous origin for the boulder beds dealt with.

- (3) There is nothing in the records referred to that provides convincing proof of the existence of land ice in Central Australian regions or in Queensland during Cretaceous times. The most that can be inferred from the evidence available is that icebergs and floes occasionally found their way into the Mesozoic inland seas of Australia towards the close of that era. These may have dropped their burdens of boulders and morainic materials as they drifted northwards and melted.
- (4) The Author's personal view is that the South Polar region was near to the southern coasts of Australia in the time of the Permo-Carboniferous glaciation and may have still been much nearer than at present to the end of the Mesozoic Era. Any bergs and floes which drifted into these Mesozoic epicontinental seas were most probably derived from the circum-polar ice sheet of Mesozoic Antarctica.
- (5) Remnants of possible boulder beds in Queensland, probably of Upper Cretaceous age, have been described by Jensen (1921). Erratics noted by him were traced along the south-eastern margin of the Great Artesian Basin in southern Queensland and were found to be most numerous in the vicinity of Injune. Wade has also referred to these occurrences but suggested the possibility of derivation from the Permo-Carboniferous horizons which outcrop not far distant to the north. Much of the material forming the accumulations of boulders on this south-eastern margin of the Great Artesian Basin is clearly derived from the former more extensive cover of siliceous "billy," but associated with this are erratic blocks of crystalline igneous rocks.

4. CONCLUSIONS.—Examination of the literature creates a strong impression that much further work is necessary before this Cretaceous Ice Age leaves the nebulous stage to become recognised as a well-established episode in the geological history of Queensland and other parts of Australia.

On such evidence it is impossible to ascribe this grooved and polished surface definitely to glacial action. The alternative agent, the stone-working aborigine, seems at present to be the more probable. In either case the occurrence is worthy of record.

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Note.—For further references see bibliography, Woolnough and David, 1926, pp. 333-334. Most of the works listed above are supplementary.



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