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REPORT ON SURVEY OF BRICK SHALES

YARRALUMLA AREA.

by

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INTRODUCTION.

This report covers the plane table survey work carried out by D.J. Tugby and W.V. Rudd from 31st December 1947 to 2nd February 1948, on the ridge running N.W. from the U.S.A. Legation, and from Brick Trig. Station to the Brick Works.

Two other parties of students have worked in the same area, and their plane table sheets are attached.

A tracing has been made integrating the maps of all three parties. It is considered desirable to state the distribution of work, among the parties, which resulted in the completed tracing.

Sheet 1 - Area immediately to N.E. of Brick Trig.; covered by Messrs. Baird, Casey, Belford. Not contoured.

Sheet 2 - Part of the area covered by the above team; another part by Messrs. Joklik and Walpole; and the remainder by the authors.

Sheet 3 - Area to N.W. of Brick Trig., covered by the authors. This, the most thoroughly investigated area, supplied much of the knowledge of the geology.

With regard to the traverse on Sheet 2 - it is noted that a large misclose occurred when tying into the U.S.A. Legation. This is considered due to the accumulation and carrying through of errors from the three different parties which worked in the area - the parties having varying degrees of knowledge of, and experience with, the plane table and Beaman Arc.

MAPPING.

Carried out with the plane table and Beaman Arc to a scale of 1" = 400'. Contours have been drawn with interval 10'; the datum being Brick Trig. at R.L.1946.16.

GEOLOGY.

Stratigraphy.

The area mapped contains a probably conformable series of sedimentary and pyroclastic rocks, including tuffs, shales, quartzites and limestones and a rock provisionally called porphyry.

The tuffs are mainly in the area between Brick Trig. and the Brick Works. They consist of fine to medium grained rocks with individual grains of quartz up to 2mm. in diameter and a quartzitic matrix. The individual bands of tuff are usually small in thickness, up to 2 - 3", and none appears to be sufficiently thick or distinctive to form a definite marker band. Occasional bands of white tuff of more distinctive character can be traced for small distances.

Generally the tuffs are interbedded with either shales or quartzites and do not form massive beds alone.

In the series marked as Shales with Tuff Bands, the tuffs are interbedded with rather tuffaceous shales, the latter being darker in colour than the yellow brown shales of the beds marked Shales. The former form a transitional series between the Shales on the one hand and the Tuff and Quartzite Series on the other.

In the S.W. portion of the map, this series occurs o either side of the Tuff and Quartzite Series but is much broader to the E. of the latter than to the W. On the E., the band running roughly N.-S. broadens out into an approximately SSE-NNW valley suggesting a change in dip from very steep towards the W. at the N. and S. ends of the mapped area to a dip of approximately 45' to 55' in the valley. This band is largely lacking in outcrops upon which d and strike can be measured.

To the W. of the Tuff and Quartzite Series a similar but thinner band of Shale with Tuff outcrops in the N. portion of the SW. mapped area, just E. of the Brick Works and apparently limiting the extension of the cuts on the side. In this position the series consists of hard purple and grey shales with fine tuff bands and is probably responsible for the hill to the E. of the Brick Works. This band is traceable to a position about half way along the Brick Works road and is then problematical, being replaced by quartzites to the S.

W. of the main Brick Works Shale is a well marked horizon consisting of fine tuffs with lenses of grey shale. This bed is approximately 30' thick and outcrops about 450' N. and 1000' S. of a point about 300' E. of the junction between main and Government House roads. This is a well marked but narrow transitional band passing rapidly into an area to the W. occupied predominantly by tuffs.

The porphyry is fairly uniform wherever it occurs but is lighter in colour in the S.W. outcrop. S. of the U.S. Legation the porphyry is more green in colour and weathers to a characteristic soft green material. Typically, however, the porphyry is hard and relatively unweathered.

The portion marked as Shale on the map is typically yellow brown in colour and shows strong cleavage in 3-4 directions. Fissibility varies from place to place, cleavage remaining constant. Bedding is not frequently shown, but, where present, only rarely forms paper shales. Most of the bands mapped as shale appear to be suitable for brick making, except where capped by ironstone in the N.E. portion of the map. White shale is only found on a localised horizon near the old white shale quarry at Westlake.

N.E. of Brick Trig. the extent of the shale band is problematical and it may narrow considerably in this direction and finish about in the position of station B' approximately 700' N. 15' W. of the junction of main and quarry roads. The E. boundary of this band has not been mapped but the area near B' appears to be a fracture zone, accompanied by small anticlines and synclines.

The quartzites occur in a fairly massive condition 600' S. of the junction of main and Brick Works roads. Elsewhere they are interbedded with tuffs; the bands, however, are normally thicker than the tuff bands and may attain 7'-8' in thickness. A good deal of the material marked as Quartzite on the ridge running N.W. from the U.S. Legation is interbedded with tuffs.

The presumptive contact between shale and porphyry S.E. of the U.S. Legation is worthy of investigation to determine the relation of the quartzite in this vicinity. The survey was commenced on the assumption that the quartzite in this district formed a capping to the hill but experience shows that, in the S.W. area at least, the quartzites and tuffs and shales and tuffs form a bedded conformable series, and this seems likely to be the case near the U.S. Legation.

Lateritic Soil.

Lateritic soil in which small ironstone nodules are developing occurs over a wide area on the Mixed Tuff and Quartzite Series. These occur up to 5' thick and contain small ironstone concretions up to ¼" in diameter and fairly profusely distributed. The soils tend to be thickest on the hillsides and best developed for iron content there. In some of the area worked on the map, distribution is patchy and confined to bands along the hillsides. Lateritic soils also occur outside the worked area in places where their distribution has not been followed up, e.g. just E. of the crest of the ridge running NNW. from Brick Trig.

Structure.

Owing to one party not having covered the N.E. area the structure there has not been well seen by any one person. To the S.W. however, the conformable beds have an average strike of N. 15° W. The dip is almost uniformly steep towards the W. but increases from E. to W. until the shale beds on the W. of the Brick Works shale band are almost vertical and possibly slightly overturned in places.

However, 100' E. of the junction of the main and Brick Trig. Quarry roads there are several distinct dips to the E. of the order of 60° in shale. This is probably due to a local syncline just E. of this point running N.-S. and probably followed by a small anticline to the E. which culminates along the top of the ridge running N.N.W. from the Brick Trig. Shale Quarry.

Wherever the shale series is well exposed in quarries, large numbers of small anticlines and synclines occur; it seems likely, therefore, that this feature occurs over most of the area, at least in the shale, and that the quartzites are faulted and fractured.

Relation of Topography and Geology.

The hard quartzites near the U.S. Legation form prominent steep sided hills with rather convex slopes near the top becoming concave near the base. The tops of the ridges are therefore marked and follow the quartzites closely.

In the S.W. area the quartzites are rather arenaceous and more friable and do not form prominent hills except 850' S. of the junction of main and Forestry School roads where bands of hard quartzite can be seen running round the hillside.

The higher parts of the area to the S.W. are formed by the Mixed Tuff and Quartzite Series. The hill upon the flanks of which the Brick Works is situated is due to hard bands of tuffs in the shale.

The drainage tends to follow the strike, major valleys occurring in the shale series.

RECOMMENDATIONS.

1. The most profitable area for future survey for brick shale would appear to be that immediately to the N. of the present Brick Works.

2. A small area S.E. of the U.S. Legation is worth investigating to establish the possible contact there between shale and porphyry, a type of contact not found elsewhere in the area.

3. Brick shale might be obtained from -

a. The continuation of the Brick Works Hill to the S.

b. Small ridge near Westlake running S.E. from the present white shale quarry.

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