

PROGRESS REPORT ON THE GEOLOGICAL SURVEY OF THE YILGARN GOLDFIELD (NORTH OF THE GREAT EASTERN RAILWAY).

(By H. A. Ellis, B.Sc., A.O.S.M.)

Field work on this area was commenced late last year and was continued this year from March 22nd to the middle of June when an interruption was caused by the concentration of work on the Koolyanobbing Iron Ore deposits.

Mr. R. S. Matheson was in the field with the writer and undertook the detailed investigations of the mining groups as well as assisting in the regional mapping when opportunity afforded.

The regional mapping was carried out by the writer, and up to the middle of June, the external boundaries of the Greenstone Series, as well as the boundaries of some of the more distinct lithological types forming part of this Series, were delineated as far north as a line passing through the Sisters Trigonometrical Station (H.K. 7) and the Radio Mine, about five miles north of Bullfinch townsite. A considerable area of granitic and gneissic country lying to the east and west of the greenstone belt extending between Southern Cross and Colreavy was traversed, and in the Koolyanobbing district Mr. Matheson carried out a plane-table triangulation survey of about 150 square miles of country in which only a very small amount of survey data was available on existing plans.

The following mining groups were examined by Mr. Matheson and his reports appear elsewhere in the Annual Report:—

The Hope's Hill Group,

The Pilot Group,

The Copperhead Syndicate (Bullfinch Group),

The Koolyanobbing Group.

Several geological features of importance in the interpretation of the major geological structure have been recognised and mapped, and it is now possible to indicate the approximate position of the axis of the major anticlinal cross-fold comparable in order of magnitude with the major synclinal crossfold occurring between Nevoria and Burbidge in the southern portion of the goldfield.

The regional pitch of the structure southward from Southern Cross is steep to the south-east, and between Southern Cross and a point situated a short distance north of Corinthian there is a length of about twelve miles of country in which changes of pitch from north-west to south-east occur, and in which are situated, in addition to many small gold occurrences, the Hope's Hill, Pilot, and Corinthian mining groups.

North of Corinthian the regional pitch is to the north-west, with minor reversals of pitch. This regional pitch to the north-west is maintained at least as far north as the Sisters Trigonometrical Station, the northern limit of the detailed regional mapping so far carried out.

The axis of a major anticlinal crossfold must, therefore, pass through the Greenstone Series somewhere between Southern Cross and a little north of Corinthian.

On the other side of the structure, namely, the jaspilite horizon in the Greenstone Series as exposed at Koolyanobbing which is traceable with breaks, from Bullfinch south-eastward through Southern Cross, Marvel Loch, Nevoria and then in a northerly

direction through Palmer's Find, Yellowdine Lake and north-westward from Koolyanobbing, there is evidence which points to a spot about eight to ten miles south-east of Trig. Station M.Y. 1 as being the locality of a change in regional strike associated with the existence of a cross-fold. On the western shores of Lake Barlee in this vicinity the jaspilite horizon can be seen extending southward to Yellowdine Lake with a regional strike approximating to the north. To the northward the jaspilites assume a regional strike of nearly north-west, and for a considerable length of this north-westerly striking portion of the jaspilites the regional pitch is to the north-west, and the major drag-folds indicate that the beds are forming the eastern limb of a northerly pitching antiline.

The axis of the major anticlinal crossfold can be reasonably presumed to pass through the major structure in a north-easterly direction from a point somewhere between Southern Cross and Corinthian to a point about eight to ten miles south-east of Trig Station M.Y. 1 at Koolyanobbing.

This anticlinal crossfold, together with the synclinal crossfold at Nevoria, has caused the gradual convergence of the jaspilite horizon in a southerly direction and the convergence of the structure lines in a general northerly direction demanded by this interpretation of the major structure, can be seen to be taking place northward from the line of the axis of the anticlinal crossfold.

A synclinal crossfold is surely being approached as we proceed in a general northerly direction from Bullfinch, but field work has not yet been undertaken in this direction.

A band of metamorphosed erosion sediments and fine grained basic tuffs in which quartzites, phyllites, pebble conglomerates, and garnetiferous amphibolite schist are prominent, has been traced north-westwards to Bullfinch townsite from the northern shore of Lake Koorkoordine immediately west of the point where the Southern Cross-Hope's Hill road crosses the lake. At present, this Series of rocks of predominantly sedimentary origin is thought to be a stage in the Greenstone Series, as no evidence of repetition of the beds by folding has so far been found. If they represented a portion of the White-stone Series which had been preserved as an infolded synclinal remnant, repetition of the beds in a direction at right angles to the strike should be able to be detected. A careful search for this feature was made without success, and it certainly seems at present that these beds form part of a unilateral structure at least as far north as Corinthian.

Anthophyllite schist and talc associated with a coarse-grained amphibolite showing a pegmatoid development occur as parallel bands on the western side of the metamorphosed sedimentary band and are traceable for many miles north-westward from the shore of Lake Koorkoordine.

The formation of replacement gneisses and micaeous schists as a result of metasomatic replacement of the marginal areas of the Greenstone Series by granitic material is well shown in the exposures near the eastern boundary of the Greenstone Series between Hope's Hill and Corinthian. Unfortunately, the rocks are too deeply weathered to provide a suite of typical specimens for petrological and chemical investigation, but the field evidence supporting the conception of granitisation is very strong in this locality.