

A map, embracing an area extending from $11\frac{1}{2}$ miles North, three and a-half miles South, two and a half miles West, and one mile East from the Lennonville Post Office, embodying the results of this work, was issued to the public in the month of September.

It was deemed desirable that the Southern extension of these deposits in the direction of Mount Magnet and Boogardie should be mapped and reported upon; this work was entrusted to Mr. Gibson. The area embraced by his labours extended over about 36 square miles. Upon the map, which is now being prepared for the lithographer, there are shown all shafts, alluvial workings, existing leases, the strike and underlie of all the reef and ore bodies, in addition to the geological boundaries, so far as they can be followed.

The main auriferous series is enclosed in a belt of more or less highly altered greenstones, which extend in a general Northerly direction from West Mount Magnet, through Moyagee, and as far North as Lake Austin and the town of Cue. The belt attains a maximum width of about 15 miles. This belt is composed of rocks, for which the term Greenstone has been provisionally adopted, and includes diorite, pyroxenite, together with hornblende and chloritic schists, which may merely represent the crushed or plated out variety of the former, induced by shearing. Owing to the paucity of natural sections, it has been found impossible to distinguish on the map, or even trace out the field, the relative area occupied by each, and further, mining operations have not been carried sufficiently far to afford much assistance in this direction. The Greenstones are intersected by numerous faults, and are also traversed by belts of laminated quartzites (cherts?), often highly ferruginous, which rise up from the surrounding country in the form of low ridges.

The Greenstones are bounded on either side by belts of Granite, from which small tongues of aplite emanate. In many portions of the district there are dykes of granite intersecting the greenstone. The foliation of the greenstone seems to have taken place prior to the intrusion by the granite.

The laminated quartzites (cherts?), which are exclusively confined to the greenstones, are of two distinct varieties, viz., the hematite-bearing, the purely silicious type; the former predominates in the neighbourhood of Boogardie, whilst the silicious type is more prominent at Lennonville. The deposits of the Lennonville type are practically vertical, and forms belts varying from two to four chains in width. They invariably carry gold, but not always in payable quantities; they are, however, traversed by numerous rich chutes, which are being worked with satisfactory results.

The deposits of the Boogardie type differ somewhat from those of Lennonville in that, at any depth yet attained, they prove to be more compact, and are in some places exceptionally magnetic, rendering work with a compass well nigh impossible. They are traversed by numerous faults, the mapping of which is of considerable importance from a mining point of view, in that it is along these lines that the rich chutes of gold for which the district is noted occur. The bulk of the gold has been found to occur in rich chutes where the faults intersect the quartzites. Wherever seen, these faults cross the strike of the quartzite at right angles, and as the latter are generally only about from 30 to 60 feet in width, it necessarily follows that the width of the chutes is small; they are never found to continue into the country rock in either wall. The fault fissures are invariably filled with brecciated quartzite, recemented with chalcedone quartz, and traversed by small angular quartz veins. The fissures vary from three to six feet in width.

The quartzites (cherts?) appear to have been old fault lines, or shear zones, along which thermal solutions carrying iron, silica, etc., have found their way to the surface.

The quartz reefs occur plentifully in both the granite and the Greenstone, though, as a rule, it is only those close to the Greenstone which have proved to be auriferous to any extent. The chutes in these reefs are short, but frequently rich. It is interesting to note that these quartz reefs often form the continuation of the faults by which the laminated quartzites (cherts?) are intersected.

So far as observations have at present been carried, these auriferous deposits of Boogardie bear a remarkable resemblance to those of Peak Hill and the Horseshoe. It is highly desirable, in the interests of the State, in view of the light conferred by the recent work in the Mount Magnet District, that when opportunity offers the Northern extension of this belt should be geologically examined with the view of showing its relation to the deposits of Nannine, Meekathara, and other districts in the North Murchison District.

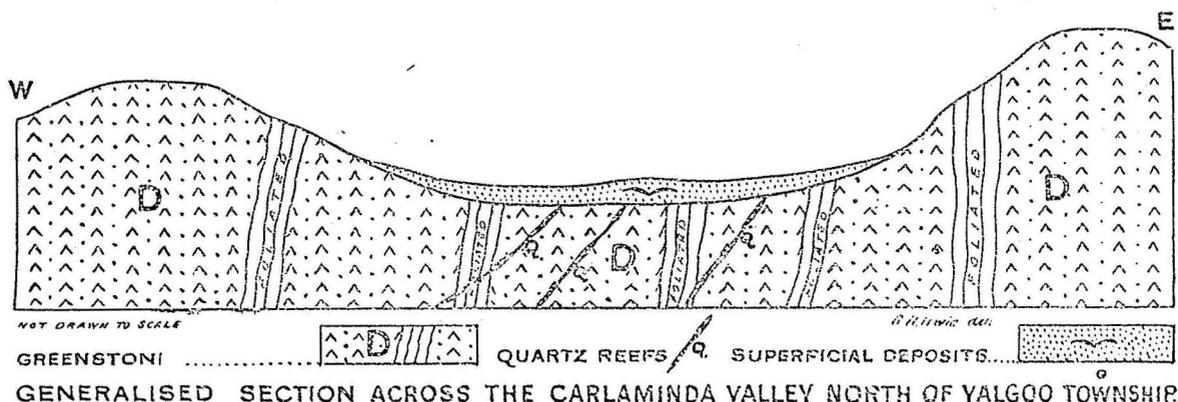
The map and report on the Boogardie District will be shortly available to the public.

Yalgoo.—In accordance with instructions, I visited Yalgoo on my return from the Murchison, for the purpose of reporting upon the alluvial deposits in the more immediate vicinity of the Township.

The Township of Yalgoo lies in a broad valley, flanked on either side by low ranges composed of amphibolite rock, which seems to be the staple formation of the district. It is in this valley that deep alluvial ground has been held to exist. The valley is drained by a small watercourse, which carries all the water Southwards. The broad expanse of the valley is covered with a variable thickness of superficial deposits, some of which are partially cemented into solid rock. The dam at the Railway Reserve shows the nature of the "cement."

The Public Battery water shaft is reported to have met with "alluvial wash" in a drive which had been put in from the bottom, but no gold was apparently obtained. I visited the site of the shaft, which is at present inaccessible. From what can be seen at the present time, it would seem that the sinking was through (below a few feet of superficial deposits) decomposed amphibolite of the type prevailing in the district. There is no evidence as to the existence of "deep alluvial" in the shaft. I incline to the belief that the "wash" encountered in the drive is nothing more than a belt of decomposed fault rock containing rounded and sub-angular fragments of the surrounding rocks. In many places along the flat in the valley the country rock is exposed at the surface. This, coupled with the evidence

derived from such of the sections as are open to inspection, would make it appear that no deep alluvial deposits exist in the Carlaminda Valley. The generalised section herewith shows the structure of the Carlaminda Valley:—



While in Yalgoo the opportunity was taken to examine the various workings on the Emerald Reef, which yielded such sensational returns in the early days of the field. About 4,000ozs. of gold were obtained from a flat or boat-shaped reef, about 100 feet in length, and 10 feet in width and depth. Since the flat reef has been worked out a good deal of prospecting work has been done in the hope of finding the continuation thereof, but so far without any success. A fairly well-defined fissure has been proved to extend along what may be called the outcrop of the reef, which has a trend of North-East and South-West. The Emerald Reef is hemmed in, as it were, between two comparatively barren belts of foliated greenstone, separated by either a line of fault or joint, which is fairly persistent to the North-East and South-West. The deposit seems to be neither more nor less than a network of irregular veins, embraced within certain well defined limits, parallel to the general strike of the reef. The known phenomenal richness of the surface would seem to me to encourage the prosecution of more judicious prospecting than has been up to the present carried out. No attempt would seem to me so far to have been made to seriously test the possible continuity of the reef at a depth.

In addition to this, Carlaminda was visited, but as most of the properties had long been abandoned, or otherwise inaccessible, description thereof is impossible. So far as could be seen the reefs were remarkably persistent in their strike, and all had a steep underlie to the West. The quartz, judging by that lying on the various dumps, was of an exceptionally glassy nature, and, in places, contained small though appreciable quantities of the green and blue carbonates of copper, together with a little limonite.

A visit was also paid to the almost deserted township of Melville, where similar conditions prevailed.

To the South of the old Gold Mining Lease 94 three men were engaged in dryblowing, but with what success I was unable to learn. In the vicinity of this locality were several quartz and jasper veins, identical in character with those occurring at the Horseshoe, Peak Hill, the Weld Ranges, Lennonville, and elsewhere on the Murchison. The judicious prospecting of these should lead to the discovery of rich ore chutes here as elsewhere.

I was guided by Mr. Howie, of Yalgoo, to the gullies west of Melville, which appeared to have been extensively worked in the early days for alluvial deposits. These deposits, however, did not attain any thickness. The occurrence of deep leads anywhere in these gullies is not to be expected.

Paddington and Broad Arrow.—The residents of Paddington and Broad Arrow, through the medium of the Town Clerk of the two Municipalities, approached the Government for assistance in boring for either lodes or alluvial deposits, at the same time agreeing to pay one-half of the expense. In accordance with an official request the local authorities delineated upon a plan those places which, in their eyes, seemed to merit especial attention, and for which aid was required, it being held that the discovery of fresh deposits would tend to establish confidence in the future of the district, and encourage the systematic exploration of the deeper ground.

Having received instructions to visit Paddington and Broad Arrow in connection with the application, the Assistant Geologist, Mr. Gibson, was employed to collect the necessary geological data bearing on the question.

The mining centres of Broad Arrow and Paddington are, in their geological features, identical with those of Bardoc, with which the various formations are coterminous. The gold produced from Broad Arrow and Paddington has been derived from two distinct sources, viz., the superficial deposits and the lode formations or quartz reefs: these having yielded, up to the end of 1901, 57,199·13ozs. of gold by the crushing of 68,815·13 tons of ore, being at the rate of ·83ozs. per ton. At the time the district was visited very little mining was going on, and most of the properties were abandoned, or otherwise inaccessible. Abandonment of a mining district, however, does not necessarily mean that the locality is worked out; and, further, strangulation of lodes or reefs is not a proof of limited extent in depth, but a necessary consequence of their mode of origin. The auriferous belt of Paddington and Broad Arrow is confined to a comparatively narrow strip of country a little over a mile in width, and is practically coincident with the area over which the country rock has suffered the greatest amount of movement. The reefs and formations are all practically parallel, and trend generally North-West and South-East. These, as far as can be seen on the surface, have a considerable longitudinal extent, being, however, cleavage veins they are liable to pinch out at any time, but will make again. Most of the numerous workings being