Preliminary Summary of the Geology near Rocky Boat Harbour Sth. Tasmania

000

mr Crimstaff
Returned with thanks
[illegible] 16/5/59.

468000
5176600

997

~~0066~~ 076

382002

27th February, 9

PRELIMINARY SUMMARY OF THE GEOLOGY NEAR ROCKY BOAT HARBOUR, SOUTHERN TASMANIA

by

Maxwell R. Banks
University of Tasmania

Due to dense coastal scrub the area covered was not as extensive as hoped. The coastal geology from the western end of the beach of Prion Bay to a point about half a mile west of Prettys Point was studied in some detail. Observations were made on the coastal rocks from this point east to South-East Cape from the fishing boat which came in close to the coast for this purpose, and the rocks in the cliffs were studied through binoculars (7x50). In this way a fair idea of the coastal geology was obtained. Should further work in the area be contemplated by the company, it should not be assumed that foot movement along the coast is at all easy. Approximately one day was spent cutting about a quarter of a mile of track through the scrub to permit access to coastal sections. Some method of rapid transfer from point to point would be much more efficient, i.e. either boat or helicopter.

The oldest rocks in the area studied are dolomites of presumably Precambrian age which outcrop in the cliffs on the western shore of the Rocky Boat Harbour and in a hill slope near the western end of the beach east of Point Vivian. The easternmost outcrop shows some bedding which is almost vertical and trends about 10°. These dolomites are overlain unconformably by a sequence of conglomerates with minor siltstone and sandstone beds. This sequence is of the order of a thousand feet thick and is remarkable on account of the composition of the fragments it contains. These are mainly dolomite, serpentinite and other ultrabasic rocks with varying proportions of siliceous fragments. The preponderance of dolomite fragments in some conglomerate beds cause these beds to be grey or mottled grey and pink in colour while predominance of ultrabasic rocks in other beds causes these latter to be vivid green or red in colour. The associated sandstones and siltstones are commonly green in colour and greasy to feel and it is thought this is due to the presence of detrital serpentinite fragments. The sandstones are commonly graded and show scour effects at their base. This conglomerate sequence is

reminiscent of the situation at the Sawback Range, Adamsfield, as postulated by Carey and Banks (1954). These conglomerates at the eastern edge of Rocky Boat Plains Beach were described by Twelvetrees (1915, p.13) as Permian tillites. On the western side of Rocky Boat Harbour a thin (about 100 feet) bed of puddingstone siliceous conglomerate with associated siliceous sandstones seems to be interbedded with this sequence. The conglomerate sequence on Point Vivian passes upwards and eastwards along dip into dolomitic siltstones with common beds up to ten feet thick of dolomitic, siliceous conglomerate with some graded bedding and large folded fragments of siltstone. These conglomerates are considered to have been deposited by turbidity currents. The dolomitic siltstones (referred to by Twelvetrees, 1915, p.14, as lithographic stone) show lamination, some ripple marking, interference ripple marking and worm casts. Thin beds of crossbedded dolomitic sandstones are interbedded with the siltstones. East of the eastern end of Rocky Boat Plains Beach there is a sequence of serpentinite conglomerates, sandstones, claystones and interbedded claystone, sandstone and fine conglomerates. The rocks of this sequence are similar in gross lithology to the beds in Rocky Boat Harbour and the beach east of Point Vivian. In one of the fine sandstones in this sequence a few sponge spicules were found and indicate that it is at least partly marine. Fossils were carefully sought in this sequence and all the rocks east of Point Cecil but, except for worm casts, these few spicules were the only fossils found. In a burnt area on the hills behind Rocky Boat Plains this claystone sequence occurs and it would appear that it extends east as far as Prettys Point where it is overlain by the quartzites, siltstones and conglomerates described by Twelvetrees (1915, p.12). Twelvetrees refers to these latter as rich in tubular casts and a specimen (probably collected by Twelvetrees) seen by the author in the Queen Victoria Museum, Launceston, was siliceous and looks like some beds of the Caroline Creek (or Moina) Sandstone. This correlation would accord with the occurrence of limestone in Surprise River Bay to the east as the beds from the east side of Prettys Point to the western end of Rocky Boat Plains Bay all dip steeply south-east. West of the dolomite at Rocky Boat Harbour the dolomitic conglomerate sequence appears to be only about a hundred feet thick and it is succeeded by the puddingstone siliceous conglomerate, quartz sandstones and rare dolomitic, cross-bedded sandstone, the whole being several hundred feet thick.

The conglomerates are faulted against contorted Gordon Limestone along the western side of Point Cecil. The limestone contains prominent stylolytic bands and fossils such as sponges (a Receptaculitid), corals (probably Lichenaria), strophomenid brachiopods, euomphalid gastropods and trilobites. Should the identification of the coral as Lichenaria be correct the limestone is Middle Ordovician. Further north along the western side of Point Cecil medium to dark grey thinly-bedded siltstone rich in worm casts, occurs below the limestone. One bed rich in trilobites (Cryptolithids and others) and brachiopods (probably orthids) was found and is probably Ordovician (possibly Lower Ordovician or lower Middle Ordovician). This suggests correlation with the Florentine Valley Mudstone. At the western end of the Prion Bay beach puddingstone conglomerates, finer-grained conglomerates and sandstones, all quartz rich, occur. They show cross-bedding, some ripple marking and some beds rich in worm castings. They appear to be typical Owen Conglomerate.

Thus there appears to be in this area a sequence of Ordovician strata similar to those elsewhere in the state, the dolomitic, serpentinous conglomerates, sandstones, siltstones and claystones probably being a correlate of the Jukes Breccia, the siliceous conglomerates, sandstones etc. being a correlate of the Owen Conglomerate followed upwards by Caroline Creek Sandstone, Florentine Valley Mudstone and Gordon Limestone. Of especial significance is the thickness of the Jukes correlate east of Point Cecil, unusual composition of this sequence and its marine origin. On the western side of Shoemakers Point the Ordovician strata, locally Gordon Limestone, are overlain unconformably by a tillite as stated by Twelvetrees (1915). East of this unconformity the rocks exposed in the cliffs are Permian and Triassic with intrusions, mainly sills, of dolerite.

Just east of Point Vivian at the western end of Rocky Boat Plains Beach are the conglomerates and claystones described by Twelvetrees (1915, pp. 16-17). The coal mentioned by him is not visible, being perhaps covered by the sand dunes. A specimen of Carbonaceous(?) clay from this sequence was collected for pollen analysis. This occurrence of steeply dipping so-called Tertiary beds is anomalous.

All older rocks are covered by a superficial quartz-rich gravel and sand dunes - a peaty sand with large fragments of wood occurs in the bed of Rocky Boat Plains Creek near its mouth.

The basic structure of the area is that of a large syncline to the west with its axis somewhere near the centre of Prion Bay, the axis trending

more or less south-west, and a large, complex anticline with its axis somewhat east of Point Vivian and also trending south-west. The syncline of Prion Bay plunges to the south-west and there are indications that the anticline does likewise. The strikes and dips and other structural elements are shown on the accompanying map. Of interest is the thrust on the west side of Point Cecil which trends 275° and is steeply thrust from the south. Point Cecil is the site of a small anticline and syncline both plunging south and then a larger anticline, in the core of which the dolomite is exposed. This anticline tends to be overfolded from the north-west. On Point Vivian dips vary somewhat and minor rolls occur. The structural relationship of the "Tertiary" sequence to the Ordovician sequence on Point Vivian is not clear but may be faulted. On the eastern end of Rocky Boat Plains Beach there is another anticline exposing dolomite and this anticline shows several faults near the core. Because of the presence of this anticline and the south-easterly dip of the beds on Point Vivian a syncline plunging more-or-less south is inferred beneath the western part of the Rocky Boat Plains Beach. From this beach south along the coastline towards Prettys Point the rocks consistently dip north-east at a steep angle. They are little folded although one small fold trending 158° and overfolded from the south-west was seen. This was associated with a minor break-thrust. The beds along this stretch of coast show many faults belonging to at least five sets but most of these have very small displacement. The major ones trend E.S.E. and have a horizontal displacement of a few hundred feet. The structure between the end of the traversed coastline and Prettys Point is unclear from air photos and from the easternmost point visited. There is a strong possibility that there is an angular discordance between the serpentinous conglomerates, sandstones and claystones visited and the Caroline Creek Sandstone on the east side of Prettys Point. The serpentinous sediments trend consistently south-east and are structurally and stratigraphically below the north-east trending Caroline Creek Sandstone. The critical area is along the thirty chains of coastline west of Prettys Point. To examine this over half a mile of track would have to have been cut and the time for this was estimated at two days. Although the critical nature of this strip was recognised at the time, time was not available, for cutting the track so that the problem had to be left unresolved. Solutions other than that of unconformity are possible, e.g. there may be a sharp swing in strike with rapid thinning of serpentinous sediments towards the south. Only ground traversing will provide

the solution. Should the unconformity solution be correct, the unconformity may be yet another expression of movements in the Lower Ordovician as shown by Wade and Solomon (1958, p.389) at Mount Lyell. Alternatively one might query the correlation of the serpentinous sediments with the Jukes Breccia and propose correlation with the Dundas Group. This would infer that at least some serpentinite masses are older than postulated by Banks (1956, p.199) and require the corollary that the serpentinites of Dundas, intruded into rocks as young as the Fernflow Conglomerate were themselves tectonic re-intrusions of a pre-Dundas Group ultrabasic complex.

On the western side of The Shoemaker, Gordon Limestone dipping south-easterly is overlain unconformably by Permian tillite.

There has been some prospecting activity in the area in the past. Black sands on Rocky Boat Plains Beach were apparently worked at one time as there are traces of a former race descending westward to bluff east of the mouth of the Rocky Boat Plains River. These are a really fairly extensive but are apparently only a superficial skin on the beach. Minor runnels of a similar nature occur in Rocky Boat Harbour itself. These black sands were noted by Twelvetrees (1915) who stated that they consisted of chromite and magnetite. Preliminary determinations by R.J. Ford of some of the black sands collected indicate that the dominant black mineral is chromite and that there is very little magnetite. Light coloured minerals are present in small proportions but have not yet been determined. The sands were thought by Twelvetrees to have been derived from the serpentinous conglomerates and this seems to be a very reasonable hypothesis. The black sands probably gave rise to widely extravagant stories, heard by the author from time to time, of runnels of osmiridium in the beach at Rocky Boat Harbour. Some osmiridium seems to have been obtained (see map, Elliston, 1953, fig.1., p.1251) but there is certainly no great quantity there. Black sands and fine gravels on the shores of Rocky Boat Harbour were panned during the visit but no osmiridium was seen.

There has been more recent prospecting activity as shown by relatively new claim pegs in several places (see map), some recently excavated prospect holes and several camp sites, one of which was occupied later than January, 1958.

Perhaps of more economic significance was a dissemination of blobs of pyritic material, the colour of which suggested presence of some copper. *

These occurred in a red serpentinous conglomerate and to a lesser extent in a sequence of dolomite and siltstone along a presumably normal fault bringing these two units into contact. The position of this occurrence is shown on the map and it is on the western side of the third minor headland from the eastern end of Rocky Boat Plains Beach. This headland is quite a prominent red one. There is not a great deal of pyritic material (probably 1% or less of the rock) and there is no sign of sericitisation in the adjacent rocks. Although it is doubtful that this occurrence is valuable it may be an "outlier" of more intensive mineralisation. A chip sample at about eye level along the cliff face in red conglomerate was taken and is submitted for assay or other examination.

In very brief summary the geology around Rocky Boat Harbour shows considerable thicknesses of serpentinous dolomitic sediments resting unconformably on dolomite and interbedded with andoverlain by siliceous conglomerates and sandstones with the characteristic lithology of the Owen Conglomerate. Sponge spicules indicate that at least some of these are marine and their stratigraphic and structural relations suggest correlation with the Jukes Breccia. Fossiliferous representatives of higher formations of the Junee Group occur. These are folded into a major south-westerly plunging syncline to the west and anticline to the east where the Ordovician rocks are unconformably overlain Permian sediments dipping gently south-east. Minor faulting and folding affects the Junee Group. Black sands occur on Rocky Boat Plains Beach and consist mainly of chromite. A small area of pyritisation occurs near the eastern end of this beach.

REFERENCES

Banks, M.R., 1956 The Middle and Upper Cambrian Series (Dundas Group and its Correlates) in Tasmania. XX Int. Geol. Cong. El. Sist. Cambrico. Tomo I, pt. II, pp. 165-212.

Carey, S.W. and Banks, M.R. 1954 Lower Palaeozoic Unconformities in Tasmania. Pap. Proc. Roy. Soc. Tas. Vol.88, pp. 245-270.

Elliston, J.E. 1953 Platinoids in Tasmania. 5th Emp. Min. Cong., Vol.1, Geol. Aust. Ore Dep., pp. 1250-1254.

Twelvetrees, W.H. 1915 Reconnaissance of Country between Recherche Bay and New River Southern Tasmania. Tas. Dept. Mines Geol. Surv. Bull. 24.

Wade, M.L. and Solomon, M. 1958 Geology of the Mount Lyell Mines, Tasmania. Ec. Geol. vol. 53, no. 4, pp.367-416.

COPY

006

382008

G-YS.

11/58

A PRELIMINARY SUMMARY OF THE FINAL REPORT ON THE

GEOLOGY OF POINT HIBBS

Precambrian phyllites and sandstones outcrop along the shoreline from Hibbs Lagoon to the south for about half a mile. These rocks are folded and the trend of the axes swings from 186° (true) in the north to 201° to the south. The pitch varies in direction and amount and there is direct evidence of two lineations. The Precambrian here is directly and unconformably overlain by rocks of the Spero Group but further south in Spero Bay this group overlies rocks of presumably Cambrian age. These Cambrian rocks consist of dark-grey argillites, with some light grey, green and red argillites, greywackes, greywacke breccias and thin beds of dark grey limestone and dolomite. These rocks are correlated with the Dundas Group on lithological grounds. In general the Cambrian rocks dip fairly steeply south or south-east but folds pitching to 86° and 150° (approx.) were measured. Along the coast for a mile and a half north of the Spero River these rocks were intruded by masses of gabbroic rock which has been partly serpentinised. Whether the isolated outcrops along the shoreline represent a once continuous body could not be ascertained.

The Spero Group unconformably overlies the Precambrian rocks south of Hibbs Lagoon and is faulted against the Cambrian rocks about a quarter of a mile further south. The best outcrops are east and south east of Pyramid Island and on the northern shore of Spero Bay where the group apparently unconformably overlies the Cambrian rocks. North of Point Hibbs this group consists of a basal light-grey conglomerate (20 feet), white, green and red sandstones more than 200 feet thick showing evidence of currents, coming from the north-west, then at least 660 feet of limestone, including near the top a bed of red conglomerate from which conglomerate dykes have spread into the limestone below. This Point Hibbs Limestone contains some richly fossiliferous horizons. Preliminary determinations of the fossils suggest an Upper Lower Devonian or perhaps Middle Devonian age. The limestone is overlain north of Point Hibbs by siltstone and sandstone with worm tubes and then a pebbly quartzite and finally a white siliceous conglomerate. South of Point Hibbs the limestone (and interbedded conglomerate) occurs and is overlain by about 800 feet of pale siltstone, quartzite and conglomerate, and these by at least 220 feet of vivid red sediments consisting of 29 cycles of conglomerate, sandstone and siltstone,

of which the siltstone is the dominant member. This red sequence is overlain by more than 210 feet of white calcareous sandstone with a thin limestone band. This contains spiriferid brachiopods and other fossils and preliminary identifications suggest a Middle Devonian age. The Spero Group is folded into an asymmetrical syncline plunging to 6° and with the eastern limb overturned. There are minor cross-folds on this main structure and one of these, an anticline south of Point Hibbs plunged 79° at 35°.

The Spero Group and the Cambrian rocks were both intruded by sills and dykes of minette up to a few feet thick. It is notable that north of Point Hibbs these intrusions occur close to faults between the Spero Group and the Cambrian rocks. With them is associated minor pyritisation and some fuchsite occurs in a shatter zone close to one of these bodies about three quarters of a mile south of Hibbs Lagoon. In this area at least five faults must be postulated, forming in essence a north-easterly trending horst of Cambrian rocks in the syncline of the Spero Group.

The limestone of the Spero Group is faulted on the west against beds low in the Permian sequence. This fault swings from almost due south on the north-side of Point Hibbs to somewhat east of south on the south-side. On the north the Permian beds are almost vertical and dipping west while on the south, close to the limestone, they are dipping east and overturned. The Permian section on the north shore is about 1300 feet thick and consists mainly of siltstones with sandstones, tillites, and some calcareous beds. They are correlated with beds of the Wynyard Tillite, Quamby Group and Golden Valley Group in other parts of the state. Only a couple of hundred feet of siltstone correlated with the Golden Valley Group occurs on the south side of the point. The Permian rocks are intruded by a sheet of dolerite transgressing stratigraphically upwards from south to north.

Consolidated boulder beds (containing dolerite boulders) of littoral origin occur in several places on the north shore of Spero Bay and are presumably Cainozoic in age.

signed MAXWELL R. BANKS

11/58