A RECONNAISSANCE OF THE CORINNA-PIEMAN HEADS AREA—GEOLOGY

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(With 1 Text Figure and 1 Plate)

ABSTRACT

Slates, phyllites, quartzites, conglomerates and dolomite of Pre-Cambrian age occur in a faulted anticline. They have been intruded by pre-metamorphic basic rocks which occur as a dyke swarm, by Cambrian ultrabasic rocks around Heazlewood and by Devonian granites at the Pieman Heads. The granite lies along the axis of the anticline.

The Pre-Cambrian rocks have been divided into four sets of beds which have been named. They have suffered low-grade regional metamorphism with superimposed thermal metamorphism near the granite. A major fault which occurs along the Donaldson River is a member of a system of faults with north-easterly trend. Silicified conglomerates and basalt of Tertiary age overlie the older rocks unconformably along the Corinna Road.

INTRODUCTION

A reconnaissance was made over parts of an area to the west and north of Corinna. Traverses were made along the Pieman River from the Heads up to the rapids near the Paradise River; from the Heads south to Conical Rocks; from the Heads north to just below the Interview River; from the Heads north-east to the plains between the Interview River and Mt. Donaldson; from Corinna south for a few miles along the track to Zeehan; along the main road north to Bald Hill; along the track towards the Savage River from the main road; and along the track into the Whyte and Rocky Rivers.

An attempt was made to unravel the complex structure and stratigraphy of the Pre-Cambrian rocks but little could be achieved in such a short time. Full use was made of air photos and much of the major structure was obtained by photo-interpretation. The dyke swarm was also mapped by this method.

The field work was shared by the two authors, while the petrology, structure and the preparation of this account was done by Spry.

PREVIOUS LITERATURE

Very little was known of most parts of this rather inaccessible area. Ward (1911) described the sediments briefly and mentioned the occurrence of slates, quartzites and conglomerates which he tentatively regarded as of Cambro-Ordovician age, while the dolomite south of Rupert Point was considered to be possibly Gordon Limestone. The Tertiary conglomerates were also found in a number of places. Ward mapped portions of the dyke swarm and described some members although he did not appreciate its extent; he considered the dykes to be coeval with the Cambrian basic and ultrabasic intrusions common to the West Coast of Tasmania. The granite was mapped and correlated with the Heemskirk mass to the south.

Smith (1897) and Twelvetrees (1900, 1903) outlined the geology along the Corinna Road between Bald Hill and Corinna. Twelvetrees (1900) described the amphibolites near the Rocky and Whyte Rivers and also discussed the occurrence of alluvial gold at Long Plains in his 1903 report, while Blake (1939) briefly discussed the Corinna alluvial goldfield.

PRECAMBRIAN ROCKS

Sediments

There is an unknown thickness (at least 10,000 ft.) of unfossiliferous sediments in the area. They are chiefly quartzites and phyllites with minor slates, conglomerates, and dolomite. The rocks may be divided regionally into four distinct groups but their mutual relations are not yet known.

Coastal Area

The rocks which exend northwards from the Pieman Heads to Rupert Point and beyond and which are confined by the granite to the east, consist of phyllites, quartzites, conglomerates and dolomite with a general strike of 330° and steep dips to the west. Severe contortion and overturning towards the east occurs in several places, though drag folds and cleavage indicate that the sequence as a whole is not overturned.

These rocks will be referred to as the Rupert Beds.

The quartzites are both well-bedded and massive and are usually white. Some specimens* (5788) show a disinct lineation parallel to the dip. A quartzite (5792) from just south of Rupert Point shows a very marked, patchy colouration in cream and dark-grey, which is due to irregular pigmentation by secondary finely granular haematite. Under the microscope the quartzites show evidence of crushing giving a "mortar" texture with large ragged quartz grains set in a fine quartz-sericite matrix.

The phyllites (5776, 5777) are grey to cream in colour with a marked fissility which is usually at a high angle to the bedding. Thin sections show that they consist of a fine-grained aggregate of quartz, muscovite and biotite accompanied by tourmaline, magnetite, rutile and feldspar in some specimens.

* Specimens in the collection of the Geology Department, University of Tasmania.

For "Pre-Cambrian" read "Precambrian" throughout the paper.

A number of conglomerate beds occur along this stretch of coast as shown in plate I, No. 3. They appear to be quite thin and lenticular with probably a maximum thickness of 20 feet and thus the thickness of 300 feet reported by Ward (1911) is not confirmed. The boulders are well-rounded and are composed chiefly of quartzite in an argillaceous matrix. The conglomerates have been sheared in some places producing a distinct schistosity in the matrix (as in 5789), and elongating some pebbles (5790). Plate I, No. 4 shows that the elongation of the pebbles is parallel to the cleavage in both the conglomerate and the associated beds, but is at an angle to the bedding. It is interesting to note that Ward (1911) reported that in certain beds only the slate fragments were deformed while the quartzite pebbles were not. The authors also noticed that in some cases only a few of the quartzite pebbles were deformed but further comment on these phenomena is deferred until a more complete study now in progress of the deformed conglomerates of Tasmania is to hand. The phyllite (5793) associated with the most southerly exposure of the conglomerate showed a weak lineation parallel to the direction of elongation of the pebbles with a stronger one at right angles.

A thin, impure, dark-grey dolomite (5789) occurs about a mile and a half south of Rupert Point. It is conformable with the other sediments and thus is not Silurian as suggested by Ward (1911).

Interview River Plains Area

This belt of country, which extends from a point east of Mt. Sunday southwards to the coast below Conical Rocks and which includes the button-grass plains of the upper reaches of the Interview River, is underlain by rocks which differ from those of the coastal belt. These rocks are phyllites and quartzites which have been intruded by the Pre-Cambrian dyke swarm. In general the rocks strike at 30° and dip moderately to the south-east although there is a considerable change in the strike to east-west on the north side of the Pieman River. The sediments strike parallel to the coast on the southern side of the Pieman Heads where they dip chiefly to the south-east with a good deal of contortion. These rocks are separated from the sediments to the west by the granite and differ from them in lacking conglomerates and dolomite and by being predominantly phyllitic with abundant basic intrusions. The phyllites are typified by containing intraformational structures such as slumping and mud flakes (5771, 5765), as well as having a more pronounced cleavage. They are separated from the beds at Mt. Donaldson by the Donaldson River Fault and differ from them in showing a little higher grade of regional metamorphism and in having abundant intrusions. These sediments will be referred to as the Interview Beds, although they are probably equivalent to Ward's (1911) Balfour Slates and Sandstones.

Mt. Donaldson Area

The Donaldson Beds consist of quartzite, conglomerate and black slate. This group lacks the intrusions which are typical of the Interview Beds and is less altered than the Rupert Beds. It is similar to the latter in that it contains much quartzite, conglomerate and black slate (5809).

The Area North of Corinna.

Between Corinna and Bald Hill, which is about 25 miles north along the Waratah Road, there are quartzites (many of them grey and impure, e.g., 5784), phyllites (5785) and some black graphitic slates (5786). The strike varies from about 340° to 10° and dips are usually to the east at 50° or more. The Precambrian rocks are bounded by the Bald Hill pyroxenite to the north-east and by the granite of the Meredith Range to the east, and will be referred to as the Corinna Beds.

There are glossy phyllites on the track to the Whyte River and these strike at 320°, dipping east at 70°. They have a pronounced cleavage and lineation. There are green schists and coarse, altered basic rocks along the river end of the track and the river itself. These are described later.

At the miners' hut on the Whyte River is a fine-grained, green lustrous schist (5794) which is cut by quartz veins and which has been mineralized. It consists of quartz and sericite with a little chlorite, iron ore, apatite and tourmaline. The quartz has been drawn out into strongly elongated aggregates parallel to the cleavage. Crenulation of the cleavage gives the rock a false cleavage and causes the macroscopic lineation.

Basic Rocks

One of the most important features of the area is the swarm of basic to ultrabasic intrusions which extend from south of Conical Rocks across the Pieman, up to the east of Mt. Sunday and beyond Mts. Vera, Hadmar and Rosslyn. The intrusions are narrow, elongated bodies some of which are concordant while others are discordant. In some places they are parallel to the bedding and are sills but in most instances they are at a shallow angle or even perpendicular to the bedding. The longest is five miles in length and they are commonly over a mile long but only up to 200 feet in thickness. They are broken by the north-west and east-west sets of minor faults. Up to the present, over 40 intrusions have been found but inspection of air photos suggests that the swarm continues to the N.N.E. where a very large number of bodies extends for many miles. Investigations are now being carried out to determine the relationships between the dyke swarm and the dolerites at Rocky Cape (Spry, this volume). It is not impossible that the sediments in the Pieman Heads area are equivalent to the Rocky Cape Group and that the Cooee Dolerite is the less altered equivalent of the dyke swarm.

The amphibolites near the junction of the Whyte and Rocky Rivers are similar although more strongly metamorphosed and are regarded as being part of the same group. Varieties have been found showing all degrees of metamorphism giving types varying from slightly sheared dolerites to coarse feldspathic amphibolites.

Two distinct petrographic types have been distinguished in the dyke swarm but it is inevitable that detailed collecting would reveal much more variation. These rocks are being examined in more detail as part of the study of the Pre-Cambrian basic rocks of Tasmania.

LEGEND

Recent
- SAND DUNES

Devonian
- GRANITE

Precambrian
- DYKES
- DONALDSON BEDS
- RUPERT BEDS
- INTERVIEW BEDS

- FAULT
- ROCK BOUNDARY
- STRUCTURAL TRENDS
- 10° STRIKE AND DIP OF SEDIMENTS
- STRIKE OF VERTICAL JOINTS
- TRACK

Coordinates on Transverse Mercator Projection. Zone 7 based on Mt. Donaldson E. 314828, N. 875663. Grid Convergence at the centre of this map is 00° 41' 30" E.

FIG. 1.—Reconnaissance geological map of the Pieman Heads area.

The most common variety is an altered dolerite which was described by Ward (1911) as an amphibolite and an example of this is (5806) which is a slightly metamorphosed and sheared dolerite consisting of ragged brown hornblende and plagioclase laths which are riddled with epidote. Ilmenite, leucoxene and quartz are present. The presence of a little biotite is possibly due to the granite which is about a half mile away.

Specimen (5804) is a more strongly altered dolerite consisting of irregular lenticular patches of ragged, pale amphibole (near tremolite) with ilmenite and leucoxene. There are a few bent feldspar crystals but the majority have been altered to very finely granular zoisite. Also present is a little fresh albite and quartz.

The second variety of dyke rock is typified by (5801) which is fine-grained, greenish-black and glittering. It consists entirely of chlorite with a texture which is decussate and unlike a normal igneous or regional metamorphic texture. There is a little iron ore present.

TABLE I.

	A	B
SiO_2	24·96	62·64
Al_2O_3	22·61	13·87
Fe_2O_3	2·13	1·18
FeO	23·50	3·17
CaO	Nil	6·16
MgO	15·50	6·33
Na_2O	Nil	4·99
K_2O	Nil	0·93
H_2O-	0·10	Nil
H_2O+	11·38	1·12
TiO_2	0·10	0·10
P_2O_5	Nil	Nil
NnO	0·22	0·11
	100·50	100·60

A. Chlorite rock, 5801, Interview River. Anal., Wt. St. C. Manson.

B. Amphibolite, 5795, Whyte River. Anal., W. St. C. Manson.

Comparison with the work of Orcel (1927) shows that it is the variety *ripidolite*. The recalculation of the analysis following Hey (1956) shows that the composition lies in the ripidolite field of Hey's classification.

	Recalculation of Analysis to Anhydrous Base	Atomic Proportions of Metal Ions	No. of Metal Atoms on Basis of 140
SiO_2	28·17	0·4694	2·59
Al_2O_3	25·51	0·5005	2·76
Fe_2O_3	2·40	0·0301	0·17
FeO	26·52	0·3691	2·04
MgO	17·49	0·4340	2·40
	100·09	Oxygen=2·536	

The chlorite is uniaxial positive with $\beta = 1{\cdot}621 \pm {\cdot}003$, and has a very low birefringence with anomalous blue interference colours. Thus the optical properties coincide quite well with Hey's ripidolite.

As the thin section of this specimen showed only chlorite and slight traces of magnetite, a powdered sample of the rock, from which magnetite had been removed, was X-rayed using CuK radiation and a Unicam 3 cm. radius powder camera. Allowance was not made for film shrinkage in obtaining the following X-ray pattern of the mineral.

Line No.	Intensity	θ (Degrees)	D
1	VS	3·25	13·60
2	VS	6·28	7·04
3	S	9·57	4·63
4	VS	12·70	3·50
5	VW	15·99	2·80
6	S	17·47	2·57
7	W	18·36	2·45
8	VW	18·91	2·38
9	W	19·91	2·26
10	S	22·65	2·00
11	W	24·23	1·88
12	VW	25·16	1·81
13	VVW	27·69	1·66
14	S	29·72	1·55
15	VW	30·65	1·51
16	VW	33·08	1·41
17	S	33·71	1·39
18	VVW	35·38	1·33
19	VVW	36·47	1·30
20	VVW	39·15	1·22
21	VVW	40·99	1·17
22	VVW	43·02	1·13
23	VVW	47·93	1·04
24	VVW	50·01	1·01

The chlorite rock is apparently the result of low-grade regional metamorphism on one of the dyke-rocks. The low silica, alkalies, and lime with high iron and magnesia suggests that some differentiation, either igneous or metamorphic, has taken place.

The rocks outcropping along the Whyte River, and the lower reaches of the track leading into it, are basic igneous rocks showing a slightly higher degree of regional metamorphism. These were recorded by Twelvetrees (1903). A fine-grained greenschist (5796) occurs about half a mile up the track west of the river. It is a green schistose rock consisting chiefly of pale-blue green actinolite with zoisite, biotite, pyrite, magnetite, chlorite and a little untwinned albite. About a quarter of a mile north of the intersection of the track with the Whyte River is a coarse, irregularly textured rock (5795) which consists of plagioclase, amphibole, sphene and quartz. The plagioclase (albite) is broken and bent with abundant inclusions, the amphibole is a pale-green actinolite, and the quartz shows undulose extinction. The analysis in Table I shows that the amphibolite resembles a basic igneous rock with spilitic affinities (4·99% Na_2O) in composition.

Structure

A number of structurally distinct units have been recognized and these are separated from each other mainly by faults or by granite.

(*a*) The coastal strip from the Pieman Heads north beyond Rupert Point contains the Rupert

Beds which strike generally at 330° and dip steeply to the west. Local contortion occurs and examples are shown in plate I, Nos. 1, 2 and 5.

(*b*) The Interview River plains are underlain by quartzites and phyllites of the Interview Beds. These strike at 30° regionally but locally there is minor folding. The strike is 350° in the Lagoon River area, 80° midway between the Pieman and the Interview Rivers and about 70° south of the Pieman Heads. Dips are moderate to steep towards the south-east but along the Pieman River just east of the granite the phyllites dip to the north-west. This may be due to drag along the fault which lies along the river.

(*c*) The Mt. Donaldson area is underlain by slates, quartzites and conglomerates of the Donaldson Beds which strike regionally at 30° but which are strongly contorted. Dips are flat (5° to 10°) along the Pieman River to the south-west of Mt. Donaldson but become steeper to the east. Inspection of the air photos of the Tikkawappa Plateau to the south reveals what may be a syncline overturned towards the west.

(*d*) The Corinna Road between Corinna and Long Plains passes over phyllites and quartzites of the Corinna Beds the strike of which swings from 340° to 10° with dips moderate to steep towards the east.

Apart from differing degrees of metamorphism, the Rupert Beds are similar to the Donaldson Beds while the rocks, phyllites and basic rocks of the Interview Beds are similar to those of the Corinna Beds and it is possible that all form a conformable sequence. Correlation with other Pre-Cambrian rocks in Tasmania is not yet possible. The general structure appears to be a broad anticline plunging to the south with an axis approximately parallel to the coast, cut by several large faults and intruded by granite. The sediments west of the granite dip to the west, while those to the east dip towards the east. Thus it appears that the axis has been faulted and intruded by granite.

Strong deformation in the extreme east and west of the area has given some rocks one or even two lineations. Some rocks show a lineation, formed by small crenulations or pebble elongation, which lies within the plane of the schistosity and usually plunges rather strongly to the south. This may be a "*b*" lineation parallel to the axis of the major folds but the "*b*" direction as determined by drag folds is extremely variable in both attitude and direction. The phyllite (5792) shows a strong lineation within the plane of the cleavage, perpendicular to the first lineation and this probably indicates "*a*". The quartzite (5788) shows a lineation parallel to the dip within the bedding, and this is probably due to bedding plane slip.

Cleavage is well developed in most of the argillaceous rocks. Close to the axial planes of minor folds it is parallel to the axial plane as shown in Plate I, No. 5, but in many cases it is parallel to the bedding and thus is not useful in interpreting the major structure.

Faults are particularly numerous in this area as in all other Precambrian areas so far examined in Tasmania. The most important is the Donaldson River Fault which extends from south of Conical Rocks for at least 10 miles N.N.E. across the Pieman and up the Donaldson River. There are two other faults between the Donaldson and the Interview Rivers and one along the Interview itself and all have approximately the same direction (N.E. to N.N.E.). There is another set of faults which trend N.W. but these are only of minor importance. The Donaldson River Fault may have a considerable throw while the N.W. trending faults have movements in the order of tens of feet. A third set of minor faults trends almost east-west.

Regional Metamorphism

Most of the sediments show the effect of a low-grade regional metamorphism which reaches only chlorite zone (muscovite-chlorite subfacies of the greenschist facies). The rocks along the north Pieman Head contain biotite but this is probably due to the close proximity of the granite. The shearing stress factor was apparently high in some places particularly along the coast where the quartzites show granulation and the conglomerates contain deformed pebbles. The grade appears to rise to the east of Corinna as coarse phyllites and schists occur several miles up the Pieman to the east and south-east.

Thermal Metamorphism

The granite shows thermal effects on the sediments along its margin but the metamorphism is most marked along the eastern boundary where it is in contact with the Interview Beds. The phyllites on the north bank of the Pieman, east of the contact show progressive changes towards the granite. Within about half a mile from the contact, the phyllite changes from a normal low grade regionally metamorphosed rock containing quartz, muscovite, magnetite, tourmaline and rutile into a spotted phyllite as tiny clots of chlorite develop (5764, 5766, 5767, 5768). The grainsize and diameter of the spots increase in size slowly until immediately next to the igneous rock is found a dark-grey hornfels (5770) in which the cleavage has been obliterated by recrystallization. It is coarser than the spotted phyllites and contains ragged quartz and poikiloblastic plates of muscovite with biotite, acid plagioclase and magnetite.

The sediments on the south side of the Pieman Heads strike parallel to the coast and almost at right angles to the margin of the granite, Plate I, No. 6. A band of black slate (5816) once again shows the effect of the superimposition of a thermal metamorphic texture on a regional schistosity. The faint cleavage at an angle to the bedding has been almost obscured by recrystallization. The rock is black, fine-grained, and consists of quartz, muscovite and biotite, with very abundant pyrite. Andalusite porphyroblasts up to 1 cm. long, elongated parallel to the cleavage, are visible in the hand specimen; in thin section the andalusite shows the typical cruciform structure of chiastolite.

Some quite striking spotted hornfelses (5782, 5826, 5822, 5828) occur near the granite contact. These are medium-grained and light-pinkish grey in colour with irregular pink spots which are usually a millimetre or two in diameter although some range in size up to 1 cm. across; they consist of quartz, muscovite and untwinned feldspar (albite?) with biotite, zircon, rutile, pyrite, sphene and tourmaline while andalusite occurs as porphyroblasts. The spots usually consist of an aggregate of tiny grains of andalusite or less often of muscovite.

There is a mass of altered dolerite (1783) in a cove about half a mile east of the South Pieman Head contact. The basic rock was originally regionally metamorphosed to a schistose amphibolite similar to the other members of the dyke swarm described previously, but it was then thermally altered. It consists of bands of green hornblende intergrown with brown biotite alternating with bands of quartz and dusty feldspar. Ilmenite is surrounded by growths of amphibole. The random growth of the ferromagnesian minerals under thermal metamorphism has tended to obscure the schistosity although much of the formation of the new minerals was in an anisotropic medium and followed the original schistosity.

The thermal metamorphism has not been intense and probably only represents the actinolite-epidote hornfels subfacies of the albite-epidote-amphibolite facies although it is possible that the amphibolite facies is reached immediately next to the contact.

Cambrian Ultrabasic Rocks

There are large masses of ultrabasic igneous rocks in the area around Bald Hill and the Heazlewood River. The most important rocks are pyroxenites with lesser peridotites and serpentinites and these are cut by small bodies of albite-rich basic and intermediate rocks. There has been considerable mineralization in this area and a number of interesting minerals were found.

The Bald Hill pyroxenite is a medium to coarse-grained enstatolite consisting chiefly of enstatite with a little fresh olivine. There has been slight serpentinization, chiefly of the olivine.

On Heazlewood Hill are pyroxenites, peridotites and serpentinites which have been cut by a small dyke of albite syenite. This rock consists of ragged pale blue-green hornblende and tabular albite. The plagioclase, many grains of which have an outer zone of fresh clear albite, is twinned on combinations of the Albite and Carlsbad laws and is obscured by a sericitic alteration product. There is a little clinozoisite and chlorite present.

Introduction of copper and lead is shown by the presence of primary bornite and galena, and oxidation products include malachite and azurite.

A specimen of pyroxene found associated with the pyroxenite at Heazlewood Hill shows a most unusual habit. It is white and translucent, contains small tabular inclusions of chlorite, and has a markedly tabular form due to strong elongation parallel to the *c* crystallographic axis. The identity of the mineral was established by X-ray and optical procedure, and it is being studied further by R. J. Ford.

Devonian Granitic Rocks

Apart from the major granite mass of the Meredith Range which lies to the north-east of the area and was not investigated, the granitic rocks are restricted to the coastal area. The most important is a thick, curved, dyke-like body which extends from the mouth of the Pieman River up to Sandy Cape. It is 18 miles long and about three miles wide at its thickest part and lies along a faulted anticline between the Interview Beds and the Rupert Beds.

The granite (5859) is light-coloured and coarse-grained with abundant large phenocrysts of feldspar, and consists of orthoclase, quartz and biotite with a little plagioclase and muscovite. The orthoclase is perthitic and contains disconnected patches of plagioclase which are in optical continuity with each other; this suggests that the granite has been formed from a granodiorite by potash metasomatism. Investigation of the Coles Bay Granite indicates a similar genesis and the significance is now being studied.

The plutonic rocks as well as the surrounding hornfelses are cut by sporadic dykes of aplite and pegmatite which are often rich in columnar tourmaline.

The granite has been sheared in two places, viz., just east of the hut on the Heads, and a short distance west of the granite contact on the south side of the Heads. The granite is brecciated and sheared with the development of a very irregular, almost gneissic, texture (5769). In a thin section the quartz, with its cracks and undulose extinction, and the broken-up and sericitized feldspar reveal evidence of great stress. The large fragments are set in a finely-grained schistose matrix cut by thin veins of chlorite.

The shearing of the granite is restricted in area and probably lies along faults.

TERTIARY SYSTEM

The Precambrian sediments are overlain unconformably by a thin discontinuous formation consisting of siliceous quartz conglomerate with some breccia. The conglomerates vary in grainsize down almost to sand grade but the majority of fragments are an inch or more across. The greatest thickness noted was about 10 feet. Chief occurrences are on Long Plains and Brown's Plains and along the track from Corinna to Zeehan. There is an extremely small patch of weathered olivine basalt of presumed Tertiary age resting on the conglomerate at Brown's Plains. The formation will be named the Brown's Plains Conglomerate and is defined as that siliceous rudite on Brown's Plain overlying unconformably the Precambrian sediments and lying below the olivine basalt. It is unfossiliferous. The sediment is notable because of its strong siliceous cement and consequent hardness which is unexpected in such young sediments. The rocks (5798, 5799) are usually composed of well-rounded fragments (less often of angular

particles) of quartz and quartzite showing a high sphericity together with a little feldspar, tourmaline and apatite. A thin section shows that the cement is unusual. The quartz grains are surrounded, first by a layer of clear quartz in optical continuity with the core, followed by common opal showing colloform texture. A little chalcedony fills the remaining cavities. Twelvetrees (1903) reported that economically valuable deposits of alluvial gold was associated with this conglomerate.

Similar siliceous sediments occur also in patches along the north-west coast stretching from the Black River to Deloraine. In some cases they are associated with Tertiary basalts but often the basalt is absent. It may be possible that the silification was caused by meteoric waters during a period of abnormal climate early in the Tertiary. It seems more likely, however, that the silification was due to the presence of overlying basalt which has now been partly or wholly removed by erosion. It is presumed that the molten basalt flowed over water-charged gravels and that the resultant steam which would be superheated and under considerable pressure dissolved some silica and then deposited it as a cement on cooling. The nature of the deposited silica changed from quartz to the lower temperature hydrous forms, opal and chalcedony, as the temperature fell. Part or even the whole of the silica may have been derived from the overlying basalt as siliceous residual fluids formed during consolidation. It is interesting to note that there are thick opal-chalcedony veins cutting the Tertiary basaltic breccia at Sandy Bay, near Hobart.

QUATERNARY

There are unconsolidated gravels and pebble beds on the elevated plains near the coast. These are of unknown age and may actually be as old as Tertiary. They may represent the unconsolidated marine and terrestrial equivalents of the Brown's Plains Conglomerate. These are discussed more fully in the section on geomorphology (Twidale, this volume). The high level fluviatile boulder beds above river level at Corinna are also dealt with in that section.

ACKNOWLEDGEMENTS

This work was carried out in conjunction with the Victorian branch of the Boy Scouts Association during their camp at Corinna in January, 1954. The analyses were carried out by W. St. C. Manson of the Tasmanian Mines Department and are published by courtesy of the Director of Mines.

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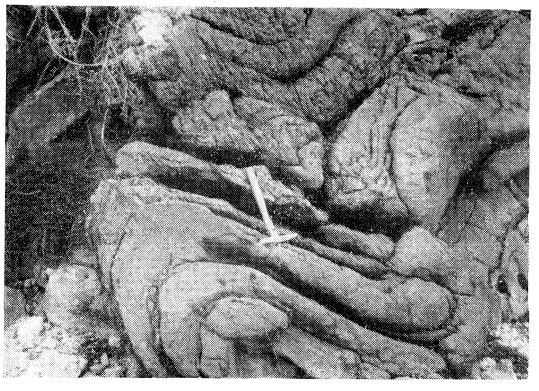

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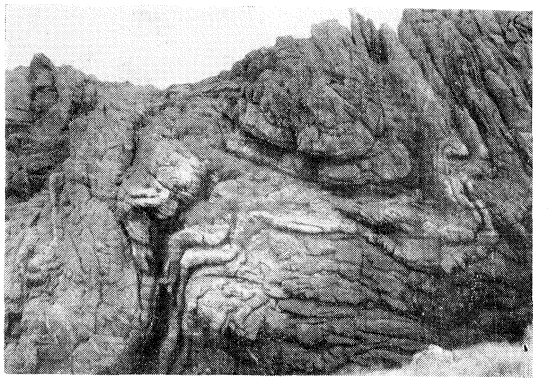

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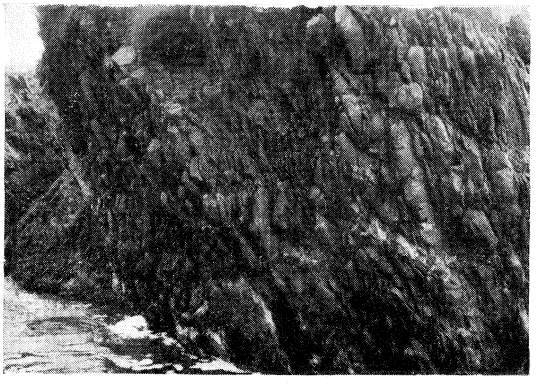

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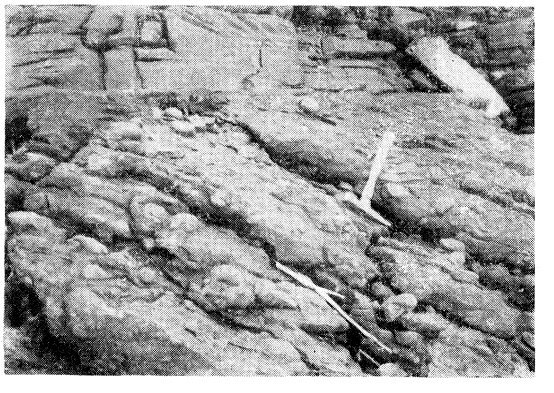

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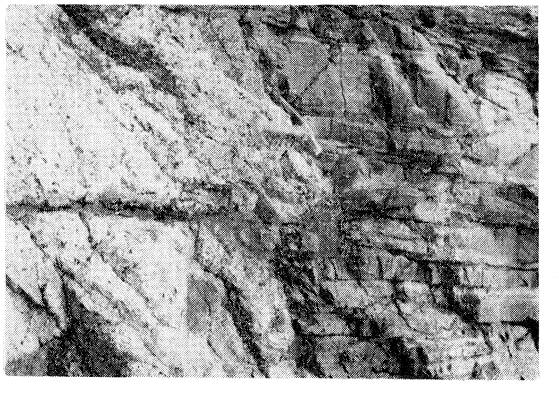

6

Nos. 1 and 2.—Strongly contorted and overturned quartzites and phyllites of the Rupert Beds.
No. 3.—Sheared conglomerate in the Rupert Beds.
No. 4.—Quartzite conformably overlying conglomerate in the Rupert Beds. The cleavage which is at an angle to the bedding is well developed in the matrix of the conglomerate but only poorly in the quartzite. Some pebbles are elongated parallel to this cleavage.
No. 5.—Phyllites south of Rupert Point showing axial plane cleavage.
No. 6.—Strongly discordant contact between hornfelses and granite south of the Pieman Heads.