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THE GEOLOGY OF THE SANDFLY-OYSTER COVE AREAS, TASMANIA

By

T. H. RODGER
Communicated by Professor S. Warren Carey

(With 2 Maps)

ABSTRACT

The Sandfly-Oyster Cove areas consist of Permian and Triassic sediments which have been widely intruded by dolerite in the form of sills and dykes. The sills are so extensive that it appears unlikely that any of the sedimentary exposures have been left in their original stratigraphical positions. Syenite dykes occur in the south of the area, and two basalt outcrops have been mapped.

INTRODUCTION

The mapped area is bounded by co-ordinates 500,000 yards E. to 510,000 yards E., and 690,000 yards N. to 710,000 yards N. on sheet No. 6 of the 4-mile State map of Tasmania. Maps were compiled from aerial photographs by the slotted template method, controlled by ground survey of the Trigonometrical Stations shown on the maps. Geological data were plotted directly on to aerial photographs in the field.

I would like to thank Professor S. W. Carey for general guidance, helpful criticism and for having made available many of the resources of the Geology Department, University of Tasmania. To Miss B. Scott, for help with several petrological problems, and to Mr. M. R. Banks who was an untiring critic and guide throughout the work, I also express my appreciation.

PHYSIOGRAPHY

The area is rugged with a juvenile topography. Elevations range from just above sea level to nearly 2500 feet, with much of the area over 1000 feet. A watershed trending north-south extends through the western section of the area from Nicholls Rivulet through the Snug Plain and Kaoota to Herring Back. Drainage from this high ground is to the east, west and south. The many small streams are swiftly flowing, with rapids and waterfalls both very common.

Exposures in the area are generally poor. In the sediments cliffs are not uncommon, but these are often too steep and high to be climbed. The steeper slopes of the area are covered with thick dolerite talus and scrub; open and undulating country is under cultivation. The boundaries between dolerite and underlying sedimentary rocks are completely obscured by the more resistant dolerite scree.

STRATIGRAPHY

Due to widespread injection of dolerite in the form of sills and dykes the sediments have been so broken that only one formation was seen as a whole unit. The heat accompanying the intrusions has so altered the sediments on the contacts that in many places where sediments are visible, they are completely altered in character. These altered sediments have resisted erosion and so form a very large proportion of the outcrops.

The sediments found in the Sandfly-Oyster Cove Areas are listed below stratigraphically:

QUATERNARY SYSTEM:
- Alluvium

TRIASSIC SYSTEM:
- Feldspathic Sandstone
- Knocklofty Sandstone and Shale

PERMIAN SYSTEM:
- Ferntree Mudstone
- Woodbridge Glacial Formation
- Grange Mudstone

PERMIAN SYSTEM

Grange Mudstone

Outcrops occur only in the Sandfly area; the most prominent extends north and south from Allens Rivulet and another lies west of Snug. Rocks in the northern part of the first, and in the whole of the second area mentioned above have been baked by the intrusive dolerite and have lost their true sedimentary character. At Allens Rivulet there are high cliffs, not easy to examine, which closely resemble the type section at the Grange Quarry. The upper and lower limits of the mudstone were not seen in the area.

The Grange Mudstone is typically a hard rhythmically bedded siliceous mudstone which fractures along the bedding planes. The rock is usually creamy-yellow in colour, but may be as dark as purple. Bedding is pronounced and is marked by weathered fossil bands. The average grain size is 0·01 mm., with grains larger than 0·02 mm. comprising less than 10 per cent of the rock. The average size of the larger grains is 0·1 mm., and the maximum grain size, 2 mm. The grains are tabular or prolate in equal proportions, and the degree of rounding varies from sub-rounded to angular with the largest proportion in the sub-angular class.

The rock is made up of fossil fragments and granular material of which 90 per cent is quartz. Feldspar makes up the remaining 10 per cent, half being orthoclase and the remainder undetermined plagioclase. Sandy horizons are known from the Grange Mudstone, but were not found in any of the exposures examined. The following heavy minerals were present in representative samples which were crushed and separated: haematite, ilmenite, muscovite, zircon, tourmaline and apatite, but of these only haematite, which is of the earthy variety, is common. Those grains not fractured in crushing all showed some rounding.

The mudstone is extremely fossiliferous throughout most of the sequence and abundant *Fenestella sp.*, *Protoretepora sp.* and *Stenopora sp.* give the rock its laminated appearance. Also common are *Strophalosia sp.*, *Terrakea fragile*, *Spirifer convoluta* and *Martiniopsis sp.*

Well-rounded pebbles are common throughout the formation and have a maximum diameter of 4 cm. The larger pebbles are all of quartzite though small pebbles of quartz less than 2 cm. in diameter are common.

Dolerite intrusions have effected the Grange Mudstone more than other Permian formations, because of the fine rhythmic bedding which allows easy access to the sediment for many thin sills of intrusive rock. It is suggested that this multiple injection has caused the extensive baking of the mudstone over such a large area. The absence of distortion of the fossils and the lack of crystal orientation in these indurated rocks suggests that alteration has been due to heat with relatively little pressure.

Woodbridge Glacial Formation

This formation, which lies conformably below the Ferntree Mudstone, presents the most varied lithology of the Permian sediments. The base of the formation was not seen, but the greatest vertical section of the Woodbridge Formation was examined within four miles of the glacial conglomerate at Woodbridge, which in other areas denotes the boundary of the Woodbridge and the Grange Mudstone. Two large areas of Woodbridge Glacial Formation were mapped, the more northerly extending south from Allens Rivulet, and the other covering most of the country between Oyster Cove and Snug.

In a small quarry at 509140 E-706120N, south of Allens Rivulet, the formation has the appearance of a well jointed, massively bedded sandstone which is yellow in colour. Further south the rock is much finer grained and very similar to the Grange Mudstone both in appearance and in fossil content although the fossils are not as abundant. On the south edge of the same outcrop, slightly higher stratigraphically, the rock is more sandy, with *Spirifer* and related genera replacing *Fenestella* and *Stenopora*. Ascending the hill towards 506910 E-701710 N, the rock changes from a sandy mudstone containing occasional Spirifer at the creek, to a dense grey very fine grained unfossiliferous mudstone containing occasional boulders, some of which are over 30 cm. in diameter. On the hill-top, immediately south of this point, a band of conglomeratic material may represent the Risdon Sandstone but this could not be confirmed. If this is the Risdon Sandstone, the upper 300 feet of the formation is visible from Allens Rivulet to the south.

The lowest part of the southern exposure is notable for the similarity to the Grange Mudstone together with very marked lithological changes in the sediment over a short lateral distance. The greatest change is in grain size. The rock varies from a fine even-grained mudstone with average grain size less than 0·1 mm. and showing distinct bedding, to a coarse sandstone with variable grain size and containing many boulders and pebbles. The erratics are mostly of quartzite though a piece of Owen Conglomerate 20 cm. in diameter and a piece of schist over 30 cm. were found. Higher in the sequence near the Post Office at Oyster Cove, the rock is a dense sandy mudstone, creamy-grey in colour, which has a pink tinge when weathered. Fossils are not common although clayey lenses contain some well preserved specimens. Above this there is a distinct sandy horizon which was traced from Oyster Cove to a point west of Margate, in the south only a few feet thick, but to the north extending 100 feet. This very sandy mudstone is composed of quartz grains of similar size in a clayey matrix and is very friable; fossils are absent.

The upper 50-150 feet of the Woodbridge Formation, is a fine even-grained dense mudstone, which is grey to cream in colour, with poorly defined bedding which breaks with an even fracture leaving a pitted surface. No fossils are present and the rock is composed of quartz grains not greater than 0·5 mm., with the average size very much smaller. The pebbles are few and very small and consist of quartzite or quartz. There are layers only a few inches thick in this upper band which at a glance appears to be a clay pellet conglomerate, but the effect is caused by circular brown markings in the grey mudstone and is probably due to weathering (though found in relatively fresh rock). The thickness of the section of the Woodbridge Glacial Formation measured at Oyster Cove is 470 feet.

General features of the material making up the Woodbridge Glacial Formation are random sorting in a rock made up of extremes in grain size, the grains being mostly tabular in shape with the degree of rounding decreasing as the grain size decreases.

The heavy mineral suite is made up of limonite, ilmenite, rutile, topaz, cassiterite, muscovite, tourmaline and apatite. Two of the grains of ilmenite were completely altered to leucoxene and all others showed some white streaks of this material. Topaz was found in both separated samples of the Woodbridge rock, but in no other Permian formation.

The fossils are similar to those in the Grange Mudstone, but *Terrakea fragile* and *Martiniopsis sp.* of the Grange are replaced by *Polypora sp.*, *Spirifer vespertilio*, *Mourlonia sp.*, *Warthia sp.* and some ostracods in the Woodbridge Glacial Formation.

Ferntree Mudstone

This upper formation of the Permian System is far less variable than the two previously described, and may be split into three facies which remain constant over the area under discussion. Ferntree Mudstone outcrops at two places on the northern boundary near Lower Longley, underlies the Knocklofty Sandstone on the western edge of the Snug Plain, and occurs again in the south-west near Nicholls Rivulet. The only structures visible are massive bedding and in rare cases, finely laminated bedding is present. This mudstone is unfossiliferous.

At the base of the Ferntree Mudstone there is a band of coarse sediment, the Risdon Sandstone. This occurs in three places near Oyster Cove between the Ferntree Mudstone and the Woodbridge Glacial Formation. In the three exposures the sandstone was identical to similar outcrops on the lower slopes of Mount Wellington. At least 90 per cent of the material is well-rounded quartz with an average grain size of between 0·12 and 0·06 mm. The remainder of the rock is feldspar most of which has been altered to sericite. The heavy mineral suite was much more limited than in the other Permian rocks, haematite and garnet being quite common while zircon and tourmaline formed only a very small proportion.

The lowest facies of the Ferntree Mudstone is well exposed directly above the Risdon Sandstone at Oyster Cove. The mudstone is grey with an irregular fracture and is composed of a very fine crystalline matrix which comprises 60 per cent of the rock. The remainder consists of quartz grains which may be as large as 1 mm. When weathered the appearance of the rock changes very little but tends to become rather glazed in places. Cliffs of this lower section are very common in the Oyster Cove area, the best examples being the two scarps at Snug Falls. As local fracturing is not present weathering is responsible for this type of exposure. All cliff faces of the lower Ferntree Mudstone are covered with a white incrustation of epsomite which may be up to half an inch thick.

Above the grey mudstone there is a horizon of yellow sandy mudstone which, though similar in grain size to the lower facies, has a very small percentage of the crystalline matrix. Thus the rock is more friable, and weathers readily to gentle slopes which contrast well with the steep slopes of the upper Ferntree and the cliffs below. The best exposure was found on the Hansen's Mill Road when ascending to the Snug Plain where the measured thickness was 200 feet.

The upper horizon is best exposed above and north of the Huon Road near Lower Longley. The thickness measured to the base of the Triassic is 150 feet. The sediment is practically identical with the lower band except for a marked mottled effect visible in all the exposures. It weathers to a creamy-yellow colour except in wet places where the grey colour remains and the mottling disappears. The upper and lower bands of the Ferntree Mudstone have an average grain size of 0·07 mm., with the average size of the large grains 0·1 mm. Grains are usually discoidal or spherical and sub-angular. The crystal surfaces are predominantly bright and there is a lack of sorting which in this even-textured mudstone indicates a short distance of transport during sedimentation. A little biotite and chlorite occurs as small blades and magnetite is visible in nearly all exposures of the upper facies.

The heavy mineral suite is made up of limonite, ilmenite, magnetite, zircon, apatite and pyrite which all exhibited a greater degree of rounding than the bulk of the sediment, probably due to redeposition of the heavy minerals. Near the igneous contacts the degree of alteration is very much less than in either the Grange Mudstone or the Woodbridge Glacial Formation, some silification which extends 2-4 feet from the contact being the only noticeable change.

The Cygnet Coal Measures which exist further south were not present in the area, and though a traverse was made around the boundary of the Permian and Triassic Systems not even traces of carbonaceous shale could be found. The thickness of the Ferntree Mudstone at Oyster Cove is 650 feet and the measurement varied only 10 feet in three sections.

TRIASSIC SYSTEM

The disconformity reported from other areas between the Permian and Triassic Systems could not be found since the boundary occurs always on steep slopes with deep soil cover. The two formations, Knocklofty Sandstone and Shale, and Feldspathic Sandstone, are both well exposed though the upper formation is found only at Kaoota. The massive form and marked structures of the sandstones suggest rapid accumulation of sediments in a still body of water, while the presence of coal and plant fossils in the upper formation indicates lacustrine conditions.

Knocklofty Sandstone and Shale

The basal grits of this formation as found in other areas are represented only in the north-west corner of the Sandfly Area, where a band of conglomerate three feet thick occurs approximately 10 feet above the base of the sandstone. Quartz pebbles up to 15 cm., together with smaller pebbles of quartzite, were cemented in a matrix of fine quartz grains. The only other exposure showing any resemblance to the above exists at Oyster Cove as a single band of similar sized quartz pebbles, 4 cm. in diameter, 20 feet above the base of the sandstone. In this band all the long axes of the pebbles are horizontal.

The lowest 200 to 300 feet of the sandstone is massive with cross-bedding and slump structures very common. The sediment is even-grained, and brown to cream in colour with some sparkling quartz faces. No grains are larger than 0·5 mm. and few are smaller than 0·1 mm., with the average diameter 0·25 mm. The grains are all rounded with some pitting or etching. Secondary regrowth of quartz in optical continuity with the original grain and secondary interstitial quartz are both usual features. Shale bands in this basal member are indicated by fragments in soil but could not be

examined. Only one band of clay pellet conglomerate was found in a road cutting north-east of Pelverata. The pebbles in this one foot band are all elliptical, flattened to some extent and up to 6 cm. long. In no one section were the lower and upper boundaries of this basal member found.

The Knocklofty Sandstone and Shale, well exposed between Pelverata and Kaoota, changes from a formation predominantly of sandstone at the base to one composed mostly of shale. As the amount of shale increases in the formation so the percentage of feldspar increases. The sandstone is similar to that found in the lower member but contains more feldspar. The soft, friable shale, is finely laminated and composed of quartz grains with minor amounts of feldspar. Mica is present in the bedding planes and is more common in some bands than in others. The colour of the shale bands is either brown, yellow, green, grey or purple. During weathering all the material but quartz is removed, leaving a particularly clean sand which is more noticeable in the sandstone, but is formed also from the shale. The thickness of this upper member of sandstone and shale is approximately 200 feet though the top at Kaoota is hidden by dolerite talus.

The thickness of the Knocklofty Sandstone and Shale measured in the section from Pelverata to Kaoota is 565 feet but this is not precise because of the hidden top of the formation. Fossils were not found even in the shale bands.

Feldspathic Sandstone

Exposed near Kaoota this formation is made up of narrow bands of shale between bands of massive sandstone. The shale bands, estimated to make up 30 per cent of the formation, persist to within 100 feet of the top of the Feldspathic Sandstone. All the outcrops of the formation are very weathered.

The sandstone, buff to brown, is composed mainly of feldspar and quartz. The feldspar forms 70 per cent of the rock and is nearly all altered to sericite; of the remainder the largest proportion is plagioclase. The grains, which vary from rounded to sub-angular, are between 0·5 mm. and 0·1 mm. and average 0·25 mm., which is identical with the grain size of the Knocklofty Sandstone. The shale bands are slate-grey in colour, and except where they are associated with coal are no more than two feet thick. They contain many plant impressions, which are mainly *Phoenicopsis elongatus* and *Cladophlebis australis*. The shale was so soft that it was impossible to obtain sufficiently good specimens for fossil identification.

The coal bands in the vicinity of Kaoota have been tested by several adits and were worked extensively for a short time. The coal occurs in eight bands which alter from several feet to a few inches thick, and usually vary extensively in thickness from place to place. The coals are all black, have a vitreous to bright lustre and an uneven fracture. The type of coal varies from anthracitic to humic and much of the anthracite has been formed by heat and pressure due to dolerite intrusions. The faulting and alteration due to the dolerite have made this coal deposit uneconomical to work and it has never been anything but a minor field. (McIntosh Reid, 1922; pp. 123-146.)

Mica is present only in the lower bands of shale of the Feldspathic Sandstone. The mica then may be used as a marker within the Triassic System. The lowest 200 feet of the system are mica free. The proportion of mica then increases to a maximum just below the top of the Knocklofty Sandstone and Shale and then decreases more rapidly to 150 feet above the base of the Feldspathic Sandstone above which it does not occur.

The thickness of the Feldspathic Sandstone Formation is 690 feet at Kaoota making the total thickness of the Triassic System 1255 feet.

QUATERNARY SYSTEM

Alluvium

The two small areas covered by alluvium are the only evidence of any sedimentation having taken place since the Jurassic Period. Tertiary deposits may have been laid down, but the rapid erosion in steep valleys which is taking place to-day would very soon remove such soft sediments. The alluvium is composed of loose soil shed from the neighbouring hills and dropped in two flat areas where streams flow over adjacent sediment and dolerite. The latter, being removed at a much slower rate has dammed the outlets to the small basins.

IGNEOUS ROCKS

Dolerite

The structure and topography of the area have been controlled by sills and dykes of dolerite. Dolerite is the most common rock type in the area and by far the most constant in appearance and composition. The rock is fine-grained near the contacts and changes to medium-grained from a few feet to 50 feet from the margin. The rock is made up of a ground mass of feldspar laths in which there are occasional grains of quartz. The feldspar is usually labradorite. The augite phenocrysts are large, some showing good twinning.

It is not possible to determine the maximum thickness of the sills. The sill beneath the Grange Mudstone near Sandfly must be at least 1500 feet thick and the sill at Herring Back is in excess of 2000 feet. The Grange Mudstone and Woodbridge Glacial formation have been most affected because the finer bedding allowed easy access of molten rock.

Possibly the most unusual dolerite formation is that which extends up the eastern margin of the Oyster Cove Area as a dyke, but to the north spreads out into a typical sill. Near Snug the margins of this mass form steep angles of 70-80° with the adjacent sediments. Red Hill, near the centre of this dolerite, is composed of a differential mass within the main body. This is a coarse granophyre, consisting chiefly of a granophyric intergrowth of quartz and orthoclase, with a little plagioclase, pyroxene and iron oxide. Throughout the dolerite, graphic intergrowth is not uncommon but nowhere else were such large crystals seen.

The Snug Plain is formed almost completely of dolerite and over this area the texture of the rock is remarkably constant. The eastern scarp of the Plain is never on the contact but always in the sediment, usually from 20-100 feet from the margin and this applies to nearly all the contacts in the area. In a few places the weathering is more pronounced on the dolerite side of the contact.

The dolerite has intruded near or at the base of the Grange Mudstone, towards the top of the Woodbridge Glacial Formation, near or at the top of the Ferntree Mudstone, low in the Knocklofty Sandstone and Shale, into the shale and coal bands in the Feldspathic Sandstone and higher in this formation. The foregoing evidence places the intrusion of the dolerite as post-Permo-Triassic sedimentation. In other areas Tertiary faulting has disrupted the dolerite, and it has therefore been suggested that the dolerite intrusions took place during the Jurassic. No evidence against this was found.

Basalt

Two distinctly different exposures of basalt were found. That near Kaoota has a distinct boundary between it and the adjacent dolerite. The rock is composed of minute feldspar laths, large phenocrysts of augite and smaller phenocrysts of olivine, and is without quartz. The olivine is altering at the edges to serpentine and the feldspar laths show definite orientation round the phenocrysts. Therefore it differs from the dolerites in the lack of quartz, the greater percentage of olivine and the orientation of the feldspar laths. The possibility of its being a chilled margin of dolerite was rejected because it is most unlikely that the dolerite would occur in this form at one place in the area and not at others equally favourable.

At 509400 E-706100 N, pieces of basalt and light-grey vesicular basalt occur with several large blocks of tuffaceous breccia. In the vesicular basalt the vesicles vary in shape and are up to 2 cm. in diameter. The breccia is mainly of tuff with pebbles of basalt and dolerite. Also noticeable are three distinct terraces, almost parallel, with eight feet between the upper two and 13 feet between the lower pair. The terraces and volcanic material are the remaining evidence of at least three basalt flows from some higher source.

There is no evidence for the age of the basalts except that the land has changed little since the extrusions so they have been associated with the other Tertiary basalts of Tasmania.

Syenite

Three dykes of a striking porphyritic rock outcrop at Oyster Cove, intrusive into the dolerite and Permian sediments. These dykes are part of the intrusive complex found to the south-west at Cygnet. The rock is composed of a fine groundmass of feldspar crystals with phenocrysts of augite, hornblende and orthoclase. The orthoclase phenocrysts are the most prominent feature of the rock. They reach 5 cm. in length and frequently contain inclusions of plagioclase. The orthoclase phenocrysts showed a marked change in size, being very large in the centres of the dykes and barely visible at the margins. When exposed to weathering the feldspar phenocrysts soon become loose and dislodged, leaving the dyke with a pitted appearance and a halo of phenocrysts round the margin, for though the phenocrysts become detached easily they do not weather quickly. Foreign boulders of quartz up to 15 cm. diameter and one piece of mica schist, were found in the southern dyke. The sediments show only slight baking at the contacts. Jointing parallel to the strike of the dyke is prominent with minor joints at right angles to the cooling fractures. The age of the syenite is not known, beyond the fact that it intrudes post-upper Triassic dolerite.

STRUCTURAL GEOLOGY

The only structural features of any importance were caused by the injection of dolerite with accompanying faulting after the Triassic sedimentation. These intrusions occurred with no apparent structural control except that where concomitant faulting occurred along the intrusive boundaries there is a general north-south trend. This structure has left an area predominantly of dolerite in which are floating variously sized blocks of sediment. Of the sedimentary exposures it seems probable that only the Knocklofty Sandstone at Longley may be in continuity with the underlying basal sediments.

In the eastern half of the Sandfly Area dolerite has formed two distinct sills, one below the Grange Mudstone, which may be seen in three places, and one above the Woodbridge Glacial Formation. The Grange Mudstone in the north-east corner of the Sandfly Area has been raised by the dolerite, and the concordant boundary of this sill was traced round the contour of the hill. A similar exposure occurs between Sandfly and Allens Rivulet and again the contact was traceable for part of its length, although only in the south-west corner of this outcrop was the junction of the two rock types visible. West of Margate a further occurrence was mapped and once more the contact of the two rock types could be seen. It is not possible to state whether or not these three masses were raised to the same height because of the change in the dip of the three outcrops and the lack of constancy of dip throughout the area. For the same reasons the two northern areas of Grange Mudstone may or may not have been lifted as one block.

Between the southernmost two of these three exposures is a sill of dolerite above the Woodbridge Glacial Formation. The contact of rock types at this boundary was not so easily seen because of the dolerite scree which spreads down the hill. No estimation can be made of the relative movement of these three blocks of sediment because up to the present it is not possible to tell at what horizons in the sediments the dolerite has been injected. Also, no section in the area permitted the measurement of these formations.

In the Nicholls Rivulet basin the faulting is complex. The step faulting of the contact between the Knocklofty Sandstone and dolerite and between the Knocklofty Sandstone and Ferntree Mudstone is readily detected in the steep cliffs surrounding the basin. There is evidence that the main north-south fault through the basin is of pre-Tertiary age, and was connected with the intrusion of dolerite: Nicholls Rivulet does not follow the fault quite as clearly as it would if the fault were recent, no signs of a fracture zone were found, and baked sediments occur against the fault on its eastern side near the Oyster Cove Road. It is probable that the dolerite on the west of the basin was intruded first, beneath the Ferntree Mudstone and the Woodbridge Glacial Formation. A second intrusion then caused the minor faulting to the east. The three oblong outcrops of dolerite shown between the Knocklofty Sandstone and the Ferntree Mudstone, together with baked sediments on one of the faults well removed from the nearest dolerite exposure, are indicative of a second sill below the sediments east of the main fault. Though the strike and dip of the sediments in all the fault blocks were not obtainable, enough were measured to show much greater change of inclination of the sediments across faults of greater vertical displacement.

The main dolerite mass in the area extends as an unbroken exposure from north to south and from east to west in the north. This mass is bounded in the south by a series of concomitant faults. Some faulting extends also to the north but parts of the same mass have spread as sills over the Feldspathic Sandstone and below both Grange and Woodbridge sediments. Along all the contacts sediments are baked and invariably the intrusive body is fine grained near the margin. Near Sandfly one undetermined block of sediments has been completely changed to hornfels. The grain size of the intrusive mass away from the margin is remarkably constant.

Near Kaoota there are small lenses of the above dolerite intruding the sediments, some extensive in both thickness and area and at least one only inches thick in one of the old adits above the Kaoota-Pelverata Road. The same dolerite has been intruded into the Woodbridge Glacial Formation in the form of miniature inch-wide dykes, as though the dolerite has been forced into existing joints in the sediments. Tertiary faulting, prominent to the east and west of the area, was not found here.

Jointing in the dolerite is universal and the three directions are constant, 80°, 135° and 170°. In most exposures only two of the three directions occur but the three are occasionally developed. The joint direction of 170° is the most common and 135° joints are rare. A very good example of columnar jointing occurs at Sandfly Falls and there are minor exposures at Allens Rivulet and Kaoota.

REFERENCE

McINTOSH-REID, A., 1922.—The Sandfly-Cygnet Coalfield. *Min. Res. Geol. Surv. Tas.*, No. 7 Pt. IV, Ch. VI.

LOCALITY INDEX

	Internat. Grid Reference K/55 Quadrangle	S. Lat.	E. Long.
Allens Rivulet	Kingborough 88	43° 1′	147° 10′
Cygnet	Kingborough 88	43° 10′	147° 7′
Herring Back	Hobart 82	43° 0′	147° 9′
Kaoota	Kingborough 88	43° 1′	147° 10′
Longley	Hobart 82	42° 58′	147° 12′
Lower Longley	Hobart 82	42° 59′	147° 8′
Margate	Kingborough 88	43° 2′	147° 16′
Mount Wellington	Hobart 82	43° 6′	147° 14′
Nicholls Rivulet	Kingborough 88	43° 10′	147° 7′
Oyster Cove	Kingborough 88	43° 6′	147° 12′
Pelverata	Kingborough 88	43° 3′	147° 7′
Red Hill	Kingborough 88	43° 4′	147° 13′
Sandfly	Hobart 82	43° 3′	147° 7′
Snug	Kingborough 88	43° 4′	147° 15′
Snug Plain	Kingborough 88	43° 5′	147° 10′
Woodbridge	Kingborough 88	43° 10′	147° 14′

OYSTER COVE

GEOLOGY OF TASMANIA
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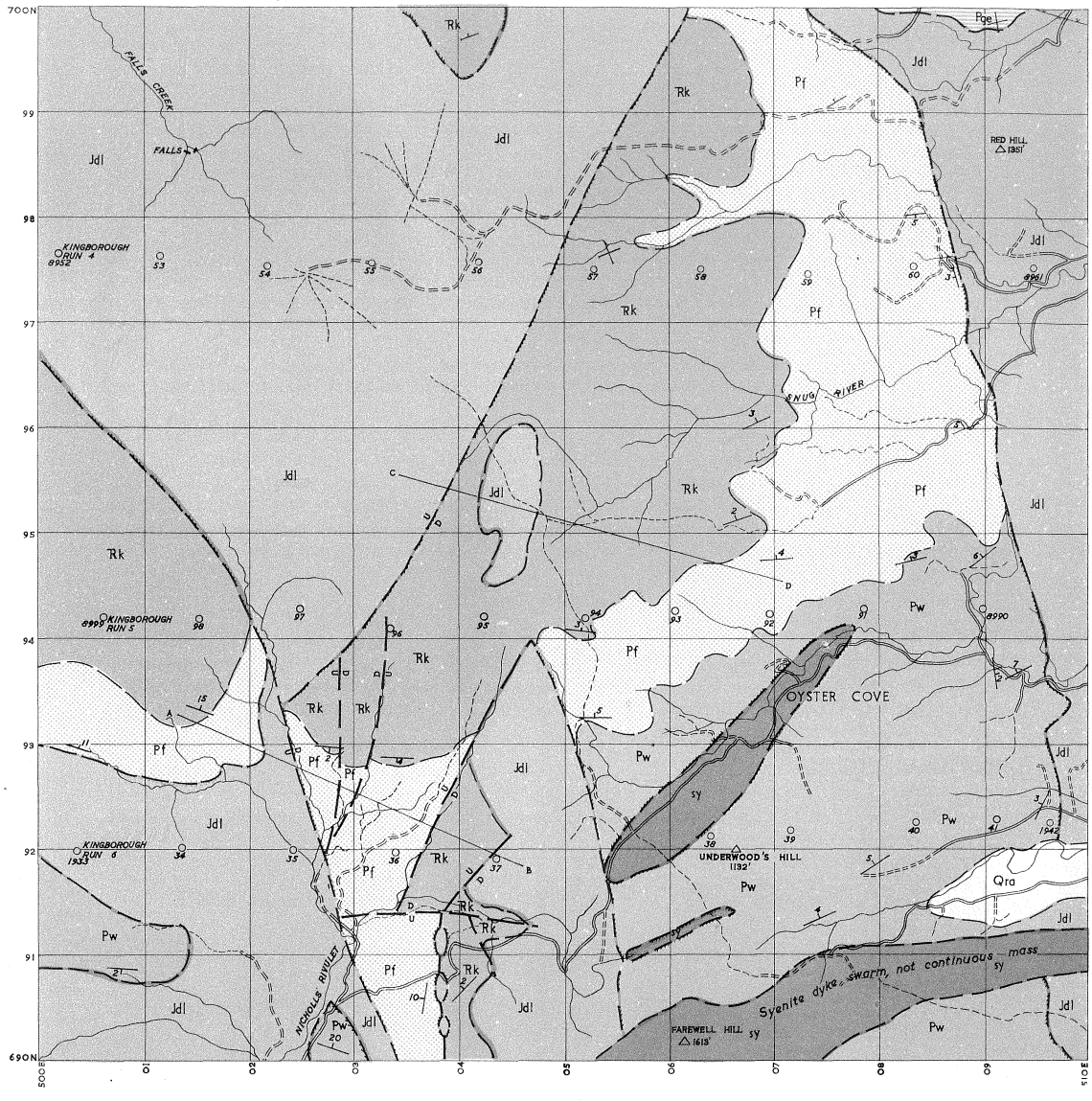

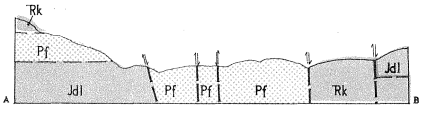

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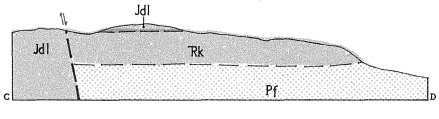


LEGEND

D/U — FAULT WITH DOWNTHROWN SIDE INDICATED
FAULT — POSITION APPROX.
FORMATION BOUNDARY — POSITION APPROX.

Dolerite Boundaries
CONCORDANT SILL
DISCORDANT INTRUSIVE BOUNDARY

STRIKE AND DIP
HORIZONTAL BEDS
ROADS
VEHICULAR TRACK
TRACK
△ TRIGONOMETRICAL STATION
○ PHOTO CENTRE
V/X TRANSMISSION LINE

Quaternary System
RECENT SERIES
Qra ALLUVIUM

Triassic System
Rf FELDSPATHIC SANDSTONE
Rk KNOCKLOFTY SANDSTONE AND SHALE

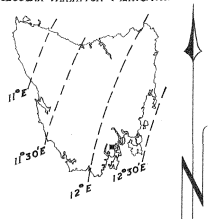
Permian System
Pf FERNTREE MUDSTONE
Pw WOODBRIDGE GLACIAL FORMATION
Pge GRANGE MUDSTONE

IGNEOUS ROCKS
sy SYENITE PORPHYRY

Jurassic (?) System
Jdl DOLERITE

Compilation from Aerial Photographs. Trigonometric Station Control by courtesy Lands and Surveys Department. Origin of coordinates 400,000 yds. West and 1,800,000 yds. South of True Origin of Zone 7 of the International Grid.

KEY MAP SHOWING MAGNETIC DECLINATIONS SECULAR VARIATION 7 MINS. P.A.



MAPPED AND COMPILED BY
T.H. RODGER 1952

SCALE
0 1 2 MILES
0 1 2 3 4 5000 10,000 FEET

GEOLOGY OF OYSTER COVE AREA.

SHEET 5069

PHYSIOGRAPHY.

This area has a relief of somewhat less than 2,000 feet with an early mature topography. The most prominent feature is Snug Plains, drained to the south by Nicholls Rivulet and to the east by the Snug River and other streams. The streams are all in mountain tract with falls and rapids a common feature. Snug Falls and falls on Falls Creek are the most spectacular. There is an overall control of stream courses by local structure or rock type, e.g. Nicholls Rivulet is partially fault controlled, but superimposition of streams is suggested by the transgressive relationship of the stream course to the structure.

STRATIGRAPHY.

The oldest formation is the Grange Mudstone which occurs in the north-eastern part of the area. This formation consists of creamy siliceous banded mudstone which is richly fossiliferous, the main fossils being fenestellids and **Strophalosia**\spp. The next formation is the Woodbridge Glacial Formation of sandstones and siltstones with erratics and fossils such as **Spirifer vespertilio** and **Warthia.** It is 470 feet thick at Oyster Cove. Near Oyster Cove the Woodbridge Formation is overlain by Risdon Sandstone and this by the Ferntree Mudstone which is about 650 feet thick. This last formation consists of grey mudstone and yellow sandy mudstone. No trace of the overlying Cygnet Coal Measures was seen.

Of the Triassic System only the Knocklofty Formation occurs. A pebbly conglomerate occurs about 20 feet above the base to the north west of Oyster Cove. The formation is dominantly quartz sandstone with some quartz siltstone.

The Permian and Triassic sediments are intruded by sills and dykes of dolerite many of the contacts in this area being very steep. The dolerite and the Permian sediments up to the Woodbridge Formation are intruded by dykes of syenite porphyry which trend somewhat east of north. The age of the syenite is not known.

Small areas of alluvium occupy some of the river valley.

PETROLOGY.

Of particular interest is the occurrence of a mass of coarse granophyric dolerite at Red Hill, which contains quartz, orthoclase, plagioclase, pyroxene and iron oxide in granophyric intergrowth. The syenite porphyry has been described by Edwards. The most prominent feature is the occurrence of large sanidine phenocrysts.

STRUCTURAL GEOLOGY.

The main structural features are the faults associated with the dolerite intrusions. In the eastern part of the area part of a horst is occupied by dolerite with a steep contact against the Ferntree Mudstone downthrow to the west. The fault initially trends south-east but swings progressively to the south. Further west the main mass of dolerite forming Snug Plains is downfaulted by a north-easterly trending fault against Triassic sediments. The Snug Plains block is cut off to the south-west by a south easterly trending fault which downthrows to the north-east so that the Snug Plains block is part of a graben. Another smaller graben occupies the central southern part of the area.

ECONOMIC GEOLOGY.

Very small amounts of gold are found in the stream flowing just north of Oyster Cove. This is presumably associated with quartz veins associated with the syenite porphyry.

POINTS OF SPECIAL INTEREST.

Granophyric dolerite: Red Hill (509.2E.698.7N)

Snug Falls (507.4E.698.4N)

Syenite porphyry (Oyster Cove Road, Oyster Cove) .

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