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GEOLOGY OF POINT HIBBS

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54-193

AMG REFERENCE POINTS ADDED

The Geology of Pt. Hibbs

L.E.G. 1957.

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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

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A Report for the Lyell-Electrolytic Zinc Exploration Co. Pty. Ltd. on:

THE GEOLOGY OF POINT HIBBS

by

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INTRODUCTION

Apparently some sort of geological observations were made on the Point Hibbs area prior to 1866, as Gould mentioned limestone from Point Hibbs in a paper on the Gordon Limestones in that year. The first geologists to survey the area and report on it was Loftus Hills (1914) who collected fossils from the limestone some of which were later described by Dr. Dorothy Hill (1942). The corals indicated a Devonian age for the limestone. As the age range of of the Gordon Limestone became better established as Ordovician, considerable doubt arose as to the assignation of the Point Hibbs Limestone as equivalent to the Gordon Limestone. It has been suggested (Banks, 1957) that it was instead equivalent to part of the Eldon Group. Extensive detailed observations and collections were necessary to establish its position. Permian tillites had been recorded from this area by Hills and as the author is engaged in a state-wide survey of the Permian System a visit to Point Hibbs was necessary to establish the presence of a true tillite and study any other Permian rocks present. It is one of the few areas where Permian rocks are sub-vertical and it was of interest to determine the reason for this as Hills had suggested that it was due to intrusion of the dolerite which would be very unusual.

The nature of the contact between the Point Hibbs Limestone and other rocks and that between the Permian System and older rocks was also of considerable interest.

Because of the number of problems known to exist, the author approached Mr. Hudspeth to see if an opportunity to visit the area could be made. Through the courtesy of the company an opportunity was made in March this year when the author and Mr. Ahmad spent 7 days in the area. Observations were made along the northern shore-line and collections of fossils gathered from the Point Hibbs Lime-stone and the Permian rocks. Specimens from all rocks exposed were collected. Aerial photographs were not at that time available but have become available since. Due to difficulties in arranging for the collections to be picked up, the collections were lost so that the age of the limestone must depend only on the author's field identifications and the precise character of some of the rocks seen must remain obscure. The aerial photographs have made it possible to define closely further problems associated with the Middle Palaeozoic rocks and it is hoped that another opportunity may be afforded to make collections and solve the outstanding problems.

I would like to thank Mr. G. Hudspeth for making the first visit possible and to thank those other members of the company who assisted in various ways.

In this report all directions are given relative to true north.

PHYSIOGRAPHY

Within the area studied only the mouths of a few coastal streams were seen. The streams are short and have cut relatively deep valleys with overlapping spurs. They are in mountain tract right up to the beach line.

The coastline is very youthful and being actively/eroded. The beaches are usually short and narrow, mainly pocket beaches, but one is over half a mile long. The larger beaches are sandy, the smaller ones gravelly. The sandy beaches are backed by a zone of sand dunes only a couple of hundred yards across at most. A prominent feature of the coast line is the occurrence of well-developed wave cut platforms. These are best developed in the Point Hibbs Limestone and in the Permian rocks. The platforms are cut at a level about 3 feet below high water mark and 6 inches above low water mark. The limestone in the shore platform is marked with small solution cavities and smoothed, that above the platform shows the solution cavities only. Strike ridges of dolomitised and ferruginous limestone stand out above the platform as also do large masses of limestone which show marked notching up to high-water mark. Sub-angular and rounded boulders are common on the platforms. The limestone platforms are deeply channeled along joint planes and are undercut so that in places a shelf of limestone less than 6 inches thick is all that remains. The platform cut into Permian rocks shows numerous strike ridges of sandstones and erratic rich bands. The platforms both in Permian rocks and in limestone is over 50 yards wide in places. The Jurassic dolerite and Cambrian argillites do not develop such perfect platforms and the dolerite especially tends to stand out as headlands like that of Point Hibbs itself.

The last physiographic feature of note is the presence of clear levels. The highest of these was first mentioned by Loftus Hills (1914, p. 5) as sloping seaward from 700 feet inland to 400 feet near the coast. He regarded this as a southerly continuation of the "Little Henty Peneplain". Taylor (1955, p. 54) notes that the top of serpentinite ridge south of the Spero River forms part of this surface at 350 feet about sea level. Hills recorded boulders and shingle forming a raised beach at nearly 100 feet above sea level on the south side of Point Hibbs. The headland on which the old depot hut is situated shows a level top at 42 feet above high water mark and a level at about the same height is a notable feature on Pyramid Island. The "Little Henty Peneplain" is probably upper Tertiary in age and the lower levels later.

In summary the physiography may be said to be that of a youthfully dissected plateau undergoing attack by the sea in the youthful stage of the marine cycle.

NOTE: PAGE 5 MISSING

correlation with the Dundas Group being perhaps slightly more probable. These rocks were included by Hills as part of his Silurian sequence.

MIDDLE PALAEOZOIC

Gould (1866) referred to limestone at Point Hibbs as equivalent to the Gordon Limestone. Hills (1914) noted the presence near Point Hibbs of a sequence including highly fossiliferous limestones, quartzites, calcareous claystones, claystones, sandstones and quartz conglomerates. These he regarded tentatively as Silurian. The limestones have generally been considered as equivalent to the Gordon Limestone but Dorothy Hill (1942) recorded corals, known elsewhere in Devonian, rocks and thus raised the question of the validity of their correlation. This will be discussed later.

The rocks occurring at Point Hibbs of Middle Palaeozoic age are:

Top: (iv) Conglomerate

(iii) Quartzite with pebbles

(ii) Siltstone (or quartzite with siltstone bands and worm tubes)

(i) Point Hibbs Limestone

Unconformity and Fault

Base: ?Cambrian argillite

1. Point Hibbs Limestone: A section of this limestone was measured, beginning at the Permian contact (faulted). The basal 55 feet of the limestone consists of a richly fossiliferous light grey limestone.

The dominant fossils are corals especially favositids, but many other phyla are represented. Cephalopods are particularly notable in the basal portion with colonial rugose corals becoming common about ~~190~~ 185 feet above and Entelophyllum occurs about ~~250~~ 245 feet above the base. The remainder of the section consists of poorly fossiliferous limestone with stromatoporoids and gasteropods becoming common near the top. Between ~~400-437~~ 385-415 feet above the base dolomitized limestones are prominent. The total chained thickness was ~~660~~ 600 feet.

The dip of the limestone varied, being ~~88°~~ 97° 41? at 78° about ~~250~~ 245 feet above the base, ~~95°~~ 106° at 56° just above the dolomitic band, ~~90°~~ 101° at 59° near the end of the section. At the south end of the small pocket beach the dip was 24° at 45°.

There is only one limestone between Hibbs Lagoon and Point Hibbs, but it outcrops in 5 separate areas, the southern two almost connected. The northern outcrop ~~immediately~~ south of Hibbs Lagoon contains Favosites spp. in abundance, Thamnopora, Syringopora, Stromatoporoids, simple rugose corals, Atrypa, Cyrtia, a pentamerid, strophomenids, rhynchonellids and spiriferids as in the southernmost occurrence. Some trepostomes and fenestellids occur and there are occasional pectinaceans, rare gasteropods, Tentaculites, actinoceroid cephalopods, crinoid columnals; all of which are very similar to forms in the southernmost outcrop.

The southernmost outcrop is the best section and shows simple corals and cephalopods at the base, then a favositid zone with numerous other fossils as listed above, and in addition, Prismatophyllum and Entelophyllum especially towards the top of the biostrome. The favositid limestone shows Favosites (discoidal as dominant form with relatively small corallites) right way up and up to 18 inches in diameter. There are rare calymenids in this zone. Then comes dolomitized limestone, then a limestone with gasteropods, mainly turretted types but there are some euomphalids. Finally there is a limestone with stromatoporoids. While most of the favositid colonies are right way up and probably in place, it is not a reef because they do not form a solid mass and are enclosed in a calcareous silt with an appreciable amount of clastic material and sometimes in a light grey to dark grey or pink limestone. The favositids are rarely in contact. Stylolites are uncommon the only ones being stylolitic bedding planes Aulopora, probably sensu stricto, is present. It should be called a coralline limestone (N.B. not a coralline calcirudite). At least four species of Favosites are present, a massive form with small corallites, a massive form with large corallites, small button shaped colonies, and frondescent colonies.

The top part of this limestone also occurs on the point north of the pocket beach and on the next major point to the north, where euomphalid gasteropods and stromatoporoids are present. There is another isolated outcrop of lithologically similar limestone just south of the southernmost outcrop of black argillite.

ii. Succession above the limestone: In the banks behind the pocket beach south of the camp siltstones occur and are interbedded with quartzite, the quartzite becoming more important towards the top. The contact between the siltstone and limestone is not revealed, but on dip the siltstone should overlie the limestone. About 200 yards north of the camp site there is a small headland composed mainly of quartzite. At low tide this quartzite is seen to be interbedded with siltstone, and the quartzite members contain worm tubes. The quartzite is thinly bedded and towards the back of the beach contains conglomeratic lenses and tubicolar burrows. Cross-bedding is present, the currents having flowed from the south and the west and the cross bedding shows that the beds are the right way up. Pebbles up to one inch long are present.

Further north along the beach the conglomerate beds become more prominent and reach a thickness of 6 feet. Pebbles up to 2 inches long are present and include white argillite. Some cross bedding indicates currents from the north and east.

iii. Conglomerate: This is very ferruginous, and contains boulders up to 3 or 4 feet across. It dips south east and appears to overlie limestone, the strike of the contact being 230°; this however may be faulted into place as it is overlain by limestone. Another evidence of faulting is that the ferruginous conglomerate and the underlying dolomitized limestone are very sheared near the contact. The conglomerate has no dolomitic boulders in it. The conglomerate is about 40 feet thick. It is overlain by limestone, 80-100 feet thick, and the contact shows slivers of limestone and conglomerate intermixed. The strike of the limestone is 265°, and it is overlain by dolerite. Near the contact the limestone is sheared but not metamorphosed. This again suggested a fault relationship.

Summary and Comments: The Point Hibbs Limestone has been regarded as equivalent to the Gordon Limestone from the days of Gould (1866) onwards (see also Loftus Hills, 1914). More recently, Dr. Dorothy Hill (1942) recorded Devonian corals from Point Hibbs and raised the question of its equivalence with the Gordon Limestone. The fossils tentatively identified during the author's visit strongly suggest that the Point Hibbs Limestone should be regarded as later than the Gordon Limestone. The abundance of pentamerids suggests that it is not older than Middle Silurian. The presence of numerous specimens of Thamnopora suggests that it is in fact Devonian, and this is supported by the occurrence of spiriferids with very high cardinal area which resemble Cyrtia. The corals are clearly not Ordovician and if the identification of Aulopora sensu stricto is correct, a Devonian age is indicated. Although the clymenids are rare, their presence shows that the limestone is older than Upper Devonian. The most likely age is Lower Devonian, but it must be clearly realized that this age determination is based on field identifications only. It is too early to suggest correlations between this limestone and any other formation in Tasmania. It might, in a general way, be considered as part of the Eldon Group but the succession above the limestone at Point Hibbs is different from anything yet known in Tasmania. The succession suggests, by its increasing grainsize, a rise in the source area, and it is tempting to speculate that this represents the onset of one of the phases of the Tabberabberan Orogeny. Proof of this speculation must await further work in the area.

PERMIAN SYSTEM

The only previous work on Permian rocks at Point Hibbs is that of Hills (1914) who noted the presence of fossiliferous mudstone conglomerate which he regarded as equivalent to the basal beds of the Permian System in other parts of Tasmania. The author has examined the Permian section only on the northern shore.

On the northern shore the Permian is faulted against a ?Devonian limestone at the eastern end. Near the contact the limestone is sheared but the Permian is affected by the fault only to the extent of a shearing trending north-westerly on some of the finer beds near the contact. The Permian at the contact dips 275° at 85° and maintains this steep westerly dip for nearly a thousand feet. At this point it is affected by another fault and after a belt of variable strikes and dips some 20 yards wide maintains a dip of 38° to the south-west (237° to 255°) for about a hundred yards before dipping under dolerite. Almost at the dolerite contact the dip is 255° at 38° and the contact, although irregular in detail, trends 300° over the length of its exposure on the shoreline. This trend would carry the contact west of Pyramid Island, which is reported to be dolerite, so that there is probably either a marked swing in the trend or a fault. The dolerite has produced intense contact metamorphism in the Permian sediments for a hundred yards from the contact.

Because of the faulted contact with the Devonian limestone, the lower part of the Permian section may be missing. The lowest bed exposed is a conglomerate about two feet thick composed of numerous small angular rock fragments in a matrix of angular, coarse sand. The grains in the matrix are equant. There is no bedding within the unit but there is a north-west trending fissility, probably due to shearing. The rock is medium grey in colour. Some of the boulders in it are striated and reach a length of one foot. One remarkable feature noticed was the lack of boulders of the adjacent limestone. This is followed by 11 feet of conglomerate, interpreted as an outwash, which is relatively well sorted and contains somewhat rounded pebbles and boulders up to a foot long and lenses of tillitic material. The boulders include many of granite, some of a feldspar porphyry and quartzite including a green quartzite as well as one boulder which is lithologically like many of the Permian siltstones from other parts of Tasmania.

The next unit which is 93 feet thick consists of a medium grey tillite with several lenses of outwash material near the base. This rock consists of faceted and striated angular fragments of many rock types varying in length up to 18 inches in a dominant fine grained matrix. Sorting is very poor.

After a gap of twenty feet with no outcrop the next unit consists of 35 feet of dark grey siltstone which contains a few pebbles near the base and these pebbles tend to be rounded. In some places in this unit there is a very fine, rather indefinite wavy lamination. The rock is somewhat fissile. Of particular interest are several lenticular masses of calcareous material one of which contains pyrite nodules and pyrite nodules occur in the body of the siltstone. Glendonites were looked for in the platform exposed at low tide but not found.

The pyritic siltstone is followed by 39 feet of thinly bedded siltstone with rare erratics, pyrite nodules and some calcareous layers. The bedding is usually less than one inch thick but in a few cases reaches a thickness of 2 inches. In the siltstone there are some sandy bands and in the topmost five feet there are three beds of sandstone up to eight inches thick, The sandy bands show very thin cross bedding, mainly from the south. In the siltstone itself are some worm burrows.

The next unit is 205 feet thick and consists of an alternation of fine-grained sandstone (or coarse siltstone) and erratic-rich sandstone in which the fine-grained sandstone is dominant as far as thickness is concerned. The fine-grained sandstone consists of angular, equant fragments of quartz, feldspar, rare white mica and carbonaceous material with a few erratics. It is medium grey in colour and bedding planes are 4 inches to 8 feet apart. It is brittle rather than fissile. Fossils are absent or rare in this rock type in the lower part of the unit but a little more common higher up. They include Stenopora, Fenestella, spiriferids, rare Stropholosia, Eurydesma cordatum, aviculopectinids, a euomphalid gastropod, and crinoid columnals, Cross-bedded sets up to eight inches thick are present and the currents came from the south. Associated with the fine sandstone are at least twenty-one beds of erratic-rich sandstone which stand up several inches to two feet above the platform cut in the fine sandstone. These bands vary from six inches to nine feet thick. They are composed of the same minerals as the fine sandstone but they are perhaps a little coarser. In places the cement is calcareous. Bedding varies in thickness from six inches up to several feet. Their characteristic feature is that they contain numerous erratics up to four feet long which are angular to sub-angular and include granites, porphyries, quartzites, quartz, quartz schist, gneiss, green quartzite and rarely limestone like that immediately to the east. These erratic-rich bands are not tillites as they appear to contain little if any clay matrix and within any one band there is some sorting, although it is far from complete. Another feature of these bands is their richness in fossils especially Eurydesma cordatum and gastropods such as Keeneia, but spiriferids, Stenopora and gastropods like Mourlonia also occur. The Eurydesma may be articulated, dis-articulated, or fragmented, the fragments lacking orientation.

This unit of alternating sandstone and erratic-rich bands is followed by fifty-six feet of siltstone with rare erratics up to six inches long and numerous fossils. It is very dark grey. The siltstone contains rare small calcareous concretions and numerous glendonites which are commonly single crystals up to six inches long and only rarely rosettes with up to three crystals. Fossils are very common and include numerous Stenopora tasmaniensis, fenestellids (very common in some bands), spiriferids including Grantonia, Neospirifer, Pseudosyrinx (?) and Martiniopsis, Eurydesma cordatum, Notomya, aviculopectinids and Keeneia. The numerous extensive colonies of Stenopora tasmaniensis are preferentially oriented in many places suggesting currents from the north-west, north or north-east.

The next unit, which is 430 feet thick consists of four cycles, each cycle consisting of a basal member of banded conglomeratic siltstone and siltstone and the higher one of siltstone. The lowest cycle is 65 feet thick and of this 59 feet are banded conglomeratic siltstone and siltstone and 6 feet siltstone. In the second cycle there are 9 feet of siltstone and conglomeratic siltstone and then 37 feet of siltstone. The next cycle is 125 feet thick with the basal member 103 feet thick and the upper one 22 feet thick. The final cycle is 195 feet thick with a basal member only five feet thick. There is a further major cycle in that in the first and third cycles the basal member is the thicker one while in the second and fourth the upper member is the thicker.

The lowest cycle contains numerous fossils, especially in the erratic-rich bands, and these include Eurydesma cordatum, Keeneia platyschismoides, Stenopora tasmaniensis, spiriferids, Mourlonia and fenestellids. The siltstones have wavy laminations. In the basal member of the third cycle fossils are again very abundant on some horizons and in the top member an 18 inch thick limestone bed occurs. This is very impure and contains numerous erratics. Fossils are not common in the limestone but include worm burrows and a bilaminar Stenopora which may be S. johnstoni. The higher member of the fourth cycle is fossiliferous and the fossils include Stenopora and Eurydesma. Erratics up to 18 inches long occur in the siltstone member and a band of erratics occurs 146 feet above the base of the member. Erratics again become common near the top of the formation.

The belt of shattering and variable strike interrupts the section at this level. Beyond it at least 200 feet of alternating sandstone and siltstone occurs with the sandstone dominant. The sandstone beds were usually 2 to 3 feet thick but one more than 20 feet thick was noted. Bands of erratics are present in the sandstone and erratics are present in the siltstone. The erratics are dominantly quartzite and are up to 6 inches long. Fossils are abundant on some horizons. They include gastropods, fenestellids, Stenopora, Aviculopecten subquinquelineatus, Eurydesma cordatum, E. cordatum var. sacculum and spiriferids including Martiniopsis. The section is terminated by a dolerite intrusion.

The Permian section on the north shore of Point Hibbs is summarized here as figure 1.

It will be seen that at least 1,200 feet of clastic sediments are present. The lowest 106 feet of dominantly glacial origin might be correlated with the Wynyard Tillite. The next major unit could be considered as composed dominantly of pyritic siltstone with some calcareous concretions and rare sandstone bands. It is at least 174 feet thick but there is a 20 feet gap between it and the underlying formation. This might be considered on lithological and stratigraphical grounds as equivalent to the lower part of the Quamby Group (= Quamby Mudstone of Wells, 1957) and the Woody Island Siltstone. The next major lithological break is at the top of the alternating sandstone and erratic-rich sandstone, 205 feet thick. Fossils become abundant in the next unit, 56 feet thick, which consists of siltstone with glendonites. The fossils indicate a position low in the Permian sequence in Tasmania and the presence of glendonites strongly suggests correlation with part of the Woody Island Siltstone as these pseudomorphs are known only from this formation and its correlates in eastern and northern Tasmania. The formation showing the four cycles follows this and is 430 feet thick. The thin limestone bed in the third member may be the Darlington Limestone as it is roughly in the correct stratigraphic position and contains some of the fossils from that formation. However, this cannot be regarded as established. It occurs within a unit 20 feet thick of siltstone much more richly fossiliferous than the adjacent beds and this strengthens the correlation with the Darlington Limestone. If the richly fossiliferous beds elsewhere are accepted as being at or near the base of the Golden Valley Group (= Formation of Wells, 1957), the base of the correlate of this group in the Point Hibbs area might well be considered as the base of the 20 feet of richly fossiliferous beds. The beds above this 20 foot unit consisting of at least 449 feet of alternating siltstone and conglomerate then sandstone and siltstone might then be considered equivalent to the higher units of the Golden Valley Group such as the MacRae Mudstone and Billop Sandstone of McKellar (1957) and the Bundella Mudstone of Banks and Hale (1957). The Mersey Group of freshwater beds does not seem to be present but it is not impossible that they are represented here by marine sediments.

One feature of the Point Hibbs section is the cyclic sedimentation. On a fine scale there are alternations of siltstone and sandstone, siltstone and conglomerate or sandstone and sandstone with numerous erratics. In many cases fossils are much commoner in the beds rich in erratics but this is not invariable as some of the siltstones with few erratics are also fossiliferous.

These alternations are themselves grouped into larger cycles with the banded sediments alternating with siltstone. On an even greater scale the succession may be considered as glacial beds, followed by siltstone, banded sandstones, siltstone, and then five cycles of alternating banded siltstone and siltstone. Explanation of these cycles requires more regional data than it is appropriate to present here.

DOLERITE

Dolerite occupies the extremity of Point Hibbs and is reported from Pyramid Island. On the shoreline the dolerite intrudes Permian sandstones and siltstones of the Golden Valley Group and has caused silicification of these for more than 100 feet from the contact. This contact trends 307° and dips 38° to the South west but to the north along strike it swings to 356°. The contact is slightly irregular. Near the contact the dolerite shows strong jointing and sheeting and basic segregations are also present. There is either a marked swing in the dolerite contact to the north-east to include Pyramid Island or a fault displacing the contact.

STRUCTURAL GEOLOGY

The (?) Cambrian argillite is folded, sheared and jointed. In places the folding is quite close but in most parts of the shore platform the dips are uniform over considerable distances. Near the northern end the dip is 128° at 45° and near the southern end of the outcrop is 171° at 43°. This may indicate a plunging anticline, a change in trend or the influence of faults. Further observations are needed.

At the northern end of the outcrop of argillite it is intruded by the (?) minette as a sill. To the north the minette is in contact with limestone and the trend of the contact is 235°. The limestone in contact with the [illegible] minette strikes 265° and dips steeply south, It is about 100 feet wide in outcrop. Near this contact the limestone is sheared but unmetamorphosed and it is considered that this is a fault contact downthrowing to the north. This is succeeded north by 40 feet of conglomerate then the northernmost outcrop of fossiliferous limestone. The contact of the conglomerate with the fossiliferous limestone is irregular and slivers of limestone and conglomerate are found together. The general trend of the contact strikes at 231°. The fossiliferous limestone dips 181° at 65°. The contacts between the conglomerate and the limestone needs checking but they seemed on first sight to be faulted. When the faults are eliminated the limestone would be unconformable on the argillite as there is a difference in strike of 40°. There thus seem to be at least two faults, one striking 231° the other 235°.

The southern boundary of the argillite is hidden by sand so that there is a gap of many yards between the argillite and a limestone lithologically like the Point Hibbs Limestone. The argillite dips 171° at 43° while the limestone dips 171° at 25°. A fault may be postulated to produce this relationship and is supported by a linear on the aerial photographs. However, there are other structural interpretations and none may be preferred on the available evidence. South of the creek siltstones and quartzites occur but there are gaps in outcrop between the limestone to the north and to the south. These siltstones and quartzites are faulted and folded but generally dip 61° at 79°. Again the actual contact with the limestone is hidden but the strike is almost a right angle to that in the limestones. A fault occurs within the siltstone and quartzite group close to the southern contact with the limestone and it is likely that this boundary is faulted. On the air photo (Run 17-898-89) a linear cuts the coast at this contact and trends almost parallel to the strike of the siltstones close to the contact, a line of evidence which also suggests faulting.

The structure within the Middle Palaeozoic sediments seen was consistent. The limestones of the northernmost outcrop dip 181° at 65°, that of the next outcrop south 171° at 23°, then 151° at 30°, further south, quartzites of this group further south dip 131° at 15° and the limestones just north of the Depot Hut dip 84° at 45° and just south of the hut 101° at 59° while the strike near the Permian contact has swung to 184°. By photo-interpretation of the shore platform on the south side of Point Hibbs it appears that the strike of the limestone has swung even further towards the south-east. The structure of this group thus is that of an open syncline faulted down on the north and east into (?) Dundas Group rocks. Examination of the air photos generally supports this but there is apparently an anomolous steep easterly dip at the south-eastern contact with the Dundas Group which requires further field examination for evaluation.

The contact between the limestone and the Permian is exposed in the shore platform. East of the contact the limestone dips 97° at an angle of about 78° and to the west the Permian 275° at 85°. Along the contact the limestone is badly sheared in many places and the contact is slightly irregular but trends generally in a direction 5°E of N. There has undoubtedly been movement along this contact with a downthrow to the west. The steepening of the dip of the limestone as it is traced west is anomalous for a drag dip.

The Permian rocks dip steeply west for about a thousand feet from the contact with the Point Hibbs Limestone. There are minor more-or-less easterly trending faults but no major ones. Towards the top of the Permian section there is a zone of disturbed strikes west of which the Permian rocks dip south-west at 38°. with a slight swing towards the west as they are traced north. The steep dip of the Permian in the eastern end of the section is due to faulting, not to intrusion of dolerite as suggested by Hills (1914, p. 10).

The dolerite contact is locally sill-like but is either transgressive or faulted between the shore and Pyramid Island.

The overall structure of the area seen was that of a syncline of Middle Palaeozoic rocks resting unconformably on folded (?) Dundas Group rocks and faulted by north-easterly (54°) trending and north-westerly trending faults of unknown age. Permian beds are faulted against the Middle Palaeozoic rocks by a northerly trending fault downthrowing to the west. No evidence on the age of this fault is available locally but it is probably Tertiary by analogy with faults causing Permian beds to be dragged into a vertical position elsewhere in the state. In fact the width of the disturbed zone is greater than any known anywhere else in Tasmania.

ECONOMIC PROSPECTS

No signs of mineralization were seen in the areas along the shoreline. Pyritic concretions are common in the Permian siltstones but these are considered to be syngenetic in origin as similar bodies occur in the Permian throughout Tasmania in a constant association

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with dark grey carbonaceous siltstone.

SUMMARY

Folded siltstones and sandstones, and dark grey argillites with dolomitic beds and concretions are intruded by (?) minette and unconformably overlain by Middle Palaeozoic sediments. These latter include a limestone, the Point Hibbs Limestone, followed upwards by siltstone, sandstone and conglomerate. The Point Hibbs Limestone is considered to be probably Lower Devonian but this requires more work. The Middle Palaeozoic rocks are folded into an open syncline which has subsequently been downfaulted into the underlying (?) Dundas Group. Permian rocks are faulted against the Point Hibbs Limestone. These are 1200 feet thick at least and include a basal glacial formation, siltstones and sandstones, the latter showing excellent cyclic sedimentation. The Permian rocks are intruded by Jurassic dolerite. No sign of mineralization was seen.

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Accompanying Maps:
FIG 1. Point Hibbs Limstone.
FIG 2. Location Map.

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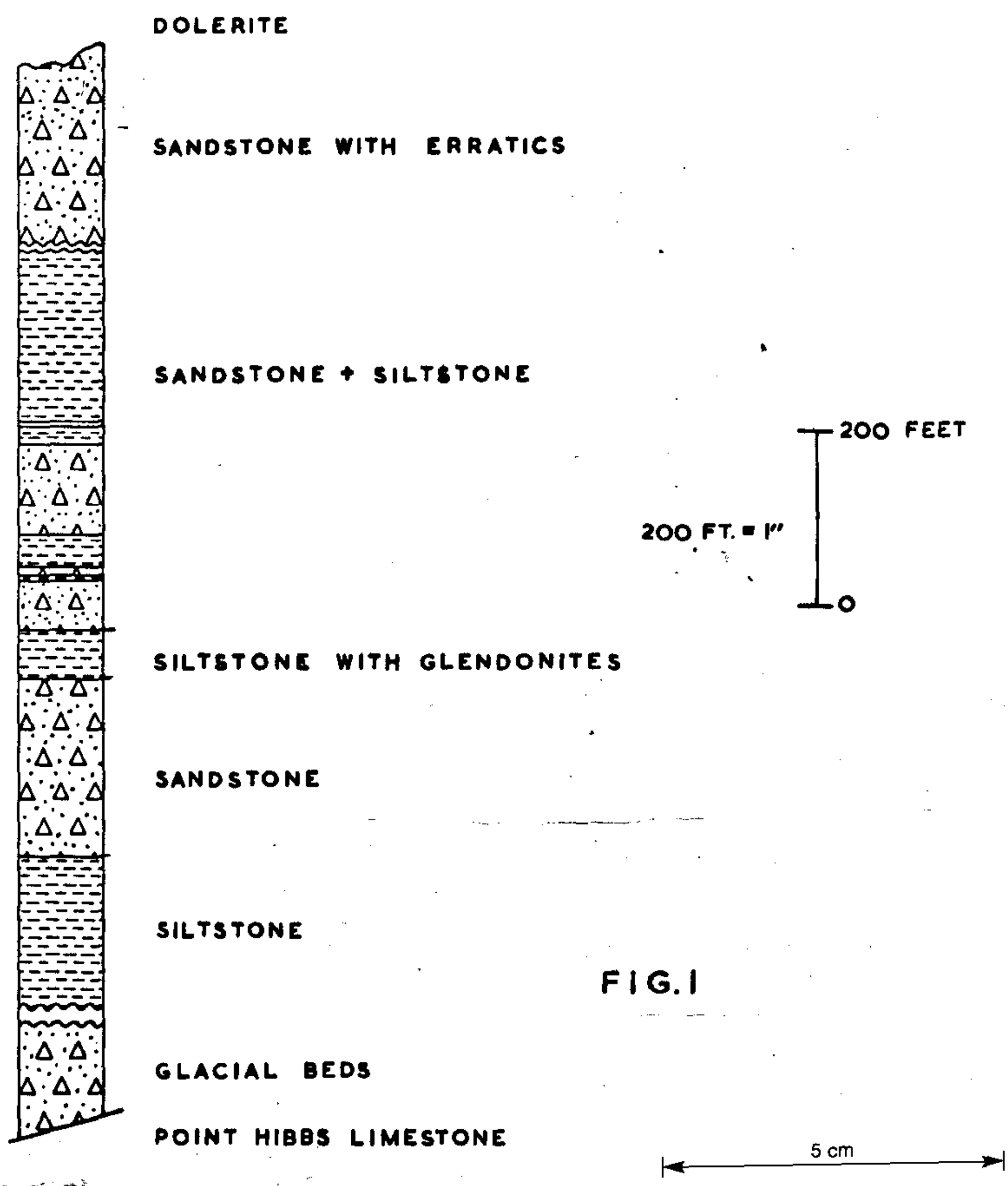
DOLERITE
SANDSTONE WITH ERRATICS
SANDSTONE + SILTSTONE
200 FEET
200 FT. = 1"
0
SILTSTONE WITH GLENDONITES
SANDSTONE
SILTSTONE
GLACIAL BEDS
POINT HIBBS LIMESTONE
5 cm

FIG. I

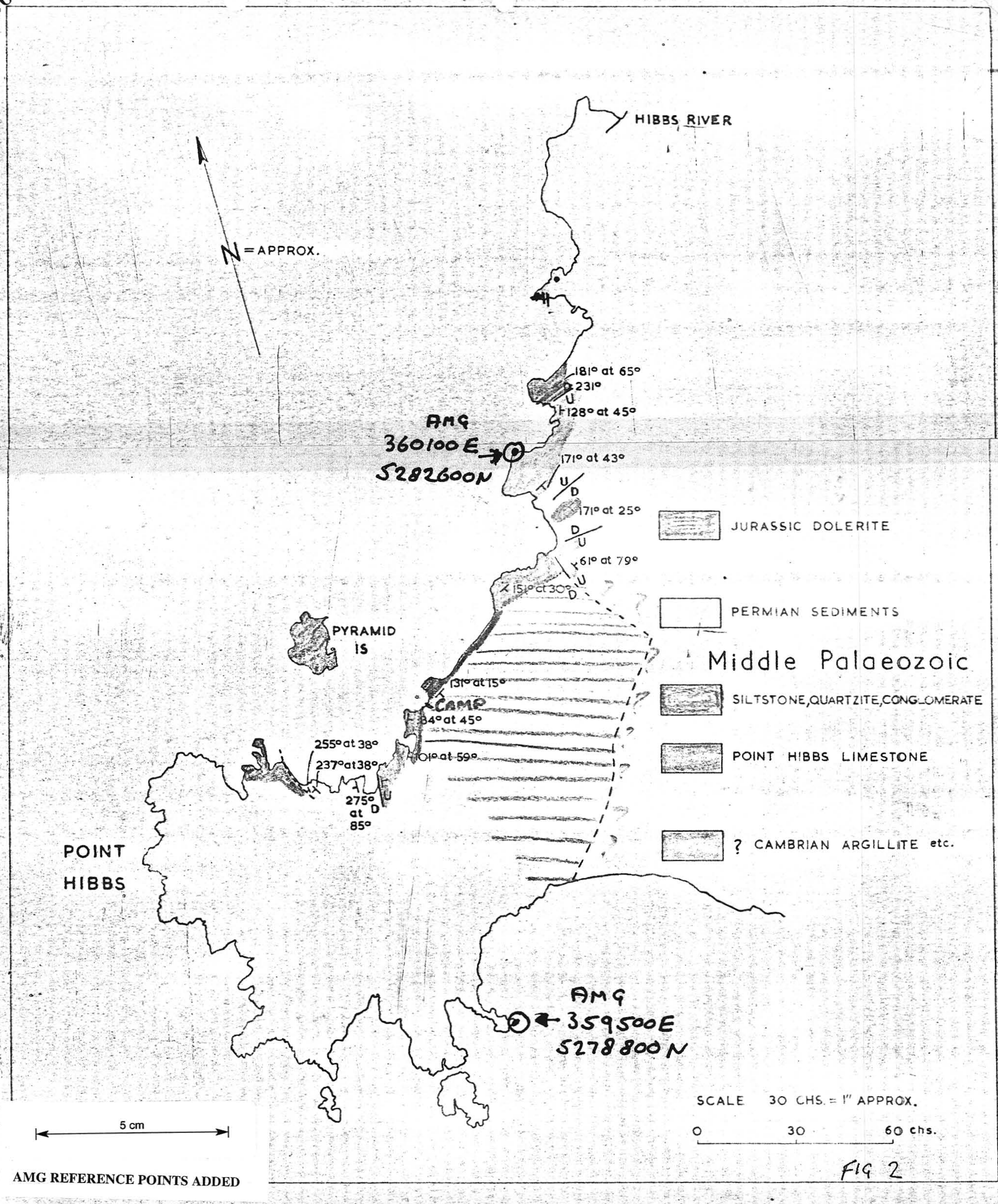
HIBBS RIVER
N = APPROX.
181° at 65°
231°
U
128° at 45°
AMG
360100 E
5282600 N
171° at 43°
U
D
171° at 25°
D
U
61° at 79°
151° at 30°
U
D
PYRAMID IS
131° at 15°
CAMP
34° at 45°
255° at 38°
237° at 38°
01° at 59°
275° at 85°
U
D
POINT HIBBS
AMG
359500 E
5278800 N
JURASSIC DOLERITE
PERMIAN SEDIMENTS
Middle Palaeozoic
SILTSTONE, QUARTZITE, CONGLOMERATE
POINT HIBBS LIMESTONE
? CAMBRIAN ARGILLITE etc.
SCALE 30 CHS. = 1" APPROX.
0
30
60 chs.
5 cm
AMG REFERENCE POINTS ADDED

FIG 2

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