

SOUTH COAST OF TASMANIA**Tertiary and Quaternary Geology****By****DJ Taylor 1966****Contents:**

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TERTIARY AND QUATERNARY GEOLOGY, SOUTH COAST OF TASMANIA

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by David J. Taylor

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INTRODUCTION

Twelvetrees (1915) reconnoitred the geology between Recherche Bay and New River, on the southern coast of Tasmania (see map fig. 1). His journey "was designed with the object of ascertaining the geological structure of the country, and especially for the purpose of examining alleged indications of the existence of petroleum near Rocky Boat Harbour and New River". He reported Tertiary deposits at Rocky Boat Plains which is 2 miles east of the mouth of the New River. He also collected specimens of stranded coastal bitumen.

These Tertiary deposits have not been examined since his trip nor have samples been available for micropalaeontological and palynological examination. Since the work of Sprigg & Woolley (1963), interest has been renewed in the bitumen which has been stranded on the southern Australian coast line and bitumen specimens from southern Tasmania would have been useful for comparison. Thus, I decided it would be worthwhile as a "vacation project" in a piece of country I'd always intended to visit.

This project received encouragement from Mr. P.T. Stafford of Esso Exploration Australia, Inc., whose company hold permits off the southern coast of Tasmania. Esso gave financial assistance to the project. Broken Hill Pty. Ltd. have a mineral exploration party in the area which gave me support in the field. Especially I would like to thank Mr. M. Hall. I experienced the almost legendary hospitality of Mr. & Mrs. Dennis King of "Melaleuca" (Port Davey) and am indebted to both this and their assistance. Mr. King's knowledge of the area was extremely helpful. Finally, the project may never have been brought to fruition had it not been for the enthusiasm of my wife, Yvonne, who acted as field assistant under conditions made difficult by inclement weather and the flora and fauna.

FIELD LOG

- 28-1-66 Flew into Melaleuca airstrip (Port Davey) by TasAir Cessna.
- 29-1-66 Taken by helicopter (Helicopter Services Ltd., in area for B.H.P.) eastward along coast, putting in food dumps at Cox Bight (in tinminer's hut) and at "boat shed" on eastern side of New River Lagoon. Reached Rocky Boat Plains Creek after a half hour flight. Helicopter returned to B.H.P. camp. We set up camp on sheltered part of beach. Investigated coastal outcrops.
- 30-1-66 Picked up freshly-cut track and followed it eastward to where it stops at Surprise Creek. Attempts to gain southern spur of Pinders Peak was hindered by dense rain-forest vegetation and heavy growth of "cutting grass" in creeks. Returned to camp. Found Surprise Bay is easier approached along coast.
- 31-1-66 Completed work on coastal sections. Broke camp at 1 pm. Reached eastern end of New River Lagoon at 2 pm. Found sheltered camp site on Milford Creek.
- 1-2-66 Attempted to get boat launched at crossing place.
- 2-2-66 Heavy weather all night and in morning. Remained in Milford Creek camp. Weather abated in afternoon. Broke camp and were able to launch boat and ferry gear to western side. Rowed some distance up lagoon. Camped in "boat house" on western side of crossing.

- 3-2-66 Completed investigations at New River Lagoon. Broke camp at 1.30 pm. Walk along beach made unpleasant by strong S.W. wind and driving rain. Track recommences at western end of beach. Reached Deadman's Bay at 5 pm. Track-cutting party camped there. As it was still raining heavily, their assistance in setting up camp was greatly appreciated.
- 4-2-66 Rest day as the track cutters radio informed us that we were on the edge of an intense depression.
- 5-2-66 Weather prospects improved (both visual and radio forecasts). Left at 7.30 a.m. Track follows parallel to coast and then picks up spur at head of Lousy Bay. Good track through thick rain forest. Reached crest of Ironbound Range (3500 ft.) at 11.30 a.m. Rain forest gives way to button grass on crest and eastern slopes of range. Good views from crest. Crossed Louisa River at 2.45 pm. River level apparently normal and we were able to "rock-hop". Difficulty finding camp site. Finally camped in hollow in button grass plain.
- 6-2-66 Misty rain. Broke camp at 7.30 am. Button grass plain saturated. Louisa Creek at 10.15 am. Excellent camp site amongst manuka grove (paper bark ti-tree).
- 7-2-66 Cloudless. Set off at 9 am. Reached Bouy Creek at eastern end of Cox Bight at 1 pm. Looked at geology. Arrived at hut 200 yds. east of Pt. Eric at 2 pm.
- 8-2-66 Cloudless. Investigated geology around Cox Bight.
- 9-2-66 Bad weather moving in from south-west. Left hut at 12.30 pm. Followed track north along broad valley. Reached Melaleuca airstrip at 3.30 pm.
- 10-2-66 Steady rain, but cleared in mid-afternoon. Tas Air Cessna landed at 5 pm and took us back to Hobart.

GEOLOGY

(A) East of New River Lagoon

Between the mouth of the New River and Shoemaker Point, the coastal section shows Paleozoic sedimentary rocks with some recent sand dune build up. Basically I agree with Twelvetree's (1915) geological sketch map. His reported Tertiary deposits were easily recognised from his section. As his section fully illustrates my contentions, I have utilised it as figure 2 in this report. Twelvetrees section is situated along the beach some 100 yds. west of the mouth of Rocky Boat Plain Creek. As his section included vertical shale beds, the interpretation required close examination of exposure on either side of it. My interpretation rests on a down-section approach.

(I) The youngest deposits are obviously the sand of the vegetated dune, which reaches a height of 70 feet immediately behind the beach on the western side of the creek. The sands are white to orange with some lenses of black mineral sand (?illmenite). The mineral sands are not horizontal and their situation gives an impression of typical dune structure. No marine faunas were noted in these sands.

(II) At the base of the sands at creek level, there is a black peat in which is embedded branches and roots of Banksia and Leptospermum (ti-tree). This horizon can be traced locally and rests directly on Palaeozoic rocks, including apparent Permian glacials. In places this peat is sandy and even contains an assortment of cobbles, obviously derived from Permian glacials. The horizon is up to two feet thick and follows an undulating surface. At the extreme western end of the beach, immediately west of Twelvetrees section, the peat fills a bedrock hollow which is apparently a creek bed. Thus, this part of the section may be reworked material.

(III) East of Rocky Boat Plains Creek, the peat unconformably overlies a repeating section of green to brown shales and glacial deposits of cobbles and pebbles in an iron rich matrix. These sediments are tightly folded. Green shales are seen on the eastern side of the creek and then the section is obscured by dune sand. These sediments reappear as brown shales and minor coals, bituminous and weathered, dipping 10°W at position ST/2 on figure 2. This disappears under a mass of glacial material with an iron matrix, not a "coaly conglomerate" as shown by Twelvetrees. These shales reappear further east, vertically inclined, between masses of glacials. Local faulting is evident and the strange inclination of the beds as shown on figure 2 is no doubt due to the incompetent nature of the glacial deposits. Further to the west are bedded sandstones, conglomerates and shales dipping 50°W. The regular alternation of grain size and rock type once again suggest glacial influence.

Twelvetrees "Tertiary deposits" appear to be structurally distorted Permian sediments on field evidence, although samples submitted to Dr. Isabell Cookson of the University of Melbourne did not contain any microflora. The lack of microflora is understandably due to the deep-seated weathering, caused by the structural distortion and oxidation of the iron-rich matrix. As inferred above the peat horizon forms an undulating surface over this section.

(B) New River Lagoon

Approaching New River Lagoon from the east, the marked route crosses Paleozoic rocks covered with button grass at the head of Rocky Boat Harbour, and then ascends into thickly-vegetated sand dunes of Banksia, Leptospermum and peppermint gums. These dunes are steepest on the shoreward side. At lagoon level there is a development of the peat horizon noted at Rocky Boat Plain Beach. Near the mouth of Milford Creek at the eastern end of the lagoon there are gently-dipping beds of Ordovician Gordon River limestone. On top of the limestone is a development of the peat, overlain by loosely-consolidated bedded sands.

The peat horizon was noted on both sides of the lagoon for some distance up from the mouth. The peat contained branches and roots of Banksia and Leptospermum. The thickly-vegetated banks of the lagoon are some 2 feet above the top of the peat. It is of interest that the dominant flora is Banksia and Leptospermum. Dead stands of these trees were noted in the lagoon. Although the lagoon water is brackish, approximately 2000 ppm, no marine organisms were noted. However, euryhaline fishes, e.g. flounder, frequent the lagoon. Salinity of the water obviously fluctuates due to wind direction at the narrow mouth and amount of water carried by the New River.

(C) New River to foot of Ironbound Range

Along the beach to the west, only dune sands were noted. The Ordovician rocks outcrop on the western end of the beach.

The peat horizon was noted at sea level in the small coves between Prion Bay and Deadman's Bay. At Deadman's Bay the peat is resting on quartzite some 15 feet above sea level. Immediately above the peat is a dark soil horizon containing broken mollusca shells including "abalone". The spires of the "abalone" shells have been broken in a manner suggestive of human activity. These shells comprise an aboriginal kitchen midden. Similar kitchen middens, above the peat, are present in Louisa Bay.

(D) Cox Bight

Sand dunes line the two beaches at Cox Bight. Behind them are low-lying areas occupied by lagoons (western beach) and swamps (eastern beach). Just east of Point Eric there is a 50-foot high terrace of angular pieces of quartzite. This material has been extensively worked over for tin. As Twelvetrees mentions, this terrace obviously represents an old shore line. Peat is present at the base of the "wash" and as reported by Twelvetrees (1915, p.8) it contains decayed timber, i.e. Banksia and Melaleuca. Mr. King (personal communication) has observed shells near the base of the "wash" and also well rounded cobbles probably derived from Permian glacials.

On the eastern beach, the vegetated bank is 4 to 5 feet above beach level, exposing the following section:-

Present day soil horizon with undulating base 1.5 ft. thick.
Sand and pebbles with mollusca shells .25 to .5 ft. thick.
Fine white sand disappearing below beach level.

The shell horizon contains close-shore foraminiferal fauna similar to specific content to that living today in near-shore Tasmanian waters. No peat horizon was noted at this level, but it is believed to be below the fine white sand.

(E) Bathurst Harbour - Port Davey

No Tertiary or Quaternary deposits were observed, although Mr. King described the peat horizon in some parts of his alluvial tin workings at "Melaleuca".

(F) Geological Conclusions

No evidence of Tertiary deposition was obtained from this reconnaissance. With both reluctance and surprise I must dismiss Twelvetrees (1915) report at Rocky Boat Harbour Plain as being a misinterpretation.

The peat horizon, which precedes sand dune development, is of interest. It is definitely Quaternary and probably of Pleistocene age and is probably a result of a marine regression due to an ice age. It is a dominant feature in low-lying places right along the south coast. In profile it is unlike that of the present day button grass plain soil, which is grey, rich in humus, but certainly not carbonaceous. The wood within the peat (Banksia and Melaleuca and/or Leptospermum) indicates a low-lying waterlogged, though not saline, environment similar to that on the banks of the New River Lagoon. The sediment forming at present in New River Lagoon is richly carbonaceous to which has been added wind-blown sand and in places rock debris carried in by the New River. It is therefore concluded that the peat horizon suggests lagoonal development during a period of low sea level. This development was much greater than it is today.

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These lagoons appear to have been inundated by sand dunes which heralded a marine ingress. This ingress is most marked at Cox Bight by the 50-foot terrace and the shell horizon. However, neither feature indicates a sea level much higher than that today.

The relationship of the aboriginal kitchen middens to the dune development and marine ingress could not be determined. But certainly the kitchen middens are after the period of extensive lagoons. The content of the middens indicates close proximity to the sea.

COASTAL STRANDINGS

Twelvetrees (1915) journey was mainly caused by reports of coastal strandings or bitumen which lead to the staking of claims at New River Lagoon by "The Asfaltum Glance and Oil Syndicate". These bitumen strandings have been reported in recent years and are well known to Mr. King, who says they are associated with high seas. I was unable to find any stranded bitumen, no doubt due to the fact that the last high seas were in May 1964.

The notable feature of the May 1964 high seas was the stranding of pumice. Large oval pieces of pumice (up to 2 ft. long) are still common well above the high tide mark and pumice flour is common at the high tide strand line. Sutherland (1965) shows that this pumice supposedly originated from the South Sandwich Islands eruption of 1962. The South Sandwich Islands are sub-Antarctic islands in the southernmost Atlantic Ocean. The pumice was thus carried eastwards by the west wind drift.

More evidence of the effect of west wind drift was provided by Mr. King. Some years ago he picked up some cut pieces of wood which he thought were similar to Nothofagus, the Southern or Antarctic beach. But these stranded pieces of Nothofagus were cut in an unfamiliar fashion. Mr. King took the wood to a timber expert in Hobart who said they were a South American species of Nothofagus and not a Tasmanian one. It should be noted that Nothofagus grows only in Australasia and southern South America (Patagonia, Tierra del Fuego). South American Nothofagus timber is not imported into Australia.

Sprigg and Woolley (1963) discuss reports of bitumen-stranding on the west and south coast of Tasmania, although their thesis centres more on the South Australian coast. It should be noted that their map (fig. 1) shows reports only at South West Cape. I can locate no reports from this seldom-visited spot, and can only conclude that they were shown there for drafting convenience.

Sprigg and Woolley (1963) are in favour of a local source for the material and dismiss suggestions by Twelvetrees (1915) and others that the bitumen originated from South America and the Antarctic. If the source was South America or the Antarctic, then the dispersal mechanism would be west-wind drift, which is definitely effective on the south-west coast of Tasmania as well as in the south-east coast of Australia (for pumice distribution see Sutherland, 1965, fig. 2). However, the probability of rapid decay of the bitumen and gas bubbles from some samples, supports Sprigg and Woolley's (1963) thesis of local origin. Yet it would be interesting to chemically compare the Southern Australian bitumen with the heavier hydrocarbons being produced in Tierra del Fuego, Chile.

It is also noteworthy that bitumen strandings were prevalent on the south west coast of Tasmania in 1913 and at the same time on the west coast of New Zealand (Twelvetrees, 1915, p.27).

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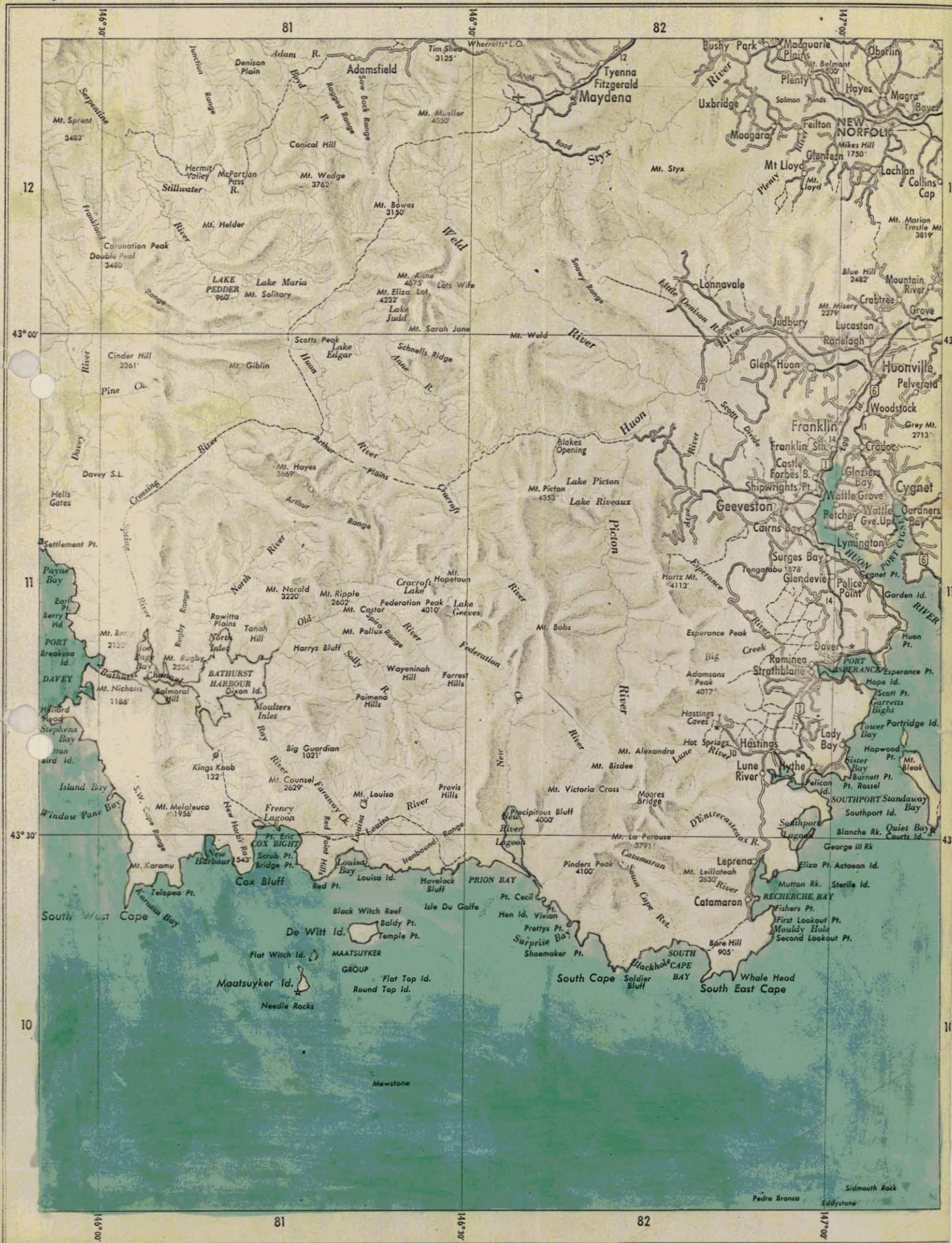
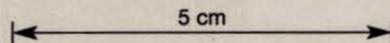
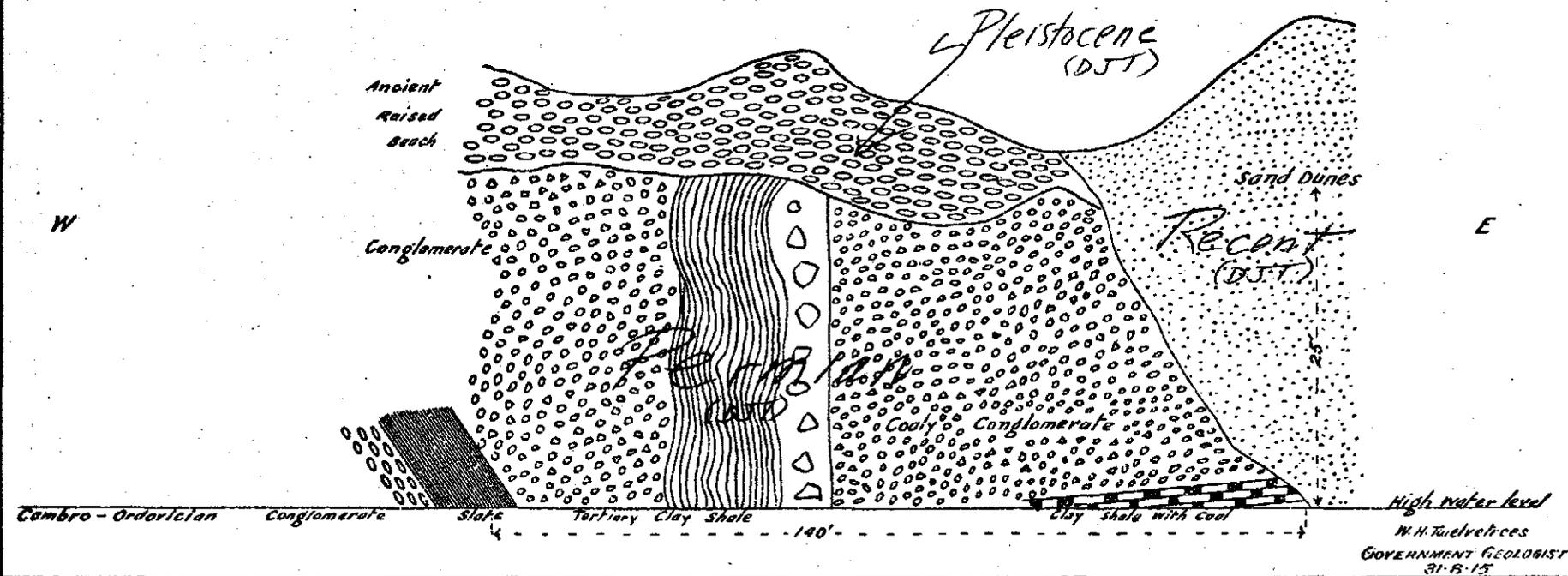


Fig. 1 - Index map

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SECTION OF BROWN GOAL BEDS AT ROCKY BOAT PLAINS

~~PLATE III~~
Fig. 2



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