Notebook No. 10

Three unlabelled Photos National Museum?

Edmund Gill

1952

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Page 1

“Crab-Holes”

On flat near junction of Moyne Canal N of Rosebrook, & old course of Moyne

Map: showing crab holes in relation to Moyne Canal

Diagrams showing transverse section and plan of crab hole

Page 2

1. Cracks due to montmorillonite clay from basalt.
2. Tend to be 3-way cracks in top of mounds – cf. Cracks in cooling, basalt where 3-way cracks yield hexagon columns.
3. Cracks deep. Steel tape pushed down 2 ft in one tested. Cracks up to 3 inches across.
4. Flat wet in winter so that clay expands. The resultant pressures cause rises. These rises highest & driest, so first to crack. Decrepitating clay filters down cracks, & so process repeated when winter returns. “Self-mulching”.
5. Diff. vegetation on summits of rises. Favoured by thistles (annuals). Mixed flora in hollows.

Page 3

Moyne River Section

Such a limestone as seen under black clay could be from pedological process, but W. Leeper cannot explain why limited to junction of the two clays.

After discussion between Leeper & self decided that my interpretation as a re-crystalized sedimentary deposit probably correct. E. D. G. later reversed his opinion.

Tower Hill

Soil under tuff and on Miocene on SE side of Tower Hill caldera as a terra rossa (classified by G. W. Leeper)

Page 4

22/1/52

Dunes S. to W. of Dennington

Leeper Light grey to dark-grey sandy soil to about one foot, & normal sand below that. No differentiated profile, i.e. uniform.

Tower Hill Island

Cinder Quarry. N.W side.

1. Soil immature in that full of rocks, yet.
2. Well defined zone of secondary enrichment by lime.

Lab tests show due to high % of limestone from Miocene underneath. Mt. Noorat & Mt. Leura 3-4% but Tower Hill 16% $CaCO_3$ in cinders from quarry on central island

Page 5

Tower Hill Beach

Soil at midden site.

Dark colour due to organic matter. Indicates times when enough rainfall for the vegetation to hold the dune. ~~Or is it from fires?~~

Shown also by low angle of dip of soil.

The two soils are two phases of the same event because

1. So close together
2. Merge in many places

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Rly to Timboon Cutting

(W. of Lake Bullenmerri)

1. Under Basalt – Tertiary terrain

Leeper:

Hard lateritic soil closely packed with buckshot right to surface.

1’ clay loam to light clay (bright brownish grey)

6” of almost pure buckshot (eroded) gravel (at 1’ very tight gravel)

Light reddish-brown very gravelly clay loam at 2’ reddish clay loam

Great depth (10’- 15’) exposed in various parts of cutting.

N. end of cutting on W. side grey, red & yellow mottled clay, c 10’

Page 7

Typical lateritic sub-soil (note pedagenic inertia).

In places at top of mottled zone 2’- 3’ of ironstone.

The gray material probably a dirty kaolin.

Photo: East side of Lake Bullenmerri from public park.

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2. N. end of cutting on E. side.

Steep slope covering c. 6’ vertical distance then actual cutting:

a. Podsol with buckshot c.3’
b. TUFF Light-grey stratified 2’3”
c. SOIL under tuff. Grey with yellowish mottling. Silty clay. Tough. Quite well structured. Profile – 0” – 12” yellowish – grey clay to a little buckshot gr.
   12” – 20” Gravelly clay (grey w. yellow mottles) Clay heavy.
   20” – 24” More yellow. Buckshot gravel almost disappeared. Very heavy clay. Uniform yellowish-grey colour.

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24” – 30” calcareous clay. Decomposed calc. rock. Dark brown alternating with limey material.

55” on 2/1/52 continued with our auger. Similar clay. Basalt at bottom.

d. Basalt
   This kind of profile in Mt. Gellibrand district & drier Western District soil. Function of present climate or rather of the recent pluvial period?

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Terang

Quarry on N.E. side of Mt. Terang. Leeper classified soil as immature dark-brown loam with stones. This soil on recent basalt.

"Chocolyn" N. of Camperdown

Soil on loess is a black silt loam. Classified by Leeper.

Photo: Aborigine behind tree hunting pre-historic diprotodon.

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26-1-52

Tower Hill

Photo: Quarry on Princes Highway on caldera rim

3'; 6" – 8" med. Brown & rest brownish yellow

2'6" Light-grey tuff & lapilli

1' Whitish agglomerate

3' Dark grey lapilli with fine layer of ash

Soils all immature. Usually thin & full of stone. Above thicker than usual.

On S.E. side of caldera, uppermost layers are of caldera complex – all kinds & conditions of rocks. e.g. pieces of bedrock, some little altered while others are baked hard & red, & others calcined on outside.

Molten Basalt temp =

Calcining temp =

"Diatomite found in uppermost layers – enough time between depositions for pools to form & diatoms flourish. Hills said a specimen diatomite when I was a student. Material from same site I have collected since is secondary calcite.

Diatomite seam later confirmed by B Tindale.

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25-1-52

Mailor's Flat

Map: Showing location of small quarry

About 5' of light-grey bedded tuff. The top layer thick & including buckshot ironstone & a bone. Tuff washed from basalt slopes higher up & so other materials included. The result is a small amount of buckshot in the soil derived from the tuff but this secondary.

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26/1/52

Guano Cave

Photo: Mouth of cave

Photo: West of cave where get down cliff, showing soil & marine beds. Same formations as marine beds on point between here & cave.

Photo: Showing soil in aeolianite.

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27/1/52

Allansford see 52: 230-232

Unlabelled Photo: Showing Hopkins River (?)

Map: Showing pre-basaltic river course now infilled through Allansford in relation to highway and railway line.

Page 15

Diagram Continuation from diagram on p. 14 (railway line to tidal limit of river.)

1. Shows river had lower thalweg (formerly) than now. Raised by basalt. Sea then lower?
2. Since then a 25' marine terrace.
3. Later incised.

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28/1/52

Hopkins Estuary

Map: Showing lower Hopkins River estuary

Tuff outcropping from c10 yds to 3 yds N of road. Remains of midden on tuff; also loam on tuff.

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Anadara specimens worn & they do not belong to the sandy facies in which they occur. They are remanie washed probably from further up estuary. Or more likely advancing sea overran a lagoon.

Emerged (not uplifted) shell beds because

1. Shells are open sea marine forms not able to grow in the present brackish estuarine waters e.g. Turbo undulatus very common but not even grow at Hopkins Mouth now (ecology different)
2. Warmer water forms like Anadara which not live in area now (distribution different). Waters warmer in times of higher S.L. which a function of melting ice caps.

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3. Shells numerous in both species & individuals which also a character of the warmer water times?
4. The beds are horizontal & undisturbed – no evidence of tectonic movement.
5. Levels coincide with worldwide eustatic height of 25’, or an earlier high sea level.

At A on p. 16 flat pebbles common. Cross-bedding involves thicknesses nowhere seen in excess of 18”.

At B about opposite “Lyndoch” residence (later became old people’s home), shell beds cut out at base of high cliffs. Band noted with flat boulders commonly 6” – 12” in diameter. At B marine

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30/1/52

conglomerate plastered in old marine cliff, & infilling crevices.

1. Matrix consists mostly of quartz grains 1/16” – ¼” above. Significant because quartz rare on newer mouth area now cf. sandy clay where river leaves basalt at Allansford (p. 15). Nearly all clear quartz & so probably of granitic origin.
2. Higher is matrix of sand & broken shells – a marl but still very siliceous due to quartz.
3. Pebbles mostly of aeolianite travertine, & of all sizes up to 15” diam. Mostly flat pebbles also of lithified red sandy soil. Piece of solution pipe c 1 ½’ diam.

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also large pieces of angular aeolianite in upper layers – apparently fallen from cliff.

4. Numerous shell fragments mostly well water-worn.
   Include Anadara, Patelloids, Ostraea, Pupura, Turbo undulatus Ninella torquata
   Opercule of Ninella found here first in W’bool dist. altho’ common at Pt. Fairy. Cotton says in deeper water off S.A. coast. In NSW, S.A. but not in Victoria unless rare (extinct) like Anadara. Once very numerous.
   Tellina deltoidalis
   Corbula
   Chione
   Polyzoan

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5. Shallow water to beach ecology as shown by pebbles coarse material water-worn character of rocks & shells cross-bedding "Littorite" (own term) appears to infill cave here. Later erosion showed in situ
6. Ninella torquata & Anadara trapezia common in Pleistocene but not here now. Rest of fauna much like same as at present.

Pleistocene in age not 10' sea because lithified. May be formed by erosion of horizon described on p. 22

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Further upstream large blocks fallen from cliffs with big flat pebbles & shells set in travertine (photo). Different from deposit just described bec. incorporated in cliff & not plastered on it? Also more lithified.

This horizon can be followed along cliffs; its top rising & falling 3' – 7' above H.W.M. "Dune" which forms cliff built over it.

Near corner of bay [C on p. 16] a complete change. Conglomerate with big pebbles forms cliff to c 10' above HWM, the whole being travertinised. A few broken marine shells. Red soil & tuff on top. In filling cave or gulch? Along the E-W part (on each side of A) there is not

Page 23

Solid aeolianite as in the cliffs to the S., but sand with kunkar capping, some solution pipes & travertine bands. This accounts for the embayment at this point, the sand being easier to erode than the aeolianite. The island* which formerly existed in this bay due to sand & silt dropped on edge of embayment where the current slacked. * This information given me probably incorrect.

Photo: Mouth of Hopkins River. Aeolianite cliffs. Aeolianite rocks at mouth. Breakers showing over sand bar formed on aeolianite platform.

Photo: Rhizoconcretions in aeolianite 25' emerged shell beds left bank of Hopkins River, a little upstream from Belvedere Cave but on other side (B. Morris, Ed "Standard")

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30/1/52

Nicholson St., W'bool

Red soil

Solution pipes filled with red soil (pre-dry period 28,000 – 8500 yr BP so gives idea of erosion rate).

Cutting on hill, especially N side of road.

E. Bank Hopkins R. Interglacial Dated ~400 000 yr

Marine conglomerate

Photo: Looking down from cliff L. bank Hopkins River opp. “Lyndoch” (B of p. 16)

Flat pebbles

Marine shells

Fragments of cuttle fish guard.

4/3/66 [with Sir Robt. Blackwood] Mostly horizontal strata but some low dips – current bedding & (?) scour holes. Conglomerates with coarse sand, broken shell & flat pebbles. Rhizoconcretion when S.L. lower? Beds of shallow water beach deposits extend some 30’ above S.L. then dune. Detailed study needed.

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29/1/52

Goose Lagoon

Three photos: Mobile dune blowing in from sea into S. end of lagoon. Water in lagoon after heavy rain. Just a swamp in summer usually & dry in drought seasons. Note older & higher dune at back completely vegetated inland. Covers aeolianite under which is basalt.

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Photo: View from dune looking N towards highway

Photo: Shrub-vegetated dune, mobile bare dune, geological dune, 3 ecologies in one place!

Photo: View from mobile dune towards midden site.

Photo: Headland – old sea cliff in aeolianite. Charcoal & marine shells collected from midden on top for radiocarbon analysis. Marine shells from emerged shell bed on flats just N (past) headland also collected.

Page 27

1. Middens of marine shells altho’ sea not entered Lagoon for a long while
2. No Bones found in these middens although plenty of game in lagoon. This because middens pre-date lagoonal swamp conditions?
3. Sites such as would expect in relation to the 25’ sea.
4. Shells of middens such as would grow on rocks there if sea at 25’ level. Carried from present coast, a process not accepted in 1952. EDG 1978

Map: Showing Goose Lagoon in relation to roads and placement of middens and shells

Page 28

Pt. Fairy Calcarenite

“Shells” on p. 27 indicates three postholes which yielded marine shells in sand. Also found in rabbit burrow spoil heaps. Loc. Is 6 ½ - 7 chains S from road (measured) Low flat here is basalt bank on which is sand & marine shells covered by peaty alluvium.

Photo: Goose Lagoon from W. side

Page 29

Kelly’s Swamp See Book 17 p. 72

Map: Showing Lynch’s Hill, the cutting and tuff depths at various sites

TUFF thicker as approach Tower Hill, so swamp deposits thinner.

Tidal lagoon at pool has surface at MSL prob.

Top of swamp is H.W.L. Old terrain not met It is over 6’ below S.L. at the pool. Area cut down by Merri R migrating over tuff W. ahead of Dennington Spit. Forced to divert to present course <3900 yr BP. The date of shells on old shore platform just S. of Moulden’s Q at Dennington. or later

Page 30

½ ch on seaward side of bridge S side of waterway, Kelly’s Swamp

Diagram: Showing cross section of lagoon wall

ON OCEAN BEACH opposite above site spade & auger hole put down 4’.

All calcareous sand & water running sand in hole prevented greater depth of excavation. Tuff not reached, although below HWL. Old river course? See Book 52, pp. 29-31

Page 31

Landward Side of dunes on same line of section

3” yellow sand

2’ yellow sand & black sand

3’ black peaty sand with plants

9” black running sand which forced abandonment

6’ 0”

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31/1/52

Mt. Warrnambool, Panmure

Tuff quarry. Some buckshot in soil but difficult to see because not shiny.

MM Panmure 673,748

Soil a reddish loam.

Terang Quarry

Map: Showing position of Lake Terang, quarry and roads

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Mt. Terang Quarry

8' Basalt ? 3 Thin flows

30' Tuff & lapilli

Tuff domed over. Dips up to 9^o

Strike S.E. i.e. F 45^o – 50^o S

Dip N.E.

Fine, uninterrupted layers

A number of very small displacements. White inclusion look like calcined limestone.

Slope on road side shows basalt dipping at 15^o (slope of hill) but truncating beds of tuff. Shows erosion interval but not long enough to decompose tuff much less form soil. Or effect of lava flow?

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31/4/52

Pejark Marsh

Property of Mr. John Scroggie at SE corner of Marsh. Aerial photos show patch of water in his corner delineated by darker peaty soil & docks when we visited the place.

Diagram: Cross section showing various levels of marsh and terraces and auger hole A

At A

6" black peaty loam

6" dark-grey to black silty clay with gasteropods etc

At 1' tuff with Coxiella

Appears to be secondary deposition of lime on surface of tuff giving a hard crust. This used by Scroggie for garden paths.

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S end of drain running roughly NS – near windmill

Diagram: cross section of Drain section & auger hole

1’ black loam

½” calcareous concretionary layer

3’ grey tuffaceous alluvium

3’ brownish grey tuff. Some cross bedding

3’+ bluish-black alluvium (abandoned because too sticky to penetrate)

Photo: This section in drain on right of figures.

In places also irregular masses of calcareous material.

On Terrace – auger hole (nearer house)

Diagram: Showing cross-section

3’ dark-brown soil

Decomposed tuff (abandoned because tuff became too hard to penetrate with auger)

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N.B. Too high for swamp deposits. Top of tuff here much higher than on floor of swamp. Is there loess underneath?

Lake Terang

Tuff (fine-bedded, grey with lapilli) in old quarry behind Scout Hall Terang

c. 10’ showing

Top of band c. 20’ above lake bed.

Immature soil

Negligible buckshot

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Mt. Noorat

Mt. Noorat quarries on E & W. sides of Noorat-Mortlake Road on W. side of the mount.

(MM Mortlake 1941 sheet 845,905).

Quarries in cinders which are coarsely stratified.

Low dip. Rest on coarse tuff which in many places forms floor of quarry. Rich in olivine and bombs plentiful. Buckshot rare.

In both quarries there are well developed soil pipes. No sub-soil lime layer as at Tower Hill comparable with Mt. Leura.

Photo: Showing Mt. Noorat pipes, Cinders and Tuff floor.

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1952

Mt. Shadwell

Cinders & scoria cone

Unstratified

Soil with only occasional solution pipes, but may be more plentiful in flatter areas.

No lime layer.

Soil immature.

Mt. Noorat

Photo: Cinder quarry, W side of Mt Noorat, E side of Mortlake Road, Tuff floor & cinders above.

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"Woolongoon"

In "buckshot country" much loose buckshot on surface – residual from arid period erosion?

Lake level artificially elevated Dune of loess (rather clayey) on SE side.

70' bore in dune penetrated loess & reached "sea shells" (marine Tertiary)

This on edge of garden on W side of house.

Note absence of basalt in bore. "Buckshot country" generally Tertiary with eroded laterite on it. Grayson & Mahony's map confuses this with hidden & sparse buckshot in basaltic soils cf bore N of A.G.T. Smith's house at Glenormiston North

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Blind Creek marginal to basalt. Basalt E of creek, & buckshot country west of creek – i.e. mutually exclusive.

Owner: Mr W. Weatherly

"Woolongoon"

Near Mortlake

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2/2/52

Mt Leura

Quarry on N slope of Mt Leura and S of Princes Highway

Cinders – unstratified

Blackish or purplish black where fresh

2’ – 3’ dark brown loam

2’ -3’ yellow tuff & agglomerate

Soil on steep slope has no solution pipes but these plentiful on gentle slopes at entrance to quarry

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Lake Koreetnung

Locally called Mud Lake. Generally dries up in summer. Shallow. Loess dune on S.E. side of lake.

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Lake Terangpom

Diagram: Showing lakeshore, lacustrine silts and loess

Light-grey horizontal lacustrine silts. Drain shows they continue under loess

Dune of loess on SE side yellow, clayey.

Abundant buckshot on shore. Apparently washed in from surrounding basalt plain.

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2/2/52

Leslie Manor

Diagram: Showing three lakes in relation to road and hall.

Where Lake Corangamite touches Leslie Manor Hall road, old shore 10’ – 15’ above present one. Masses of broken Coxiella are found on E shore (cf. S of Cressy). On present shore ½” weed(?) under ? bed consisting mostly of buckshot (cf. in Colongulac & Terangpom). The highest beach is of buckshot & buckshot sand.

Erosion of dune at X shows

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mottled light-brown or yellow and light-grey clay with large ferruginous ? limestone concretions, which almost a pan in places.

Evidence of higher lake levels.

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Lake Gnarpurt

Diagram: Map showing salt lake & loess dunes

Lake salt in spite of streams running in & distance from sea. Once part of L. Corangamite. Cliffs in light-grey silt. Beach in same covered with some quartz sand (mostly clear). In grey silt on beach are pebbles of calcareous concretions, iron concretions, worn pieces of Ostraea, bone etc. suggesting Tertiary nodule bed.

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At Foxhow Lake Gnarkeet has been drained by Gnarkeet Cr. Wind blown material on S.E. as judged from road.

Swampy lake on east side of Foxhow.

High ground on SE of this.

Dry lake on west of Lake Rosine has cliffed dunes on S.E. side.

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Lake Corangamite

(East Side)

Map: Showing old lake floor in relation to road, site 'Ex' and railway line

c. 1 ml N. of Barpinbah rly stn. Beeac MM 733,004

West side of road S. of Cressy 'Ex'. Shows yellow sand very rich (esp. in certain bands) in Coxiella cf p. 44

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Two-Mile Bay = Shelly Beach

West of Port Campbell

Diagram: Showing former sea cliff, Two-Mile Bay and Shelly Beach, Shore Platform

Different maps have different naming

Emerged shore platform 10' – 11' above present shore platform.

Cut in yellow Miocene marine limestone.

Lovenia & Ditrupa seen in it.

Miocene horizontal practically

Platform apparently stretches back to former sea cliff.

Wide contemporary platform protects the structure.

Immediately behind the exposed part of the platform (washed by storm waves) is a sand dune averaging c. 30’ in height. Dune vegetated

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by trees, rushes, & grasses.

Hard crust on top of emerged plaster. Secondary calcification makes it much denser & tough.

Edge of platform has a well-determined notch.

Diagram: Showing emerged platform and notch on contemporary platform.

On the platform is a plaster of aeolianite-like rock consisting chiefly of calcareous sand cemented 2’ thick in places can distinguish a lower part with coarser sand, shells, pebbles; & buckshot gravel from higher part more or less of sand only.

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Buckshot gravel mostly at bottom on or near the platform, but it has been noted at all levels. Buckshot cannot reach shoreline now because of vegetated red behind the dune. Therefore beach plaster with buckshot older than the dune.

Some of the plaster ferruginous & some not. Staining very irregular vertically & horizontally. Iron from buckshot probably. Iron pebble 3” in diameter seen in situ in plaster. Also pebble of Miocene limestone.

In the plaster are numerous fossils of species still living therefore Quaternary Height of emerged platform that of Mid-Holocene sea, but c 14 says older

Bedding of plaster horizontal but cross-bedding common. That with

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heavy buckshot & shells must be water-laid or beach washed, & some probably Aeolian. “Littorite” = Beach deposit?

Some black sand in yellow sand of beach (where developed)

On top of the plaster at the back of the platform are blocks of rock cast up by storms. They are of Miocene & of the “littorite”.

They form a kind of beach ridge.

Diagram: Cross-section of sand dune showing:

Sand dune

Miocene block 2’ x 6’6” cast up & overturned.

3’6” x 4” of littorite (with buckshot) on wrong side.

2’ mottled light brown & grey clay with fragments of limestone.

1’16” “Littorite” plaster

Miocene emerged Platform.

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Photo: View from Port Campbell end looking west.

Photo: Ditto.

Photo: Note shoreline dune because mobile revealing midden.

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Photo: 11’ staff held against emerged platform. C. 10’ above present platform. Note notch & visor.

Photo: In middle of area platform eroded to S.L. Many springs. Creeks emerged here. Sand plaster also at the lower level.

Photo: Holes of molluscan borers in slab of Miocene marine limestone.

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Photo: At west end talus from cliffs overlies platform.

Photo: c. 3’ rounded Miocene boulders & some buckshot immed. over emerged platform, then irregular slump material higher up again.

Photo: Platform partly eroded by present debouchement of creek.

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Photo: View from west end. Note dune.

Photo: Ditto. Note where ephemeral dune lake has been.

Photo: Unlabelled cliff photo

Photos continued p. 170

Pages 57-58

Survey 19-1-53

Table: Showing survey data for platforms

Pages 59-60

Table continued.

Diagram: Showing cross section from sea to cliff top showing platforms

Incipient valley in fossil cliff has yielded a wide talus fan over which is a veneer of sand.

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Auger Hole

0’ – 1’ Dark brownish-grey sandy humic soil grading into grey & blue-grey sandy clay

1’ – 5’7” Grey & blue-grey sandy clay

5’7” – 7’9” Grey & yellowish-brown calcareous sand & sandstone pellets with some buckshot admixed with clay (essentially a calcareous clay).

7’9” Hard rock of platform.

The clay 5’7” – 7’9” is like that exposed in the cliff section overlying the platform & under the dune.

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Miocene

Lovenia coll. near section-line

Ostraea coll. near west end of platform. Very large specimen.

East of section line noted & number of holes probably made by boring molluscs & now infilled.

Diagram: Showing infilled hole in Miocene marine limestone.

[for evidence of boring see photo p. 54]

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Diagram: Showing 6” cross section of a marine boring with sand/shell/buckshot fill

Evidence of mid-Holocene (?) borers.

In sand plaster on platform of 10’ sea fossil Scutum, Turbo, Monodonta found & a number of limpets all rock shells

Small lenticles of conglomerate to agglomerate in places.

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Also midden on top of dune where “blow” shown in photos. Fireplaces of burnt stones. Charcoal. Numerous shells, mostly (if not all) rock types. No Ninella torquata. Subninella, Haliotis, Limpets. Flakes of flinty material.

At the eastern end of the emerged platform where the fossil cliffs merges with the present sea cliff, the sand dune cuts out. A fresh section of the clay on top of the emerged platform shows here. It is mottled light-brown & grey as met in auger hole. Not so oxidized as beach outcrop on section line.

Diagram: Showing cross-section of clay wall.

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At east end of emerged platform which is sectioned along with overlying deposits by present marine erosion.

Diagram: showing cross-section at east end of the platform

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20/1/53

On fossil platform against fossil cliff lie huge fallen blocks of Miocene l’st surrounded by boulders, pebbles calc. sand & numerous broken shells incl. the warmer water form Ninella torquata; also Subninella undulata, Neothais, Haliotis, Conus, Patella, etc. Lithified in places, generally superficially.

Diagram: Showing cross-section fossil platform and talus cover

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As sea retreated

1. Falls of rock from cliff not washed away.
2. Sand & shells blown up over these fallen blocks.
3. Talus of soil, buckshot etc covered 2. Then vegetation bound it together.
4. Sand & shells not blown over talus remained on platform where it has been cemented.
5. Clay aggregated over plaster. Apparently laid down in conditions of chemical reduction & mottling of colour due to partial oxidation.
6. The sea has cut back the emerged platform probably the width of the present shore platform.

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Storm waves strip the emerged platform of its superficial deposits faster than the sea cuts back the Miocene rock in which the platform was cut. The beach rock being more resistant than the clay forms another step in the profile.

The attack of the sea has not been precisely parallel to the fossil cliffs & so now the present cliffs transect the fossil cliffs at an oblique angle.

At the next minor headland east is a remnant of the 10’ platform with large fallen Miocene blocks on it. If sea retreated now & this covered with sand & shells, then get parallel to this fossil structure.

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Diagram: Map showing location of section on p68 dune, emerged platform, bay and remnant 10’ platform.

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West end, emerged Platform

For about 200 yds the emerged platform is eroded down to near the level of the present one.

Diagram: Showing emerged and present platforms over 200yds.

Beach of sand (thin cover) here & beach rock at back. Clay bed (mottled grey & light-brown sandy clay) as met in auger hole, 5’ – 7’6” deep.

Overlain by sand dune which affected by erosion.

~~Sand on beach largely from dune probably.~~

See photo middle of p. 54.

Erosion of dune is carrying away the vegetation.

Page 71

From aerial photos can see this area the former debouchement of the creeks behind the sand dune. Numerous small springs still emerge, & there is an ephemeral dune lake on the landward side of the dune shown in summer by a lower bright green patch, less sandy.

Beach wider here – c.85 yds. Runnels in shore platform (see air photo).

Sandy grey soil on dune 1’6” – 2’ deep with about 1’ whitish layer (extra lime?) underneath, shown by sectioning of dune resulting from erosion at base by sea following by slipping.

In cliff plaster or rather cemented sand layer over clay. Further west clay lenses out & plaster runs

Page 72

into cliff at beach level over 1’6” – 2’ of clay [Not sure whether 1 or 2 plasters concerned here.] Numerous small freshwater springs on top of clay.

Further West the platform comes up again. c. 200 yds break

Diagram: Showing possible drainage of creek to explain lowering of platform

Drainage which formerly emerged here now at west end of embayment where it is gradually reducing the level of the emerged platform. It has cut a channel almost through it. c.5’ clay on platform, & dune above clay. Fossil snails in sandy clay

Page 73

Sand plaster in some places on top of clay. Seem to be associated with springs. Seems that as emerged platform cut back by sea, the dune has migrated inland over the calcareous clay.

Diagram: Section at west end

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Coll 15/5/54

Midden on blow in sand ridge E end Two Mile Bay

Foredune with

Haliotis ~~udevosd~~ ruber

Subninella undulata

Dicathais textilosa

Limpets

Flint flakes & scrapers

Hammer stones

Fire place

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22/1/53

“The Grotto”

[Between Peterborough & Port Campbell]

Cross section of Port Campbell Limestone at the Grotto

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Section In Unnamed Bay = Type Section Of Peterborough Member

Diagram: Showing vertical profile E of Curdie Inlet where cliffs begin:

Armstrong Calcarenite 12’ - sandy soil (grey sand)

30’ aeolianite - Dennington Aeolianite

Fossil soil & buckshot

20’ clay - Hesse Clay

60’ limestone (marine Miocene) - Port Campbell calcisiltite

Shore Platform

“Peterborough Member” – so called by George Baker.

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26/1/53

Ditrupa bands in bottom of cliff between 10’ & 20’ above L.W.M.

Beds narrow & defined commonly by hard bands. Beds horizontal here to Peterborough and (except for very minor rolls) beyond as far as the west side of The Bay of Islands where a dome structure starts to come in.

Photo: Sea cliff with labelled aeolianite, fossil soil & buckshot clay, Limestone.

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3 unlabelled photos of sea cliffs near the type section

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Photo: aeolianite layer

Photo: West of type section

Photo: West of type section

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Photo: East of type section

Photo: East of type section

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23-1 53

Coast c.3/4 mile S.W. of Peterborough

Yellow earthy limestone with secondary concretions.

Lovenia, Magellania, Magasella, ribbed Pecten, small Seripecten, Ditrupa. Some other echinoderms. A piece of Clypeaster.

10’6” platform with blocks

Diagram: showing platform above the shore platform

Platform appears to be due to erosion along softer marly layer.

Page 82

This layer (and associated layers) a good marker & tracing of it shows slight rolls. Can be seen by walking to edge of shore platform & looking landward.

Among beach boulders were some of lithified beach rock as found on emerged platform at Two Mile Bay (or should it be called Shelly Beach?). Operculum of Turbo undulatus proves Quaternary age. Largest block 3’6” x 2’ x 6” approx.

Marker layers traced to huts west of Peterborough where calcareous sand replaces cliffs (old river course?) & then from Massacre Bay to Crofts Bay.

Middens with flint flakes, Turbo, & limpets all along tops of cliffs.

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34-1-53

Childers Cove

Diagram: Showing aeolianite on Miocene limestone at Childers Cove

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One E side of Childers Cove in aeolianite near cliff is large sinkhole c 160’ diameter & 30’ deep

At S.L. in Cove thick massive bed with barnacles, Lovenia, & rare Ditrupa. Thinner & nodular beds above that with organic remains more common Magellania, Magasella, Lovenia, barnacle, Ditrupa, etc.

At head of Cove sand ridge formed so that sea not now reach cliffs.

On both E & W sides of Cove thick sandy clay between Miocene & aeolianite but none in “The Sentinel” (small island) in The Cove. Old valley of pre-aeolianite time apparently

Page 85

See P. 264

Wilson’s Crack, west of Childers Cove about half the cliff is Miocene & half aeolianite. No clay horizon. Midden on cliff tops. P 169 Australites & also implement (semi- discoidal scraper) made from one.

“The Gardens” between above & The Cove. Behind this are areas blown bare, revealing sandy clay formation. Buckshot, also flakes, shells & some tachylyte & australites noted. Also basalt boulders apparently used as pounders.

Soil Horizons in aeolianite. Red, & clayey to sandy.

Page 86

1953

Photo: Childers Cove cf Bk. 55:39-44. Note Fisherman’s steps

Photo: Childers Cove cf changes (loss of smaller peak & basalt slab) Bk 55:39 (1982)

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27-1-53

Bay of Islands

Small bay met by projection of track from Peterborough Rd to coast. This c 5 miles SW of Peterborough.

Large island shows 2^{o} dip east. Regional rise starts here. Section on E side of bay:

Top

9’ Massive earthly yellow limestone with a few knob-like concretions

3” Ditrupa band with other fossils.

1’ 4” Yellow earthly limestone

4” – 5” Ditrupa band & other fossils

2” – 6” L’st. with cross-bedding.

3 ½” Ditrupa band w other fossils.

4’ 3” L’st. as above.

6” Fossiliferous band

______________ shore platform

2’ 6” yellow l’st to water level (12:15 midday)

Page 88

Cave Bay

Further W & so named by us because of numerous caves. Port Campbell Mil. Map 1ml = 1” 719,433

Ditrupa bands rise to top of cliffs. Island 735,419 shows S.E. dip of c.2º (measured from shore). Cave Bay (N-S shore) shows small dip out to sea, but horizontal over main groups of caves (NE)

Diagram: Cross-section showing Pt. Campbell Limestone and Ditrupa bands

Page 89

Ditrupa bands collected from on cliff tops, especially a minor headland where clay stripped off.

Peterborough L'st chiefly thin-bedded with secondary deposition emphasizing this. This not so noticeable where recent rock falls or lack of weathering. Most noticeable on headlands. Underneath is the more massive Port C'bell L'st in which caves seem to form more readily.

27/1/53 Croft's Bay N.W. of Peterborough Also flakes of brownish, off-white & grey flint. One of tachylyte. Turbo undulata (=subninella) & Purpura textiliosa

Page 90

28-1-53

Diagram: Road map showing section site ('x') on sea cliffs

At this point the Peterborough Member risen above level of cliffs. (Mil. Map 704,440)

Photo: These photos taken from Pt. C'bell Mil Map 709,434 cliffs shown are 713,433.

Note low dip seaward.

Photo: Cliffs shown here are about half way between Bay of Caves & point 'x' shown above.

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Photo: Unlabelled of sea cliff

A short distance west of the point from which this photo was taken at the very highest part of the cliffs, Ditrupa band with brachiopods & Ostraea etc noted on top of 20' – 25' whitish earthy limestone. Cliffs here of Port Campbell limestone with veneer in highest part of Peterborough member.

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About ¼ mile West of point 'X' of map on p. 90 c. 2 ½ mls NNW of Bay of Islands (Mil. Map ref. 702,440)

Diagram: Showing cross section of Port Campbell L'st and Peterborough Member

Photo: Peterborough member at cross section site.

Highest cliffs here & this why the Pet. Member found here. Practically no middens from Bay of Is to here bec. no access to shore.

Page 93

About ½ mile further west deep gulch in cliffs. Cliff faces show Pt. Campbell L'st only. Island nearly reduced to shore platform shows how the isolated platforms are formed. By these could reconstruct islands & stacks now gone.

Photo. Of island and cliff

Page 94

See p. 165

c. ½ ml S.E. of Flaxman's Hill

c. 300 yds E of Flat Rock.

Photo: sea cliffs showing small W dip

Diagram: interpretting cross-section shown in photo

Page 95

30-1-53

Three-Mile Beach

Through Mr. Harington's property (S of Nayler's Cnr.) to area W of Flaxman's Hill. Wide area of sand in between.

Photo: Flaxman's Hill. View from Harrington's farm to Flaxman's Hill looking along coast.

Wide area of sand in front of cliffs along Three Mile Beach.

Diagram: Showing levels of sea, beach, dune, sand flat and cliffs (c.175').

Page 96

High cliffs but no Ditrupa bands found. Limestone whitish mostly but yellow in parts. Dips 0^{o} – 4^{o} west depending whether on strike or not. Dip N.W.

At foot of cliffs towards Flaxman's Hill prominent Ditrupa – brachiopod – Lovenia – Seripecten – ribbed Pecten band c.6' above beach level. Erosion of this band defines narrow platforms & forms roof of a cave. In cave dip determined as 2^{o} N 35^{o} W.

Photo: Rock stacks W end of Sandy Bay

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29-1-53

Sandy Bay

Photo (unlabelled) of cliff layers with ruler for scale.

Diagram: Showing cross-section of cliff.

Calcarenite = “littorite”. Calcareous sand plus waterworn pebbles of hardened Miocene limestone at base of the aeolianite, esp. near the cliff.

Page 98

Turbo undulatus & limpets fossil in this bed (cf. E side of this infilled valley).

East end of platform curves over under sand. Aeolianite & pebbles with shell fragments horizontally bedded & going below beach level. Level part of this buried platform judged to be c. 10’ above present platform.

At east end of Sandy Bay cliffs & rock stack are of aeolianite. Creek flows into sea nearly. Grey peaty bed with fossil snails under calcareous dune sand. At least 2 lines of dunes.

Page 99

Two photos: Section of p. 100 observed somewhat wit fallen blocks of aeolianite.

Page 100

Diagram: Showing stratigraphic cross-section at E end of Sandy Bay

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See Book 17, p. 83

Lake Elingamite

Near Cobden

Photo: Cliffs of Tuff & lapilli and Old lake floor

Photo: Caldera

Photo: (unlabelled) of cliff

Page 102

Pirron Yallock

Map: Showing Pirron Yallock Creek in relation to road

In both tributaries & further downstream is much quartz sand & gravel. Quartz noted also in ripple-marked tuff.

Page 103

E of Lake Corangamite

Photo: Lava blister NW of Alvie Tumulus

Photo: of tumulus

Photo: Site of material for C14 analysis. Broken Coxiella shells in fossil dune SW of Alvie. Lake Corangamite just out of site on left.

Page 104

Lake Cundare

Photo: Lunette on E & SE side of Lake Cundare

Low clay dune on E side being sectioned by high 1953 lake level. Sample collected. Yellow in colour.

Page 105

Fossils in Dept. Geol. Univ. of Melbourne

Lake Kariah 5 mls N.E. of Camperdown. Macropus titan No. 1096.

Colac Macropus titan? No. 1175

Strathdownie, W. Vic. Large Sarcophilus. C.R.B. Quarry, Allot. 19, Par. Of Wilkin, N. of Strathdownie. No 1093. Also Macropus titan No. 1094

Girgarre, Vic. 2’6” from surface small (young) Sarcophilus. No. 1148 Echuca district.

Coimadai. Alkemade’s Quarry. Phascolomys parvus No. 1671. Cited by De Vis Proc Roy Soc. Vic X (2), p. 198.

See Book 54:74

Page 106

From J. Manifold’s property “Purrumbete” at Weerite

Near Camperdown

Skull & bones of abo turned up in plowing.

Axes with ground edges.

Axe of vesicular basalt with hafting groove as below.

Diagram: Showing dimensions & shape of axe.

Greatest length 19.4 cm

Page 107

Lake Terang

Bore 194

Reported by B. Campion, Dunlop St. Mortlake

0' – 6' Peat

6' – 44' layer blue clay

44' – 300' Scoria (with fragments of baked? Tertiary limestone).

Map: Lake Terang showing bore location in relation to roads and golf course as drawn by Campion.

Piece of yellow tuff in scoria.

Page 108

Hooper Family

"Chocolyn" near Camperdown

Photo: Woman and three young children

Photo: Christine (child)

Photo: (male child)

Page 109

Cheetham Salt Works

Geelong

Information from Mr. G. B Hope

Rough log of two bores:

Clay with calcareous layers 12'

Basalt (hard in one bore decomposed in other) 78'

Dense blue clay 4'

Coarse carbonaceous sand

<u>With salt water (not penetrated) 26'</u>

<u>Total thickness 120'</u>

Bore 195

See Book 54 p. 85

Page 110

Camperdown

Small diagram: Cross section described below

Tuff from immediately above soil at N.W. end of caldera scarp south of Mt. Leura. Coll. E. D. Gill 1/4/52 Finely bedded tuff, fine then coarse.

Mr Arthur Cobbitt, Govt. explosives chemist examined the sample for phosphate & reported 5/4/54 that a strong reaction obtained in the phosphate test.

Fossil Soil 0" – 6" Brown. Easily dispersed clay with rounded & angular qtz of many sizes. Pisolites of non-mag & magnetic iron oxide commonly polished & so prob. derived. Maghemite nodules 1mm - 1cm. Polished and sometimes coated. Soil probably derived from early light tuff spreads. Certainly not just a balsaltic soil.

(on p 109) 6" – 12" Brown. With pebbles of decomposed basalt. Much greater quantity thank 0" – 6" of polished (mag) buckshot, & buckshot with skins. Some loess? All sizes polished buckshot 1mm up Pea size in parna like matrix with some quartz like material under basalt at Timboon rly ctg.

Page 111

15/5/54

Two-Mile Bay

West of Port Campbell.

Day of squalls & showers.

Diagram: Coastal cross section showing Dune in relation to wave cut nip, blocks and middens

Middens of Turbo, Haliotis & limpets. No Ninella. Blackened hearth stones. Chips of travertine, flint – also piece of green ?serpentine.

Australites

Stanhope's Bay 554

For District add 35

589

Page 112

E. of Stanhope's Bay

Further australites collected.

Nodules in clay resting on marine limestone reminiscent in size, shape & content of nodules in the upper Pliocene podsol under the basalt on The Grange Burn

Orig. coll australites	331
Coll. Colin Drake & Brian Mansbridge	98
	429
From B. Mansbridge 23/7/54	8
	437
From B. Mansbridge Sept. 1954	11
	448
From Colin Drake 30/11/54	16
	464
From B. Mansbridge May 1955	53
	517
From Colin Drake 15/7/55	14
	531

Continued page 168

Page 113

16/5/54

Bushfield (N. of W'bool)

See Bk. 17, p. 9

Diagram: Showing Merri River terrace and surrounds and various items found on the terrace bed

In this bed only a foot high there is sand in the lower part & conglomerate at the top.

Page 114

C14 of wood could give earliest possible date of deposition of terrace because in situ, but could be derived.

No bones found above the level of the terrace or in the soil there or on valley side.

Wood collected from site shown also from stumps shown in text - fig. in Mem. 18

For photos see Notebook 53 p. 274

Page 115

17-5-54

Human Skeleton from Tower Hill

Diagram: Map showing location of skeleton at Tower Hill

Skeleton found by Charles Foyle & partly collected by him. Rest collected by E.D.G.

Site 17 paces (c15yds) E. of thorn bush seen on aerial photo 609-129

Run 4 Port Fairy. 2.95” NW of C.P.

Skeleton found in light chocolate soil developed on grey small scoria or cinders on S. side

Page 116

(uphill side) of tourist road. Skull packed tightly with soil and some bones partly decayed. All animal matter gone. Not very recent.

Flexed burial as all bones found were in an area 3’ x 1 ½’. Mr. Foyle said the long bones he collected were sub-parallel. Skeleton incomplete – probably part of it swept away by the bulldozer when the road was being made.

Prof. S Sunderland & Dr L. F. Fay determined this as skeleton of aboriginal girl 18-25 years (1/6/54)

Taped in map showing location of skeleton in greater detail than map on p. 115

Page 117

18/5/54

L/IGl

Old Shoreline, Warrnambool

Map: Showing area of Princes Highway between Laverock St. and Morris Rd.

Pipeline put down along N side of Princes Highway from Warrnambool to Dennington. Over distance shown above evidences of a Pleistocene shore were found consisting of

Page 118

a. Flat Waterworn pebbles of travertinized aeolianite up to 12” diameter but usually 1” – 4”
b. Marine shells including Subninella undulata, Haliotis naevosa, Purpura, Monodonta, limpets etc. cuttlefish “bone” reported. High energy open coast ecology.
c. Calcareous sand.

cf. similar materials collected from S.E.C. post holes previously. Also marine shells found in well at old cheese/bacon factory Bk 6: 111

further E along Princes Highway near Convent (these fossils in Warrnambool Museum).

Is 25’ ~~Could be 40’~~ eustatic level. Platform 22’6” above LWM Lady Bay.

Further collection June 1957.

See book 17, pp. 26 & 33

Page 119

19-5-54

Powers Creek

Map: Showing Glenelg River, Powers Creek and location described.

Powers Creek about 40 miles N. of Casterton. Locality shown about 1/3 mile south of road.

Map: Showing roads, creek bed, Wynniatt's house and locations X, Y & Z.

Page 120

Limestone found in bores on W site of creek but not on E. Side. BORE 196 on E side at Warner's place

Thicknessess

6" to 12" grey sandy loam

2'6" to 3' yellowish clay

3' to 7' limey layer with dispersed lime & nodules of same.

At 10' and proved to 21' sandstone.

Section on E of creek at loc. X

18" black alluvium with buckshot washed in

18"brownish grey sandy clay

5' (maximum) yellowish Tertiary crystalline. Polyzoal limestone with waterworn pebbles.

____________________Unconformity

Carbonaceous, pyritised sandstone

Diagram: cross-section of above layers.

Page 121

Bedrock Dip NE $25^{o} - 30^{o}$

Strike 310^{o}

N 50^{o} W or W 40^{o} N

Finely bedded siliceous sand-stone with carbonaceous matter in places in fine bands that look like black lines in sections across the stratification. Cross-bedding but only involving inches of stratigraphic thickness.

In one place a band of fossilferous Tertiary limestone 1 ½" thick penetrated the bedrock for 6 feet.

Limestone formed of fragments of polyzoa, echinoids (thick long spines of cidaroids common), shells, corals, sharks' teeth, etc. Much secondary cementation so that the rock is very

Page 122

tough. Most of the fossils very worn. Beds horizontal. Cross-bedding involving inches of stratigraphical thickness only.

On opposite side of creek to section on p. 120 is

Bottom 2' 3" black peat measured fr. creek level

1' 3" dark grey sandy alluvium

Top 2' dark grey to black clayey alluvium

5' 6"

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20-5-54

Pebbles in limestone common in lower part but not seen in upper part. Up to 18 inches in diameter. Same angular and some rounded. Consist of

1. Bedrock sandstone which in some cases has inclusions of siltstone, & sometimes shot through with milky or greyish quartz.
2. Granitic rocks.
3. Grey quartz.
4. Milky quartz.
5. Pegmatite reported – "quartz & micas as big as 6d" Same noted E. of Harrow.

Page 124

Martin's Creek

At Connewirricoo opposite W. Burgess' farm and about 1 ½ miles from Glenelg River. Burgess (address Connewirricoo via Coleraine) showed me

Spondylus

Ostraea

Conus

Pecten

Other gasteropods

Bryozoa

Shark's tooth Isurus

In yellow earthy limestone indurated in places.

Calcitic shells preserved but aragonitic ones leached away.

Diagram: Map showing landslips at Martin's Creek.

Page 125

Harrow

Miss Nellie Jones

Box 20

Harrow, Vict.

Collection of about 36 australites found on own property, east of Harrow.

About a mile E of the house is a gully leading down to the Glenelg River. Locally it is called the Worm Tree Gully because there is a soak under some trees at the head of the gully where worms can always be found for fishing c. ¼ mile from river where erosion is deepest, the bedrock has recently been uncovered. It is a schist ~~sandstone with dips & lithology like that at Powers Creek.~~ It is invaded by a

Page 126

pegmatite dyke with large quartz & mica crystals. Also flake found in gully. This has been planated & on it is a thin (a foot at the most observed) bed of ironstone with clear impressions of Haliotis & some bivalves.

Above this bed is c 50' of soft sand & clay. Peneplain on top. This clayey with "crab-holes".

Bore 199 near house

Soft rock

Hard rock

Granite at 30'

Reached 90' Salt Water

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Sandy soils of Powers Creek to Harrow respond well to superphosphate & subterranean clover

1. 2 to 5 times the number of sheep per acre.

2. Land drier because 3” to 4” of rainfall used in growing the extra vegetation.
3. Slower run-off because of extra vegetation.
4. Ground firmer because of mat of vegetation. Can drive trucks across paddocks in winter which not possible before.
5. No difference noted in springs or in levels of wells, bores, etc. Water table appears to stand at about the same level.

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Blank.

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21/5/54

Puralka

In 1926 Mr J. S. Lockie of “Forest Field” found a ramus of Nototherium and some other bones in a small cave north of Puralka railway station. See Melbourne “Herald” 16th & 17th July 1926.

Charles Barnett (Vic. Nat.   ) recorded an aboriginal flake from there which he called The Puralka Flake. There was no evidence of the association of the bones and flint.

The property now belongs to Mr. Joe Hugil

Ardno East

Strathdownie, Vic.

Who is giving it to his grandson John Ireland (Mrs. Hugil a second wife & John son of her daughter).

Page 130

There is a ridge of limestone which runs N.W. – S.E. Under the ridge there was previously a long cave or series of caves. These caves are now near the surface and there has been extensive collapse. Many shallow caves are there now but they are recent features largely resulting from the collapses. Fossil snail from one.

The limestone is a shallow water marine limestone or calcarenite with cross-bedding involving up to a foot of stratigraphical thickness. Includes flat pebbles of travertine up to 2” diameter & worn Ostraea shells. The oysters are fairly common. This

Page 131

may be an inland extension of the Dartmoor limestone with caves because of its relation to the water table. A few lamellibranchs (impressions only).

Calcitic fossils remain but aragonitic ones leached away. Solution pipes & sink holes. A stone crusher has been fed with stone from this ridge, a quarry (from the road to the NW end of the ridge where the crusher stands) having been excavated in the ridge for a depth of from 6' to 10'.

In the NE face of the quarry can be seen the undisturbed horizontally bedded limestone while on the SW side the stratification dips in many

Page 132

directions & at many different angles due to collapse.

Map: Showing cave and where E.D.G collected fossils as X & Y in relation to the Quarry and private road.

Page 133

Diagram: Section at Y from p. 132

Nototherium Molar of young one

Molars of adult

Giant Kangaroos

Carnivore

Small but frequent pieces of charcoal

Page 134

See on Strathdownie Book 17 page 19

Page 135

Pretty Hill

c. 15 miles NNW from Pt. Fairy on Hamilton road. Mil. Map Pt. Fairy sheet 084,835.

Cutting on S.W. side of road marked on mil. Map.

Yellow earthy limestone with occasional flinty material. Apparently horizontal.

Ditrupa band

Ostraea

Lovenia forbesi

Bryozoa

Traces of molluscs.

Page 136

Broadwater

Ctg. c. 1 ½ miles N. of Broadwater on Pt. Fairy-Hamilton road.

MM 009,005.

Just S of Deep Creek cutting c. 12’ deep shows very decomposed basalt like older Basalt. Tertiary?

Limestone outcrops on same road N. of Scott’s Cr. & Byaduk.

In valley, tributary of Lyne Creek is young lava flow – must be very recent Holocene?

Diagram: Stony rises in creek floor

Page 137

Tower Hill

Diagram: Showing part Caldera & rim of Tower Hill with location of fossil bones

Easter 1954 on FNCV excursion Miss Allender collected bones including wallaby molar in tuff near top of rim. Not indubitably in situ but could be.

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25-5-54

Grange Burn where flows off basalt on to Tertiary at waterfall c 1 mile E of Henty’s

Basalt:

Columnar

Pahoehoe – ropy lava frequent. Not come great distance. Very vesicular.

Many vertical streams of bubbles through lava, & in some places cavities lived with scoraceous basalt – suggest steam from hot lava on wet ground. Also H_2O & CO_2 from burning wood. Ground very flat & much carbon (comparatively) under basalt so probably swampy with a lot of vegetation. Or is it the remains of trees?

Page 139

No pollen obtained from carbonaceous matter under basalt. Probably just burnt vegetation.

Page 140

Fossil Podsol. Sandy at top. More lime lower. Calcareous nodules come in at about 32”

Streaks of iron in soil – from basalt? Some small iron nodules seen in a couple of places. Streaks of sulphurous yellow colour in places are probably nontronite.

Is a strongly leached soil & so bones destroyed. Only enamel of “CUSCUS” tooth preserved; root crumbled as soon as touched.

Page 141

Fossil Wood. Root complex 20” X 6” noted. Another section of roots 19” X 4”. Largest single root measured was 7” X 4”. No trunks observed.

Wood coalified in places. Water expelled probably by heat of basalt. This an irreversible change (see Dulhunty).

cf. coalified wood at Kiandra in N.S.W. (Lower Tertiary), Irishtown Dist. In Tas (Tert. under basalt) & on surface at Mella & Pulbeena in Tasmania.

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Limestone Lithified & crystalline at Forsythe’s Bank above the Kalimnan shell bed – due to podsoloziation?

A few chains further W. the same Kalimnan shell bed dips into the Grange Burn where it is lithified & the aragonitic shells disappear altho’ the calcitic ones remain. This appears to be a function of creek water & ground water.

Note near shore shells as limped, mussel, oyster.

Beds rise again towards fault E of Henty’s house so that Balc. marl forms floor

Page 143

of creek & base of Kalimnan shell bed some feet above it Dip 5^{o} E. Warping post-Kal. At gully between Henty’s house (E of it) & fence, fault brings up rather reddish Batesfordian foraminiferal limestone (lepidocycline). Section further downstream shows Balcombian marl of the order of 75’ thick c5’ Balc. marl in creek bank so uplift on W side of fault 70’ + thickness of red lep. L’st. showing which is about 50’. Fault therefore of order of 120’. Area planated before basalt extruded therefore faulting post-Kaliminan & pre-basaltic i.e. Up. Pliocene. This story could be made more precise by more detailed field work. Reverse fault.

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Diagram: Showing layers exposed Sections S bank, W. of Henty’s (including Bed ‘X’)

Page 145

1. Low dips over porphyry less, & higher dips where beds run off it.

2. Partly sedimentational as shown by thickening of bed X away from porphyry to W.
3. Compaction no doubt a contributing factor but not the major one in view of the nature of the sediments, & the degree of dip.
4. Tectonic prob. The major factor. Whole area one of low dips. This may account for the fact that planated tops of porphyry columns dip in same direction as stratigraphic dip.
5. No evidence to suggest that this is a karst feature such as collapse over caves. Dip consistent & fits tectonic pattern.

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6. Only a local feature because beds flatten out a further 100 yds downstream where a porphyry bar ponds the creek water.
7. West of bar is low dip to E i.e. towards bar. Vertebra of whale set in limestone in crevice of porphyry.

Downstream the Balcombian is gradually brought to the water surface by the E dip. At Pat's Gully top of lepidocycline limestone only 6' above water level. Disappears about 100 yds further downstream.

Valley has steep walls between Henty's & Pat's Gully due to porphyry & red limestone

Page 147

From Pat's Gully downstream the valley walls are smoother & not near so steep because formed by soft Balc. marl & Kal. coquina.

Springs emerge at contact of red limestone & overlying marl.

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26-5-54

Section

Map: Showing section from E-W fence to Grange Burn 50' W of N-S fence.

Page 149

Diagram: Showing cross-section of creek cliff showing Balcombian Marl and other strata

Diagram: Showing close up of the water edge from above diagram.

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Conformable Succession Shelf Deposits

3. Grange Burn Coquina 6'9" Kalimnan Lower Pliocene Shallow water to shoreline

2. Muddy Creek Marl 76’

Balcombian

Lower &/or Middle Miocene

Deeper water than above.

Little terrigenous matter – transgressing sea?

No discemible disconformity

1. Bochara Limestone 50’+

Batesfordian

Lower Miocene

Conditions similar to 2.

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Auger Hole A on section line

23’ N of fence.

0” – 10” Dark chocolate soil with pieces of l’st, nodules, & shells of Polinices-Ostraea (Kalimnan) bed.

10” – 6’8” Fawn earthy clayey limestone

At 32” free lime

At 3’3” a little more clayey

At 4’2” firmer, & greyer inside lumps

At 4’6” Corbicula

At 5’6” fragments of thin lamellibranch shell

At 5’8” Marl fairly rich in iron. Nodules rich in iron ?Ledd

At 6’8” typical Balcombian marl

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6’8” Marl

At 6’10” Glycymeris & gasteropod

Summary 0” – 10” soil & Kalimnan

10” – 6’8” weathered Balcombian

6’8” – 7’8” fresh (although still brownish = oxidized) Balcombian.

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Auger hole B on section line

3’ N. of fence.

0” – 9” Dark chocolate soil with basalt boulders & limestone nodules. One piece of Lamellibranch noted.

9” – 6’9” Fawn earthy limestone or calcareous sand. At 1’3” Polinices band in hard crystalline limestone.

At 32” limey

At 3’3” thin hard band.

Below this numerous lime nodules.

Fossils, including Polinices

At 5’6” - 5’9” cricket ball nodules

At 5’10” into Polinices bed.

Nodules common at junction with underlying marl bed. “Nodule bed”. Better “Nodule band” or zone.

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6’9” Grey clay marl (Balc.)

Numerous nodules at junction & of different kinds.

Thin shelf deposits here compare with Melbourne area & contrast with very thick Balcombian of the Otways – Mt. Gambier area & the Sorrento bore area

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Map: Grange Burn showing location used on p. 149

Map: Area around ruined bridge showing shark’s tooth locations

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Blank

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27-5-54

Muddy Creek

Note Yulecart 1 Mines Dept. bore

Summary

Soil 2’

Pug subsoil 2’

No “tuff” or Polinices bed

Calcareous facies 100’

Alternating calcareous & sandy facies 152’

Depth bored 252’

Bore 200

Two zones of “waterworn pebbles

2’ sand & waterworn pebbles 135’ – 137’

2’ sand & waterworn pebbles 238’ – 240’

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At downstream end of Macdonald’s Bank the nodule band can be seen in the N bank of Muddy Cr. Stratigraphically between the Balc. Marl & the Kalimnan shell bed. One nodule band here & not two as in Grange Burn at “Porphyry Gorge”.

Phosphatic Nodules a. long cylindrical

b. lumpy, short

(cf. Beaumaris)

c. Shells replaced with iron

d. Whale bone

e. Flattish nodules derived from marl.

Nodules collected from an area 24” long (along strike) 4” wide and 2” vertically. (1/9 cubic foot, 192 cubic inches) Piece of whalebone overlapped boundary.

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This for quantitate analysis of:

1. Number of nodules
2. Sizes of nodules
3. Kinds of nodules

On testing nodule bed for as far as exposed on both barks noted:

1. Above fair sample altho' more cylindrical nodules & more replaced fossils (with iron) elsewhere.
2. In some places on S bank the nodule band is not present – no large nodules anyway.

At this point there is a 1^o dip upstream which causes the nodule band to disappear quickly. Stream also a high declivity – running as rapids & pools.

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Balc. marl & Kalimnan shell bed both non-ferruginous yet iron-rich nodules. Nodules apparently by erosion of iron-rich horizon –

a. Pyritic clay FeS (Marine)
b. Pedological enrichment (Terrest.)
c. Glauconite

Last the explanation.

Also brown of phophorite.

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Post-Shellbed Strata

Diagram: Cross-section of section from bed to hillwash next to Muddy Creek.

Map: Showing the location of the diagram above.

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Tuff

1. Looks tuffaceous in hand specimen.
2. No quarty seen in hard spec. but some found under microscope.
3. Olivine a very common constituent.
4. Unoxidized. Went reddish when boiled with acid & went dry. Rest on unoxidized Kal.
5. Appears to be the bed from which came rock with ?Blechnum in Museum.
6. Bed dips 1^o upstream same as Tertiary so warp later than this bed.
7. Bed stratified.
8. 11" thick where outcrops but deposit apparently thicker than this.
9. Rests on grey (unoxidized) Kalimnan without interposing soil or apparent disconformity.

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Foyle's Notes

See letter 6-7-54

Stones with alleged human imprints at Warrnambool found 8/12/90. See “W’bool Standard” of 9/12/90. “About a yard distant this discovery made at a depth of 55 feet from the surface in the natural layer of sandstone…The quarry referred to is one used by Mr. W Kellas, & the stone was being taken out for building the Town Hall”. Stone being quarried for Town Hall.

Soft aeolianite used with burnt lime for mortar in early days but red sand from Lake Gillear & cement used now.

Quarry man James Pelling, Ryot St. nr. Raglan Pde who built Foyles’ house found numerous footprints when quarrying stone. Nuisance because raised surfaces mean not sit flat. Tracks always diagonally across the slope. Tracks of large bird with about 3’ stride. “Human imprints” alongside.

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Midden Material Handed On To Ethnology Dept. Nat. Mus

Coll.

20/1/53 East end Sandy Bay, near Childers Cove, Vic. Flakes grey & brown mottles flint Turbo; Purpura, Monodonta, limpets

22/1/53 Top of cliffs between The Grotto & E end of Peterborough dunes. (grey and brown) flint (red and brown) quartzite, Turbo

22/1/53 Top of cliffs at The Grotto between Peterborough & Pt. Campbell (c 5 mls W of latter).

Flakes of milky quartz, grey flint, Piece of brown sandstone pebble

Turbo, Purpura, Limpets.

24/1/53 Cliff Top Wilson’s Crack, west of Childers Cove, V.

Purpura, Turbo, limpets

See p. 85

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28/1/53 Large buckshot gravel patch E of Flaxman’s Hill, W. of Peterborough. Piece of large brown quartzite pebble. This piece 3” in diam. Grey & brown flint. Milky qtz. Brown sandstone. Brown quartzite, red do.

Turbo opercula & columella.

cf. page 94

29/1/53 Dogtrap Bay & Stanhope’s Bay

Grey flint; brown flint, milky quartz. Tachylyte.

Turbo operculum.

Mussel (Marine small)

23/1/53 Coastal Cliffs W. of Wild Dog Cove W. of Peterborough, V Brown & grey flakes of flint & other siliceous rocks.

Turbo opercula

21/1/53 Rim Tower Hill volcano where Princes Highway contacts rim near SE part where Tertiary outcrops.

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65 pieces of grey & brown flint (incl. desilicified crust).

2 pieces of basalt of chip size

(½" X ½" – ½" X 1 ½")

4 chips of milky quartz.

2 fragments of burnt bone.

1 Turbo undulata shell

? Turbo opercula

20 Turbo fragments

23/1/53 Cliff tops c. ¾ mile W. of Peterborough

Turbo, Purpura, Limpets, Haliotis,

Charcoal. Burnt Turbo opercula

Bones. Wallaby teeth

Brownish sandstone flake

24/1/53 Childers Cove

Diagram: Flint flake

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Flakes of green siliceous rock, grey & red quartzite, whitish grey & brownish flint, milky quartz etc. Bones incl. bird bones, Turbo, limpets, Purpura. Good coll of rock types.

Warrnambool

Excav. For SEC powerhouse pump on W (right) bank of Hopkins River c 1 mile from mouth. C20' below surface of River very clear impression of both valves of Crassatellites dennanti

= Eucrassatella

Coll. H.C. White, Fitzroy Road, Warrnambool.

Note aragonite removed although c20' below river level. During low sea level?

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Stanhope Bay

Recorded p. 112	531	Progress Total
C. Drake & B Mansbridge		
August 1955	3	
C. Drake Sept. 5th 1955	29	
C. Drake Dec. 1955	1	
C. Drake Jan. 1956	3	
C. Drake April 1956	7	574
C. Drake. 1958	43	617
G. Baker & EDG 1959	3	620
E. Gill 13.3.66 Boat	1	621

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Other Districts

Drake & Mansbridge August 1955

Childers Cove 6

Port Campbell 1

Dec 1955 2 miles W. of Childers

Cove (Wilson's Crack)

Incl-abo implement 11

Made from one See p. 85

Hopkins Point 6

Jan 1956 Swampy patch about 3sq

chains about ½ mile west of

Childers Cove, W. Vict. 22

Apr 1956 Semidiscoidal scraper blade

That may have been a point &

2 chips fr. Betw. Childers Cove

& Wilsons Crack 4

Mar. 9 1966 Fragments about 1m N

Deean Rd. on Colac Rd just W (c 2 m) of

Princetown EDG 1

1964 Dec Pt. Campbell Project 14

Two others found in dump 2

Harrow p. 125 36

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Two Mile Bay Cont'd from p. 56

Three Photos (unlabelled of beach and platforms

End Notebook 10.