CHAPTER I
Natural History

Fauna

Hans and Jolanda Naarding

Before the arrival of the white settlers the district of Taroona probably supported most of the Tasmanian mammals. Albion Heights and Bonnet Ridge formed part of the Mount Wellington and Mount Nelson forest area with many valleys, streams and hills running to the edge of the Derwent River. This would have provided a good habitat for our large and small marsupials. Forest birds would also have been fairly plentiful.

However, all of this changed with the gradual urbanization of the lower slopes along the Derwent River. As roads and houses were built and the human population in the Greater Hobart area increased, so most of the mammals and many of the birds were displaced. Taroona too suffered this fate and today not much of the original wildlife is left.

A nostaligic desire to create an environment similar to the home country caused many settlers to plant trees and shrubs from the northern hemisphere on their properties. That is why today Taroona has an almost park-like appearance. These introduced trees and shrubs, together with the remaining native vegetation, at least, have provided a habitat which supports a wide variety of bird species. Above the line of house development, in the forest, it is still possible to see Potoroos just after dusk or early in the morning, while along the foreshore the occasional Water-rat scuttles about. The only common residents are the Brush-tailed Possums. They come right into the gardens and can often be heard arguing in the tops of the trees. They also frequently fall victim to the speeding traffic through the infamous Taroona Bends. The Ringtail Possum, although far less numerous, also can be seen in our area.

The only other native mammals that one is likely to encounter are the Barred and Brown Bandicoots.

Nearly every resident of Taroona has a view of the river. Armed with a pair of binoculars and a bit of time, it is amazing how much wildlife can be observed right from our lounge windows. Quite often a group of dolphins can be seen swimming up or down the Derwent. Sometimes a lone seal works its way up the river, quite close in-shore. On a very rare occasion one might see a whale. The last few years have seen the presence of several species, of which the Southern Right Whale was certainly the largest and most impressive.

Out on the Derwent one can always see some bird activity. One of the most spectacular displays is given by the Australasian Gannets as they wheel and turn effortlessly in high winds and plunge from a great height into the water to catch small fish. Sometimes one can see Short-tailed Shearwaters, or muttonbirds, streaming in large numbers up the river, or floating in a "raft" so dense that the water looks black. This often occurs during the latter part of November (egg laying period) or late January-early February (chick hatching period), when they search for food close to their breeding grounds. Usually these birds range far and wide over our southern oceans during summer but spend our winter far north in, and above, the Bering Sea.

When the water is very rough one can sometimes see a group of small birds skimming close to the waves, fairly far out in the river. These are Common Diving Petrels. They breed on off-shore islands.

However, it is right in our own gardens that most of the bird activity takes place. Many are with us throughout the year, while some leave for the mainland during the winter months. As soon as the days begin to lengthen, after the third week of June, they come back and become very conspicuous during their mating and breeding activities. Among the first ones are the Striated Pardalotes. Their incessant call of "pick-it-up, pick-it-up" heralds the beginning of the new breeding season. They can be seen and heard wherever there are some large Eucalyptus trees. At the same time the Pallid Cuckoo and the Fan-tailed Cuckoo can be heard and often seen too in the branches of dead trees in the forest.

During those early winter months one might see a brilliant orange flash of a Flame Robin. Later it leaves Taroona for its breeding areas further inland, but the Scarlet Robin, with its

red breast and black bib, is fairly common throughout the year.

As soon as the early blossoms start to appear there is great excitement among the small honeyeaters. The noisiest and most conspicuous are the New Holland Honeyeaters with their black, white and yellow feathers. The Yellow-throated Honeyeater is usually solitary and can be recognised by its melodious song, often ending in a drawn out "rrr". One of the prettiest, and also solitary, is the Eastern Spinebill. It has a long, curved beak with which it extracts honey from deep within the flowers.

Flowering Eucalyptus trees often attract the Black-headed Honeyeater. They come in a flock and are a noisy lot. There are several other honeyeater species which are less common.

Of the larger honeyeaters the Yellow Wattlebird, with its long yellow appendages, is probably the most common and can be seen and heard almost throughout the year.

Many of our birds treat us to some wonderful songs. The most common is the Blackbird. Although introduced from Europe, it is now an established garden bird and its beautiful song can be heard throughout the summer. The Grey Shrike-thrush is another songster, which can be heard frequently in summer, while on a quiet day the yodelling call of the Grey Butcher-bird echoes from the forest line to the water edge.

Apart from an occasional flute-like whistle, Rosellas do not contribute much to our bird songs. However, their vocal shortcoming are amply compensated for by their brilliant colour. Green Rosellas are very common, but the more colorful Eastern Rosella only passes through occasionally. Sometimes, with a lot of noise and a whirring of wings a flock of Swift Parrots flashes by. Although difficult to see, they are the most brilliant coloured of all, and the nosiest too. Talking about noise, residents living close to the forest line can often hear the raucous call of the Yellow-tailed Black Cockatoo. They are as big as a Raven and usually occur in small flocks of up to about seven birds. Their flight is beautiful to watch as they battle against a strong wind.

Down at the Alum Cliffs a pair of Peregrine Falcons has made its home. For several years they have bred and raised their young in this area. They can often be seen and heard as they range along the hills and valleys above Taroona. Occasionally a White Goshawk visits this area. It can sometimes be seen in a valley along Truganini's Track. If one is lucky one might see the White-breasted Sea-eagle. This massive bird sometimes comes up the Derwent as far as Taroona.

Even after dark there is evidence of bird activity. The Masked Lapwings that inhabit the sports fields are sometimes very noisy, while occasionally one might hear a rather mournful "mow-poke, mow-poke", the call of the Boobook Owl.

These are just a few of our more common birds. In all there are about seventy different species that might be encountered in Taroona at one time or another. It is great fun to watch and learn to recognise some of our feathered neighbours. There are several good books on the market which would help you with identification. However, it can be very satisfying to just recognise a few different species by their plumage or their song, even though you have now idea what they are called. A cat-proof water and/or feeding table, strategically placed, can be a source of great enjoyment.

For those equipped with a pair of binoculars, we enclose a list of birds, mammals and reptiles which the observant Taroona resident might encounter. At dawn and around dusk are the best times. Good luck.

Mammals:

Brush-tailed Possum
Ringtail Possum

Potoroo

Barred Bandicoot
Brown Bandicoot

Fur Seal
Common Dolphin
Southern Right Whale

Brown Rat
House Mouse

Water Rat

Reptiles:

Tiger Snake
Copperhead Snake
Whip Snake

(All three are poisonous)

Blue-tongued Lizard

Oak Skink
Mountain Dragon
Metallic Skink
White Skink

Birds:

(c = common, u = uncommon, r = rare, v = vagrant, b = breeding)

Common Diving Petrel, *v.*
Little Penguin, *c-rb.*
Short-tailed Shearwater, *cv.*
Australasian Gannet, *cv.*
Black Cormorant, *uv.*
Little Pied Cormorant, *uv.*
Black-faced Cormorant, *uv.*

White Goshawk, *rv.*
Brown Goshawk, *ub.*
Collared Sparrowhawk, *ub.*
White-breasted Sea-eagle, *uv.*
Brown Falcon, *uv.*
Peregrine Falcon, *b.*

Masked Lapwing, *cb.*
Silver Gull, *c.*
Kelp Gull, *c.*
Pacific Gull, *c.*
Crested Tern, *uv.*

Brush Bronzewing, *ub.*
Common Bronzewing, *u.*

Musk Lorikeet, *uv.*
Swift Parrot, *cb.*
Yellow-tailed Black Cockatoo, *cv.*
Green Rosella, *cb.*
Eastern Rosella, *u.*

Pallid Cuckoo, *cb.*
Fan-tailed Cuckoo, *cb.*
Horsefield Bronze Cuckoo, *cb*

Laughing Kookaburra, *uv.*

Masked Owl, *u, possibly b.*
Boobook Owl, *u, possibly b.*
Tawny Frogmouth, *ub.*

White-faced Heron, *uv.*

Welcome Swallow, *cb.*
Tree Martin, *cb.*

Black-faced Cuckoo-shrike, ub.

Blackbird, *cb.*

Superb Blue Wren, *cb.*

Brown Thornbill, *cb.*
Tasmanian Thornbill, *cb.*
Brown Scrubwren, *ub.*

Flame Robin, *cv.*
Scarlet Robin, *cb.*
Dusky Robin, *cb.*
Grey Fantail, *cb.*
Satin Flycatcher, *ub.*

Olive Whistler, *ub.*
Golden Whistler, *cb.*

Grey Shrike-thrush, *u.*
Spotted Quail-thrush, *cb*
Spotted Pardalote, *cb.*
Striated Pardalote, *cb.*
Forty-spotted Pardalote, *uv.*
Silvereye, *cb.*

Crescent Honeyeater, *cb.*
Eastern Spinebill, *cv.*
Yellow-throated Honeyeater, *cb.*
Black-headed Honeyeater, *c, possibly b.*
New Holland Honeyeater, *cb.*
Strong-billed Honeyeater, *possibly b.*
Yellow Wattle-bird, *cb.*
Little Wattle-bird, *ub.*

Beautiful Firetail, *ub.*
Greenfinch, *ub.*
Goldfinch, *cb.*
House Sparrow, *cb.*

Starling, *cb.*
Dusky Woodswallow, *ub.*

Grey Butcherbird, *ub.*
Australian Magpie, *ub.*

Black Currawong, *uv.*
Forest Raven, *cb.*

Flora

Michael J. Brown

Taroona is well stocked with remnant patches of native vegetation. The hinterland and foreshores in places provide some good examples of relatively undisturbed plant communities, especially on the hills, in some gullies and along the sea cliffs.

When the early French explorers and naturalists, N. Baudin and F. Peron, travelled into the River Derwent in February 1802, their exploratory parties were amazed to see the wanton use of fire displayed by the Aborigines — whole trees of eucalypts were engulfed before their eyes. As the long term residents of Taroona well remember from 1967, wildfires can and do still occur. One of the reasons for the type of fires is to be found in the vegetation and the results of fires are apparent also in the vegetation. In fact, the non-coastal vegetation of Taroona largely depends on fire for continuance in its present from.

The Native Plants

A checklist of Tasmanian native plant species found so far in Taroona is given at the end of this article. It includes over two hundred species. Doubtless many more will be found by assiduous collectors now that a basis has been established. The checklist includes 12 ferns, 48 monocotyledons (grasses, sedges, orchids, etc.) and 142 dicotyledons (herbs, shrubs and trees). There are no native conifers in the Taroona area, although the Oyster Bay pine *(Callitris rhomboidea)* is commonly planted in gardens and may eventually establish in the wild. This problem has already occurred with the introduced *Pinus radiata*.

Fifteen of the species are endemic to Tasmania, that is they occur nowhere else. Two of these, the currajong bush *(Asterotrichion discolor)* and a small grass like species of cutting-grass *(Gahnia graminifolia)* are confined to south east Tasmania, having their major occurrences in Taroona and the southern foothills of Mount Nelson and Mount Wellington.

The Coastal Vegetation

The Taroona coastline includes spectacular cliffs and shore platforms formed in sedimentary rocks, some limited areas of boulder beach and, of course, some very pleasant sandy beaches.

The vegetation of the sandy beaches is predominantly introduced grasses, especially the marram grass *(Ammophila arenaria)*, interspersed with weed species, such as periwinkle *(Vinca major)*, fumitory *(Fumaria bastardii)*, boneseed *(Chrysanthemoides monilifera)*, thistles *(Cirsium* spp.*)* and garden escapes, such as Yorkshire fog, rye grasses and clovers. However, in places remnants of the original native vegetation can still be found. One of the more obvious species, especially when its seeds are ready for dispersal, is the native buzzy *(Acaena novae-zelandiae)*. This is one of the few plants Australia and/or New Zealand managed to export to Britain in part payment for the thistles, etc. we acquired from there.

Other native plants to be found at the rear of sandy beaches include the sea rocket *(Cakile edentula)*, sea parsley *(Apium prostratum)*, which tastes and smells like ordinary parsley, the native pigface *(Carpobrotus rosii)*, which has succulent edible fruits and the club rush *(Scirpus nodosus)*.

The boulder beaches between the Fisheries Research Laboratories and the State High School are backed by steep slopes clad in she oaks *(Casuarina stricta)* which form a dense canopy over a relatively sparse understorey of herbaceous plants. In places where the light can penetrate there are dense hanging mats of the ice-plant *(Tetragonia implexicoma)*, together with the nodding saltbush *(Rhagodia nutans)* and the seaberry saltbush *(Rhagodia baccata)* with its succulent, deep red, translucent berries.

All of the above species are to be found also in crevices and clefts on the sea cliffs and in sheltered parts at the rear of the shore platforms between Hinsby Beach and Kingston. In places the she oaks lean precariously over the cliffs and occasional dead trees with root mounds intact occur on the platforms, attesting to the innate instability and insecure future of such a life! On the cliff faces and small rubble fans, mats of ice-plant mingle with round leaf pig face, clumps of silver tussock, coastal spear grass groundsels and native pelargoniums, together with occasional shrubs of native fuchsia and white correa.

The cliff tops in the area support she oak woodlands with sparse understoreys, or else woodlands of silver peppermint *(Eucalyptus tenuiramis)* with heathy understoreys. These heath communities are rich in wildflowers which add considerable interest to walks through the area in spring. There are several species of acacias, native heath and native cranberry, bush peas *(Pultenaea, Bossiaea* and native gorse*)*, together with lilac bells, trigger plants, parrots food, blue berries and native cherries.

Occasional declivities and the wetter parts of the cliff tops support blue gums *(Eucalyptus globulus)*, stringy bark *(E. obliqua)* and white gum *(E. viminalis)* over scrubby understoreys of dogwood, native hop, musk and blanket bush. Most of these gullies were burnt by the 1967 bushfires and, whilst some dead stag trees and occasional live individuals still attain thirty metres or more, the younger regrowth eucalypts have yet to reach their mature heights.

The Vegetation of the Gullies

The range of hills on which Taroona is situated is well dissected by stream courses. The gullies of these streams support a distinctive vegetation which to some extent varies, depending on the interaction between fire, topography and the availability of water.

In general the gullies support wet sclerophyll, that is, tall eucalypts, usually blue gum, stringy bark and white gum, over a more or less dense understorey of tall, broad leaf shrubs and low trees. The understorey exhibits local changes in its composition, but, depending on the degree of topographic protection afforded from fire, some or all of the following features are to be found: a layer of tall eucalypts, or dead trees and regrowth from the 1967 bushfires; a secondary, non-eucalypt tree layer; a tall and/or medium broad leaf shrub layer; a layer of tree ferns; a layer of ground ferns, together with minor herbaceous species, including native stinging nettles; a community of filmy ferns, mosses and liverworts.

The main understorey shrubs include musk, dogwood, pinkwood, stinkwood, native currant and currajong. Blackwood and silver wattle are common secondary trees. Manferns are to be found in the more deeply incised creeks where water flow is more assured and there is a greater reliability of constantly high humidity. Such places also support a good cover of other ferns, such as mother shield fern, hare's foot fern and filmy ferns, together with abundant mosses and liverworts.

The shallower gullies are prone to dry out and are more frequently burnt. They often contain bracken and the secondary trees are not as well developed. Musk and dogwood may be absent and species such as pinkwood, currajong and stinkwood predominate.

The Vegetation of the Slopes and Ridges

As the residents well know, and the real estate agents omit to mention, Taroona is on the shady side of the hill. Consequently most of the natural vegetation is shrubby, except for the ridge tops and relatively few north facing slopes. The main eucalypt is blue gum, but white peppermint is abundant on the sunnier aspects, and black gum is common in areas where the shallow soils are underlain by clays, or the drainage is otherwise impeded.

There are several patches on steep and rocky, north facing slopes where eucalypts are absent and low forests, or tall shrublands, of she oaks have developed. These areas are carpeted in needles shed from the trees, but there are a few species of grasses and saggs present, along with shrubs, such as prickly box and native fuchsia.

The northern aspects and ridges support grassy, white peppermint woodlands. There is an abundance of grasses, native lilies, flag iris and some low shrubs, such as wax flower, common heath, bushmans bootlace and native cranberry. These communities also contain patches of the rare, small cutting grass species, *Gahnia graminifolia*, whose bright green leaves stand out from the surrounding dry grasses in summer. Taller shrubs and low trees of native cherry, silver banksia, native hop and prickly box are scattered through the woodlands.

On the more sheltered aspects to the east and south east the above species become interspersed with and are eventually replaced by denser shrubberies of parrots food and blanket bush. This broad leaf understorey is found on all rock types on shaded slopes in the Taroona area. Unfortunately in many places the community has been invaded by

boneseed. Boneseed forms a dense cover and, once established, can only be controlled by repeated grubbing. It has a hard stony seed which is fire resistant, so that the species is encouraged by burning.

Most of the flat areas between the hill slopes and the sea have now been developed for housing, but there are a few patches of native vegetation remaining, especially around Bonnet Hill and Taronga Road. The rock type there is mudstone and this supports patches of mallee-form silver peppermint, with a heathy understorey. The main shrubs present are native hop, Casuarina, native daphne, native cherries and a sparse ground layer of common heath, saggs, native cranberry and bush peas.

Conclusion

To the casual observer, Taroona has an abundance of trees, and one of the charms of the suburb is its leafy aspect. By retaining some of the remnant patches of native vegetation the charm can only be enhanced, whilst adding to the recreational and educational opportunities available to the residents.

List of Native Species Observed in Taroona

PTERIDOPHYTA (Ferns and fern allies)

Aspidiaceae	
Polystichum proliferum	mother shield fern
Rumohra adiantiformis	hares foot fern
Aspleniaceae	
Asplenium bulbiferum	mother spleenwort
Asplenium flabellifolium	necklace fern
Blechnaceae	
*Blechnum wattsii**	hard water-fern
Dennstaedtiaceae	
Histiopteris incisa	bats wing fern
Hypolepis rugosula	ruddy ground-fern
Pteridium esculentum	bracken
Dicksoniaceae	
Dicksonia antatctica	man-fern, tree fern
Grammitidaceae	
Ctenopteris heterophylla	gipsy fern
Hymenophyllaceae	
Hymenophyllum cupressiforme	common filmy-fern
Polypodiaceae	
Microsorium diversifolium	kangaroo-foot fern

ANGIOSPERMAE (Flowering Plants)

DICOTYLEDONEAE (herbs, shrubs and trees)

Apiaceae	
Apium prostratum	sea parsley
Daucus glochidiatus	native carrot
Hydrocotyle javanica	

Asteraceae	
Bedfordia salicina	blanket bush (endemic)
*Brachycome aculeata**	native daisy
Brachycome scapiformis	native daisy
Cassinia aculeata	dolly bush
Gnaphalium collinum	
*Helichrysum bicolor**	everlasting
Helichrysum dendroideum	dolly bush
Helichrysum obcordatum	
Helichrysum scorpioides	everlasting
Leptorhynchos squamatus	scaly buttons
Olearia argophylla	musk
Olearia ericoides	(endemic)
Olearia lepidophylla	
Olearia lirata	
Olearia ramulosa	
Olearia viscosa	dwarf musk
*Senecio hispidulus**	groundsel
Senecio linearifolius	fire weed
Senecio lautus	groundsel
Senecio minimus	groundsel
Senecia quadridentatus	groundsel
Senecio vulgaris	groundsel
Brassicaceae	
Cakile edentula	sea rocket
Cardamine sp.	bitter cress
Campanulaceae	
Wahlenbergia consimilis	blue bells
Wahlenbergia gracilenta	blue bells
Wahlenbergia quadrifida	blue bells
*Wahlenbergia tadgellii**	blue bells
Casuarinaceae	
Casuarina littoralis	bull oak
Casuarina monilifera	
Casuarina stricta	she oak
Chenopodiaceae	
*Beta vulgaris ssp. maritima**	wild beet
Rhagodia baccata	seaberry salt bush
Rhagodia nutans	nodding salt bush
Salicornia quinqueflora	samphire
Convolvulaceae	
Dichondra repens	
Crassulaceae	
Crassula sieberana	stone crop
Dilleniaceae	
Hibbertia riparia	guinea flower
Droseraceae	
Drosera peltata	sundew

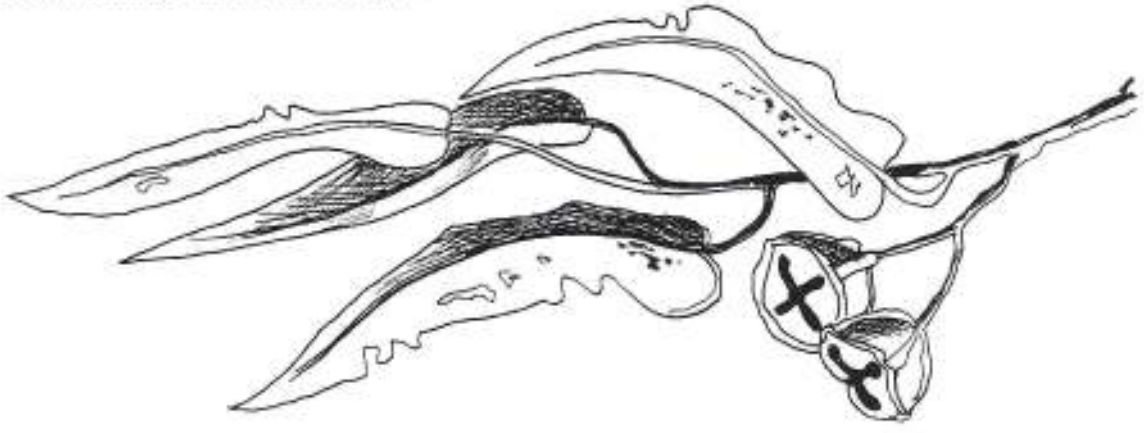
Epacridaceae	
Acrotriche serrulata	ants delight
Astroloma humifusum	native cranberry
*Cyathodes divaricata**	(endemic)
Cyathodes glauca	cheeseberry (endemic)
Epacris impressa	common heath
Leucopogon virgatus	bearded heath
Lissanthe strigosa	peach berry
Euphorbiaceae	
Beyeria viscosa	pinkwood
Fabaceae	
Bossiaea prostrata	
Daviesia ulicina	native gorse
*Hovea heterophylla**	
*Indigofera australis**	native indigo
*Kennedya prostrata**	running postman
Pultenaea daphnoides	native daphne
Pultenaea gunnii	
Pultenaea gunnii var. *beckioides*	
Pultenaea juniperina	prickly beauty
Pultenaea pedunculata	
*Sphaerolobium vimineum**	globe pea
Ficoideae	
Carpobrotus rossii	native pig face
Disphyma australe	round-leaf pig face
Tetragonia implexicoma	ice plant
Gentianaceae	
Centaurium australe	centaury
Geraniaceae	
Geranium potentilloides	native geranium
Pelargonium australe	native pelargonium
Goodeniaceae	
*Goodenia elongata**	
Goodenia lanata	
Goodenia ovata	parrots food
Haloragaceae	
Gonocarpus tetragyna	raspwort
Gonocarpus teucrioides	
Hypericaceae	
Hypericum gramineum	
Hypericum japonicum	
Lamiaceae	
Ajuga australis	bugle
Prostanthera lasianthos	mint bush
Prunella vulgaris	self-heal
Lauraceae	
Cassytha pubescens	dodder
Linaceae	
Linum marginale	native flax
Malvaceae	
Asterotrichion discolor	currajong (endemic)
Mimosaceae	
*Acacia botrycephala**	sunshine wattle

Acacia dealbata	silver wattle
*Acacia genistifolia**	
Acacia mearnsii	black wattle
Acacia melanoxylon	blackwood
Acacia myrtifolia	
Acacia sophorae	boobyalla
Acacia stricta	
Acacia verniciflua	varnished wattle
Acacia verticillata	prickly mimosa
Myoporaceae	
Myoporum insulare	false boobyalla
Myrtaceae	
Eucalyptus globulus	blue gum
Eucalyptus obliqua	stringy bark
Eucalyptus ovata	black gum
Eucalyptus pulchella	white peppermint (endemic)
Eucalyptus tenuiramis	silver peppermint (endemic)
Eucalyptus viminalis	white gum
Leptospermum scoparium	manuka
Oleaceae	
Notelaea ligustrina	native olive
Oxalidaceae	
Oxalis corniculata	
Pittosporaceae	
Billardiera longiflora	climbing blueberry
Bursaria spinosa	prickly box
Marianthus procumbens	
Pittosporum bicolor	cheesewood
Plantaginaceae	
Plantago hispida	native plantain
Plantago varia	native plantain
Polygalaceae	
Comesperma volubile	blue love creeper
Polygonaceae	
Muehlenbeckia adpressa	
Proteaceae	
Banksia marginata	silver banksia
Lomatia tinctoria	guitar plant (endemic)
Ranunculaceae	
Clematis aristata	native clematis
Clematis gintianoides	(endemic)
Rhamnaceae	
Pomaderris apetala	dogwood
Pomaderris elliptica	native pear (endemic)
Pomaderris pilifera	native pear
Rosaceae	
Acaena echinata	
Acaena novae-zelandiae	buzzy
Poterium polyganum	
Rubus parvifolius	native raspberry
Rubiaceae	
Coprosma quadrifida	native currant
Galium australe	
Opercularia varia	

Rutaceae	
Correa alba	white correa
Correa reflexa	native fuchsia
Eriostemon verrucosus	wax flower
Zieria arborescens	stink wood
Santalaceae	
Exocarpos cupressiformis	native cherry
Exocarpos strictus	native cherry
Sapindaceae	
Dodonaea viscosa	native hop
Scrophulariaceae	
Euphrasia collina	eye bright
Gratiola sp.	
Veronica derwentiana	
*Veronica formosa**	(endemic)
Stackhousiaceae	
Stackhousia monogyna	candles
Stylidiacea	
Stylidium graminifolium	trigger plant
Thymelaeaceae	
*Pimelea drupacea**	
Pimelea humilis	
Pimelea nivea	bushmans bootlace (endemic)
Tremandraceae	
Tetratheca glandulosa	lilac bells
Tetratheca pilosa	lilac bells
Urticaceae	
Urtica incisa	native stinging nettle
Violaceae	
Viola hederacea	native violet
MONOCOTYLEDONEAE (grasses,lilies,orchids,etc.)	
Cyperaceae	
Carex appressa	
Carex breviculmis	
Gahnia grandis	cutting grass
Gahnia graminifolia	(endemic)
Lepidosperma elatius	sword grass
*Lepidosperma filiforme**	rapier sedge
Lepidosperma laterale	sword grass
Lepidsoperma lineare	
Lepidosperma lineare var. *inops*	(endemic)
Schoenus apogon	
Scirpus fluitans	
Scirpus nodosus	club rush
Iradaceae	
Diplarrena moraea	flag iris
Juncaceae	
Juncus kraussii	sea rush
Juncus pallidus	
Juncus pauciflorus	
Juncus planifolius	

Luzula sp.	
Liliaceae	
Dianella revoluta	blue berry
Dianella tasmanica	blue berry
Dichopogon strictus	chocolate lily
Drymophila cyanocarpa	turquoise berry
Lomandra longifolia	sagg
Stypandra caespitosa	tufted blue lily
Orchidaceae	
*Acianthus exsertus**	mosquito orchid
*Pterostylis longifolia**	long leaf greenhood
Pterosylis pedunculata	maroonhood
Thelymitra sp.	sun orchid
Poaceae	
Agropyron scabrum	
Agrostis avenacea	
Aira caryophyllea	
Danthonia caespitosa	wallaby grass
Danthonia laevis	wallaby grass
Danthonia pilosa	wallaby grass
Deyuxia quadriseta	
Dichelachne rara	
*Dichelachne sciurea**	
Distchlis distichophylla	
Festuca littoralis	
Microlaena stipoides	
Poa labillardieri	silver tussock
Poa labillardieri var. *acris*	
Poa sieberi	
Stipa aphylla	spear grass (endemic)
Stipa pubinodis	
Stipa stipoides	coastal spear grass
Tetrarrhena distichophylla	
Themeda australis	kangaroo grass

* species marked by an asterisk were taken from a list for the Truganini Park, kindly provided by Alan M. Gray, or from the personal observations of Margaret Allan who also assisted by commenting on the manuscript.



Geology

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INTRODUCTION AND EARLY HISTORY

The geology of Taroona or the North Ward of Kingborough has never been written in any detail ever; so much of this work relates more to my own personal field work than to all of the publications which mention this area.

Taroona is nearly a complete microcosm of the geology of the Derwent Valley. It contains many of the elements of the Derwent Valley but lacks a few of the more important ones. The elements which are here are usually better represented elsewhere and there are no enigmatic formations here to cause any interest or controversy. The geology of Taroona is however an important aspect in the consideration of the settlement and construction in the area.

Darwin (1844) must have travelled the then new Brown's River Road because he mentions the volcanic rocks at Blinking Billy Point, Porter Hill and then Brown's River. No mention is made of the geology between these two places.

R.M. Johnston (1888) mentions some of the rocks in passing and uses the Alum Cliffs as an erroneous analogy. A.N. Lewis (1946) makes some observations about Taroona in Chapter XI of his book. Many of the formations mentioned have been superseded and simplified so many of his interpretations of faults and sedimentary formations were unnecessarily complicated. He was more interested in the rocks of Porter Hill (Fort Nelson), just north of Taroona.

The area has been mapped in a very generalised way by the Tasmanian Geological Survey and appears on the Hobart Quadrangle (now out of print). Geology students from the University and other places regularly visit Taroona as part of the Sandy Bay excursion but what they visit and the explanations given provide little insight into the geology of Taroona as a whole.

Early Settlement

The decision to build the road to Brown's River would have been based substantially on geological considerations. Although much of the ground was steep and hilly, most of the route could be driven through softer rocks, which was important at a time when it was uncommon to use explosives for breaking rocks. The main limiting factor was the quality of steel tools, which at that time could only slowly drill shot holes in hard rocks like dolerite.

There are two main types of rock in Taroona. The harder, older rocks on the steep hills and the softer, younger rocks which form a coastal apron. It happens that as the streams emerge from the hilly areas, they have relatively shallow valleys. Lower down as they cut into the softer rocks, the valleys become deeper and very steep. The route taken by the Brown's River Road then had to stick to the ground at the base of the hard, rocky hills where there was less excavation needed.

From about the old Taroona Shopping Centre to the top of Bonnet Hill no soft option was available, so much convict labour had to be devoted to this section which is mainly in steep dolerite. There was however, one consolation in the discovery of a small deposit of very high quality building sandstone on the crest of the Taronga Ridge. This was put to good use to house the convicts at the Brown's River Probation Station and to construct a number of landmarks around Taroona, most notably the Shot Tower and "Acton".

Although limestone outcrops at Porter Hill just north of Taroona, there is no evidence of its use as a mortar in the very early buildings associated with the road. These were either constructed using rammed earth as a mortar or sand and burned seashells as a render or mortar.

Some bricks were made from the deep, clayey soil overlying mudstone at Taronga Road. This was probably the only material known at the time. It is not an ideal brick material and a small number of fairly typical crumbly convict bricks were produced and used.

The road provided better access for the area, improving the prospects for settlement. Although the soil was clayey and swampy in places, much of it was quite suitable for agriculture. The enforced settlement of the Brown's River Probation Station on a high and isolated ridge dwindled and the lower, more amenable terrain prospered.

The Older Sediments

These are mainly mudstones and sandstones of the Permian period, deposited about 250 million years ago. They were intruded by dolerite about 165 million years ago during the Jurassic period.

The oldest rock in Taroona is the Grange Mudstone, though there are older rocks at Porter Hill. The Permian rocks are divided into separate layers or units which are named. Well represented in Taroona, we have the Grange mudstone, overlain by the Malbina Formation, which is subdivided into A, B, C, D and E.

The Risdon Sandstone overlies the Malbina E. and it in turn is overlain by the Ferntree Mudstone. The Cygnet Coal Measures, present in much of southern Tasmania, is absent from Taroona. The next unit is the Knocklofty Formation which is Triassic in age, approximately 220 million years old.

The Grange Mudstone can be seen at its type locality in the large quarry just next to the city boundary. It is pale green to buff in colour and contains some layers which are very rich in fossils. The main fossil types are bryozoa which resemble small lacy or branching corals and brachiopods which are a mostly extinct type of shellfish. These are bilaterally symmetrical, some having a winged appearance and others resemble small spiny half spheres. Occasionally coiled snail-like shells and scallops are found. Many of the fossils found in the Permian rocks are illustrated in texts published by the Mines Department and the University of Tasmania.

The Malbina Formation can be seen in its entirety on the ridge which goes up opposite bust stop 35. The top of the Grange Mudstone can be seen in a little gully nearly opposite the bus stop. On scrambling up the hill, one passes into the Malbina Formation and on upward to the highest sub-unit next to the dolerite high on the ridge.

The upper part of the Malbina is seen better at the base of the Alum Cliffs. Here it is a rather messy formation of dark grey muddy sands and gritty, sandy mudstones. There are bands of small pebbles, often granite or quartzite and "Drop Stones" which are isolated large pebbles in a muddy or sandy matrix. The shape and occasional scratches on these indicate a glacial origin and they probably dropped into the sediment from floating icebergs.

Bands of well preserved fossil shells occur on the shore platform below Taronga Road. It is best not to remove them because they are well displayed and not particularly common in this form. They photograph better "as is where is" than if they are removed and invariably broken.

The Risdon Sandstone is seen just above the fossil layers. It is a buff coloured layer of sandstone about 2 metres thick that can be traced along the cliff rising from south to north and disappearing into the clifftop bush near Wandella Avenue. It contains a few, often broken, fossils and some pebbles.

The Ferntree Mudstone is seen mainly in the southern part of the Alum Cliffs. It is a rather uniform rock of alternating bands of harder and softer mudstone. This rock contains many angular sand grains and a quantity of pebbles and "Drop Stones" in places. The freshly broken surface of this rock shows many intermingled lines of worm castings. The mudstone contains much sulphur which can be smelled when the rock is struck. Much of the sulphur manifests itself as a white encrustation on the sheltered areas of the cliffs. It has the distinct bitter-sweet taste of alum from which the cliffs are named. It is a sulphate of mainly sodium, potassium and aluminium. In the past this white material was collected, dissolved, filtered and crystallized to produce a useful household and industrial chemical. It was used for dying textiles and tanning hides.

The Knocklofty Sandstone occurs as a small outcrop on the top of the Taronga Ridge above the Ferntree Mudstone. This is mostly a well sorted sandstone with angular, interlocking grains. There are a few layers with small pebbles. This is the rock that was found to be an excellent building stone.

The Sedimentary Environment of the Permian and Triassic Rocks

When these rocks were being laid down as sediments, Tasmania was part of Gondwanaland which was a huge continent occupying the southern hemisphere much as Eurasia does in the north today. Most of Tasmania was a basin of accumulating sediments. The formations in Taroona are found over a large proportion of Tasmania. At various times the place was a shallow sea or low, flat land. The

climate was most likely subpolar with icebergs drifting in the sea. The most likely environment to be found on earth today approximating that of the Permian rocks is the mouth of one of the great rivers which flow into the Arctic Ocean. Starting at the top of the sequence in the Knocklofty Formation we have a vast riverine plain with a slow river meandering across it.

The Ferntree Mudstone was laid down in a large estuary, probably as tidal mudflats with a few shell fish, pieces of driftwood and sand worms. Sizeable pieces of floating ice must have drifted over the mud to drop in pieces of granite and quartzite from mountains a hundred kilometres or so to the west.

The Risdon Sandstone probably marks a change from estuarine to marine conditions and has been interpreted as a kind of sand bar deposit. Some of the muddy sandstones of the Malbina Formations could fall into this category. The fossils in this region are either fairly robust or broken indicating an environment with a fair amount of wave action.

As we move down into the lower Malbina and the Grange mudstone, the fossils become more delicate and the sediments finer grained, indicating a deeper, quieter water, still with icebergs floating above.

The Dolerite

This is the dark grey crystalline rock capping the hills behind Taroona. Fragments of this are found in many parts of Taroona. It occurs as generally horizontal or steeply sloping bodies many hundreds of metres thick, cutting through the Permian and Triassic rocks. The grain size is usually 3 or 4 mm but is finer close to the boundary with the surrounding rocks. It consists mainly of two minerals, light grey feldspar and dark grey pyroxene.

The surrounding sediments show signs of heating. The mudstones have been changed to a flinty sort of material called hornfels and the Knocklofty sandstone at Taronga Ridge has been welded together by new minerals formed under the intense heat thus enhancing its strength and durability.

The dolerite itself is too tough to be a good building stone though natural blocks make good garden walls. Large blocks along the coast have prevented the soft rocks on the coast from eroding much faster. It has a negative side though. It is responsible for the steep slopes and shallow soil of the hills. It is difficult to move for roads and building foundations and weathers to the black clay soil which can be like putty in winter and concrete in summer. Dolerite was quarried and crushed for bluemetal some years ago, just along Derwent Rise.

The Taroona Fault

This is a major structure which runs through the middle of Taroona. It was formed about 60 million years ago as part of the great subsidence which was the cause of the Derwent Valley. This happened probably as Australia was breaking apart from Antarctica in the final fragmentation of Gondwanaland.

The fault line runs from just east of the Grange quarry, crosses the Channel Highway near St. Joseph's Centre, continues south in a gently wavy line to recross at the top of Taroona Crescent and then heads into the sea at the south end of Hinsby Beach, running under the sea not far out from the foot of the Alum Cliffs. The western side of the fault has risen 300-400 metres with respect to the eastern side.

The Rocks of the Tertiary Period (about 60 million years old)

The Taroona fault divides the older hard rocks from the soft Tertiary rocks which were formed about the same time as the fault was active. The lowest formation in these rocks outcrops on Crayfish Point. It is hard to determine whether this is the lowest formation as there is some debate as to whether the lower levels of this are weathered dolerite bedrock. It consists of boulders of coarse-grained dolerite in a matrix of buff coloured clay. Small veins of limy material and a piece of woody-textured, manganese oxide have been found in this formation. It grades upward into a reddish, mottled clay still with dolerite boulders. This can be seen at the corner of Flinders Esplanade and Norwood Avenue.

The red clay is fairly typical of a red tropical soil indicating that the formation has stood for some thousands of years close to the land surface. This reinforces the theory that it is the top of a deep dolerite soil. Conversely, on Cartwright Point, there are dolerite boulders embedded in a similar red-brown clay with large recognizable volcanic fragments in it.

This was most likely formed from mud and slope debris deposited as a mud slide associated with an earthquake or volcanic eruption.

Above the red clay is a layer of tuff or volcanic ash. This can be seen as a brown porous rock on the beach below "A" Block at Taroona State High School. It consists mostly of glassy vesicular grains about 5mm across. At Sandy Bay there is a similar tuff with a suite of other volcanic rocks. There is a greater depth of tuff here indicating closer proximity to the source, which was most likely a volcano out in the Derwent off Cartwright Point.

Above the tuff there is a layer of dolerite boulders in a clay which varies from kahki colours to a bright blue-green as seen near the Taroona State High School boat shed. This is most likely a mud flow deposit.

At the boat shed the blue-green clay is overlain by a brown sandy, fine conglomerate. This is part of the next suite of Tertiary rocks.

Fresh water sediments

These are highly variable in grain size both from place to place and vertically within the sequence. The lower layers are mostly coarse boulders and cobbles as in the cliffs below Winmarleigh Avenue. They differ from the boulder beds in that they contain little clay and a few layers of enclosed sands which are typical of sediments deposited from fast running water.

Below Karingal Court and north to the State High School the sediments are much finer with clay layers which sometimes contain impressions of leaves and other plant matter. Fossil turtles almost indistinguishable from present Murray River turtles *(Emydura Macquarii)* have been found indicating a warm temperate to sub-tropical climate. These sediments were deposited from small streams flowing into depressions near the fault escarpment. The coarse sediments were deposited near where the streams emerged from the escarpment and the fine clays and sands in ponds and small lakes. Occasionally heavy rain or movement of the fault would cause coarse material to wash into the fine sediments giving alternate bands of sandstones and conglomerates.

Between the top of the Fresh Water sediments and the fault line there is another boulder deposit with a light brown gravelly matrix. Cartwright Point mostly consists of the previously mentioned mud flow deposit which is underlain by a tuff similar to that at the State High School. On the northern side of the Point there is a confused sequence which contains a white mudstone similar to that found under the volcanics at Alexandra Battery at Sandy Bay. There are many beach pebbles of basalt at Cartwright Point indicating the possible proximity of a lava flow.

Most of the Tertiary sediments were laid down horizontally but today the strata slope (dip) all over the place, even vertically. This is caused by two factors. Firstly the sequence was laid down as the fault was active. Each earthquake, and there would have been many, shook and moved about the unconsolidated sediments as it tilted the land. Secondly, quite recently there have been (and are still continuing) slumps and landslides due to impeded drainage.

The environment of Taroona during the deposition of the Tertiary rocks was vastly different from the older Permian or from today. If the Permian was like being transported to Northern Siberia then the Tertiary was like the African Rift Valley. The climate was probably subtropical monsoonal. The land was steep and unstable and wracked by earthquakes and small volcanic eruptions.

The Quarternary Rocks

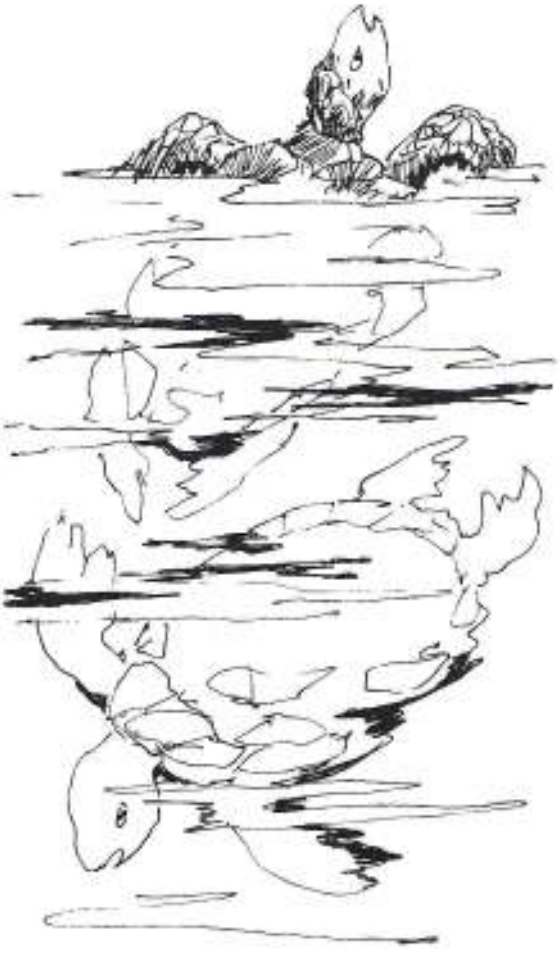
The last major geological event was about 10,000-20,000 years ago when Tasmania was in the grip of the last glacial epoch. South eastern Tasmania was extremely cold and dry, such that little vegetation existed. Occasional rains and snow-melt washed vast quantities of pebbles and cobbles into existing creek valleys. Most of the little creeks around Taroona contain valley fills which form terraces in the lower reaches of their valleys. At St. Luke's Church the valley was so filled that an extensive fan shaped deposit emerged from the creek valley behind the Church.

Alluvial fans are often areas of indeterminate drainage subject to flooding and stream course changes. At one time, the creek behind St. Luke's must have flowed overland into the gullies near Kelvedon Avenue and upper Seaview Avenue. They joined at the bottom of Seaview Avenue and flowed into the sea there. This explains the presence of creek pebbles at the bottom of Kelvedon Avenue and all the small pebbles of material from the hill

behind the Church now on the foreshore below Seaview Avenue. It is interesting to speculate on whether the present nearly straight course of the creek was the result of early attempts at drainage. It is also unusual that this creek has not cut any valley like the others. Perhaps the course runs along the straight line between two early property boundaries.

After the last glacial epoch the sea rose to about the present level. Steep cliffs formed in the hard rocks. Lower cliffs and beaches formed where there were soft rocks and rocky, bouldery foreshores developed where dolerite boulders protect the soft rocks from erosion. Where large amounts of weathered dolerite have been eroded by the sea, the sand contains large amounts of the heavy minerals, ilmenite, magnetite and a few zircons. These are the cause of the black sand on Taroona Beach.

The only ongoing geological problems are to do with land slips which are mainly located near the creek which runs past the schools. Land slips may occur in many places in the lower parts of Taroona. They can be avoided by good housekeeping with water supply and drainage. Broken and leaking pipes or anything else which allows water to collect in the soil must be repaired.



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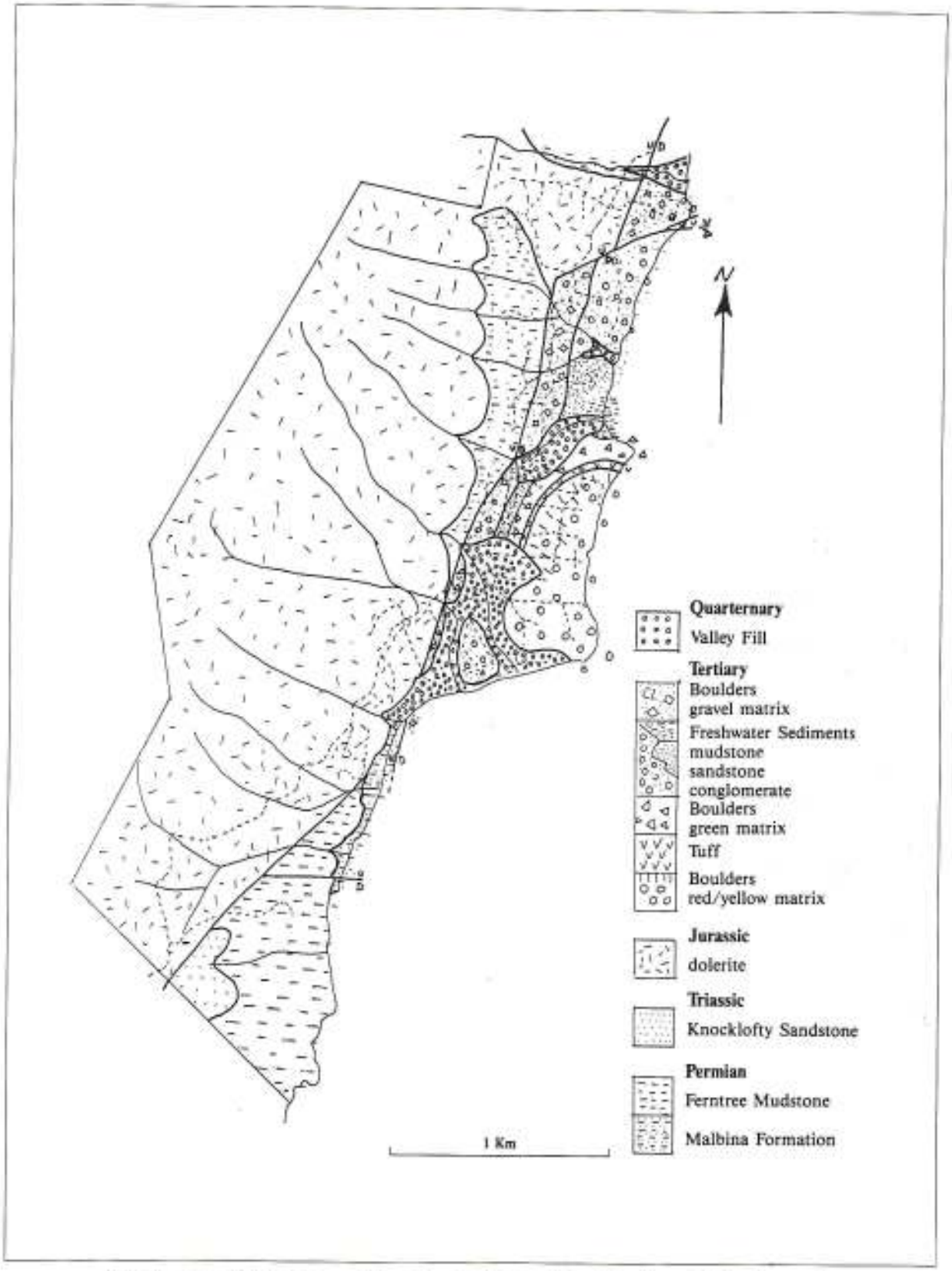

Sketch map of Geology of the North Ward, Municipality of Kingborough.

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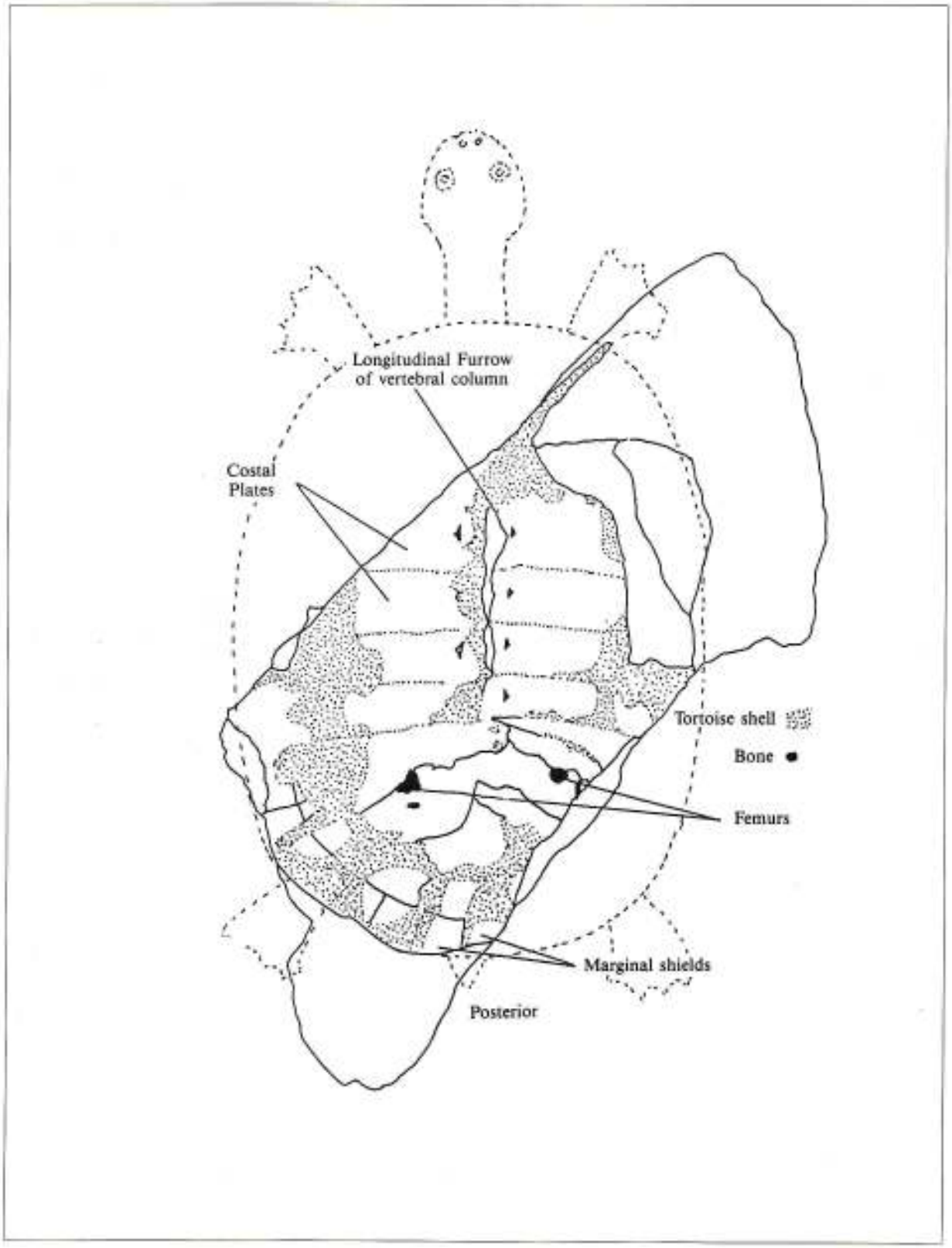

Diagram showing relationship of the living turtle to the fossil in the photograph opposite.

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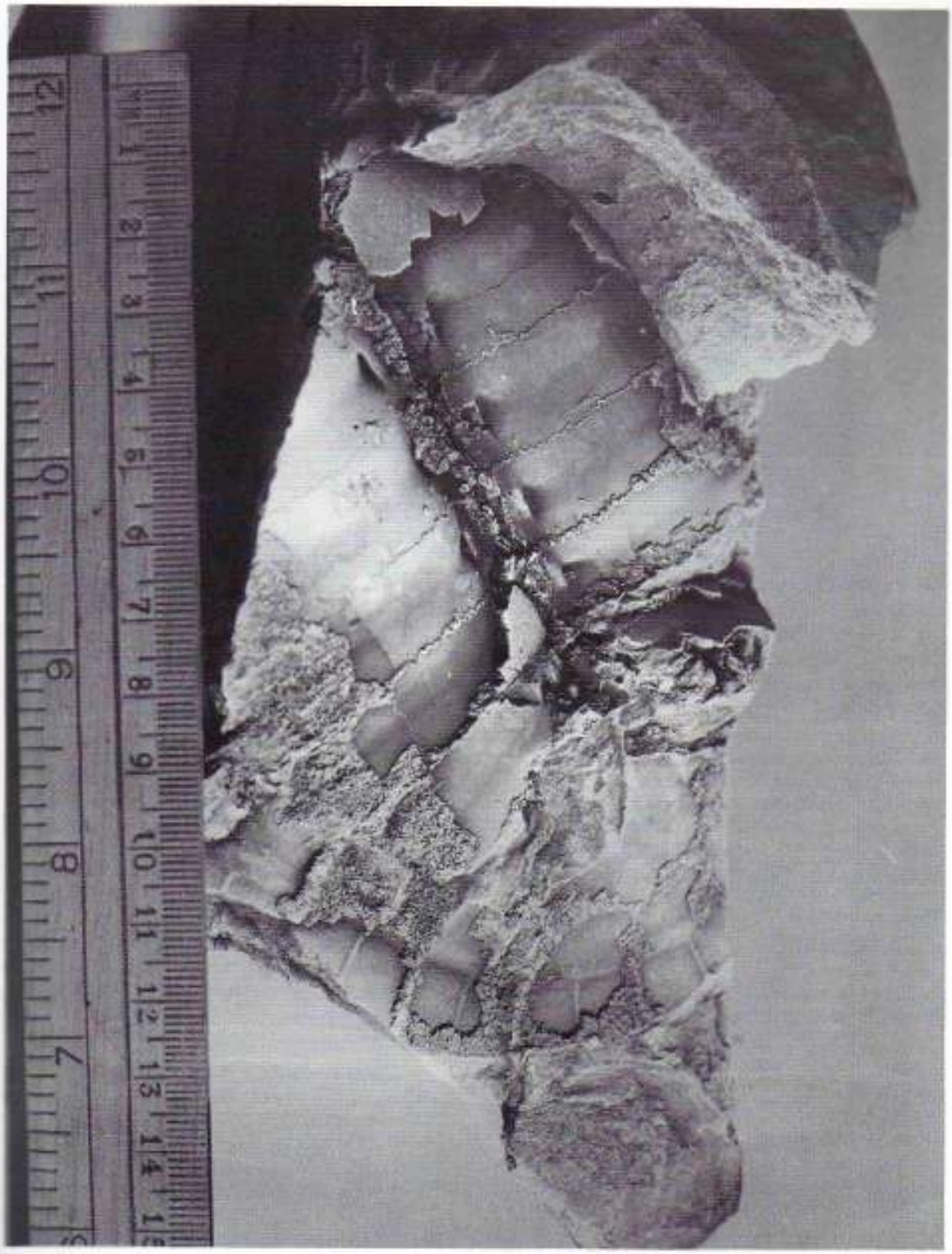


Fossil carapace of "Murray River" turtle from mudstone about 60 million years old at Dixons Beach.
PHOTO UNIVERSITY OF TASMANIA.

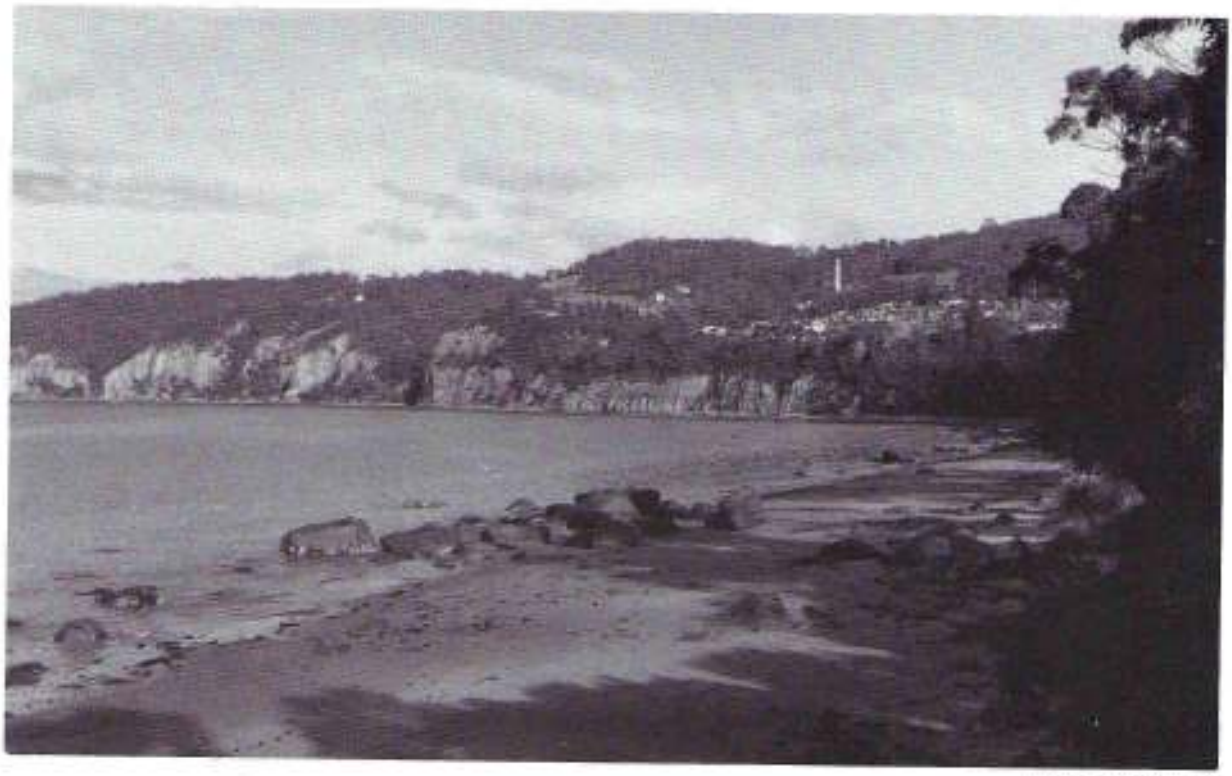
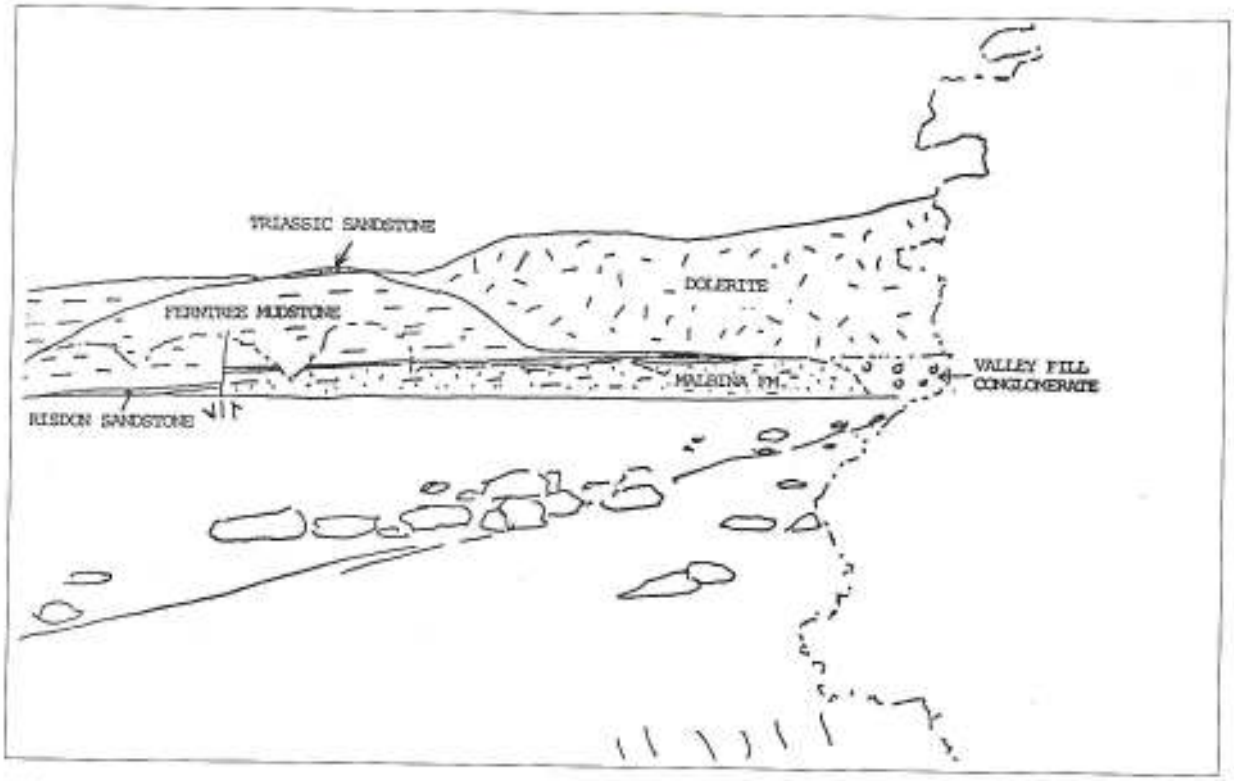


PHOTO J.C.S. BOWLER.



View and diagram looking south west along Taroona Beach showing the structure and sediments of the Alum Cliffs. The beach in the foreground is derived from removal of the clay from around the boulders, leaving sand, boulders and heavy minerals.

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