Fossils of Beaumaris

Erich Fitzgerald and Rolf Schmidt
Geological background to the fossils of Beaumaris

The Beaumaris Sandstone of Beaumaris, Victoria, has produced the Beaumaris Local Fauna, including sharks and rays, bony ray-finned fish, penguins, diomedeid and pelagornithid seabirds, dugongs, phocid seals, baleen whales, toothed whales, rare remains of land-dwelling flightless birds and marsupials, and innumerable invertebrate fossils.

The coastal section at Beaumaris occurs onshore in the cliffs, shore platform and beach shingle from Table Rock about 1.6 km northeast to ‘Dog Tooth Rock’ (approximately opposite the intersection of Beach Road and Cliff Grove), and approximately 100 m out to sea as submarine outcrop. The rock is exposed parallel (W–E) to the shoreline by a shallow asymmetrical fold in the rock strata with its axis occurring at approximately the level (horizontally) of the intersection of Beach Road and Banksia Avenue (near 37°59' S, 145°02'E). From here, the strata dip eastward along the shoreline at a shallow angle of ≤2°. The cliffs along the shoreline are parallel with the eroded Beaumaris Monocline, which has a seaward (SE) average dip angle of 10–20°.

The base of the rock sequence at Beaumaris consists of middle Miocene (~10 million years old) Fyansford Formation, which is overlain by a thin (ca 20cm thick) phosphatic nodule bed at the base of the Beaumaris Sandstone, which has a maximum thickness of about 15 m. The clayey limestone of the Fyansford Formation is not exposed in onshore outcrop, and only in limited areas on the sea bed close to shore where it is covered by beach sand.

The basal nodule bed and overlying 6.7 m of the Beaumaris Sandstone at constitutes the type section of the Cheltenhamian southeast Australian geological stage, which was originally correlated with the upper Miocene of international use. More recently, microfossils from the Beaumaris Sandstone have indicated that the sediments were laid down during the latest Miocene epoch, or about 4.5–6.5 million years ago. Strontium isotope dating of the basal nodule bed and overlying 5 m of Beaumaris Sandstone give ages of 6.2 million years ago (within basal nodule bed) to 4.9 million years ago (at 4.3 m high in the cliffs). These dates show that the Beaumaris Sandstone and its fossil fauna is between about 6 and 5 million years old, dating to the very end of the Miocene epoch and the beginning of the Pliocene epoch on the Geological Timescale.

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Phylum Cnidaria

Order: Scleractinia (corals)
Family Flabellidae

Flabellum gambierenense, Gambier fossil coral

Flabellum gippslandicum, Gippsland fossil coral

Placotrochus deltaideus, Fossil coral

Family Carophyllidae

Deltocyathus sp., fossil coral

Trochocyathus sp., fossil coral

Family Montlivaltiidae

Montlivaltia sp., fossil coral

Family Fungiidae

Bathyactis beaumariensis, fossil coral
Phylum Brachiopoda
(lamp shells)

Family Terebratulidae

*Anakinetta tumida* fossil brachiopod

Phylum Bryozoa
(moss animals, lace corals)

Order Cheilostomata
Family Lepraliellidae

*Celleporaria nummularia*, fossil lace coral

Family Porinidae

*Porina sp.* fossil lace coral

Order Cyclostomata
Family Horneridae

*Hornera foliacea* fossil lace coral

Phylum Mollusca
(molluscs)

Class Bivalvia (bivalve shells)
Family Cucullaeidae (false arc shells)

*Cucullaea corioensis*
Family Limopsidae

Limopsis beaumariensis

Family Glycimeridae (dog cockles)

Tucetona convexa

Family Carditidae

Glans kalimnae

Family Crassatellidae

Eucrassatella eupontica

Family Corbulidae (basket clams)

Notocorbula ephanila

Family Pholadidae (piddocks or angelwings)

Barnea tiara

Family Pectinidae (scallops)

Mesopeplum divergens

Serripincten yahlensis
Family Spondylidae
- Spondylus baileyana

Family Ostreidae (oysters)
- Lopha hyotidoidea
- Ostrea manubriata

Family Trigoniidae
- Neotrigonia acuticostata

Family Mactridae
- Mactra hamiltonensis
- Zenatiopsis phorca

Family Veneridae
- Kereia johnstoni
- Proxichione moondarae
Class Gastropoda

Family Cypraeidae (cowries)

*Umbilia hesitata*

Family Turritellidae (tower shells)

*Gazameda victoriensis*

Family Naticidae (moon snails)

*Polinices subvarians*

Family Dentaliidae (tusk shells)

*Fissidentalium mantelli*

*Austrocypraea subsidua*
Phylum Echinodermata

Class Echinoidea

Aturia coxi

Family Nautiliidae (chambered nautilus)

Phylum Echinodermata

Class Echinoidea

Family Clypeasteridae (sand dollars)

Fellaster incisa

Clypeaster gippslandicus

Family Loveniidae (heart urchins)

Monostichia loveni

Phylum Echinodermata

Class Echinoidea

Family Echinometridae (regular urchins)

Evechinus palatus

Lovenia woodsi

Family Echinometridae (regular urchins)
Phylum Arthropoda

Class Crustacea (crabs, lobsters and barnacles)
Family Goneplacidae

*Ommatocarcinus corioensis*, crab

Family Balanidae (barnacles)

*Austromegabalanus victoriensis*

Balanus decorus

Phylum Chordata
(animals with a notochord, including vertebrates)

Class Chondrichthyes (sharks and rays)
Family Heterodontidae

*Heterodontus cainozoicus* fossil Port Jackson shark, crushing tooth plates

Family Orectolobidae (wobbegong sharks)

*Orectolobus*, wobbegong shark tooth

Order Lamniformes (mackerel sharks)

*Lamniformes sp.* mackerel shark vertebrae
Lamniformes sp. articulated mackerel shark vertebrae

Family Lamnidae

*Carcharodon carcharias*, white shark tooth

*Carcharodon hastalis*, extinct white shark lower teeth

Family Odontaspididae

*Isurus oxyrinchus* shortfin mako tooth

*Carcharias taurus*, grey nurse shark tooth

Family Otodontidae

*Carcharodon hastalis*, extinct white shark upper teeth

*CARCHAROCLES megalodon*, megatooth shark tooth

*Parotodus benedeni*, false mako shark tooth
Order Carcharhiniformes (ground sharks)
Family Carcharhinidae (whaler sharks)

*Order Carcharhiniformes* (ground sharks)

*Family Carcharhinidae* (whaler sharks)

*Carcharhinus brachyurus*, bronze whaler shark teeth

*Galeocerdo*, tiger shark teeth

Order Pristiformes (sawfish)
Family Pristidae

*Order Pristiformes* (sawfish)

*Family Pristidae*

*Pristis*, sawfish rostral tooth

Order Myliobatiformes (stingrays)
Family Myliobatidae

*Order Myliobatiformes* (stingrays)

*Family Myliobatidae*

*Myliobatis*, eagle ray, base of tail stinger

Order Chimaeriformes (chimaeras)
Family Callorhincidae

*Order Chimaeriformes* (chimaeras)

*Family Callorhincidae*

*Edaphodon sweeti* extinct giant chimaera, tooth plates

Class Actinopterygii (ray-finned bony fish)

*Class Actinopterygii* (ray-finned bony fish)

*Actinopterygii sp.*, bony fish jaw

*Actinopterygii sp.*, bony fish jaw bone fragments

Myliobatis, eagle ray, tooth plates
Actinopterygii sp. large bony fish dorsal fin spine

Order Tetraodontiformes
Family Diodontidae (toadfishes)

Diodon formosus, extinct toadfish crushing tooth plates

Class Reptilia (reptiles)
Order Testudines (turtles and tortoises)
Family Cheloniidae (hard-shelled sea turtles)

Cheloniidae sp. extinct sea turtle shell bone in internal view

Class Aves (birds)
Order Sphenisciformes (penguins)
Family Spheniscidae

Spheniscidae sp. extinct penguin humerus (upper wing bone)

Spheniscidae sp. extinct penguin wing bones

Order Odontopterygiformes (bony-toothed birds)
Family Pelagornithidae

Pelagornis sp. extinct giant bony-toothed bird tibiotarsus (shin bone)
Order Procellariiformes (tube-nosed seabirds)
Family Diomedeidae (albatrosses)

Order Anseriformes (waterfowl)
Family Dromornithidae (thunder birds)

Class Mammalia (mammals)
Order Diprotodontia (marsupials with two front teeth)
Family Diprotodontidae (giant quadrupedal herbivorous marsupials)

Order Cetacea (whales, dolphins, porpoises)
Suborder Mysticeti (baleen whales)
Mysticeti sp., eroded tympanic bullae (outer ear bones) of baleen whales

Mysticeti sp., periotics (inner ear bones) of baleen whales

Mysticeti sp., front section of the lower jaw of a baleen whale

Mysticeti sp., rear section of the lower jaw of a baleen whale

Suborder Odontoceti (toothed whales)

Superfamily Physeteroidea (sperm whales)

Physeteroidea sp., extinct sperm whale, front end of lower jaws measuring 27cm long.

Physeteroidea sp., extinct sperm whale teeth.

Family Ziphiidae (beaked whales)

Mesoplodon sp., rostrum (upper jaw or beak) of a beaked whale, measuring 31cm in length.
Superfamily Delphinoidea (dolphins and porpoises)

Delphinoidea sp., dolphin or porpoise tympanic bullae (outer ear bones)

Delphinoidea sp., dolphin or porpoise periotics (inner ear bones)

Delphinoidea sp., dolphin or porpoise lower jaws

Delphinoidea sp., dolphin or porpoise humerus (upper forelimb bone)

Phosphate nodules

Pseudofossils and other structures

Ironstone structures, including ferruginised fossils and burrow casts