CAPE SCHANCK SEA CAVES

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INTRODUCTION

The cape was named after Captain John Schanck, a Commissioner of the Transport Board, and first appears on a sketch made by Governor King showing the track of the Lady Nelson (Keble, 1968). The caves themselves would probably have been visible to any of the early navigators who came close enough to the coast. The first mention of the caves is by Baker and Frostick (1947), who described some of the Pisoliths and Ooliths found in Angel Cave. According to Keble (1968), Angel Cave was known to the early settlers, some of whom vandalised the caves.

Speleologists have been visiting the caves since the late 1950s, but it is only recently that any systematic work has been done on the caves. The Victorian National Parks Service have taken over most of the Peninsula coastline in recent years but have not, as yet, drawn up any specific management plans for the caves.

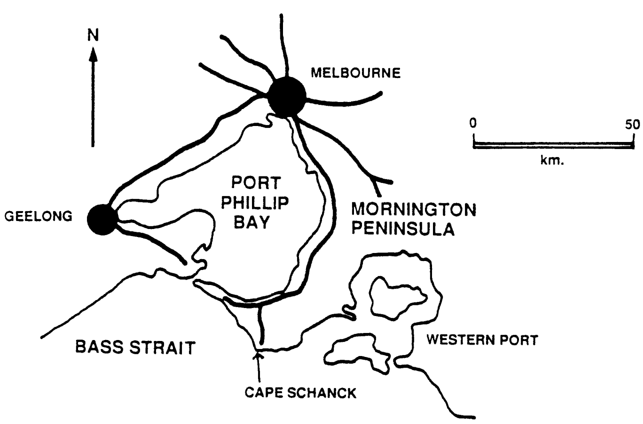

Figure 1: Location map

TOPOGRAPHY

The immediate hinterland of Cape Schanck is predominantly gently rolling vegetated dunes approximately 100 metres above sea level. This terminates in cliffs which range up to 60 metres in height and drop to shore platforms or small beaches. The only deviation from this is where Main and Burrabong Creeks have cut valleys down to Bushranger Bay (Mill, 1977).

The character of the coast on either side of the cape appears to be quite different. On the west (Portsea) side the cliffs are quite decomposed and much more degraded than those on the east (Flinders) side (Keble, 1968). Also, the shore platform on the west side can be up to 60 metres wide whereas the east side has shore platforms only about 10 metres wide. Tufa deposition on the east side is much more profuse than on the west side. This is probably due to two factors:

(i) the west side is more exposed to the prevailing westerly winds and rough seas of Bass Strait and receives more of a battering than the east side.

(ii) the profuse tufa deposition on the west side has probably helped protect and cement the cliffs. These deposits are virtually absent on the east side.

There are two rock types present in the area. both undeformed and present in the cliff faces. The bottom unit is a series of Eocene basalt flows which cover a large area of the south–western Mornington Peninsula. Between the flows are at least two old soil profiles. one of which is just about at the top of all the sea-caves. The older flows are intruded by basaltic dykes which probably fed the younger flows. Above this is a layer of Pleistocene aeolian deposits. high level irregular dunes composed of calcareous and siliceous sand. These dunes cover the southern part of the Peninsula from Point Nepean to Cape Schanck. The average calcium carbonate content of this limestone is 75% (Keble. 1968).

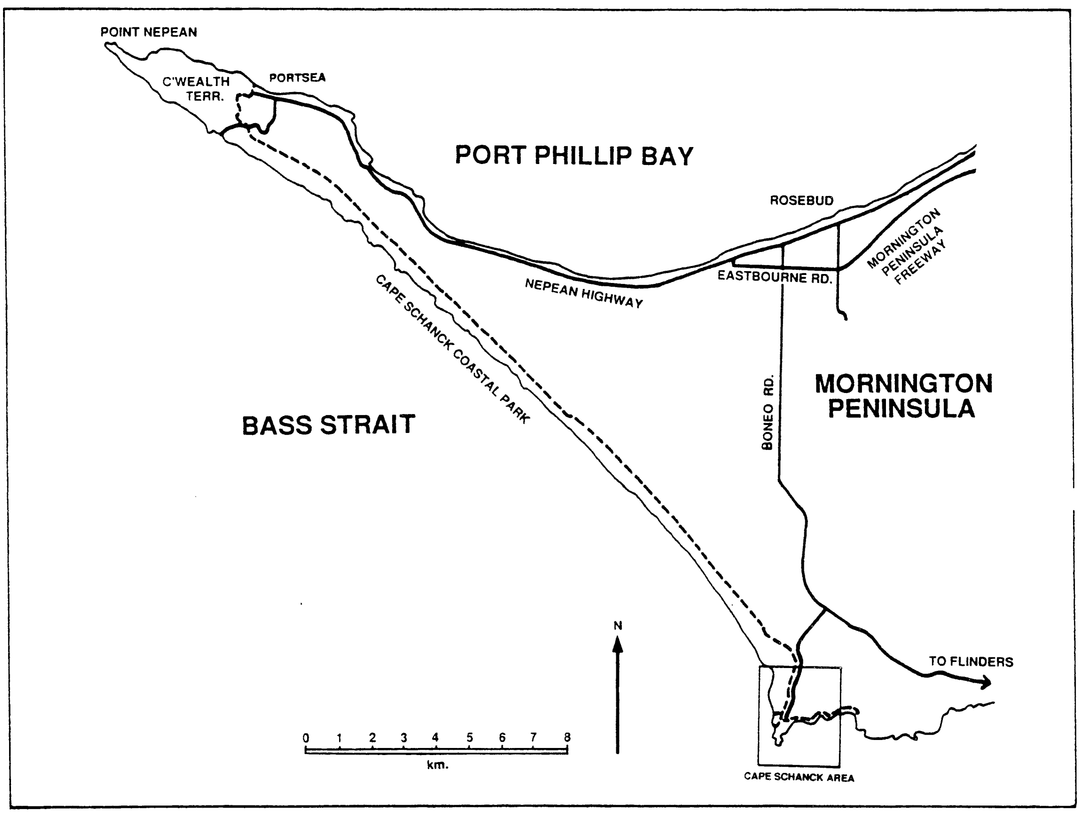

Figure 2: Cape Schanck area map

GROUNDWATER

The overlying limestone, being very porous, forms quite a good aquifer. Groundwater continually seeps out along the limestone–basalt contact and forms tufa deposits on the cliffs and shore platforms. Groundwater also moves down joints in the basalt to some of the caves where speleothems are deposited. The amount of groundwater flowing out of the aquifer is quite large. Angel Cave is probably the drippiest cave in Victoria. Standing in Angel Cave is like standing in a forest just after a rainstorm. Everything drips. Table 1 .shows that the groundwater contains a certain amount of saltwater, probably from sea spray. If the chemistry is adjusted to take this into account, dripwater from Angel Cave is very similar to the water coming from Duke's Cave at Buchan. This probably indicates that the Cape Schanck groundwater is in the aquifer long enough to become fairly saturated with Ca^{2+} and Mg^{2+} and then gains sea spray just before leaving the aquifer.

Table 1. The Chemistry Comparisons

Place	Date	Salinity (°/*oo*)	Conductivity (mhos)	Ca^{2+} (ppm)	Mg^{2+} (ppm)
Buchan					
Dukes Cave (B-4)	20/9/80	0	1290	111.0	34.5
Moons Cave (B-2)	20/9/80	0	510	60.0	18.0
Buchan River	18/9/80	0	10	16.0	1.16
Angel Cave dripwater	4/10/80	2	3.00	120	95
Adjusted dripwater	–	–	–	120	20.71

THE CAVES

The caves seem to fall into three basic types (Mill, 1978):

(i) Amphitheatres

(ii) Angel type

(iii) Active channel caves

Amphitheatre caves are found on the west side of the cape. They are basically large recesses in the cliff with a pile of rubble in the front. Their floor level is about 5 metres above the shore platform. These features would appear to be the remains of ancient caves whose roofs have collapsed. They were probably formed by a higher sea level than at present. The extensive collapse is likely to be due to the harsher climate on this side of the cape. The Angel type is best represented by Angel Cave itself (Fig. 4). Other examples are Barragunda Cave, and possibly Penguin Parade. (See Fig. 5). The entrances of these caves are 2 to 3 metres above the shore platform and are rarely entered by the sea, even at high tide. This type of cave is no longer being eroded by the sea, and in some cases they are being rapidly filled by speleothem deposits. There are two possible explanations for the origins of these caves. The first is that they were simply formed when the sea level was slightly higher than at present and they have been abandoned when the sea level dropped. The second, most bizarre, explanation is that some old lava tubes have been slightly modified by wave action. The features which point toward this explanation are:

(a) All of the caves are just below a fossil soil horizon indicating that they could have been below ground level after one of the early eruptions.

(b) The shape of one of them (GP–4) is more like the rounded shape of a lava tube rather than the square shape of a sea cave. (See Fig. 6).

(c) Barragunda cave is tucked in behind a point in a spot very protected from wave action. For the full force of the wave action to have developed this cave, the waves would need to make a 90° turn from their usual direction.

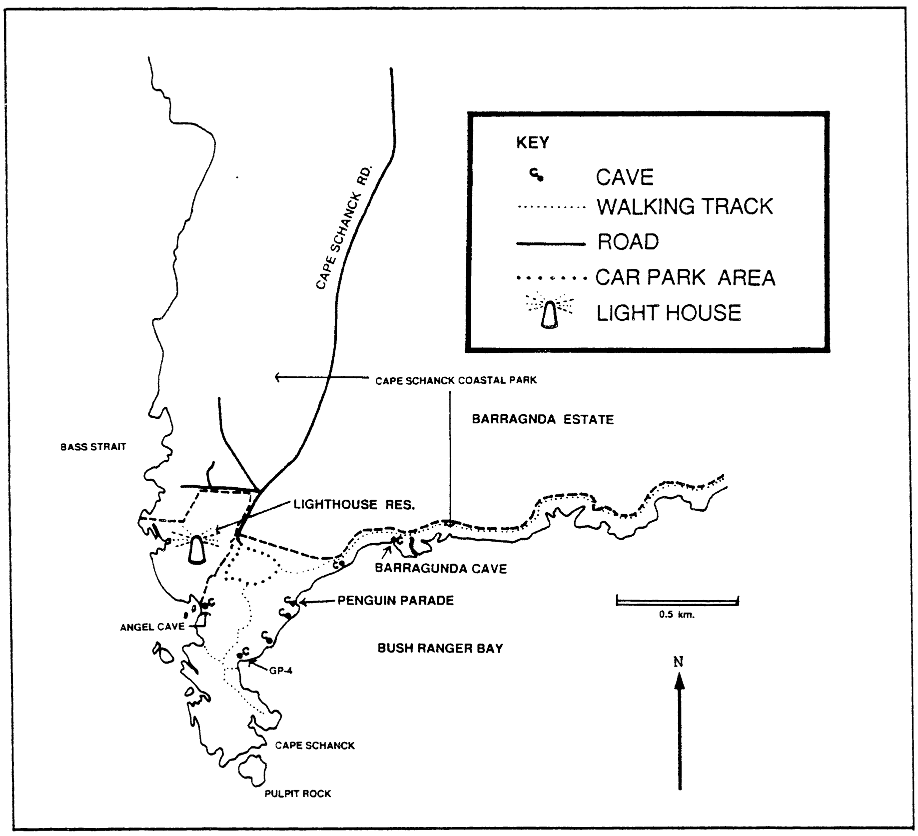

Figure 3: Cape Schanck

Active channel caves, even at low tide, are connected by a channel which cuts through the above platforms. The channels vary in size and depth but all seem to have rounded cobbles and pebbles on their floors and are being actively enlarged by the sea.

SPELEOTHEMS

A number of the caves have profuse calcite speleothems, even though the host rock is basalt. The two best examples are Angel Cave and Barragunda Cave. The source of the calcite is the Quaternary dune limestone which overlies the basalt. The amount of groundwater coming through the roof ensures that the speleothems are very active. Angel Cave is notable for the many pisoliths and ooliths found on some ledges (Baker and Frostick 1947).

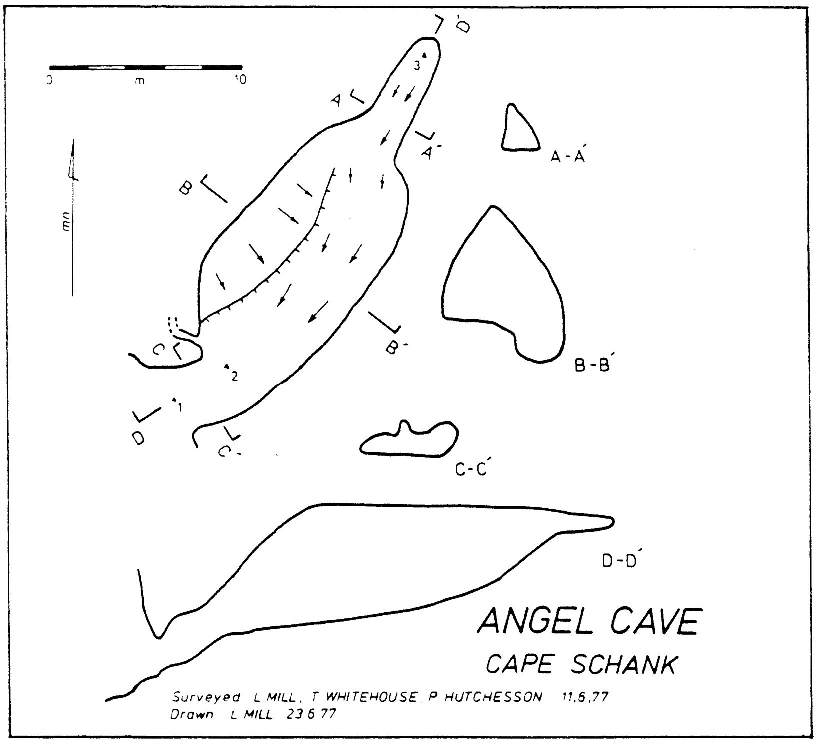

Figure 4: Angel Cave

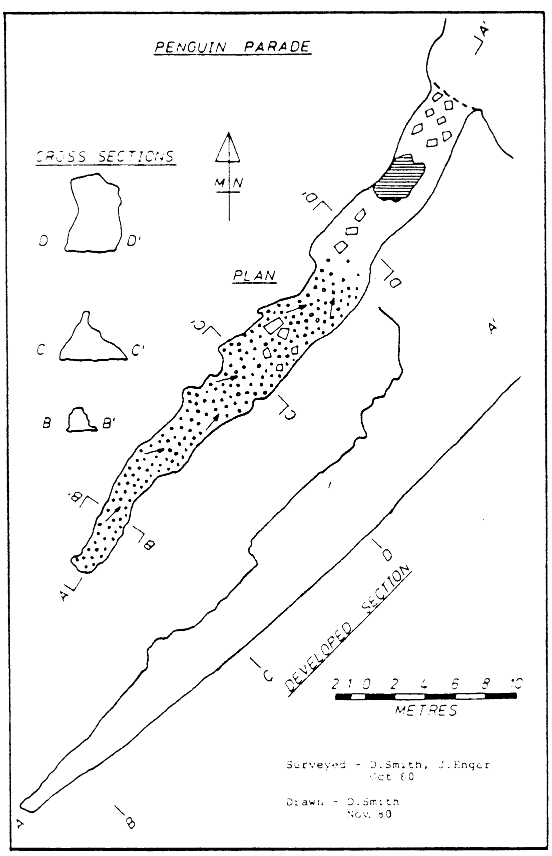

Figure 5: Penguin Parade

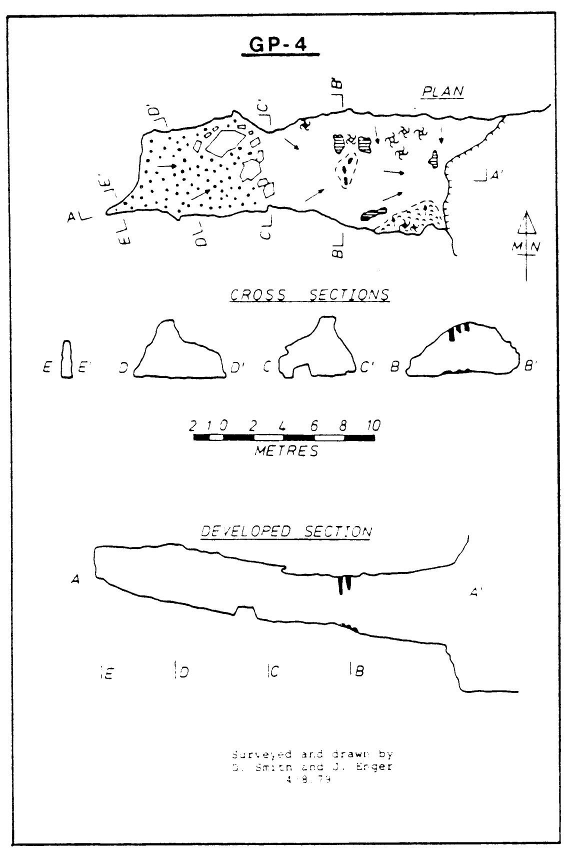

Figure 6: Cave GP–4

CONCLUSION

The sea caves of the Cape Schanck area are some of the best on the Victorian coastline, both because of the large numbers which occur along a short stretch of the coast and the profuse calcite decorations inside them.

The following points warrant further investigation. Firstly, what is the reason for the difference between the west and east sides of the cape? As discussed, this is more likely to be due to climatic rather than lithological reasons.

Secondly, whether the grouping of the caves is due to variations in sea level.

Finally, the lava tube origin of some of the caves. Although this is a very unlikely explanation (and will not be vigorously defended by this author), it is still worthy of investigation.

ACKNOWLEDGMENTS

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Mill, L. (1978) *Nargun* **10(10)**: 159–160

Appendix: Chemistry Adjustments to Angel Cave Dripwater

Dripwater Salinity = 2‰
Seawater Salinity = 35‰

Therefore: Dripwater is probably 2/35 or 5.7% seawater. In seawater there is negligible Ca^{2+}, so this figure remains unchanged.

However there is 1300 ppm of $MgCl_2$ in seawater so, by proportions, the amount of seawater Mg^{2+} in the dripwater sample is:

5.7% of 1300 ppm
= 74.28 ppm

So therefore the remainder can be attributed to groundwater.

= 95.0 - 74.28 ppm
= 20.71 ppm.