Keynote Address

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INTRODUCTION

The limestone caves of Victoria were known to the aboriginals prior to the exploration and settlement of Victoria, although our knowledge of their use of caves and the legends associated with them is rather restricted. Cloggs Cave at East Buchan was occupied from 18,000 to about 8000 years B.P. Some rock painting near a cave in the Buchan district of a very much later period indicates that aboriginals were associated with caves at or close to the time of white settlement. One other cave in the New Guinea Ridge area has wall engravings similar to that at Koonalda, S.A., although studies of this site are preliminary at the present time. A few other caves in the Buchan area, more of an overhang nature, have rock flakes and fresh water mussels on their floors, indicating occupation, although these also have not been studied in detail. The aboriginals of East Gippsland had legends associated with caves. The Nargun was a spirit who lived in caves and would capture or eat anyone who ventured into them. The Den of Nargun, near Glenaladale, now a National Park, and a cave on Lake Tyers, are two caves associated with such legends. There are also caves or shelters in Tertiary limestones along the coast west of Cape Otway which show evidence of occupation and a number of overhanging rock shelters in the Grampians which have extensive painting galleries. I will come back to these caves and sites when discussing cave protection later in this paper.

Discovery of caves must have been extremely rapid following settlement, as many caves are near sites of early settlement. East Gippsland was settled from the Monaro district of NSW in the 1830s and 1840s, and caves at Limestone Creek and in the Buchan district were discovered at this time. In the Western District, the Henty family settled in the Portland Area, where many of Victoria's other caves occur. Graffiti in caves in both areas indicates knowledge of these caves in the nineteenth century.

Government interest in caves was limited, and it was not until after geologists such as Howitt and Stirling made recommendations concerning caves in the Buchan area that A.E. Kitson was commissioned to examine the caves and report to the Government. Kitson's report was accepted, and various separated cave reserves were proclaimed in the Buchan area. These reserves were vested in the Department of Crown Lands and still exist in this form today. There was one anomalous step to protect caves in the nineteenth century, when, in 1880, by means of an Order in Council, the main outcrop containing caves, Sheehan's Bluff, at Limestone Creek, was exempted from occupation for mining purposes. This will be further discussed later.

To recap, caves occur in Devonian limestone in the Buchan area, along the coast in the west of the state in Tertiary limestones and associated with the Glenelg River, where there are 32 caves. Some 65 caves also occur in the Quaternary dune limestones at Bat Ridges, west of Portland.

The nineteenth century fascination with caves was based on their aesthetic and scenic values. The scientific values recognised at this time were those associated with animal and human remains in caves; palaeontology and archaeology.

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This original intrinsic fascination with caves has broadened over the years, and a much wider importance can be placed on them, although the particular values of an individual cave can only be subjectively assessed. These values include tourist use of caves. The Royal and Fairy Caves at Buchan are currently visited by about 80,000 people per annum. The Princess Margaret Rose Cave on the Glenelg River receives about 30,000 people per annum. Recreational use of caves is extensive and ranges from the organised members of speleological clubs through members of outdoor groups from tertiary institutions, churches, the scouting movement to individuals with no affiliations. A cave visitor survey in progress at the moment has led us to an estimate of some 3,000 person–days per annum of recreational caving in the Buchan district alone.

Many other values can be attached to caves apart from those discussed already. These are palaeontological, biological, geological, hydrological and geomorphological.

It is true to say that studies of bone material, since bones are often well preserved, have led to a much deeper understanding of the fauna of the past. Caves act as animal traps and as predator dens. Studies of such deposits have extended our knowledge of the extinct megafauna. Important studies have been conducted in Cloggs Cave, Mabel Cave and caves in the Pyramids Area in the Buchan District. Other such caves have been the Gisborne Bone Cave and McEachern's Cave on the Glenelg River.

One of the major biological values of caves is as a roost for bat colonies. Three species of cave bats occur in Victoria. The most numerous is the little bent–winged bat, *Miniopterus schreibersii*. There are three population groups of this bat in Victoria, based on their maternity caves. One of these occurs at Nowa Nowa near Buchan; another population is based on maternity caves near Warrnambool, and the third has its maternity site at Naracoorte just over the border in S.A. The females return to these caves in the summer months to give birth to their young, accompanied by juveniles. Dispersal then takes place to many caves throughout the state. They become extremely torpid, and go into a state of hibernation during winter. The other species are the Eastern Horseshoe bat, *Rhinolophus megaphyllus*, which has three known maternity sites in the Buchan Area. The large-footed bat *Myotis adversus* was formerly known from Buchan, but now occurs only in a few caves along the Glenelg River. Bat numbers have declined markedly in recent years. This is probably due to a number of factors involving human interference in various forms, ranging from disturbance during winter, when they are extremely sensitive because their energy reserves are depleted, to disturbance of maternity sites by cave visitors and shooters, leading to high infant mortalities. There are only a very restricted number of caves with the right structural features to be maternity sites. In the case of the horseshoe bat, one maternity site has been abandoned and the population has been markedly reduced. The demise of the Buchan population of *Myotis adversus* may have been due to over-collecting, although this population was never very numerous. Other factors may have contributed to the decline of bat populations in Eastern Australia, such as clearing of land for agricultural use affecting food chains, and the use of insecticides, of which DDT is one to which they are extremely sensitive. Bats themselves are protected in Victoria under Fisheries and Wildlife legislation, but there are no controls on habitat interference.

A number of invertebrates inhabit caves, and these may be full troglobites exhibiting adaptations to an exclusive cave life, or trogloxenes which may also exist outside caves. These populations may be extremely vulnerable to interference. None are protected.

There are a number of economic values attached to caves. The direct economic effects of the paying tourist, and the year-round recreational caver, are extremely important in local and regional economic terms. The principal economic value of limestone is as a raw material for the construction and other industries. A perception has to be placed on whether caves are more valuable than the rock that contains them. In some instances there is bound to be direct conflict. The Buchan area has had some silver-lead mines in the past. These have not led to clashes over cave values, but at Limestone Creek there is a potential clash over a lead anomaly on the contact of the Sheehan's Bluff limestone and the surrounding Cowombat formation.

Caves provide an extremely valuable research resource for a number of disciplines not yet mentioned. Such research has led to new understandings of earth processes, past climates and hydrologic mechanisms and thus an extremely valuable educational tool.

In discussing Victorian caves, let me now turn to caves in rocks other than limestone. The major example of a cave in granite is Labertouche Cave to the east of Melbourne, although there are some others. Granite caves are extremely rare on a world scale, and Labertouche is a long cave with a stream which has eroded a passageway between granite boulders. At the present time the cave is in a water catchment, and is under Forests Commission control.

Secondly, the Western District lava plains are very extensive. Apart from the usual features of volcanic areas, there are a number of caves. These are scattered, and occur alone or in groups, from Parwan, a simple tunnel in the east, to the Mt. Eccles group in the west. At Mt. Eccles there are arches, tunnels and vents represented. Only at Mt. Eccles and at Byaduk are these caves protected. In particular, a number of extremely important caves are quite unprotected, such as Skipton Cave, Mt. Hamilton Cave, and Porndon Cave. There are also a large number of other features unprotected, such as lava blisters, channels, maars and mountains or points of eruption. The caves have important mineral deposits, and have valuable biological populations, including bats.

These then are the caves of Victoria. They range from the Buchan District, with numerous caves, and a few caves at Limestone Creek, to the sea caves and other caves along the coast in Western Victoria, to caves in the dune calcarenites of Bat Ridges, and the granite caves, such as Labertouche, and to the lava caves of the volcanic plains. Caves are also associated with a valuable and unique landscape, whether it be an area of sinkholes or blind valleys, cliffs, springs, tufa terraces, or microsolution features, all of which make up what we know as karst. This resource is scarce in Victoria and well removed from population centres, but not so far that they are by any means remote, given modern means of transportation.

What of the pressures on our caves? Man poses the greatest threat to caves. There are many examples. The original clearing of land for agricultural purposes caused the siltation of a number of caves, and closure of many of them to prevent stock losses. We have recently seen the use of bulldozers in dolines to close holes, in an endeavour to control rabbits and blackberries. Caves have also been used as convenient rubbish tips. We have a number of examples, two of which, in recent years, VSA has cleaned out. But this practice still continues, not only by private individuals, but also by government instrumentalities. It was only a couple of years ago that dumping of rubbish in a doline in the Buchan Caves Reserve ceased and sewage effluent is still discharged to a cave in the Buchan Reserve. Caves have been used as a repository for bones from

butchers' premises, and to discharge dairy factory wastes. In one instance, this has led to expensive road repairs due to collapse. But what are the effects on ground water? This has yet to be seen.

These are the obvious influences of man. Some of the less obvious changes are to the caves themselves, from rockhounds removing speleothems, to graffiti and marking of walls by cave visitors, to the trampling and muddying of cave formation.

What steps can be taken to prevent these things happening? The single most important step would be to develop policies for the protection of this scarce resource but this would not be effective without direct management protection.

I have mentioned the Buchan Caves Reserves. Without exception, since these areas were proclaimed, management has concentrated on the commercial caves solely, and neglected the rest. The tourist caves are poorly presented, and, without going into detail, tracks, lighting, fences and interpretation could all be considerably improved. Indeed, I do not think Frank Moon could be proud of the caves at present. Most other caves in the Reserve system at Buchan have deteriorated markedly over the years. The Reserves were proclaimed at a time when the cave resources of Buchan were only partly known. They are not representative of some of the most important caves and cave systems of the area and do not follow hydrological boundaries. Land ownership at Buchan is complex, with some older titles giving ownership to the centre of the Earth. There are quarrying pressures, as well as land ownership pressures. There is a need to examine the area afresh, but such an examination would need to be extremely sensitive to questions of existing land tenure and use. Such an examination is not possible under the Land Conservation Council, since it is limited to public lands, and many of the important caves are on private land.

The Land Conservation Council has been instrumental in including some cave and karst areas in National Parks. These are the Glenelg River National Park and various parks and reserves along the coast, including Port Campbell National Park. Proposed additions to the Snowy River National Park include New Guinea Ridge. NG-2 cave had a gate installed by the VSA at the request of the Victoria Archaeological Survey. This gate has been broken once. The cave is on the register of the National Estate. Upgrading of the track into the area has not helped the protection of this site. The Limestone Creek caves have been recommended for inclusion in extensions to Tingaringy National Park. Both these parks will add considerably to the list of caves protected in this State, but the proclamations still appear to be years off. Meanwhile, some vandalism still occurs, and the threat of mining in proximity to Sheehan's Buff is still a possibility, but this will not be removed by proclamation of a National Park, since there are mechanisms enabling mining to occur even in National Parks.

Bat Ridges State Faunal Reserve makes an interesting study in planning. It was proclaimed as a result of Land Conservation Council recommendations, but recent developments are occurring in Portland Shire associated with the Alcoa aluminium works. The first is a new airport, which is now being built right next to the Faunal Reserve. The quarry to the South of the Reserve is being enlarged. The caves are not directly threatened by these developments, although the long term integrity of the fauna and flora of the reserve is incompatible with these developments.

I think this is enough background to the Victorian situation. I will now pass on to

the legislative side of cave protection. Firstly, the Land Conservation Council has been instrumental in recommending that various cave areas of Crown Land, to which they are limited, are included in parks. These include the Glenelg River Caves, Bat Ridges State Faunal Reserve, various coastal reserves (Cape Schanck, Port Campbell National Park, Cape Bridgewater and Cape Nelson). They have developed a graded series of Parks, but their definitions leave a lot to be desired, since they are couched in human terms.

Secondly, the problem with the Land Conservation Council is that it is restricted to Crown Lands. A number of very valuable caves are on private land.

Thirdly, although the Land Conservation Council has talked of geological monuments, there is no legislation which can be used to protect small, valuable sites, be they on private land or public land.

The Ministry of Planning and the Ministry of Conservation have both conducted studies on sites of scientific or environmental significance. The first were along the coast. But this was not enough to stop the Portland Aerodrome being placed next to a Faunal Reserve. The Conservation Ministry is now conducting a study of environmentally important sites, and East Gippsland caves are included in a study to be published shortly. However, the values revealed by such studies do not provide the legislative mechanism of protecting important sites (including caves).

Various new legislative mechanisms could be used to protect caves generally. A 'Cave Protection Act' has now been passed in some states of the United States. Briefly, some aspects of this legislation include Statutes concerning vandalism, and a provision that caves be "posted", Statutes providing penalties for pollution in a broader sense, which would include rubbish dumping, use of caves or dolines for land fill, toxic or industrial waste disposal, and provisions for protection of cave wildlife. Protection of archaeological sites is also covered in these Acts. They also have permits for scientific work, cover the sale of speleothems and prescribe an indemnity for owners/agents against liability for damages. They also set up a Cave Commission to provide expert advice to the Government or its agencies in regard to caves. Some of these provisions are extremely attractive, but what is lacking is a mechanism for management.

The Heritage Commission Legislation is good so far as it goes, but is extremely limited in terms of State rights. We must rely on State legislation if we are to protect our caves. The U.S. Landmark legislation is an appropriate model. This mostly covers sites on private land, but also provides that sites may be removed from the register if they are not appropriately managed. Registered sites may be of cultural importance with scientific or scenic value. Such legislation is badly needed in Australia. It appears to be a gap which has not been filled, and will complement Federal Heritage Commission legislation.

Finally, let me summarise: Caves and karst are scarce in Victoria. While some caves are protected, some of the most important caves and cave systems are not: many of these are on private land. Some protected caves are poorly managed and bat populations are undergoing decline throughout the state. Various improvements could be made: changes to mining and planning legislation could be made to reduce conflict. New legislation could be enacted, such as Landmark legislation to cover small sites of special value (caves), on public or private land. There is a need for a mechanism whereby the knowledge cavers have of the cave resource could be appropriately used. Such a vehicle could be a Cave Commission constituted of experts to report to the State Parliament on matters

concerning caves, and to conduct studies as required to improve the protection and management of caves, or to provide advice in the event of development proposals having a bearing on caves.