CONSERVATION OF LAVA CAVES: EXAMPLES FROM AUSTRALIA

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ABSTRACT

The problems of the management and conservation of lava caves and their associated features differ from those of karst caves. Some features mostly peculiar to lava caves include a generally simpler plan with regular, large, tunnel-like cross-section; entrances often large and relatively easy to use; for these reasons, often relatively safe for visitors; speleothems formed rapidly at the same time as the cave without any later growth; later internal changes restricted to infilling by rock-fall, collapse, and sometimes the accumulation of fine sediment washed or blown in; streams or pools of water uncommon; more than one level of passage uncommon; generally dark rock walls making lighting and observation difficult.

In Australia, most lava caves are little known, and are visited mostly by speleologists and occasional research workers interested in geology, botany and other sciences. However, several cave groups are better known, and have come under pressure from other visitors. Caves have also been threatened by rubbish dumping, deliberately blocked up by farmers, or distributed by nearby quarrying.

Some caves have recently been developed for tourist use, and several will be described in detail.

Studies of the problems of conservation of lava caves have recently been made a part of surveys by the Queensland and Victorian Divisions of the Geological Society of Australia sponsored by the Australian Heritage Commission (de Jersey and others 1976, Joyce and King 1980, Willmott and others 1981). In these reports, the young volcanic areas and their caves have received special attention and the incorporation of several cave groups into new National parks and similar reserves has begun.

INTRODUCTION

When "Conservation of Caves" is under discussion, perhaps most of us think of caves in general, and if asked, we would admit we had a mental image of one or more limestone caves at the back of our mind. Limestone caves are, of course, most common and perhaps most in need of conservation. However, it may be worthwhile considering whether lava caves need a different approach, and whether they pose different problems of conservation.

In this discussion, we probably need some definition of conservation first. Perhaps looking after caves, their preservation, restoration, and management would all be aspects of conservation. We need to consider who goes into caves and who might want to do so in the future; what they do there, and with what effect on the cave; who should be in charge of the cave. These matters we will discuss at the end of the paper.

However, first we will mention some features of the Australian lava caves, adding to those covered in the earlier paper, and relevant to any discussion of conservation. We will try to highlight aspects which are different from those of other (limestone) caves, and so may pose different conservation problems, or lead to different ways people may look at and experience lava caves.

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Many lava caves in Australia have been adversely affected by man's presence. Some examples are: graffiti at the entrance to Skipton Lava Cave; secondary school children's graffiti in Parwan Cave; candle wax on floor of Skipton Cave, and farm rubbish in a collapse in the lava flow near Mt. Eccles.

Cave entrances have also been blocked up to protect stock, and keep out visitors; in one case, a farmer bulldozed the entrance to several small caves in an area just outside the boundary of a national park.

It is often thought that lava caves are less easily damaged than limestone caves, but many of them contain interesting and often fragile features worthy of preservation such as — needle-like stalactites, near Mt. Napier, the "Hands," ("lava stalactites" Staircase Cave, Byaduk), aragonite crystals in Mt. Hamilton Cave; lava drips on the cave's wall at Mt. Eccles, a ropy flow entering a cave at Mt. Napier, and layers of guano and minerals in the floor of Skipton Cave; several rare minerals have been found in this cave, guano mining was carried out in the nineteenth century, and now collectors have removed much of the mineral material.

Many lava caves also contain fauna and flora worthy of consideration such as: spider webs behind the lava lining in Skipton Cave, and fungae on the wall of Skipton Cave.

In the nineteenth century, this cave contained a bat colony, which may have been forced out by increasing dampness in the cave, probably related to tree clearing when the area was settled. The insect fauna of this cave survived the departure of the bats, but recently became extinct, probably because of floor compaction due to visitors' trampling.

Today, several lava caves in western Victoria have bat colonies; one is a maternity cave. At certain times of the year, any entry into such caves may be harmful to the bats.

The collapses of Byaduk contain large tree ferns which do not occur elsewhere on the dry lava plains; 20 ferns and 62 mosses are recorded. Many tree ferns have been removed for sale. The dumping of several cars in one of the collapses was little recompense. Also noteworthy are roots in ceilings of caves and sub-fossil bones found in Mt. Hamilton Cave.

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"March 99" graffiti, Skipton Cave.

When drawing up conservation strategies for lava caves, their present relationship with man-made features must be taken into account, such as windmill pumping from a cave pool at Skipton, and stone fences, such as on the Byaduk flow.

Man's impact may not always have been disastrous; the entrance to Panmure Cave was made more accessible by quarrying near the entrance collapse. However, in many areas, quarrying of scoria or cinders in the volcanic cones or quarrying the stone of the flows, poses problems to the general conservation of the volcanic features of the area.

Major pressures for the preservation of many of the volcanic features of the area have begun to yield fruit recently, with the declaration of the Mt. Napier area and the Byaduk Caves as a state park.

Some graffiti may be so old as to be worthy of preservation. Those in Skipton Cave date back to 1899.

In any management plan, first priority must be removal of unsightly (and smelly) rubbish. Often dead farm animals are included in the rubbish dumped.

Management may involve provision simply of access roads and signs, or included better facilities such as car parks and camping areas, with a ranger in attendance, and signposted walks, as at Mt. Eccles National Park. Some lava caves are easily opened for tourist inspection merely by provision of steps, and clearing roof-fall from the floor.

One cave on private land is run as a tourist cave, catering mainly to school bus parties. The owner collects an entrance fee, which is being saved with the idea of putting in lights and installing a toilet system. This is the cave with many graffiti, excavated rare minerals, lost insect fauna, and candle-wax on the floor.

Some caves are so remote they might just be left alone, such as the Undara lava tube system, Queensland. The owner of the property with several of these caves, who contracted histoplasmosis from the bats in the cave, has actively discouraged visitors to the caves, and opposes the entry of the caves on the Heritage Commission Register.

SUMMARY

We can generalize and say that limestone caves are generally evolving systems in which the caves may be increasing in size and number (although any one cave may be filling in by collapse or deposition of sediment). On the other hand, lava caves are decaying systems — if material is carried in or the roof collapses, if stalactites are damaged or removed, there is no replacement. In the short-term time-scale, probably on the human time-scale, such caves may be thought of as static, unchanging — most have been in existence, little altered, for several hundred to several thousand years. Human interference may speed change, however, and rapidly alter or infill a lava cave.

In many other ways, lava caves are like other caves, with problems of littering, problems of physical damage by collectors, by trampling, by developers installing lighting or steps or guide rails or signs; this in turn leading to alterations to cave temperature and ventilation, perhaps to alteration of cave water quality (even if it is only present as drips and puddles) because of farming practice nearby, waste disposal, tourist car parking and the leakage from toilets; finally, general problems arising from over-use or sometimes any use.

Our approach to these problems might be — in order of decreasing control — protection (e.g., gating), conservation by management, "open-go?" If we reject the latter approach, we might argue for at least some caves to be fully protected (even from speleologists, even from scientist-speleologists, perhaps?). However, in this discussion we should probably concentrate on the management of lava caves for the use of the spectrum of visitors ranging from family day-trippers to dedicated scientists from distant lands.

It might be useful to ask ourselves:

"Why do people decide to go to a cave?

"What do they hope to experience?"

"What do they actually experience?"

"Can this experience be varied, to their advantage, or to the cave's advantage?"

"Are there alternative or substitute experiences which could be made available?"

We cannot answer most of these questions without some survey of visitors and potential visitors. We might guess that people decide to visit lava caves for many reasons — they are visiting

Spider web behind lining, Skipton Cave.

a park or reserve and see a signpost or read a leaflet; they read about it on a map, tourist literature or popular semi-scientific literature (e.g., a geographical magazine); they are told about it by others who have been there; they go as a group with a leader (e.g., a school group, scout group, speleology club); they visit the cave again after one of the above.

They may be hoping for some sort of aesthetic experience (the quiet, the dark, a semi-claustrophobic thrill); the satisfaction of curiosity, scientific or otherwise; a social or group experience (e.g., young couple, family group, holidaying teenagers); just the satisfaction of having been (as with the T-shirt saying "I climbed Ayers Rock"); because everyone else is going; or perhaps they just see the queue at the entrance and join it.

They may actually be scared, experience real claustrophobia, panic part-way through a conducted tour on a one-way route, get wet or dirty, fall and sprain an ankle, cut their head in the dark, quarrel with their companions, be caught littering or breaking off stalactites.

Porndon Rubbish Cave.

We could arrange to vary the experience with lighting, steps, guide rails, a cave nature trail with markers, an official cave guide to lead tours, plus explanatory literature display boards, interpretive centers, extra features in the cave such as stuffed wombats or plastic bats, spot-lit statues of bush rangers, perhaps selections from the soundtrack of the film "2001."

We could arrange alternative experiences — a surface nature trail briefly entering or just looking into caves, as an audio-visual display, a strip through a simulated cave made of rocks, plastic and cardboard (especially suitable for the handicapped or elderly —or should they have a suitable cave developed for them?

Obviously, the conservation of lava caves requires more study. There are certain features of lava caves — their general rarity but sometimes local abundance; their nature as decaying systems; their ready accessibility and general suitability for the casual visitor which pose special problems.

Solutions may include:

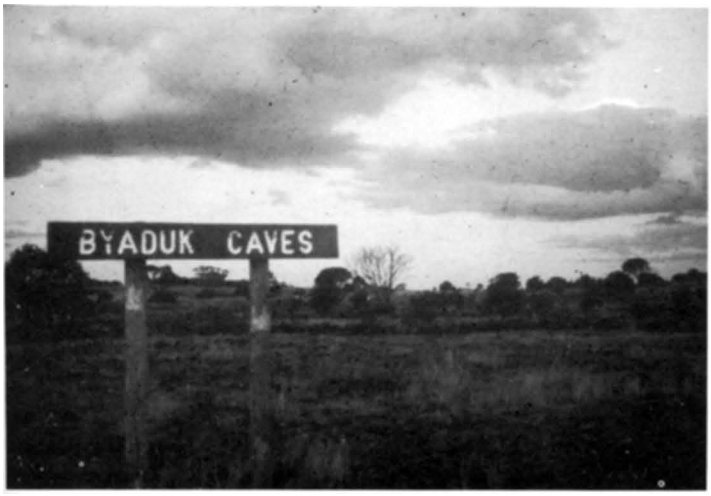
1. Complete protection of certain caves (such as those with fragile or scientifically-important features such as bat colonies or rare minerals) by gating, prohibiting access to the surrounding area, keeping the cave location generally as secret as possible.

2. Conservation of certain caves by proper management; relating caves to the general volcanic environment, so that they are seen as just one aspect of the young volcanic activity of the region; this may be best done in national parks established for this purpose.

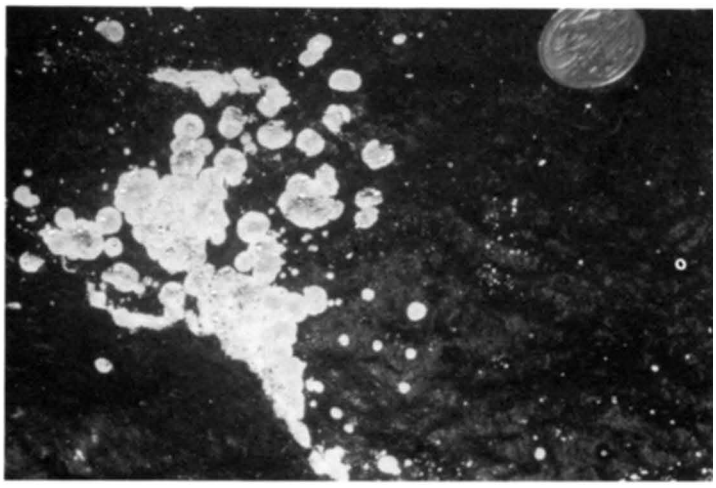
3. Perhaps one-access to certain caves (e.g., those with simple plans, no fragile features); if on private land, with the cooperation of the land owner; and as a means of reducing demand and assisting in the first two methods.

Recent moves in Australia for the entry of caves and similar features on the Register of the National Estate; the government-commissioned listing of sites of geological and geomorphological interest in each state; and moves toward increasing the numbers of national parks and similar reserves; all give some hope for the future. Comments are welcome.

(References not received)



Car park at Byaduk Caves.



Porndon Rubbish Cave.