



La Trobe University

DEPARTMENT OF
MATHEMATICS

H. A. COHEN

"THE SCIENTIFIC CASE FOR THE CONSERVATION OF
THE BYADUK LAVA CAVES AND ENVIRONS"

MELBOURNE, AUSTRALIA

This paper was presented at the Tenth Biennial Conference of the Australian Speological Federation, Sydney, December 1972, and will appear in the Proceedings when published.

There are three lava flows from Mt. Naglar, a recently dormant volcano 25 km. south of Ballarat in Western Victoria. The Harman Valley lava flow possesses a number of notable geological features whilst providing an unusual environment with a distinctive and peculiar flora. In this paper, those features, which establish the Harman Valley Lava Flow as of high scientific interest shall be described, and the conservation problems posed by this region shall be discussed.

The Western plains of Victoria form (according to Miller) the third largest lava plain in the world. Dramatic though this sounds, this entails a generally dull volcanic landscape (originally as the original bush cover has been removed) with high winds blowing in the form of fairly numerous cones where lava was erupted. The rich farming lands on their surface are a stark contrast to the surrounding area.

H. A. COHEN

**"THE SCIENTIFIC CASE FOR THE CONSERVATION OF
THE BYADUK LAVA CAVES AND ENVIRONS"**

However the Harman Valley flow is (like other recent flows) a marked feature - being a rocky belt 200 metres or more wide, "flowing" between banks of forested benches from the heavily wooded slopes of Mt. Naglar. The volcanic flow features are most dramatic at the sharp double curves where the West-Sea-Dunkeld road crosses: there are banked pressure ridges on the curves, some 3-10 metres high from trough to crest. One mile upstream from this point there is a generally flatter region of flow punctuated with 11 large hollows, commonly referred to as the Byaduk Lava Caves. These hollows are up to 40 metres

"THE SCIENTIFIC CASE FOR THE CONSERVATION OF
THE BYADUK LAVA CAVES AND ENVIRONS"

[Paper presented to the 10th Biennial Conference of the Australian Speleological Federation, Sydney, December 1972.]

There are three lava flows from Mt. Napier, a recently dormant volcano 25 km. south of Hamilton in Western Victoria. The Harman Valley lava flow possesses a number of notable geological features whilst providing an unusual environment with a distinctive and prolific flora. In this paper, those features, which establish the Harman Valley Lava Flow as of high scientific interest shall be described, and the conservation problems posed by this region shall be discussed.

The Western plains of Victoria form (according to Ollier) the third largest lava plain in the world. Dramatic though this sounds, this entails a generally dull undulating landscape (especially as the original bush cover has been removed) with high relief coming in the form of the fairly numerous cones where lava was vented. The rich farming lands on their surface show little sign of their fiery past. However the Harman Valley flow is (like other recent flows) a marked feature - being a rocky belt 200 metres or more wide, "flowing" between banks of verdant pastures from the heavily wooded slopes of Mt. Napier. The viscous flow features are most dramatic at the sharp double curves where the Hamilton-Dunkeld road crosses: there are banked pressure ridges on the curves, some 5-10 metres high from trough to peak. One mile upstream from this point there is a generally flatter region of flow pockmarked with 12 large dolines, commonly referred to as the Byaduk Lava Caves. These dolines are up to 60 metres

long, 30 metres across, 20 metres deep, and the case of 5 pairs of dolines are joined by short passages of commodious size - the roof of these passages being sometimes only 3 metres thick. The caves connected to the larger doline are 20-100 metres long, and possess a profile which supports the theory that they represent tubes in which hot lava flowed through laid and cooled lava - the dolines being formed by roof collapse. In addition some rather more constrictive passages link other dolines, and it seems possible that there is a complex honeycomb of narrow passages through the basalt blocks - as instanced by a cave "Blood Cave" recently found by the writer. The Byaduk caves boast small scale decoration in the form of bubbly flow surfaces and lava stalactites, but the striking aspect of these caves is the lush and dense vegetation in the dolines. The other surface feature of the Harman flow of special note is the "Pinnacles" region some miles down flow from the Byaduk Caves. Here on a level plane there are some thirty lava "tumicles" or "blisters" - referred to locally as pinnacles. These tumicles apparently were formed as hemispherical gas filled bubbles on the hot flowing lava surface, and cooled in this form, and subsequently collapsed, leaving rubble piles about 5 metres high, 10 metres in diameter. There are also some mysterious cracks in the ground nearby.

The flora of the Harman Valley flow is most remarkable. The dolines are lush with tree ferns, mosses, lichen and liverwort - species usually found only in deep ferny valleys in the midst of rainforest. To single out the mosses for special discussion: there are 283 species of mosses known in Victoria of which 83 have been collected at Byaduk - one species "Anoetangium Bellii" is unknown elsewhere. A similar picture prevails with regard to the other phylum mentioned. Although specimens of alien plants

have been collected, predominantly the original flora remains.

The Pinnacles area is consistently waterlogged through winter and is very rich in a group of the liverwort family - the genus *Riccia*. In the natural ponds in this area may be found fresh water algae of special interest: *Characia Nittela* which has a somewhat cactus-like appearance being in the form of little trees up to 25 cm. high.

The caves support a sizeable bat population identified as the bent winged bat (*Miniopteris schreibersii*), there being guano deposits on many ledges in the dolines with many beetle shells (including *Ptinus tectus*) in the black gummy mass. Bats banded at the Naracoorte and Warrnambool maternity sites have been sighted at Byaduk - so that Byaduk is a point of intersection of the distinct populations. An extensive range of birds have been sighted at the caves, in particular parrots and birds of prey. Currently rabbits abound. The dolines have served in the past as traps for marsupials leading to extensive fossil deposits which have included bones of the Tasmanian tiger (*Thylacine*).

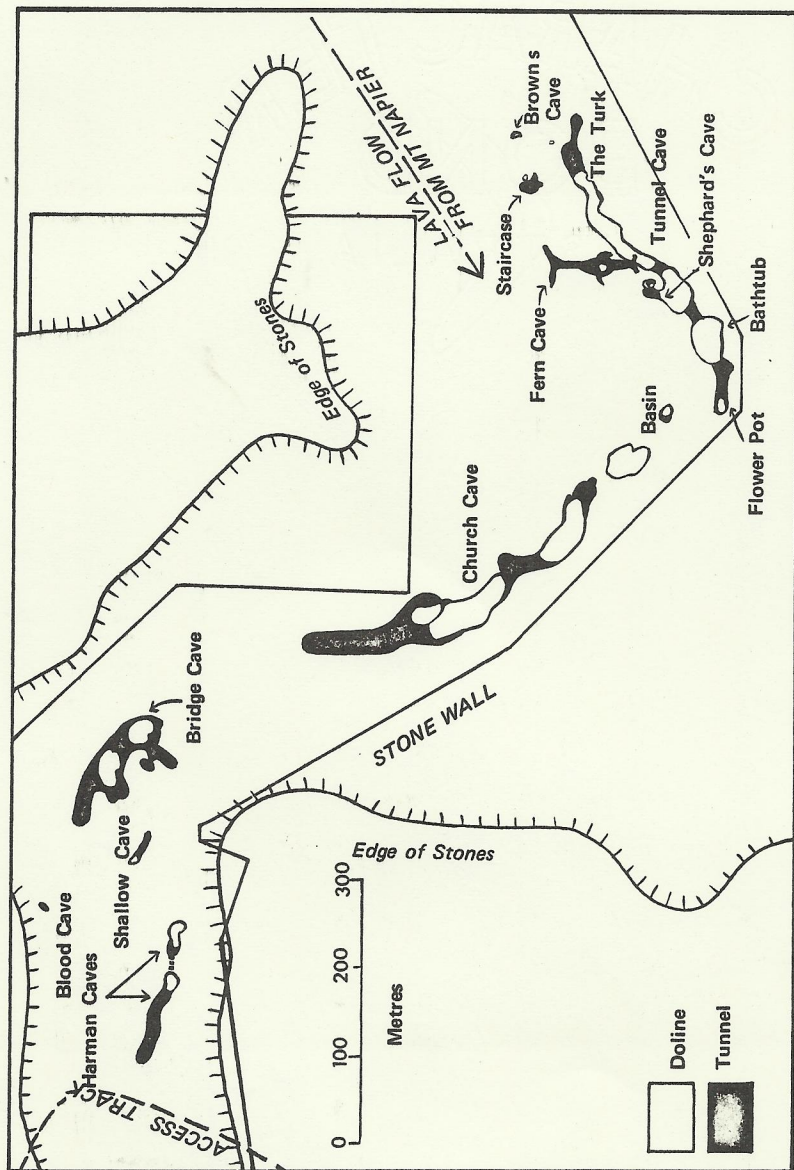
The rough rocky surface and lack of grasses makes the Harman Valley Flow of small economic value for grazing or other rural pursuits. However enterpid florists have ravaged the dolines in the past, cutting down the giant tree ferns: 6 metre long trunks of *Dicksonia Antarctica* lie in several dolines, only young trees remain. Two cars have been dumped in Church Cave. Only 200 metres from the Pinnacles a sizeable used car dump has been established since 1971.

Almost all the known caves are in Crown Land. The Pinnacles are

also on Crown Land over which a grazing licence has been granted. Such licences preclude quarrying which in any case is not likely in view of the major quarry in Mt. Hamilton. (It is worthy of note that this quarry is not visible from the Harman Valley Flow.) The features mentioned have been protected in the past by lack of publicity: the Byaduk caves are not sign-posted, and neither are the Pinnacles. However more positive measures of protection need to be taken, or we may see such spectacles as the Pinnacles being bulldozed flat to make room for more wrecked cars.

REFERENCES

- BEAUGLEHOLE, A.C. & LEARMONTH, N.F. (1957) The Byaduk Caves. Vic.Nat.73: 204-10
- HAMILTON-SMITH, E. (1965) Distribution of Cave Dwelling Bats in Victoria. Vic.Nat. 82(5): 132-137.
- (1970) The Bat Population of the Naracoorte Caves Area, in A. Goede (Editor): Proceedings of the Eighth Biennial Conference of the Australian Speleological Federation, December, (1970), 66-75.
- OLLIER, C.D. (1963) The Lava Caves of Victoria. Helictite 1: 69-77.
- OLLIER, C.D. (1964) Tumuli and Lava Blisters of Victoria. Nature 202: 1284-6.
- OLLIER, C.D. & BROWN, M.C. (1965) Lava Caves of Victoria. Bulletin Vulcanologique 28: 1-15.
- OLLIER, C.D. & BROWN, M.C. (1964b) The Byaduk Lava Caves. Vic.Nat.80(9): 279-290.
- OLLIER, C.D. & JOYCE, E.B. (1964) Volcanic Physiography of the Western Planes of Victoria. Proc.Roy.Soc.Vic. 77: 357-376.
- SELWYN, R.C. (1860) Notes on the Geology of Victoria. Quart. J.Geol.Soc.London: 145-150.
- SKEATS, E.W. & JAMES, A.V.G. (1937) Basaltic Barriers and other Surface Features of the Newer Basalts of Western Victoria. Proc.Roy.Soc.Vic. 49: 245-292.



MAP OF BYADUK CAVES AREA