SOUTHERN CAVER

Southern Tasmanian Caverneers

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In this issue:
The H.E.C.'s 1983
SW cave surveys

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Editorial

Even before the Hydro-Electric Commission's 1977 announcement of its plans to build another dam on the Gordon River and a dam on the Franklin River, concerned Tasmanians had been aware that this part of our natural heritage was under threat of inundation. In February 1974, Kevin Kiernan, Bob Hawkins and the editor ran their first expedition to the Gordon and Franklin rivers looking for caves. This was followed by others in Dec. 1974, Feb. 1976, Jan. 1977, Feb. 1978 and a number of archaeological expeditions thereafter. The purpose of these trips was to try to find caves that might help to bolster the case for conservation of the area. Many caves were found but by far the most significant turned out to be "Fraser Cave" (officially renamed Kutikina in 1982), found by Kevin on 13 Jan. 1977. It was on a later visit to the cave, in Feb. 1981, that Kevin recognised that some of the stones in a bone deposit we had recorded had actually been worked and that many of the bones had been burnt. Subsequent investigations of the site revealed one of the richest Aboriginal occupation sites ever found in Australia and dated it between 14k and 20k years BP.

This resulted in a great deal of publicity for Fraser Cave, especially following publication of a paper in *Nature* by Kiernan, Jones and Ranson in Jan. 1983 which announced its significance to the world. At the time there was a High Court challenge underway by the Tasmanian government against the Federal (Hawke) government's proclamation of regulations to prohibit the building of dams in the World Heritage Area. The Tasmanian government reasoned that the cave could strengthen the Commonwealth's case but the importance of Kutikina could possibly be reduced by the finding of other similar cave sites *outside* the area planned to be inundated. Who should conduct such a search but the HEC? Contemporary reports on plans for a cave search are reproduced here to provide background to the HEC reports reprinted in this issue.

As the contemporary reports indicate, a deal of hypocrisy and misinformation surrounded the search, which took place in May 1983. It is worthy of note that no archaeologist in Australia was prepared to take part so the HEC sent out its own geologists and contracted field workers to carry out the searches. While a number of caves with archaeological potential were located, even the HEC didn't claim that they had found anything to rival Kutikina and it never sought to follow up the search with archaeological investigations (though investigations were later undertaken by Jones, Allen, Cosgrove and others).

In the reports reprinted here, detailed location information has been omitted in accordance with normal speleological practice in Australia.

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STC
Southern Tasmanian Caverneers

Southern Caver

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Cover photo:

Two HEC employees or contractors explore a cave they designated Acheron Cave 1/2 on the Acheron River, a tributary of the Franklin in South-West Tasmania. The HEC subsequently named it Cardia Cave and suggested it had "a long and complicated occupation history". Photographer: Unknown

STC was formed by amalgamation of the Tasmanian Caverneering Club, Southern Caving Society and Tasmanian Cave and Karst Research Group in 1996.
It is the modern variant of the oldest caving club in Australia (TCC), formed in 1946.

BACKGROUND - CONTEMPORARY PRESS REPORTS

Some press reports relating to the H.E.C. cave search in 1983 are reproduced here to provide contemporary background to this unique venture into cave searching by the then extremely influential Tasmanian electricity investigation, construction, distribution, sales and promotion authority.

Search for more caves

Anon. 1983 The Examiner [Launceston] 27 April 1983

The State Government is attempting to locate more caves in Tasmania's South-West.

The Minister for National Parks and Wildlife, Mr Pearsall, said yesterday that the government was conscious of the geological and tourism value of many of the State's caves.

A continued effort was needed to protect existing sites as well as to locate new ones.

The Government had agreed to continue funding projects which involve speleological research in Tasmania.

Sources believe that the State Government is concerned that the existence of two Aboriginal caves in the Gordon-below-Franklin Dam site area could sway a High Court decision in favour of the Federal Government.

Last week the Federal Government strengthened its external affairs case for intervening to stop construction of the dam with legislation which makes use of wider constitutional powers such as those relating to protecting of racial minorities, trade and commerce.

The race powers are relevant to the Franklin dam case because of the discovery of the Kutikina and Deena-reena Aboriginal caves, which prove that Aborigines lived in the area during the ice age 20,000 to 30,000 years ago.

Mr Pearsall said efforts were underway to locate further cave formations in the largely unexplored South-West so that they would become accessible as the area was opened up.

The search for caves, which have the potential to become tourist attractions like the Mole Creek and Hastings Caves, is being spearheaded by the National Parks and Wildlife Service.

[This report contains a number of blatent falsehoods.]

Tasmanians search for more caves

Simon Balderstone. 1983 *The Age* [Melbourne] 29 April 1983

Canberra. – The Tasmanian Government has begun an urgent search for more archaeological deposits in caves in south-west Tasmania to bolster its High Court challenge against Commonwealth regulations stopping the Gordon-below-Franklin Dam.

Hydro-Electric Commission workers, including track cutters with chainsaws, have been sent into limestone areas of the World Heritage area of south-west Tasmania to try to find caves.

Tasmania believes discovery of archaeologically rich caves outside the area to be flooded by the dam will lessen the uniqueness and importance of the rich Kutikina and Deena Rena caves on the Franklin River and reduce the argument to save them.

These two caves, which prehistorians say are two of the richest and most significant in the world, show the area was inhabited more than 20,000 years ago, at the height of the ice age.

The team of lawyers working on Tasmania's case for the High Court challenge, which will probably be heard at the end of May, has told the Government and the HEC that more caves must be found.

If any caves are located Tasmanian national parks offices will be flown in to study them for archaeological significance.

Prehistorians are concerned that irreparable damage could be done to any caves by HEC workers with no experience or knowledge of such matters. Even walking in such caves could destroy many archaeological invaluable objects.

They argue that if more caves are found, the area would be even more in need of complete preservation and would result in an even stronger argument for stopping the dam.

A Tasmanian Labor senator, Senator Coates, said yesterday that the search was a perversion of environmental impact procedures because it was being concentrated in areas not due to be flooded.

"They are deliberately not looking where it would be important to discover further sites," he said.

"You can imagine the damage which will be caused to the environment by an army of people determined to find a cave by the end of May."

On Wednesday, the Tasmanian Minister for National Parks and Recreational Lands, Mr Pearsall, issued a statement saying the government was conscious of the geological and tourist value of many of the State's caves, and a continued effort was needed to protect existing sites as well is locate new ones.

Mr Pearsall said efforts were underway to locate further cave formations in the south-west so that they would become accessible during the opening up of the area.

Caves search hypocrisy

Anon. 1983 *The Examiner* [Launceston] 30 April 1983, p. 14

The State Government is guilty of blatant hypocrisy over its attempts to find more caves in the South-West, Senator Coates (Lab.) said yesterday. Senator Coates was commenting on a State Government announcement that the National Parks and Wild-

life Service was searching for more caves in Tasmania because of their geological and tourist value.
"It is not a genuine attempt to improve the archaeological knowledge about the South-West nor its tourism potential," he said.
Senator Coates said it was now clear that the frantic search for caves had been inspired by lawyers acting for the State Government.
Sources believe the State Government is concerned that the existence of two Aboriginal caves in the area to be flooded by the dam could sway the High Court decision in favour of the Federal Government.
"The only concern of the State Government is to downgrade the importance of the Kutikina and Deena-Reena Aboriginal caves which are to be flooded by the Gordon-below-Franklin dam," Senator Coates said.
A spokesman for the HEC yesterday confirmed that it had been involved in talks with the NPWS concerning a search in the South-West for new caves.
However no decision had yet been made about active involvement by the HEC.

Search for prehistory sites alarms experts

Allen, Jim 1983 *The Age* [Melbourne] (Letter to the Editor), 5 May 1983, p. 12

The Australian Archaeological Association is alarmed to learn that the Tasmanian Government will, over the next four weeks, institute a wholesale invasion of the Tasmanian countryside in an effort to locate caves containing archaeological deposits.
Leaving aside the political cynicism of this endeavour, which totally contradicts the Tasmanian Government's previous refusals to implement archaeological impact monitoring of the works already undertaken in the Franklin-Gordon region, where there seems to be a case that already some damage has been done to archaeological sites, this association wishes to make the following observation. Archaeologically untrained "cave-finders" are likely to damage sites, without recognising that they contain archaeological deposits.
That since the import of this mission is to find sites comparable to Kutikina and Deena Reena, the Tasmanian Government is likely to condone the disturbance of deposits in order to obtain sample for radiocarbon dating. Such disturbance will not only be wanton vandalism but will also require, under the Act, permission to excavate a known archaeological site. While this permission will likely be given by the Tasmanian Minister for National Parks and Wildlife, such permission will be contrary to the spirit of an act designed to protect such sites.
Should such sites be found they will strengthen the scientific importance of the archaeological sites already located along the Franklin, since the range of information about the distant past that can be gathered from a number of sites both broadens and clarifies the information that can be gained from two or three.
This association believes that the past helps to inform the present. The Tasmanian Premier's earliest predecessor, Governor Arthur, initiated the "Black Line" to round up the Tasmanian Aborigines and eventually caught one old man and child. For the sake of the world cultural heritage in Tasmania we are left to hope that this new "Black Line"will meet with similar success.

Dr J. Allen
Canberra, ACT

HEC finds more caves Outside area to be flooded

Anon. 1983 *The Mercury* [Hobart] 2 June 1983, p. 3

A Hydro-Electric Commission team of geologists has found 20 caves, claimed to be of archaeological significance, in widely separated areas of the South-West conservation area.
In a statement yesterday, the Commissioner of the HEC, Mr J.R. Ashton, said the "shelter sites" were outside the flood zone of the Gordon-below-Franklin Power scheme, and included Peuniak Cave at New River, Nanwoon Cave in the Florentine Valley, Lugra Cave on the Andrew River and Cardia Cave in the Acheron River Valley.
Of these caves, Lugra Cave would be flooded in any further stage of the Franklin integrated power scheme.
The HEC's month-long search in May for archaeological sites was done by commission geologists who, with bushman and surveyors, were flown by helicopter into the South-West.
A commission spokesman last night confirmed that although the HEC had consulted the National Parks and Wildlife Service on the hunt, it did not engage the NPWS staff archaeologist, Mr Don Ranson, who had been involved in investigating Kutikina Cave on the Franklin River.
The HEC also drew on the findings of Tasmanian geomorphologist, Mr Kevin Kiernan, of Hobart, who discovered and subsequently researched the Kutikina Cave, but did not seek Mr Kiernan's participation in the search.
The HEC neither indicated what material had been discovered in the 20 caves nor who would be engaged to investigate the finds.
No archaeological material was removed from sites.
Mr Ashton said the HEC would arrange soon for "professional archaeologists" to examine the sites.
Mr Kiernan, a doctoral student at the University of Tasmania, said last night the HEC should engage for confirmation of the sites those archaeologists whose personal involvement in the Franklin River discoveries would enable objective comparison of the sites, and establish credibility in any comment on the value of the sites.
He said he was surprised that so few sites had been located in karst areas generally riddled with limestone caves.
He said several factors, such as richness of artefacts, age and relevance to the ice-age would need to be considered.
HEC spokesmen last night were unable to give the cost of the survey.

HYDRO-ELECTRIC COMMISSION

OF

TASMANIA

GORDON RIVER POWER DEVELOPMENT - STAGE 2

CAVE SURVEY

GEOLOGICAL REPORT NO. 644-94-23

by

S.J. Paterson, R. Underwood, R.K. Tarvydas, D.R. Wilson & F.J. Baynes

MAY, 1983.

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1 App. 1. not reproduced in this reprint. App. 2 to 4 were not published with this report but have been included in this reprint, though repeated elements such as some plans and photographs have been omitted.

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SUMMARY

A cave search was undertaken in May 1983 to locate archaeologically significant caves in southwest Tasmania outside the reservoir area of the Gordon River Power Development Stage 2.

Five caves in widely separated areas containing material considered to be archaeologically significant were located, four of these caves being previously unknown. The archaeological evidence in the caves includes large quantities of bones and teeth, split and burnt bones, charcoal fragments, stone artifacts and in one cave a flake of Darwin glass. The similarity in content and present day environment of these caves to the Franklin River caves suggests a similar age and origin. An additional fifteen caves considered to be of possible archaeological significance were located and await inspection by an archaeologist.

The widespread distribution of cave forming rock formations in southwest Tasmania indicates a large potential for cave sites. This search indicates that archaeologically significant cave sites may be located by searching these areas. It is concluded that caves of similar archaeological significance to the Franklin River caves exist outside the proposed reservoir area throughout the southwest.

I INTRODUCTION

Depositions to the High Court of Australia state that the archaeological finds within the Franklin and Gordon valleys are unique, and that similar finds are unlikely to be found outside the reservoir area. To test these statements and assess the objectivity of the depositions an investigation was carried out. The investigation consisted of three parts:

1. A site survey of caves within the reservoir area that are designated as containing material of archaeological interest.
2. An office study of the literature of known caves, potentially cavernous areas and archaeological sites throughout southwest Tasmania.
3. A field reconnaissance of potentially cavernous areas outside the reservoir area of Gordon River Power Development Stage 2. The aim of this reconnaissance was to locate caves containing material of archaeological interest. The field work was carried out during a two week field period in May, 1983.

II ARCHAEOLOGICAL CONTEXT

Archaeological studies in Tasmania have established that Pleistocene (Ice Age) man was a hunter and fisher who inhabited caves and rock shelters. Four significant caves recording early occupation have been reported and are listed in Table 1.

TABLE 1 PLEISTOCENE CAVE SITES

Location	Age in Years BP Radiocarbon Dates (Flood, 1983 & Harris, in press)
Cave Bay Cave, Hunter Island	22 750 ± 420
Beginners Luck Cave, Florentine Valley	20 650 ± 1 790
Kutikina (Fraser) Cave, Franklin Valley	19 750 ± 840 to 14 840 ± 930
Deenareena Cave, Franklin Valley	c. 20 000

These age determinations suggest that the caves were inhabited at the beginning of the last cold phase of the last glaciation. At that time sea level had dropped over 65 m below the modern level as a result of an expansion of polar ice and a build up of continental glaciers. This drop in sea level provided a land-bridge connecting Tasmania with mainland Australia.

Southwest Tasmania has a rugged landscape composed of a series of arcuate, parallel strike ridges and deep, broad valleys. In this part of Tasmania glaciation during the last cold phase was restricted to small cirque and valley glaciers that were only well developed on the eastward-facing sides of high ridges (Peterson, 1968). The climate was markedly colder and drier than at present and the land surface was largely devoid of trees (Macphail, 1979), with the lowlands covered by grasslands or sclerophyll heath and sedgelands (Macphail, 1975). The situa-

tion changed at c. 11 500 yr BP when rising temperature and an increase in precipitation resulted in an expansion of eucalyptus and other trees across Tasmania (Macphail, 1979) producing the inhospitable rainforest of today.

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During the period between the earliest recorded occupation at the Cave Bay site and the climatic change around c. 11 500 yr BP, the broad valley plains of the southwest are thought to have provided bountiful hunting grounds for the aboriginal population. Under these conditions valley access would have been excellent and cave locations obvious. The presence of wildlife is indicated by the finds of animal bones in the caves of the Franklin and Florentine valleys.

The subsequent expansion of the rainforest rendered the area uninhabitable, and may have ensured that the sites occupied by hunting parties remained untouched.

III PREVIOUS ARCHAEOLOGICAL INVESTIGATIONS

Investigation of the archaeological features of the Lower Gordon were included in the original brief for the Lower Gordon Scientific Survey. A literature search and preliminary discussions with officers of the Tasmanian Museum in 1974 produced little indication of pre-history possibilities. The Museum's archaeologist R. Vanderwal advised the Commission that in his opinion aboriginal occupation of the area had been restricted to the coastal fringes, and that there was little hope of finding remains in the Lower Gordon study area. This opinion was consistent with the views published by Jones (1974) at that time.

In the summer of 1978-79 the Museum's archaeologist Dr. Murray was invited to join the Scientific Survey, but the invitation was not accepted. The Commission completed its cave survey in 1979 and the results were published in *Land Use, Resources and Special Features of the Lower Gordon Region,* 1979. This report contained the statement that "Nothing of archaeological significance has yet been found in any of the caves" (Naqvi, 1979)[2].

During the following summer the Labor Government announced a moratorium on any further Hydro-Electric Commission investigation of the Lower Gordon area. This moratorium did not apply to the National Parks and Wildlife Service, to Dr. Rhys Jones or to 'private' investigators such as Middleton, Kiernan *et alia* who engaged in field studies within the proposed reservoir area. Their findings are now being used to

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attempt to stop development by asserting that the Lower Gordon Dam is a threat to the archaeological resources of the area.

The proposed development has clearly stimulated archaeological interest, though no known attempt has been made by professional archaeologists to extend their activities to explore the remainder of the vast potentially rewarding Southwest. The comment by Harris (1981) summarises the situation: "Until the last couple of years a vast core of the southwest produced no archaeological evidence for prehistoric man. On the other hand, no-one had seriously looked for it".

IV CAVE FORMING ROCK FORMATIONS

The distribution of the potentially cave forming rock formations is shown on Fig. 1. The dominant rock types are the limestones and dolomites of Precambrian, Ordovician and Devonian age. They are widely distributed throughout the western half of the State. In addition, a vast number of caves and shelters exist around the coastline and through the Midlands where they are developed in sandstone formations. The archaeologically significant cave at Cave Bay on Hunter Island is an example of such a cave.

V LITERATURE SEARCH

The main sources of published information are listed below:

1. Literature and references from the previous H.E.C. caves study (Naqvi, 1979).
2. The references quoted by Kiernan, 1979, (*Journal Sydney Speleological Soc.*

2 This report was reprinted in *Southern Caver,* No. 64 (Dec. 2008).

Vol. 23, No.8).

3. Cave lists in Goede (1978) & Matthews (1979).

4. The National Parks and Wildlife card system of archaeological sites, Harris (in press) and Kenneally (1980) provided information on the caves and rock shelters shown in Fig. 2. Altogether, the N.P.W.S. register has 1839 archaeological sites, including middens, stone alignments, rock engravings, rock paintings, artifact scatters and quarries. According to N.P.W.S. officers these records probably represent only a very small portion of the total number of sites used by aboriginal man. Most of these sites are of Holocene (i.e.

< 10 000 years old) age, and only four sites have published Pleistocene ages.

5. Items in “Southern Caver”, the “Australian Speleological Federation Newsletter” and “Wilderness” published after 1978.

6. New information resulting from the current search for caves by the H.E.C.

The literature search revealed records of over 1 000 caves, the locations of which are shown on Fig. 2. The Tasmanian Archaeological Site Register lists 85 caves as containing archaeological material. The general impression gained from the literature review is that only a small proportion of known cave sites have been archaeologically investigated, an impression confirmed in talks with N.P.W.S. officers and other interested parties. As a specific example, of the 335 known caves in the Florentine Valley, only about 20 have been seen by archaeologists.

VI RESULTS OF CAVE SEARCH

The search for caves was carried out in three areas, the New [sic: New River] valley, the Florentine valley and in the area around the Lower Gordon Scheme. Reports detailing the field work are listed as Appendices 2, 3, and 4 and are retained in Geological Section records.

1. Major Cave Finds - Caves Containing Archaeological Material

The caves listed in Table II and shown on Fig. 1, are considered to have a significant archaeological content: that is to contain significant quantities of bones, stone flakes or charcoal in a context that suggests human habitation at some time in the past. They are considered to be worthy of detailed archaeological study.

Most of these sites were located with difficulty in areas now largely covered by forest. Given that the inland area was abandoned as a habitat about 15 000 years ago (Kiernan *et al,* 1983) following upon the change in vegetative cover that occurred at the end of the last glacial phase (Macphail, 1975 and 1979), it is reasonable to assume that the evidence of habitation contained in the caves represents the same period as that covered by the Franklin caves. Radiocarbon dating undertaken as part of a detailed study of the sites should provide a definite time base.

2. Caves Worthy of Archaeological Inspection

Table III lists caves considered to be worthy of archaeological inspection. Caves in this category appear to be suitable for habitation and contain floor deposits which may prove to be archaeologically significant after detailed investigation and excavation.

3. Survey of Known Caves of Archaeological Significance in the Franklin Valley

Table IV lists survey data of archaeologically significant caves in the Franklin valley. Locations were indicated in the field by officers of the National Parks and Wildlife Service. The locations are shown on Fig. 7.

VII COMMENTS ON SUBMISSIONS TO THE HIGH COURT OF AUSTRALIA

The submissions to the High Court of Australia contain aberrations.

1. Archaeological Sites in Southwest Tasmania Outside the Reservoir Area

The declaration by Rhys Maengwyn Jones, C6 of 18th April, 1983 contains the following statement on p.10, at para. 12:

> *It is most unlikely that sites providing material of comparable archaeological value will be found in south west Tasmania outside these (lower Franklin and middle Gordon valleys) limestone belts.*

This statement is repeated in essence in the supplementary document DJM1 of Derek John Mulvaney of the 18th April, 1983.

The results of our cave search clearly suggest that this statement is incorrect.

The situation with respect to the further potential of the southwest for archaeological research is obviously appreciated by the Canberra based archaeologist Flood (1983) who states on p.107:

> *Fraser Cave is not unique. Already several other ice age occupation sites have been discovered in the 100 square kilometres of previously unexplored limestone country in the region.*

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This theme is repeated by this author on p. 126:

> *Many more rock art sites will probably be found in Tasmania in the future, especially along the remote south-western coast, much of which has not been explored by white people, and certainly not by an archaeologist.*

2. Comparison with Famous Caves

The submission by Derek John Mulvaney DJM2 of 18th April, 1983,contains a letter to the Secretary, Senate Select Committee on South West Tasmania of 7th December, 1981, which in discussing the caves of the Franklin Valley Limestone states on page 5 paragraph (e)

> *The region promises to be a veritable laboratory for research into the society of early Homo sapiens, no less than the upper Palaeolithic sites in the Vezere valley in the French Dordogne, has proved for studies of European cultural origins.*

In comparing the Franklin caves with the famous French caves there is a danger of being misled unless the different types of evidence are distinguished. The archeological features include stone artifacts and flakes, cave art, animal remains and traces of fire.

The caves of the Dordogne, the Lascaux Caves (Windels, 1949), are notable in that they contain remarkably few stone implements and animal remains. They are famous for the magnificent examples of prehistoric art they contain (Baitalle n.d.), with paintings and engravings of some 98 animals together with numerous vestiges of animals. The paintings are in colours that are fine and clear and still vivid after some 20 000 years. By contrast, the Franklin River caves contain no known art but merely record occupation by hunting parties. The only known example of a cave in Tasmania containing aboriginal art is on High Rocky Point on the southwest coast (Sims, 1977) where the dominant motif is a fish-like figure.

VIII DISCUSSION AND CONCLUSIONS

1. Archaeological investigations in the Lower Gordon area to date have been by groups or individuals who, for logistical, motivational and other reasons, have concentrated on the proposed storage area to the almost total exclusion of other potentially fruitful areas of search.

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   It follows that statements or allusions to the uniqueness of the Franklin River sites cannot be considered to be objective scientific assessments.

2. Over one thousand caves are known in the extensive potentially cavernous formations, and in the coastal and midland sandstone formations of Tasmania. The inaccessibility and dense vegetation cover of the southwest suggests that

there is potential for discovery of many more caves. Only a small proportion of the known cave sites have been archaeologically investigated. The situation has been summarised by Flood (1983) who concluded that many more occupational and rock art sites remain to be discovered in the southwest.

3. During a brief search four new caves which appear to have significant archaeological content of similar age to the Franklin sites were located outside the proposed storage in widely separated areas. These sites have yet to be investigated by an archaeologist, however, this new evidence clearly demolishes the argument of Jones and Mulvaney that new archaeological finds outside the Franklin and Gordon River limestone belt are unlikely. In fact it demonstrates that caves of comparable archaeological value may rather easily be found outside the proposed storage.

4. Outside the reservoir area, a further fifteen cave sites widely dispersed and of potential archaeological interest, await inspection.

5. It is concluded that the archaeological submissions to the High Court of Australia contain material that lacks scientific objectivity, are misleading and, as a result of this cave search, is factually incorrect.

6. Clearly much could be achieved by an interdisciplinary approach in a spirit of goodwill with a less rigid approach towards preservation of relics.

TABLE II
CAVES CONTAINING ARCHAEOLOGICAL MATERIAL

Field Name *Assigned Name* *Location* *Map Sheet (1:100 000)* *and GR [omitted]*	*Environment*	*Aspect & Size* *Height x Width x Length* *(Metres)*	*Nature of Cave Deposit*
Acheron 1/2 Cardia Acheron River Valley [-]	Entrance at SL 172 m; broad valley in pre-Cambrian dolomite.	North-easterly; central cave 5 x 5 x 10-15 Subsidiary caves: A 4 x 1-4 x 15 B 1 x 1 x 7 C 5 x 1-3 x 20 D 2 x 15 x 5 See Fig. 3 and Plates 1 to 5.	1. Charcoal flecked brown clay at hearth site (?) in central cave. 2. Midden (?) with charcoal flecks, bone fragments and stone artifacts (?) in subsidiary cave A. 3. 300 mm thick deposit of bones and limestone fragments with charcoal blebs in subsidiary cave D.
Andrew 2/1 Lugra Andrew River Valley [-]	Entrance at SL 100 m; broad valley in Ordovician Gordon Limestone.	Easterly; 1-3 x 3-6 x 20. Entrance nearly completely blocked. See Fig. 4, and Plates 6 & 7.	Midden containing numerous bones and charcoal fragments and some stone artifacts including a flake of Darwin glass. Midden extends over 30 m^2 and is at least 0.5 m thick, possibly up to 2.5m thick.
Florentine G16-1 Nanwoon Florentine Valley [-]	Entrance at SL 400 m; broad flat valley in Ordovician Limestone.	North-easterly; extent of cave unknown Area of deposits 6 m^2. See Fig. 5 and Plates 8 & 9.	Numerous bones and some teeth in cemented breccia beneath flowstone near entrance exposed by recent erosions. Many bones in entrance mound of unknown depth.
Nelson G3-2 Nelson River Cave Nelson River Valley [-]	Entrance at SL 240 m; flat valley in Ordovician limestone.	North-easterly; 10 x 15 x 15. See Fig. 6 and Plates 11 & 12.	Bones occur in upper horizons of Clay deposit overlain by cave breccia, in south section of entrance chamber. Deposit has been eroded by cave stream causing slumping of clay and breccia. Area of slumped deposit 10 x 15 m.

TABLE II (Cont'd)
CAVES CONTAINING ARCHAEOLOGICAL MATERIAL

Field Name *Assigned Name* *Location* *Map Sheet (1:100 000)* *and Grid Reference*	*Environment*	*Aspect & Size* *Height x Width x Length* *(Metres)*	*Nature of Cave Deposit*
New River 1 Peuniak New River Valley [-]	Entrance at SL 20 m; broad coastal valley in Ordovician Limestone.	North-westerly; 3 x 1.5 x 2. See Fig. 1 and Plates 13 to 16.	An entrance mound is present. Cave deposits contain charcoal, terrestrial gastropods and occasional (?) teeth. Smoke on roof.

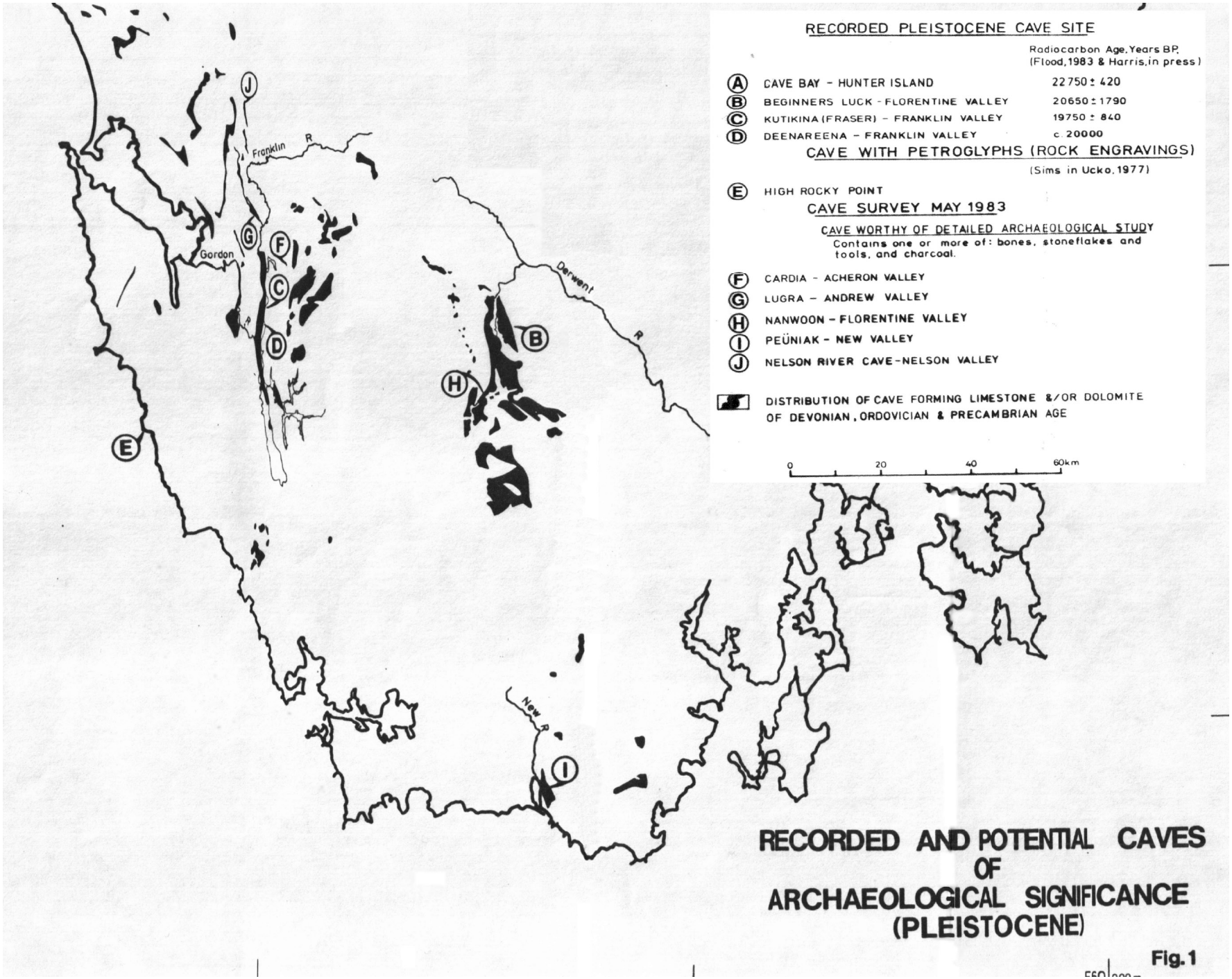

RECORDED PLEISTOCENE CAVE SITE
Radiocarbon Age, Years BP.
(Flood, 1983 & Harris, in press)
A CAVE BAY - HUNTER ISLAND 22750 ± 420
B BEGINNERS LUCK - FLORENTINE VALLEY 20650 ± 1790
C KUTIKINA (FRASER) - FRANKLIN VALLEY 19750 ± 840
D DEENAREENA - FRANKLIN VALLEY c. 20000
CAVE WITH PETROGLYPHS (ROCK ENGRAVINGS)
(Sims in Ucko, 1977)
E HIGH ROCKY POINT
CAVE SURVEY MAY 1983
CAVE WORTHY OF DETAILED ARCHAEOLOGICAL STUDY
Contains one or more of: bones, stoneflakes and tools, and charcoal.
F CARDIA - ACHERON VALLEY
G LUGRA - ANDREW VALLEY
H NANWOON - FLORENTINE VALLEY
I PEÜNIAK - NEW VALLEY
J NELSON RIVER CAVE - NELSON VALLEY
DISTRIBUTION OF CAVE FORMING LIMESTONE &/OR DOLOMITE OF DEVONIAN, ORDOVICIAN & PRECAMBRIAN AGE
0 20 40 60km
Franklin R
Gordon R
Derwent R
New R
RECORDED AND POTENTIAL CAVES OF ARCHAEOLOGICAL SIGNIFICANCE (PLEISTOCENE)
Fig. 1

TABLE III

CAVES OF POSSIBLE ARCHAEOLOGICAL SIGNIFICANCE

Map references to Tasmania 1:100 000 sheets [omitted].

Cave dimensions height x width x length.

1. Timbertops

1/1 CAPE SORELL [-], 0.5-2 m x 8 m x 20 m, dry cave with numerous charcoal fragments in clay deposits.

2. Kinghorn Creek

1/1 FRANKLIN [-], 0.5-2 m x 5 m x 5 m, dry cave with floor obscured by collapse debris.

3. Algonkian

1/1 FRANKLIN [-], 0.5-1.0 m x 4 m x 6 m, dry overhang with floor obscured by collapse debris.

4. Nelson River

G3-1 FRANKLIN [-], 1 m drop from entrance, 2-3 m x 8 m x 2-3 m, burnt logs and much charcoal in cave.

G3-3 FRANKLIN [-], 30 m upstream from G3-2, 3 m above river 1 m x 2 m x 10 m small shelter cave.

G3-4 FRANKLIN [-], north facing 1-3 m x 3 m x 15 m dry near entrance, 4 m^2 flat area.

5. Florentine Valley

JF-150 WEDGE [-], large cave 2-5 m x 2-3 m x 30 m clay deposit containing charcoal and bone. Plate 10.

JF-55 WEDGE [-], good shelter cave but close to river level, may still contain some old deposits beneath recent silt.

JF-53 WEDGE [-], southerly aspect, large entrance with several small passages; no deposits found.

JF-260 WEDGE [-] 2-3 m x 1-4 m x 15 m, large flat area, charcoal in cave floor deposit.

JF-72 WEDGE [-] 3 m x 3 m x 15 m, floor covered with debris and flowstone, jaw bone found in small passage.

JF-185 WEDGE [-], small, east facing, dry, shelter 1.5 m x 4 m x 3 m; no deposits found.

G10-2 WEDGE [-], east facing rock shelter, large debris mound almost blocking entrance.

6. Acheron River

1/1 FRANKLIN [-], 8-5 m x 2-5 m x 35 m, cave sloping down to pool with bones in floor deposits.

7. New River

2 HUON [-]; 15 m x 5 m x 5 m, large midden, probably Holocene, but could overlie older material.

3 HUON [-], 4 m x 6 m x 20 m, dry cave with small midden, probably Holocene.

TABLE IV

SURVEY DATA - FRANKLIN RIVER SITES

[omitted]

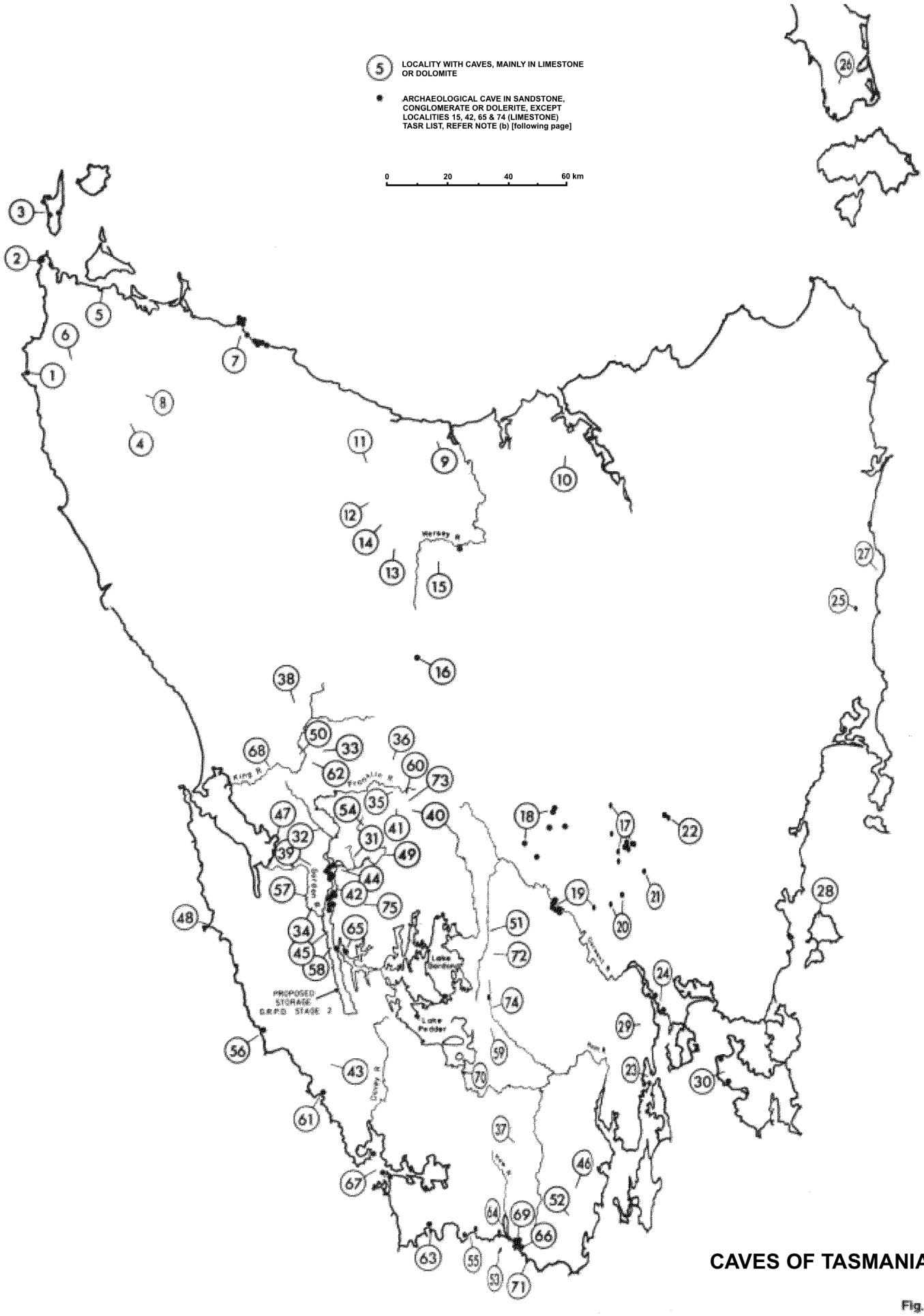


Fig.2

For key to numbered cave locatities see following page

FIGURE 2 — KEY TO CAVE AREAS

Locality No.		All Caves *(a)*	T.A.S.R. *(b)*	H.E.C. *(c)*
	N.W. TASMANIA			
1	Bluff Hill	1	1	–
2	Cape Grimm	1	1	–
3	Hunter Island	4	4	–
4	Julius River	5*(d)*	–	–
5	Montagu	6	–	–
6	Redpa 11	–	–	
7	Rocky Cape	9	9	–
8	Trowutta	2	–	–
	NORTHERN TASMANIA			
9	Eugenana	1	–	–
10	Flowery Gully	13	–	–
11	Gunns Plains	9	–	–
12	Loongana	12	–	–
13	Lorinna	4	–	–
14	Moina 3	–	–	
15	Mole Creek	183	1	–
16	Upper Mersey Valley	1	1	–
	MIDLANDS			
17	Bothwell	10	10	–
18	Central Highlands	6	6	–
19	Hamilton	7	7	–
20	Jordon River	2	2	–
21	Mt. Mercer	1	1	–
22	Oatlands	2	2	–
	EASTERN TASMANIA			
23	D'Entrecasteaux Channel	3	3	–
24	Derwent River	2	2	–
25	Douglas River	1	1	–
26	Flinders Island	6	5	–
27	Gray 1	–	–	
28	Maria Island	6	–	–
29	Mount Wellington	3	–	–
30	Tasman Peninsula	2	2	–
	S.W. TASMANIA			
31	Acheron River	Reported	–	4
32	Andrew River	Reported	–	10
33	Bubs Hill	13	–	4
34	Butler Rivulet	5	–	–
35	Carbonate Creek	Sinkholes	–	–
36	Cheyne Range	Probable	–	–
37	Cracroft	15*(e)*	–	–
38	Dante Rivulet	11*(f)*	–	–
39	Eagle Creek	Sinkholes	–	–
40	Erebus-Denison	Huge sinkhole	–	–
41	Everlasting Hills	Sinkholes	–	–
42	Franklin River	27+	14	–
43	Giblin River	Unlikely	–	0
44	Goodwin Creek	Reported	–	–
45	Gordon-Sprent	11	–	–
46	Hastings	27	–	–
47	Hazell Creek	Reported	–	–
48	Hibbs River	Reported	–	1

Locality No.		All Caves *(a)*	T.A.S.R. *(b)*	H.E.C. *(c)*
	S.W. TASMANIA (cont.)			
49	Jane River and Goldfields	9	–	3
50	Jukes-Darwin	5	–	–
51	Junee-Florentine	335	–	40
52	Ida Bay	133+*(g)*	–	–
53	Isle de Golfe	Reported	–	–
54	Lightning Plains	1	–	–
55	Louisa Bay	2	2	–
56	Low Rocky Point	1	1	–
57	Lower Gordon	10	–	3
58	Lower Olga	Reported*(h)*	1	–
59	Mount Anne	8	–	–
60	Mt. Ronald Cross	10	–	–
61	Mulcahy Bay	1	1	–
62	Nelson River	2+	–	4
63	New Harbour	1	1	–
64	New River (incl. Precipitous Bluff)	2*(i)*	–	3
65	Nicholls Range	4	1	–
66	Osmiridium Beach	1	1	–
67	Port Davey	3	3	–
68	Queen-King	A few, small	–	–
69	Rocky Boat Inlet	10*(j)*	3	–
70	Scotts Peak	3	–	–
71	Surprise Bay	10	–	–
72	Tim Shea	Small	–	–
73	Upper Lodden River	1	–	–
74	Weld River	7	1	–
75	West Maxwell-Algonkian	Sinkholes	–	1

NOTES:

(a) includes sinkholes; information from Matthews (1979) and notes *(b)* to *(j)*.

(b) caves and shelters, sandstone and limestone, on the Tasmanian Archaeological Site Register kept by the National Parks & Wildlife Service, Tasmania, and from Kenneally (1980).

(c) total number of caves entered during H.E.C. caves survey May 1983.

(d) Kiernan, 1980, *Southern Caver* Apr. 1980: 3-9.

(e) Supplemented from Gillieson & Taylor, 1980.

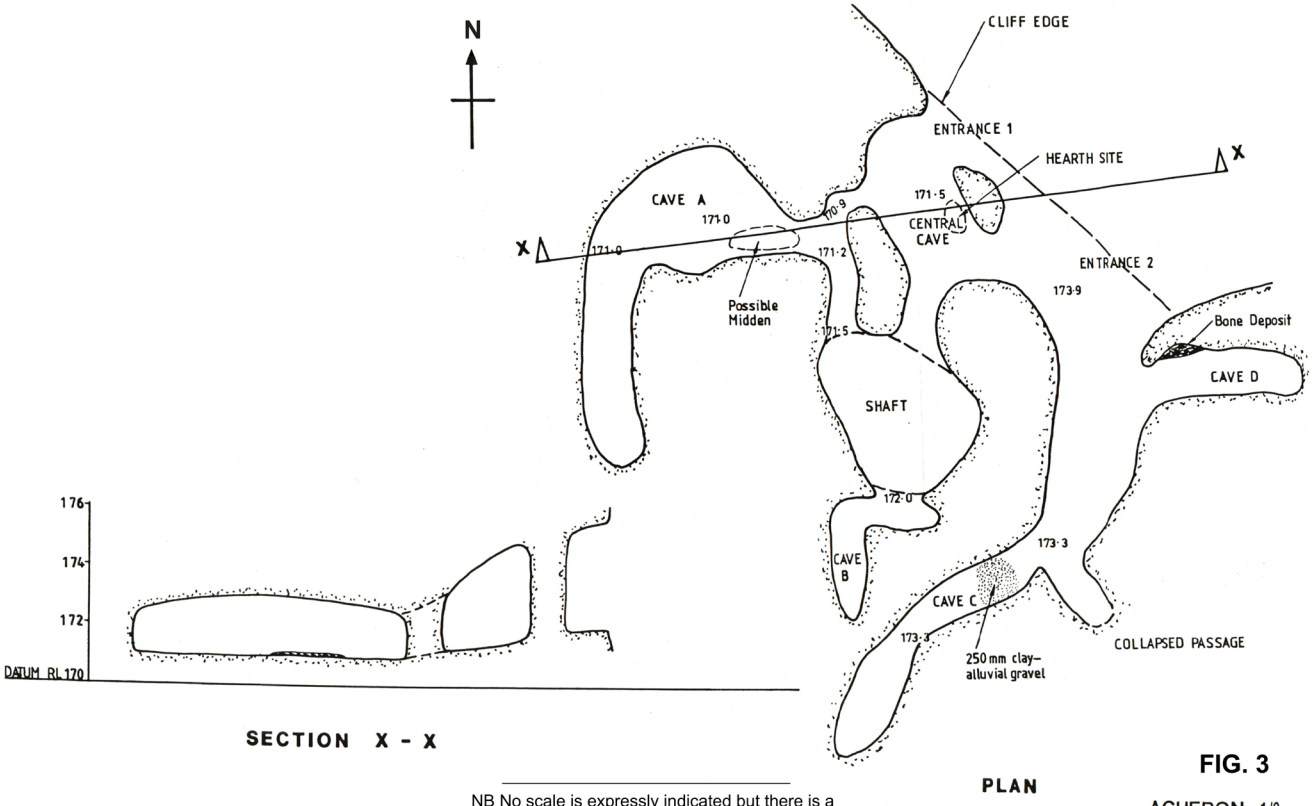
(f) Supplemented from Kiernan, 1981, *Southern Caver* Jan. 1981: 50-59.

(g) Matthews (1979) gives 33 cases; note in *Southern Caver* Aug. 1982 [p. 22] says “As a result of this [survey] over one hundred new entrances have been found …”

(h) Kiernan, 1979, *Journal of Sydney Speleological Soc.* 23(8): 201.

(i) Kenneally, 1980.

(j) Poulter, 1981.



NB No scale is expressly indicated but there is a grid shown with this separation, which measures 7 cm on the original.

FIG. 3

ACHERON 1/2

CARDIA CAVE
ACHERON VALLEY

NB No scale is expressly indicated but there is a grid shown with this separation, which measures 7 cm on the original.

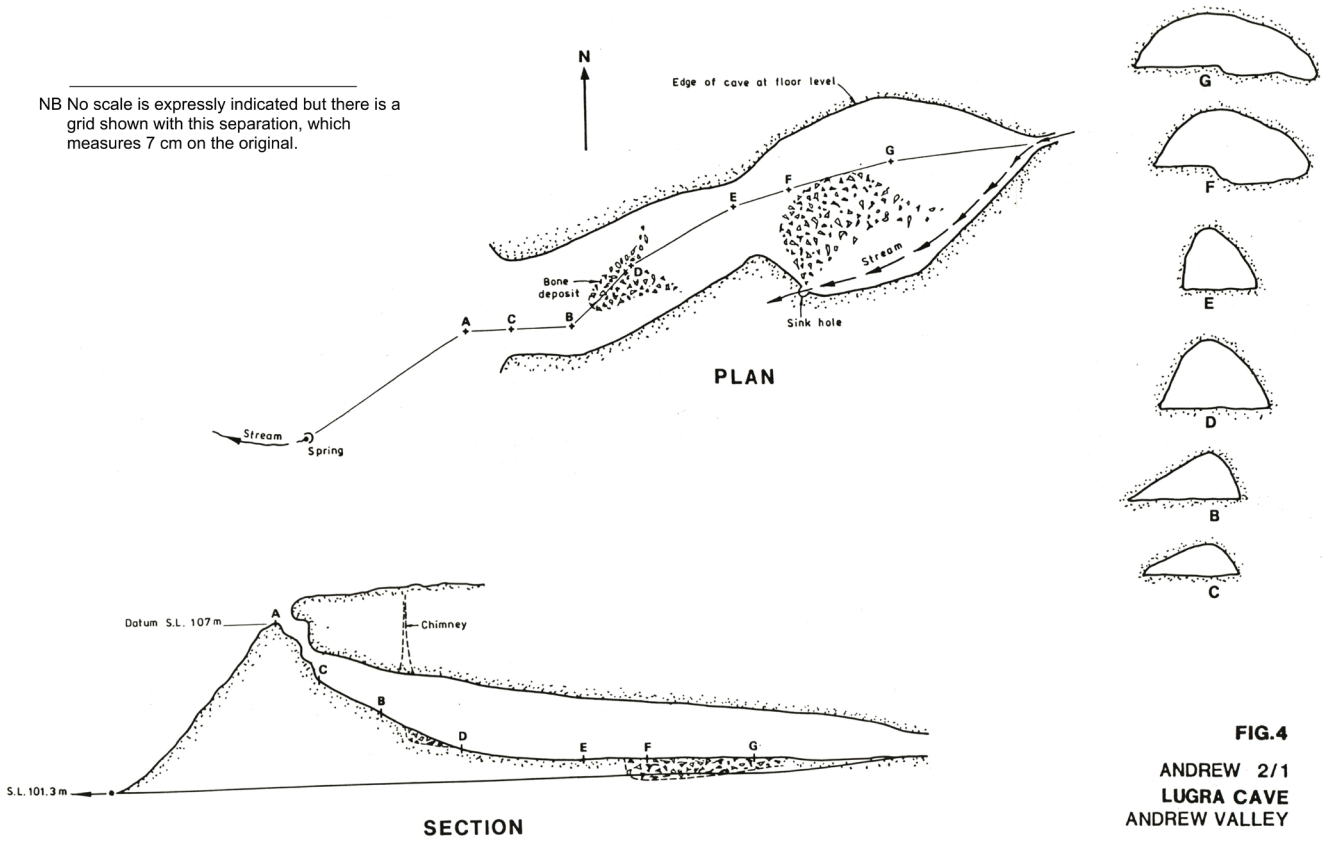


FIG.4

ANDREW 2/1

LUGRA CAVE
ANDREW VALLEY

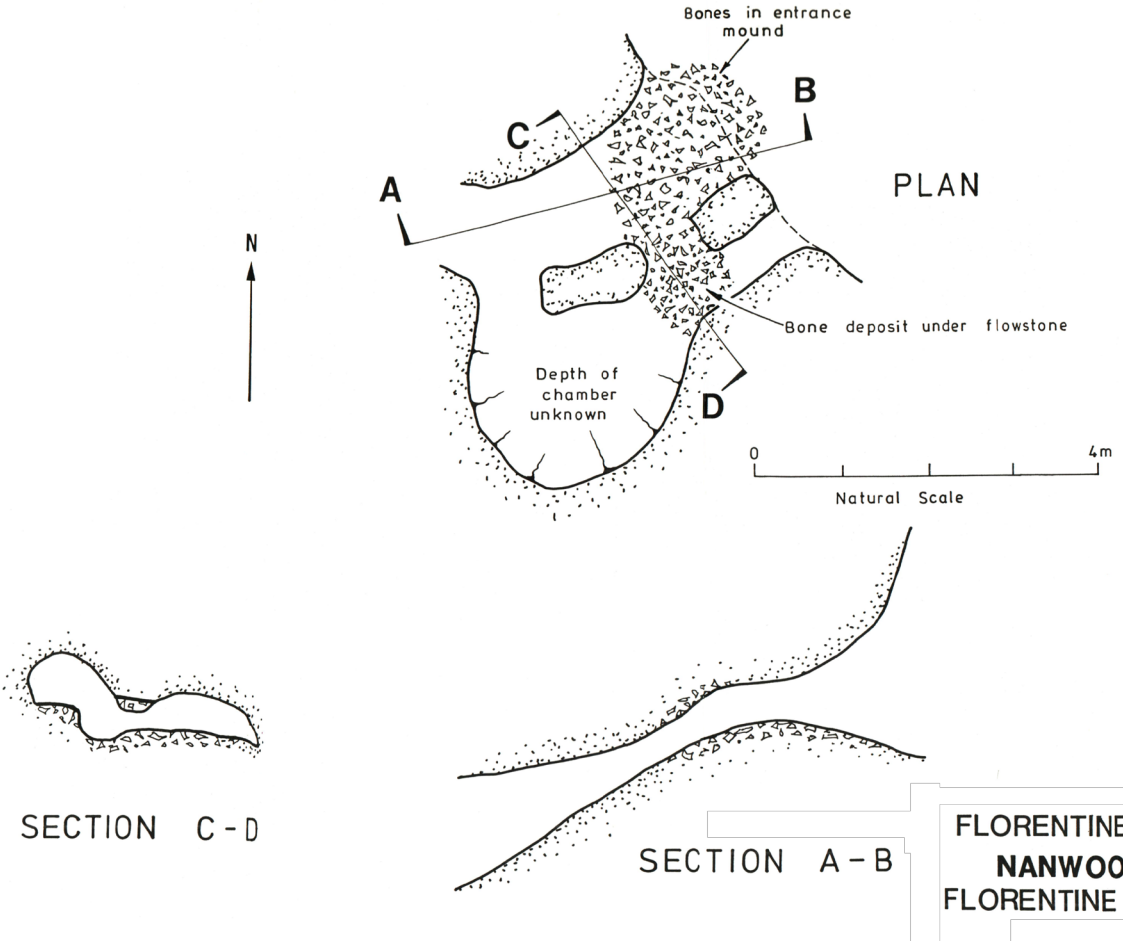


FIG.5

FLORENTINE G16-1

NANWOON CAVE

FLORENTINE VALLEY

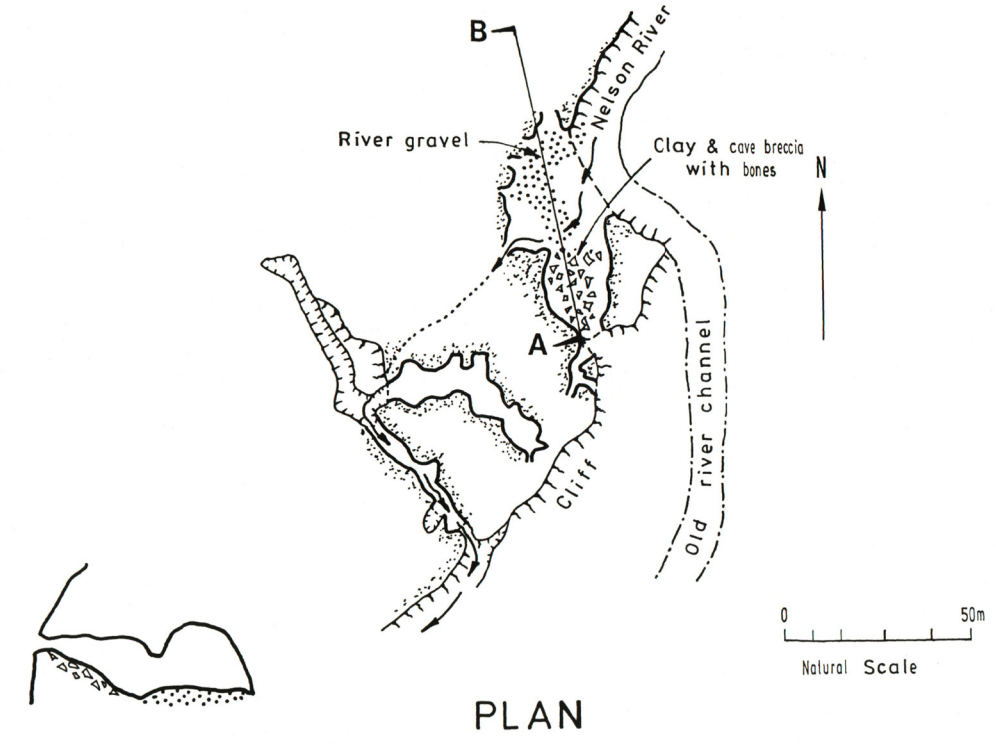


FIG.6

NELSON G3-1

NELSON RIVER CAVE

NELSON VALLEY

From Kiernan, K., 1980 Honours Thesis

PLATE 1. Acheron Cave 1/2: viewed from interior of central cave. Subsidiary Cave D on right of picture.

PLATE 2.

Acheron Cave 1/2: Subsidiary Cave A - flagging tape at possible midden. Charcoal fragments, bone fragments and stone artifacts were observed in this area.

PLATE 3. Acheron Cave 1/2: bone deposit in Cave D. Angular limestone fragments and brown bones. (Examples arrowed). Bone deposit exposed in section by foundering of floor.

PLATE 4.

Acheron Cave 1/2: Interior of Subsidiary Cave C. Figures on original floor level with foundered area between figures and camera.

PLATE 5.

Acheron Cave 1/2: Interior of Subsidiary Cave B - entrance. Floor covered with brown clay deposits.

PLATE 6. Andrew Cave 2/1: view towards entrance from middle of cave. Entrance blocked by collapsed blocks. Angular collapse debris overlies bone deposits on the floor of the cave.

PLATE 7. Andrew Cave 2/1: numerous bones exposed in deposits on the floor of the cave.

PLATE 8. Florentine Cave G16-1: view of entrance overhang showing moss covered entrance mound (centre).

PLATE 9. Florentine Cave G16-1: eroded breccia deposit beneath flowstone, containing numerous bones and teeth (arrowed).

PLATE 10. Cave JF-150. Florentine Valley: showing clay deposit forming flat floor of cave. Pieces of charcoal have been exposed by a slump (foreground), bones have been reported by Goede.

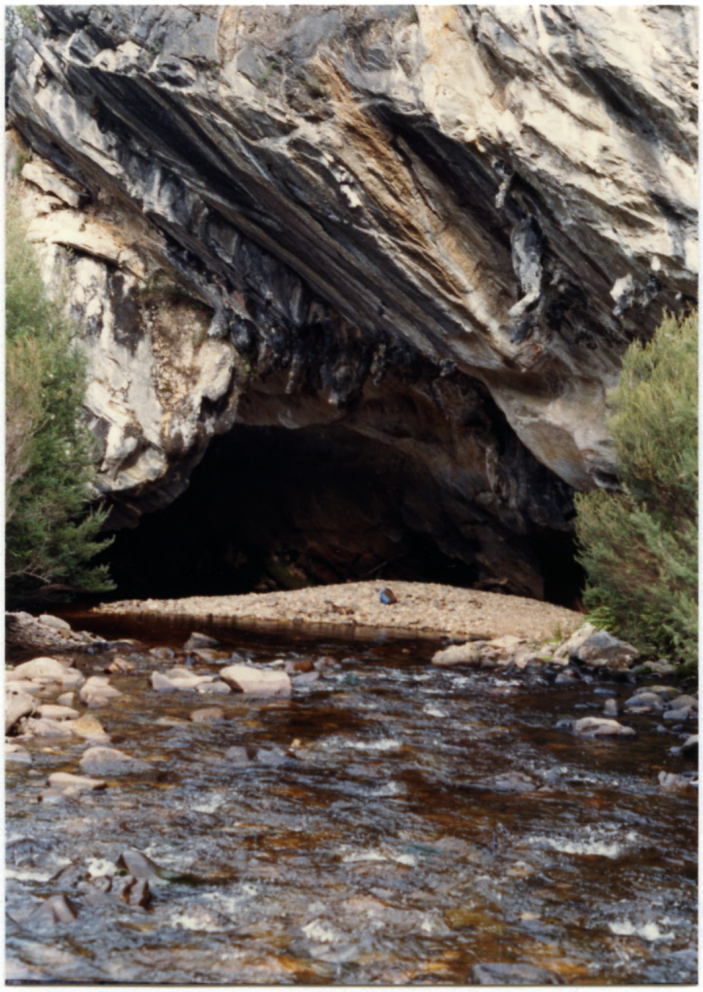


PLATE 11.

Nelson River Cave G3-2: large north-east facing entrance. Nelson River flows around gravel bank into cave.

PLATE 12. Nelson River Cave G3-2: showing slumped clay and breccia deposit in south chamber of entrance.

PLATE 13. New River 1 (western slope of Precipitous Bluff): entrance faces 299°M; floor slopes gently away from camera.

PLATE 14. New River 1: interior, compact periglacial? gravelly clay deposit with charcoal and gastropod shells in right foreground. Present-day erosion of this is locally occuring near base of staff and drains down a 20° inclined, inaccessible tunnel in left background. Staff is 1 m long.

PLATE 15. New River 1: interior showing present day local erosion of gravelly clay at rear. Black areas are charcoal. The smallest division on the staff is 0.5 cm.

PLATE 16. New River 1: interior showing loose debris eroded from cave deposit. Fragments include angular quartzite and limestone, limonite concretions, gastropod shells and (centre) possible wombat canine.

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APPENDIX 1

Tasmanian Caves

from *Check-List of Australian Caves and Karst 1979.*

Edited by P.G. Matthews.

[not reproduced here; published separately]

[APPENDIX 2.]

A SEARCH FOR CAVES OF POTENTIAL ARCHAEOLOGICAL INTEREST, NEW RIVER AREA, SOUTHWESTERN TASMANIA.

M. C. FORSTER
W. C. CROMER
T. G. SUMMONS

MAY, 1983.

[-1-]

A SEARCH FOR CAVES OF POTENTIAL ARCHAEOLOGICAL INTEREST, NEW RIVER AREA, SOUTHWESTERN TASMANIA.

1. INTRODUCTION

101 This report summarises the results of a search for caves of possible archaeological interest in the New River area of south-western Tasmania. in particular the search concentrated on areas and sites with the potential for pre-Holocene occupation.

102 The work was commissioned by the Hydro-Electric Commission of Tasmania on May 2, 1983, and the search was carried out during the period May 3-May 13, 1983. The Commission's Chief Geologist (Mr. S. Patterson) visited the search area on May 13,1983.

103 Party members were leader M.C. Forster (prospector), W.C. Cromer (consultant geologist) and T.G. Summons (consultant geologist).

104 The schedule of contract (Appendix [2.]1) sets out the objectives and guidelines of the search.

2. METHOD AND LIMITATIONS OF SURVEY

201 Aerial photographs (scale 1:45000), various published reports and the Hobart 1:250000 geological map were studied intitially to select likely search areas. Emphasis was placed on proven or probable limestone areas of moderate relief less than 400m ASL (approximately the Late Last Glacial regional snow-line), and on several previously recorded sea-caves of probably Pleistocene (Last Interglacial) age. Holocene coastal deposits were not studied

202 Promising areas were inspected from the air by helicopter, and most were subsequently explored on foot.

203 Because of the limited time available for the survey,

a) only readily accessible areas near suitable landing sites were explored

b) the Lune River area was not visited

c) a full literature search of documented cave sites in the New River area could not be made; some sites listed here may have been recorded elsewhere.

3. RESULTS

301 Eight general areas in the New River area were inspected by helicopter reconnaissance, on foot, or both. Results are summarised in Table 1. where we have assessed each on its potential for further archaeological discoveries. The most favourable area in this regard is the karstic limestone outcrops on the western slopes of Precipitous Bluff where the prospects seem very good for further discoveries. Also promising is the Judds Cavern - Cracroft area. All other areas are regarded as poor prospects.

302 Four specific sites with archaeological potential have been identified. Each we regard as sufficiently interesting to warrant closer investigation. [cont. after Table 2]

[-2-]

Figure 1. [not reproduced here]
Location map of northern part of search area, (New River Lagoon to Judds Cavern): scale 1:100 000.
Position of New River 1 cave and Judds Cavern indicated.

[-3-]

Figure 2. [not reproduced here]
Location map of southern part of search area (Prion Beach to South Cape); scale 1:100 000.
Position of New River 2 and New River 3 caves indicated.

[-4-]

TABLE 1. AREAS SURVEYED FOR POTENTIAL ARCHAEOLOGICAL SITES, NEW RIVER AREA, S.W. TASMANIA

AREA	DATE VISITED		GEOLOGY	CAVES RECORDED		ASSESSED POTENTIAL FOR FURTHER POSSIBLE ARCHAEOLOGICAL SITES
	Aerial Reconnaissance	Ground Survey		Total	Potential Archaeological sites	
Western (limestone) slopes of Precipitous Bluff	3,4,10 May 83	3,4,10 11,12 May 83	Middle Ordovician limestone (New River Beds; Burrett et al. 1981)	Numerous	1	Very Good
Salisbury River - Vanishing Falls	3 May 83	3 May 83	As above	None	None	Fair
Prion Beach, W. end	-	7,12 May 83	Late Cambrian? - Early Ordovician? Siliceous Conglomerate	2	2	Poor
Rocky Boat Inlet	7 May 83	7 May 83	Middle-late Cambrian and Late Cambrian-Early Ordovician siliceous conglomerates	9 (Poulter, 1981)	None	Very Poor
Near-shore islands du Golfe, Hen and Chicken	11 May 83	–	Middle Ordovician Limestone? (du Golfe): Late Cambrian?-Early Ordovician? siliceous conglomerates (Hen and Chicken)	None	None	Very Poor
Coast, Point Vivian to South Cape	11 May 83	–	Various; Cambrian to Jurassic	Occasional Recent? sea clefts and caves	Uncertain	Poor
Western Shore, New River Lagoon	3 May 83	–	Uncertain-possibly Precambrian quarzites	None	None	Poor
Judds Cavern-Cracroft area	13 May 83	13 May 83	Middle Ordovician? Limestone	Several	Uncertain; 1 ?	Good

TABLE 2. SUMMARY Of OBSERVATIONS MADE AT SOME POTENTIAL ARCHAEOLOGICAL SITES, NEW RIVER AREA, S.W. TASMANIA

NAME	LOCATION *(a)* GRID REFERENCE	GEOLOGY	CAVE CHARACTERISTICS					
			ASPECT	SIZE(m) *(b)*	CAVE DEPOSITS	ENTRANCE MOUND	WATER SUPPLY	REMARKS
NEW RIVER 1 (cave; plates 1-4)	[-](western slopes, Precipitous Bluff)	Middle Ordovician New River Beds (Limestone) (Burrett et al. 1981)	Faces WNW (Plate 1)	3 x 1.5 x 2 (Plate 1 & 2)	Periglacial? compact brown gravelly silts clay on SW side and floor; 0.6m thick (Plate 3)	Present	50m west	Approx. 20m ASL. Deposits contain charcoal, terrestrial gastropods and occasional (?) teeth (Plates 3&4). No obvious stone or bone artefacts
NEW RIVER 2 (rock shelter, plates 5-9)	[-](western corner, Prion Beach)	Siliceous conglomerate (Late Cambrian? Early Ordovician?)	Faces S (Plate 6)	15 x 5 x 5 (Plate 5)	Midden, at least 0.6m thick (Plate 8) and probably 1m. Black organic silt and fine sand rich in shell and bone, deposited on sloping rock floor (Plate 7)	Not Applicable	In shelter	Rich deposit, approx. 4-6m AHWM, eroded at base along storm line; probably mainly Holocene. No obvious stone or bone artefacts, charcoal common.
NEW RIVER 3 (sea cave, plates 10-13)	[-](western end, Prion Beach)	Siliceous conglomerate (Late Cambrian? - Early Ordovician?)	Faces SE (Plate 10)	4 x 6 x 20 (Plates 10&12)	Entrance and floor of large boulders in silt-sand matrix (Plate 10)	No Obvious mound; floor horizontal	100 m NE	Large, dry, sea cave with horizontal floor, approx. 6-8 m AHWM; sheltered entrance. Possibly of Pleistocene (Last Interglacial) age. Small Holocene shell midden (Plate 13). No obvious signs of fire or stone artefacts.
JUDDS CAVERN	[-]	Middle Ordovician limestone	Faces N	Variable large entrance	Not studied	Not Applic able	In cave	Cursory examination only. Possible shelter near secondary exit on W side of entrance, above present flood level

Notes: (a) Universal Grid Reference [all grid references omitted]
(b) Approximate maximum dimensions: width x height x length

The location of each is shown on Fig. 1 and 2 [omitted] and site investigations are summarised in Table 2 and Appendix [2.]2 [In fact, the second appendix contains the plates.]

303 The sites are termed New River 1 (limestone cave), New River 2 (rock shelter), New River 3 (sea cave) and the previously named Judds Cavern[1] (limestone cave).

304 Of the four specific sites recommended for further study, New River 2 (rock shelter) and New River 3 (sea cave) probably have the most potential. Both are presently inactive, are probably Pleistocene (Last Interglacial) in age, and offer the possibility of pre-Holocene human occupation. Each would have provided good shelter proximal to fresh water, overlooking lightly timbered grassland on the exposed continental shelf during Late Last Glacial times. Both show evidence of Holocene occupation.

305 New River 1 (limestone cave) on the lower western slope of Precipitous Bluff is probably only one of many similar sites in the area. Although presently small, it may have been initially larger. We suggest it warrants further study because of its entrance mound, and the presence of gastropods, charcoal and fossil teeth in a compact gravelly clay cave deposit. We regard the deposit as probably a solifluction feature developed under periglacial conditions, suggesting at least a pre-Late Last Glacial age for the cave. New River 1 cave may prove to be archaeologically barren, but the general area warrants detailed exploration.

306 Only a very brief inspection was made of Judds Cavern. Our conclusion is that it and several other explored and unexplored caves in the vicinity offer good potential for archaeological discoveries (Goede, 1979).

4. CONCLUSIONS AND RECOMMENDATIONS

401 The limestone areas on the western slopes of Precipitous Bluff and near Judds Cavern offer very good prospects for the discovery of new cave sites - some of which may prove to be of archaeological importance. Other areas investigated (including coastal sites and most previously recorded sea caves) show little potential in this regard.

402 The present survey has identified four caves which in our opinion warrant archaeological investigation. Two of these are limestone caves (Judds Cavern, and New River 1 on the western slopes of Precipitous Bluff) and two are inactive sea caves of possible Last Interglacial age (New River 2 and 3). All four sites offer the potential for Pre-Holocene human occupation.

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1 Since October 1988 known as Wargata Mina –Ed.

M. C. Forster (prospector)

W. C. Cromer (consultant geologist) William C. Cromer Pty. Ltd.

T. G. Summons (consultant geologist) Summons Geoservices Pty. Ltd.

May 17, 1983.

[-8-]

APPENDIX [2.]1

SCHEDULE OF WORK.

[-9-]

SCHEDULE TO M.C.s. 8719, 8720, 8721

1. The objective of the search is to locate, identify and accurately record, caves in the New River and Lune River area which exhibit characteristics that may warrant archeological investigation.

2. The Party Leader will be Mr. M.C. Forster, who will assume full responsibility for the activities of the individual members of the party. All finds and reports will be made to Mr. Forster, who will collate them and submit them to Chief Geologist of the Hydro-Electric Commission, who will follow up with the necessary action.

3. The following guidelines have been established from known sites.
   (i) The caves are usually found in limestone.
   (ii) They are usually in areas where there is a rise and fall of more than 10 metres in the landform.
   (iii) The caves generally face north-west.
   (iv) They tend to be dry.
   (v) The caves are near horizontal.
   (vi) There is usually a small soil mound at the entrance.
   (vii) The entrances are generally well lit.
   (viii) The caves are generally more than 2 metres wide.
   (ix) They have usually been found at the head of dry valleys, in dolines or behind bluffs.
   (x) If it looks like a reasonable site to shelter you for a reasonable period during inclement weather, it has potential.

4. This exercise is specifically a cave search. It is illegal to collect or excavate for aboriginal artefacts without a permit and no attempt should be made to do so. Photographs may be taken but no attempt should be made to disturb or interfere with a potential archeological deposit.

5. The search operations base will be at Mr. M.C. Forster's property, Sandfly.

   The H.E.C. will provide helicopter transport from the base to the various search areas.

   The H.E.C. will provide a rubber dinghy and outboard motor for travel up New River.

   The H.E.C. will provide the search equipment including radios, camping gear, ropes and rucksacks.

6. The search will be weather dependent and will generally consist of day sorties from the operations base, whenever the weather is suitable.

7. Two weeks only are available for the search which must be completed by no later than Tuesday, 17th May 1983 and a final report submitted to the Chief Geologist no later than Thursday, 19th May 1983.

APPENDIX [2.]2

PLATES.

[The report was accompanied by 13 colour plates.
Plates 1 to 4 appear in the main report as Plates 13 to 16.]

PLATE 5 New River 2; a composite view of the rock shelter which faces S at the extreme western corner of Prion Beach. The shell and bone deposit is concentrated on the left-hand side, extending up slope from M. Forster to the rear wall. Numerous shells and bones are wedged in an eroded bedding plane in the dark cleft on the right-hand side, suggesting that occasional storms have stripped the sloping rock floor of deposits up to this level.

PLATE 6 New River 2 rock shelter; western corner, Prion Beach, looking NNW. The richest shell and bone deposits occur near the centre-left of the photo, about 4-6m above present HWM

PLATE 7 New River 2 shelter; general view of vegetation-stabilized, hummocky shell and bone deposit.

PLATE 8 New River 2 rock shelter; 0.6m of shell and bone deposit exposed in small erosion pit by dripping water from overhanging roof. Smallest division on scale is 0.5cm.

PLATE 9 New River 2 rock shelter; 0.4m of deposit exposed in erosion channel. Smallest division on scale is 0.5cm.

PLATE 10 New River 3 (sea cave): composite view (looking NW) of entrance partially blocked by a compact rock fall (with matrix of sand and silt). Present entrance is approximately 6-8m AHWM. This may be of Pleistocene (Last Interglacial) age, suggesting a pre-Holocene age for the floor deposits, here over 3m thick. The staff is 2m long.

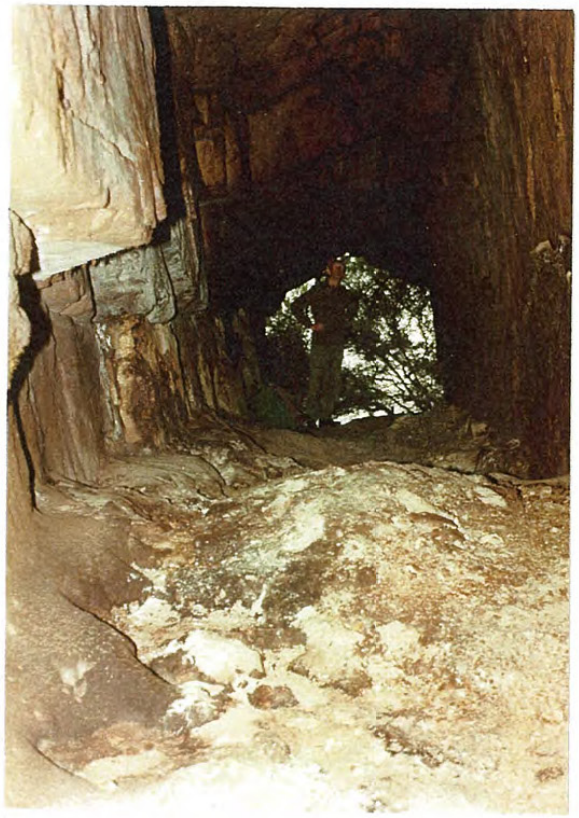

PLATE 11 New River 3 sea cave; view from rear of cave looking SE, showing parallel walls, high ceiling and near-horizontal floor.

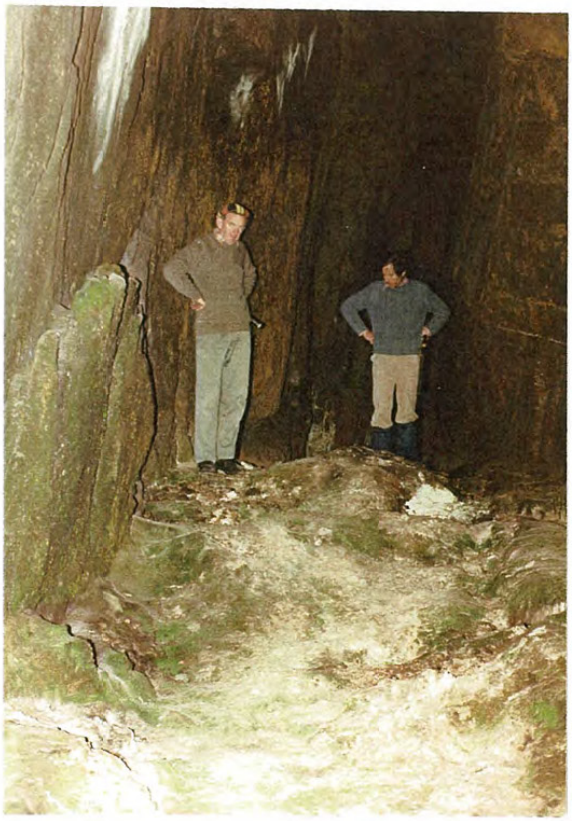

PLATE 12 New River 3 sea cave; view from entrance looking NW to rear.

PLATE 13 New River 3 sea cave; small Holocene shell midden on floor of cave near entrance. Smallest division on staff is 0.5cm.

[APPENDIX 3.]

THE HYDRO-ELECTRIC COMMISSION
OF
TASMANIA

GORDON RIVER POWER DEVELOPMENT - STAGE 2

A SEARCH FOR CAVES OF POTENTIAL ARCHAEOLOGICAL INTEREST AROUND THE LOWER GORDON SCHEME, SOUTHWEST TASMANIA

BY F.J. BAYNES

MAY, 1983.

-1-

INTRODUCTION

A search for caves of archaeological significance outside the proposed storage area of the Lower Gordon scheme was carried out. The search was one of three, other searches being carried out in the Florentine Valley and the New River areas. The search was carried out between 28 April 1983 and 18 May 1983.

THE INVESTIGATION

The study area consisted of those areas covered by the Franklin, Olga, Cape Sorell, Spiro and Port Davey 1:100 000 Tasmap Sheets. The investigation was restricted to areas underlain by Limestone and Dolomite rock formations.

Prior to the field work enquiries were made to local residents for information which might lead to the location of caves; this approach was not productive. Targets for search were located by the study of maps and aerial photographs and by helicopter reconnaissance. Steep breaks of slope with limestone outcrop were considered favourable areas. Such areas were then searched on foot by teams of surveyors and track cutters.

Virtually all the target areas are covered by dense scrub or rainforest and access to these areas was predominantly by helicopter with some access by boat, 4WD and on foot. All caves located were flagged and caves considered to be of possible archaeological significance were surveyed, photographed and examined in detail. The search covered a small proportion of potential targets in a limited and non-methodical manner.

-2-

RESULTS OF THE INVESTIGATION

A daily diary of work carried out was kept and is presented in Appendix A. In this record karstic areas which were located are noted. Within karstic areas numerous caves were located however only those caves which might have been inhabited were described.

Two caves of probable archaeological significance were located; a single large cave in the Andrew River Valley (Franklin [-]) and a cave complex in the Acheron River Valley, a tributary of the Jane River (Franklin [-]). In both locations substantial deposits of bone fragments, charcoal blebs and stone artifacts were observed. In the Andrew River cave a flake of Darwin glass was observed. These sites are detailed in Appendix B. The age of these deposits is unknown however their similarity in content and environment to the cave deposits within the storage area suggest that they have a similar age and origin.

A cave of possible archaeological significance was located in a tributary valley to Timbertops Creek (Cape Sorell [-]). In this cave numerous charcoal fragments were observed in clay deposits. This site is detailed in Appendix B.

Two further sites of possible archaeological interest were located; a 5 m diameter potentially inhabitable cave at Kingshorn Creek (Franklin [-]) and a potentially inhabitable 4 m overhang at Algonkian River (Franklin [-]). At both sites no evidence of habitation was observed although both the cave floors were obscured by large quantities of collapse debris.

-3-

CONCLUSIONS

It is concluded that at least two previously unknown archaeologically significant cave sites exist outside of the proposed Lower Gordon storage area. Inspection and analogy suggests that these sites are of similar age to the cave sites within the storage area.

Three other sites of possible archaeological interest were located.

The large potential for cave sites, the success rate and the perfunctory nature of this search suggest that further archaeologically significant sites could well exist outside the storage area.

PHOTOGRAPHS

Refer to Report 644-94-23 for cave photographs
Plates 1-5. Acheron Cave 1/2.
Plates 6 & 7. Andrew Cave 2/1.

APPENDIX A

DAILY DIARY 29 April - 18 May 1983

-A1-

28 April	Chasing “local knowledge” and reviewing literature.
29 April	Chasing “local knowledge” and reviewing literature.
30 April	Overcast and cloudy. Reconnaissance of Kingshorn Creek area, located limestone cliff. Searched area and found numerous Karstic features, small caves and one potentially inhabitable cave (Franklin [-]). The cave was 4-5 m diameter with a dry bottom, south case aspect and about 2 m from floor to roof at the rear. No evidence of habitation was observed, however, the cave was partially infilled with collapse debris. Four HEC cutters and myself.
2 May	Sunny with some cloud. Reconnaissance of Andrew River. Searched right bank of lower reaches superficially. Numerous Karstic features. Bruce McQuitty badly gashed hand and was flown to Queenstown (severed tendon in thumb). Bruce McQuitty and myself.
3 May	Planning search in morning, reconnaissance of Andrew and Franklin valley in afternoon.
4 May	Sunny becoming overcast. Searched right bank of Andrew River downstream of Looker River, two large Karstic areas.

Reconnaissance of Goodwin Creek (outcrop only at Jane River intersection), Jane River (Karstic areas within storage area and large Karstic areas upstream), Acheron River (one large Karstic area). Located archaeologically significant cave in the Andrew River (Franklin [-]). Four contractors and myself.

-A2-

5 May — Low cloud and rain. Searched lower reaches of Andrew River until bad weather and rising river level forced a return to camp. Numerous small Karstic areas located. Six contractors, two HEC chainmen and myself.

6 May — Patchy cloud and rain. Searched Marble Cliffs area. Numerous Karstic features on western slopes - dolines, pavements - mantled by gravels. Potential for caves only at the northern end. Six contractors, two HEC chainmen and myself.

7 May — Some rain and low cloud. Completed search in Lower Andrew area. Weather worsened in afternoon. Six contractors, one HEC chainman and myself.

8 May — Some rain, low cloud and bad forecast. Reconnaissance of Nora Valley and search via 4WD from Kelly Basin road. Six contractors, two HEC chainmen. Planning search tactics.

9 May — Drizzle and heavy rain. Continued search in Nora Valley, located large Karstic area and several known caves. Some bone fragments in one cave but not considered to be of archaeological significance. Six contractors, two HEC chainmen and myself.

10 May — Raining in morning, torrential rain midday. No search carried out on my instructions. Planning search tactics and following up “local knowledge”.

11 May — Overcast with some sun. Survey of Andrew River cave site (see Appendix B). Searched downstream of Looker

-A3-

river located many Karstic features and a large cave which appeared uninhabitable. Reconnaissance of Jane River area. Six contractors, 1 HEC chainman and myself.

12 May — Patchy cloud. Searched Algonkian area. Jane River east of the Surveyor Range and at Acheron River. Numerous Karstic features were observed at all three areas. A 4 m x 8 m overhang with a dry base was observed at Algonkian Rivulet (Franklin [-]) which could have been used as a rock shelter. No evidence of habitation was observed however, the floor of the overhang was infilled with collapse debris. Two large caves were located at Acheron River one of which appeared inhabitable (Franklin [-]). Six contractors and myself.

13 May — Cloudy with some sun. Surveyed photographed and inspected both caves at Acheron River. One cave appeared to be of definite archaeological significance (see Appendix B). Searched area for further caves. Six contractors working.

14 May — Cloudy becoming overcast. Searched Andrew River upstream

of the Looker River. Some small Karstic features.

Reconnaissance of Algonkian area located further Karstic areas, a large Karstic area to the west of the Lancelot Hill and extensive massive Karstic cliffs in the upper reaches of the Maxwell River. Searched the Lancelot Hill Karst area, numerous collapsed caverns located. Six contractors and myself.

15 May Showers, heavy rain and a bad forecast. No search carried out on my instructions. Preparing report.

16 May Heavy rain clearing in the afternoon. Searched the Spence Valley in the area of the solitary limestone knob. Small

karst features observed. Reconnaissance of Timbertops Creek area to the west of Birch's Inlet indicated some karst features. A search of this area located one cave of possible archaeological significance (see Appendix B). Six contractors working. Preparing report.

17 May Overcast with periodic showers. Reconnaissance of the Giblin River area. Only minor subdued karst features observed from the air. Unsuccessful ground search. Inspected and photographed the cave at Timbertops Creek. Charcoal observed in clay deposits (see Appendix B). Four contractors working.

18 May Cloudy. Searched Algonkian Rivulet area north to Jane River and south to the headwaters. Four contractors working. Preparing Report.

APPENDIX B

DETAILS OF ARCHAEOLOGICALLY SIGNIFICANT CAVES

ANDREW 2/1

LOCATION The cave is located in the lower reaches of the Andrew River valley on the right bank downstream of the confluence of the Looker River. The cave opening is in a degraded cliff line of about 10 m height and has an easterly aspect. There is a prominent limestone pavement to the west of the cliff line, elsewhere the area is covered by thick scrub. The cave is developed in Ordovician Gordon Limestone.

ACCESS Via helicopter to the open limestone pavement (Rockery Pad) - a rather difficult landing. A flagged track runs 50 m north from the pad to the cave. The cave entrance is blocked by rocks and only agile thin people can enter the cave.

DESCRIPTION The cave is approximately 20 metres long, between 3 and 6 metres wide and between 7 and 3 metres high. A stream flows through the rear of the cave. The entrance is almost completely blocked by collapsed blocks of limestone and angu-

lar limestone fragments litter the floor of the cave. A deposit of alluvial sediments has been partially eroded from the rear of the cave. Interdigitated with the alluvium and underlying the limestone fragments there is a deposit with numerous bones which extends over 30 m^2. The bone bed consists of numerous bones and limestone fragments with some quartzite and vein quartz fragments in a matrix of brown silty clay. Dripstone areas and carbonate encrustations are common. A plan and sections of the cave are given in Figure Bl [Fig. 4 of main report].

-B2-

ARCHAEOLOGICAL CONTENT

The bone bed contains a large quantity of bones, bone fragments and teeth. Many split and broken bones were observed together with blackened and burnt bones. Blebs, flecks and pieces of charcoal were observed in the bone bed. Numerous quartzite and vein quartz fragments were observed and in one area sharp flakes of these materials were observed. A flake of Darwin glass was observed.

COMMENT The contents of the bone bed indicate that it is a large aboriginal midden. The midden probably extends beyond the 30 m^2 over which it is observed and underneath the collapsed blocks at the entrance of the cave. The survey information suggests that a depth of up to 2.5 metres of midden could occur in the entrance area. The location, content and environment of the cave site and the similarities to the known sites in the Franklin area suggest that this site could be of similar age and origin. The collapse of the entrance is likely to have resulted in a high degree of preservation of the midden.

-B3-

ACHERON 1/1 & 1/2

LOCATION The caves are located near the Acheron River upstream of its confluence with the Jane River (Franklin [-]). Cave 1/1 is in a cliff line of about 7 metres height and has a northerly aspect. Cave 1/2 is in a similar cliff 50 metres to the east of cave 1/1 and has a north-easterly aspect. Both caves occur within a Karstic topography of indented cliff lines with some rainforest cover and some heavy scrub. The caves are developed in Precambrian dolomites.

ACCESS Via helicopter to a clearing approximately 100 metres south of the karst area, and between that area and the Jane River (Punters Pad). A flagged track runs 100 metres north to cave 1/1 and cave 1/2 is to the east over a ridge of limestone.

DESCRIPTION **Acheron 1/1**

The cave is more than 35 metres long, between 1 and 4 metres wide and up to 5 metres high. The cave drops more than 5 metres from the surface and there is a pool of water on the floor. The cave extends an unknown distance

beyond the survey. The floor is covered with limestone fragments and alluvial pebbles in a matrix of brown silty clay. More than 1 metre of this material is exposed in a steep bank. An animal skull and bones were observed in these deposits. At the entrance there is a covering of topsoil and rotting vegetation on a steeply sloping bank.

Acheron 1/2

This cave site consists of a complex of karst features around a central cave. The central cave has an arched roof up to 5 metres high and between

-B4-

10 and 15 metre span with daylight from two front openings in the cliff face and an opening into a large shaft at the back of the central cave. Four subsidiary caves run off from the central cave and shaft. A plan and sections of the cave complex are given in figure B2 [Fig. 3 of main report]. The floor of the central cave is littered with angular collapse debris and finer grained materials. In an obvious hearth site there is a deposit of charcoal flecked brown silty clay.

Subsidiary cave A is more than 15 m long, between 1 and 4 metres wide and up to 4 metres high. The floor consists of silty black sand and limestone fragments, one area appears to be a raised mound of possibly human origin. Charcoal fragments were observed in this mound, also a possible chert artifact and burnt bone fragments.

Subsidiary cave B is more than 7 metres long over 1 metre wide and over 1 metre high. The floor consists of a smooth deposit of brown silty clay.

Subsidiary cave C is over 20 metres long, between 1 and 3 metres wide and up to 5 metres high. At the rear of this cave a 200 mm deposit of clay with numerous small shells at its base overlies alluvial gravels. At the front of this cave the floor is at a lower level and littered with collapse debris and brown silty clay. A collapsed passage leads off this cave.

Subsidiary cave D is 5 metres long, 1.5 metres wide and up to 2 metres high. The floor is littered with collapse debris and brown silty clay. Exposed in section at the front of this cave is a 100-300 mm bed of angular limestone fragments, bones and calcite cemented yellow sandy silts. Bones make up more than 50% of the deposit and include

-B5-

vertebrae, jaw bones and split bone fragments. A charcoal fragment was observed in this deposit. The shaft floor is mantled with topsoil and vegetation.

ARCHAEOLOGICAL CONTENTS

Acheron 1/1

No definite archaeological evidence of habitation was observed. However the bones within the cave deposits may be of significance.

Acheron 1/2

Charcoal flecked clay in an obvious hearth site, deposits of bones with charcoal, split broken and burnt bones were observed. Flakes of quartz and a chipped chert flake could be artifacts. These indicate human habitation.

COMMENT The observed evidence of human habitation at Acheron 1/2 suggests that the cave complex was once occupied by aborigines. The variety of deposits suggest a long and complicated occupation history. The extent of floor deposits indicates a large potential for further finds within the complex. The nature and position of the bone deposit in cave D suggests great antiquity for some of the deposits. The proximity of Acheron 1/1 to the inhabited cave site suggests that this cave may have been occupied as well.

TIMBER TOPS 1/1

LOCATION The cave is located near a southern tributary of Timbertops Creek, to the west of Birch's Inlet (Cape Sorell [-]). The cave opening is at the base of a karstic cliff and has a southerly aspect; the area is covered by medium dense scrub. The cave is developed in Ordovician Gordon Limestone.

ACCESS Via helicopter to a button grass plain east of the Karstic mound. The base of the mound is followed about 100 metres to the south-west to the opening.

DESCRIPTION The cave is between 15 and 20 metres long and extends into the cliff more than 8 metres. There are two entrances. Entrance 1 consists of a 4 metre wide opening 2 metres high at the front and tapering back to a low cave which connects the two entrances. Entrance 2 is partially collapsed with an estimated original height of 20 metres, which is filled with debris. Charcoal fragments were observed in clay deposits at both entrances.

COMMENT The significance of the observed charcoal fragments is not known. The deposit could have been derived from human occupation or from bush fires.

FIG. 1. Caves of Possible Archaeological Significance
Andrew & Acheron Valleys
Location Plan
[omitted]

FIG. 2. Andrew 2/1 Lugra Cave, Andrew Valley
[see main report Fig. 4.]

FIG. 3. Acheron 1/2 Cardia Cave, Acheron Valley
[see main report Fig. 3.]

[APPENDIX 4.]

A SEARCH FOR CAVES OF POTENTIAL ARCHAEOLOGICAL INTEREST IN THE NELSON AND FLORENTINE VALLEYS, SOUTH WEST TASMANIA.

BY D.R. WILSON

MAY, 1983

I INTRODUCTION

This report summarises the results of a search for caves of possible archaeological significance in the Nelson Valley - Bubs Hill and Florentine Valley areas of Southwest Tasmania.

The field survey was carried out between 2nd and 17th May, 1983.

The aim of the survey was to locate and record caves containing material of archaeological interest.

II LOCATION

Bubs Hill is situated 18 km east-south-east from Queenstown immediately south of the Lyell Highway. The cave area is in easterly dipping Ordovician limestone on the western slopes of Bubs Hill.

The Nelson River rises near Bubs Hill and flows west then south, finally joining the King River about 2 km north from the King River bridge on the Kelly Basin Road. The area of interest is 2 km south from the Lyell Highway at the head of the broad flat section of Nelson Valley in west dipping Ordovician limestone.

The Florentine River runs northward through a broad flat valley in Ordovician Gordon Limestone forming the eastern limb of the Florentine Synclinorium.

III LOGISTICS

Likely areas of search were selected on the basis of known limestone outcrop and reference to possible sites in the literature. Promising limestone outcrop was identified from aerial photography and later inspected from the air by helicopter. Ground searches were then conducted in these areas.

Aerial inspection proved difficult in the densely forested areas of the Florentine valley and likely targets, both in cleared and uncleared areas, were best identified from aerial photography and ground survey.

Because of the limited time available for the search only those areas with relatively easy access were inspected.

IV RESULTS

Details of the results of the cave search are presented in Tables I & II. Sketch plans for the caves listed are held in the Geology Section file, but only two are presented here.

1. Bubs Hill

An area immediately to the west of Bubs Hill summit was searched. Many small sinkholes and caves (9 of reasonable size) were found, including 2 numbered caves. Only one of these sites, G2-1, is considered suitable as a shelter. No evidence of human occupation was discovered in the surface deposits of the cave. The approximate location of the cave is shown in Fig. 1 [omitted].

2. Nelson Valley

Two limestone karst areas and the terrain between them were searched for caves.

Twelve caves were found, three of which are listed in Table II. One of these caves, the Nelson River Cave, has previously been described by Kiernan (1979a), and details are given in Table I. The locations of the four caves are shown in Figs. 1 & 2 [omitted].

Caves not included in Table I are either too close to present river level and prone to flooding or are too small or steep to be entered easily.

Bones were found in only the Nelson River Cave (G3-2), however, the other three caves appear to be suitable as shelters and warrant closer inspection.

3. Florentine Valley

Three hundred and thirty-five limestone caves are known in the Junee-Florentine area.

Several caves of known archaeological interest, the main one being Beginners Luck Cave, were inspected.

The cave search was conducted in three parts:

1. a search of known cave areas,

2. a search of recently logged but previously unsearched areas,
3. a search of unexplored, uncut forest areas.

A total of forty caves were visited. Twenty-five numbered caves were located, six of these having possible archaeological interest. Fifteen new caves were found, one being a possible rock shelter and another (Site G16-1) containing a rich bone deposit.

Details of G16-1 are given in Table I and the other seven caves are listed in Table II. The cave locations are shown on Fig. 4 [omitted].

Cave G16-1 is located … [omitted].

A sketch plan and sections of the cave are shown in Fig. 5 [Fig. 5 of main report].

The extent of the cave is unknown as only the entrance was inspected. However, the cave appears to connect with an outflow cave found further to the west and the whole system may be fairly large.

V CONCLUSIONS

During the two week field search approximately 60 caves were inspected. Of these 9 were considered to be of potential archaeological interest and a further 2 had sufficient bone deposit to be considered to have potential archaeological significance.

Much of the Florentine Valley has been searched for caves in the past; few new caves were found in these areas. Very little of the recently logged area is in limestone and no caves of archaeological interest were found in these areas. The region holding the most promise for new cave discoveries lies in the virgin forest to the south of the valley where an area of over 20 sq km of limestone exists. Only a small area of this, near access tracks, could be searched in the time available.

D. R. Wilson, Geophysicist

TABLE I

CAVES CONTAINING ARCHAEOLOGICAL MATERIAL

Location *Name* *Map Sheet (1:100 000)* *Grid Reference* [omitted]	*Aspect & Size* *Height x Width x Length* *(metres)*	*Remarks*
Nelson Valley G3 - 2 (Nelson River Cave) Franklin [-]	North-easterly 10 x 15 x 15 Fig. 3 [main report Fig. 6] Plates 3 & 4	Bones occur in upper horizons of clay deposit and cave breccia in south section of entrance chamber. Deposit has been eroded by cave stream causing slumping of clay and breccia.
Florentine G16 - 1 (Nanwoon Cave) Wedge [-]	North - easterly; extent of cave unknown. Area of deposits 6 m2 see Fig. 5 [main report Fig. 5] & Plates 5-7.	Numerous bones and some teeth in cemented breccia beneath flowstone, near entrance, exposed by recent erosion. Many bones in entrance mound of unknown depth.

TABLE II

CAVES OF POSSIBLE ARCHAEOLOGICAL SIGNIFICANCE

Location *Name* *Map Sheet (1:100 000)* *Grid Reference* [omitted]	*Aspect & Size* *Height x Width x Length* *(metres)*	*Remarks*
Bubs Hill G2-1 Franklin [-]	South-westerly 2 x 4 x 5 Plate 1	Dry 20 m^2 rock shelter.
Nelson Valley G3-1 Franklin [-]	Westerly 2-3 x 2-3 x 8	One metre drop from entrance, burnt logs, many charcoal fragments in cave.
Nelson Valley G3-3 Franklin [-]	North-easterly 1 x 2 x 10	Small shelter 3 m above river level.
Nelson Valley G3-4 Franklin [-]	Northerly 1-3 x 3 x 15 Plate 2	Dry flat 4 m area near entrance, muddy 5 m descent to stream.
Florentine JF-150 Wedge [-]	Northerly 2-5 x 2-3 x 30 See Plate 8	Large cave containing charcoal and bone in clay deposit.
Florentine JF-55 (Deviation Cave) Wedge [-]	Northerly Entrance 2 x 4 x 8 Total length 30 m + Plate 9	Good shelter cave but close to present river level, may still contain some old deposits beneath recent silt.
Florentine JF-53 Wedge [-]	Southerly 1-3 x 5-2 x 12 Plate 10	Large entrance at base of cliff, dry with several small passages, no deposits found.
Florentine JF-260 Wedge [-]	Southerly 2-7 x 1-4 x 15	Large flat area inside cave, charcoal found in cave floor deposit.
Florentine JF-72 Wedge [-]	South-easterly 3 x 3 x 15 Plate 11	Floor covered with roof debris and flowstone, jaw found in small passage.
Florentine JF-185 Wedge [-]	Easterly 1.5 x 4 x 3 Plate 12	Small, dry, shelter cave. No deposits found.
Florentine G10-2 Wedge [-]	Easterly	Rock shelter with large debris mound almost blocking entrance.

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Fig. 1
Caves of Possible Archaeological Significance
Nelson Valley & Bubs Hill
Location Plan [omitted]

Fig. 2
Nelson Valley - Aerial photograph
Cave Locations [omitted]

Fig. 3
Nelson G3-1 Nelson River Cave, Nelson Valley
[see Fig. 6, main report]

Fig. 4
Caves of Possible Archaeological Significance Florentine Valley
Location Plan [omitted]

Fig. 5
Florentine G16-1 Nanwoon Cave, Florentine Valley
[see Fig. 5, main report]

PLATE 1. Bubs Hill Cave G2-1: view of rock shelter entrance.

PLATE 2. Nelson Valley Cave G3-4: view of entrance.

PLATE 3.

Nelson River Cave G3-2: large north-east facing entrance. Nelson River flows around gravel bank into cave.

PLATE 4. Nelson River Cave G3-2: slumped clay and breccia deposit (arrowed) in south chamber of entrance.

PLATE 5. Florentine Cave GI6-1: view of entrance overhang showing moss covered entrance mount (centre).

PLATE 6. Florentine Cave G16-1: eroded breccia deposit beneath flowstone, containing numerous bones and teeth (arrowed)

PLATE 7. Florentine Cave G16-1: eroded breccia deposit beneath flowstone (arrowed), containing numerous bones.

PLATE 8. Florentine Cave JF-150: showing clay deposit forming flat floor near entrance. Pieces of charcoal were observed in the slump (foreground) and bones have been reported by Goede.

PLATE 9. Florentine Cave JF-55: view of entrance showing recent silt deposit.

PLATE 10.

Florentine Cave JF-53:
View of entrance.

PLATE 11. Florentine Cave JF-72: interior view showing fallen roof blocks on flowstone floor.

PLATE 12. Florentine Cave JF-18: view of east facing entrance of small shelter cave.