Abstracts of papers to be presented at

THE ELEVENTH BIENNIAL CONVENTION

OF THE

AUSTRALIAN SPELEOLOGICAL FEDERATION

CANBERRA - DECEMBER 1976

I N T R O D U C T I O N

The papers have been divided into four broad sections as follows:-

A Conservation/Management

B Geology/Geomorphology

C Biology

D Techniques

I would like to take this opportunity to thank all those who have contributed papers - especially those who provided firm commitments and/or abstracts somewhere near the requested deadline.

A. P. SPATE

C O N T E N T S

EVALUATION OF CAVES AND KARST

Elery Hamilton-Smith

Project Director, National Heritage Assessment Study
Australian Speleological Federation

The Australian Speleological Federation has been awarded a research grant by the Australian National Heritage Commission to examine the criteria which might be used in determining which caves and karst features should be placed on the official register of the National Estate. In terms of the legislative definition of the National Estate, it appears that we must, in particular, establish a basis for the assessment of 'significance'.

A variety of techniques are being used to generate discussion of the topic throughout the Federation, and to obtain various levels of feedback to the study group. These will be described fully elsewhere. The present paper raises some of the important issues emerging from the study.

These include :

* validity or otherwise of the assumptions underlying the concept and definition of the National Estate.
* definition and delimitation of a 'place'.
* influence of such factors as state boundaries and accessibility.
* problems in assessment of the clearly subjective characteris such as beauty; and in assessing the degree of subjectivity which enters into apparently objective criteria.
* practical implications of registration per se.

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HUMAN IMPACT AND ITS MANAGEMENT IN CAVES

L. G. Reider
N.S.W. Department of Tourism.

Impact of human use of cave environments is considered in terms of flora and fauna, cave atmosphere and the physical and chemical conditions. Management principles are discussed and include the concept of a cave carrying capacity.

A BASIS FOR CAVE MANAGEMENT

Graeme Worboys
N.S.W. N.P.W.S.

As part of its charter to protect and conserve natural phenomena, the New South Wales National Parks and Wildlife Service has the responsibility of managing a number of cave areas. Because of the unique values of caves and the ever increasing demand on them for recreational usage, the Service proposes to implement a Cave Management Plan which will provide a basis for protecting caves under its control.

The Cave Management Plan introduces a cave classification which will be used to categorise individual caves into management groupings. The caves will then be managed according to these groupings.

Five levels of Cave Management are recognised in the Cave Classification. They are:-

1. the Service Estate Level
2. the individual National Park or Nature Reserve level
3. the cavernous area level
4. the cave level
5. the within-cave level

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CAVES AROUND CANBERRA

J. N. Jennings, Australian National University

The purpose of this paper is to illustrate, primarily for the beginning speleologist, fundamental ideas about limestone cave origins and evolution from caves around Canberra. First, important generalities about the nature of the tiny, impounded karsts involved are set out. Then follows a summary of the relevant hydrodynamic contexts with their related cave morphologies, in which two new terms are introduced to help avoid some misconceptions which arise from present terminology. Next some of the ways, in which these different types of speleogenetic action may combine over time and spatially, are exemplified from local cases. In this the importance of rejuvenation of drainage and relief is apparent but it is stressed that the intervention of very localised factors, especially details of geological structure, tends to be neglected. Some indication of the part that Pleistocene climatic changes may have played in our caves' development is given and the need for more work in this direction, in which cave sediments provide vital evidence, is underlined. Finally the problems of cave chronology are touched upon, with particular reference to the very difficult case of Bungonia.

THE WAITOMO STREAM, WAITOMO GLOW-WORM CAVE, NEW ZEALAND

David Hawke
University of Auckland

The Waitomo Stream, draining a catchment of approximately 45 square km, flows through the Waitomo Glow-Worm Cave. A rapid increase in the rate of sediment deposition in the cave has been noted in recent years, threatening both the cave and the unique faunal assemblage. Ongoing research is aimed at quantifying the erosional and depositional aspects of the stream flow so that conservation measures may be established. This paper will describe the current programme, and present preliminary results.

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MEASUREMENT OF RELATIVE AND ABSOLUTE WATER TABLE LEVELS IN NULLARBOR CAVES

Edward G. Anderson

Several specially conducted trips to the Nullarbor Plain have been made over the period December 1968 to January 1970 with the aim of measuring the differences in height between the water table levels in a number of major caves. In addition, by connecting the surveys to the national levelling network, the water table heights with respect to mean sea level at Esperance and Eucla have been determined. The water table level was assumed to be indicated by the free standing surface of the lakes which occur in some caves. Minor diurnal and longer period fluctuations in these levels are also reported.

Special surveying techniques, devised to cope with the difficult conditions in the caves, are explained and results are presented for Mullumallang (Oasis Valley), Cocklebiddy, Weebubbie (Weebobby), and Murra-el-elevyn Caves.

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CAVES IN THE QUATERNARY RAISED REEFS OF EASTERN MANUS, PAPUA NEW GUINEA

Geoffrey Francis,
University of New England.

There are at least 18 known caves in the raised reefs of Eastern Manus. These range from small single chambers to complex systems with up to 500m of passages developed on more than one level. All caves appear to be of phreatic origin but in some cases bedrock morphology is obscured by sediments, speleothems or breakdown. Loniu Cave contains ferruginous phosphate deposits thought to have formed through chemical reactions between bat guano and sesquioxides which were previously concentrated along

partings and fractures by pressure solution. Cave development was initiated when the sea stood at higher levels and has been influenced by eustatic and tectonic sea level changes. Several caves have water filled lower levels where phreatic solution is now taking place. In the narrower raised reefs groundwater is brackish or saline whereas in more extensive reefs groundwater is usually fresh but may become brackish during dry periods. Limited data obtained from water analyses suggests that brackish and saline waters are sometimes capable of limestone solution. Although cave formation was preceded by substantial diagenetic changes in the reef limestones no sharp distinction can be drawn between diagenesis and karst development. Cave forms are controlled largely by the distinctive geological structures of Eastern Manus but there is little relationship between surface and underground karst morphology. Most of the caves originally developed without penetrable entrances and have only become accessible through being partially unroofed by collapse or exposed by backwearing of the limestone slopes. As percolation waters are usually saturated or supersaturated, cave genesis under these conditions requires processes by which water that has entered the limestone can regain aggressiveness on reaching the water table. The available evidence suggests that "rejuvenated aggressiveness" caused by mixing of ground and percolation waters with different Ca/Mg ratios may be involved. This phenomenon could also be responsible for the formation of bell holes in cave roofs.

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KARST OF THE BORDER RIVERS REGION, QUEENSLAND AND N.S.W.

K. G. Grimes,
U.Q.S.S.

The Border Rivers Region contains the only significant karst areas in southeast Queensland. Three cave areas occur in small limestone lenses within the Carboniferous Texas Beds of the New England Fold Belt. The Texas Caves were the largest area and have been studied in most detail. The two smaller areas are at Riverton and Ashford.

Surface karst forms include a diversity of well developed karren forms. Large collapse dolines, karst windows, and a natural arch were associated with the Glenlyon system. Cave development probably commenced in late Pleistocene times after the limestone lenses had been exposed by Pliocene-Pleistocene uplift and dissection.

At the Texas Caves the partly collapsed, high energy "vadose" Glenlyon system is a subterranean cutoff of a meander spur of Pike Creek. Relatively high energy stream passages are superimposed on an earlier low energy "phreatic" network. Complete capture of the creek has not occurred as collapsed sections of the cave have restricted stream flow through the system.

On the other side of Pike Creek, the Viator Hill caves are dominantly low energy "phreatic" systems which formed at several levels as the valley developed. A few passages show evidence of strong flow and water from Pike Creek may have been diverted through the hill on one or more occasions. There were two main periods of deposition and speleothem formation within the caves. Bone deposits have been sampled, and some unusual phosphate minerals have been identified in old guano deposits.

The Riverton Cave is a dominantly low energy "phreatic" system. The main Ashford Cave is in part an abandoned subterranean cutoff of a meander spur, but "phreatic" features dominate.

Riverton Cave is important as a maternity cave for Miniopterus schreibersii. Ashford is a locally popular, but uncontrolled recreation cave. Both Riverton and Ashford have been mined for guano in the past. The Texas caves have been flooded by the Glenlyon (Pike Creek) Dam.

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ATEA KANADA

Julia James,
Randall King and Neil Montgomery

The Atea Kanada, located in the tropical rainforest of the Southern Highlands of Papua-New Guinea was investigated during the recent 1976 Muller Range Speleological Expedition. In the course of the expedition, 3 kilometres of cave passage in the Atea Kanad were mapped, a 5½ kilometre survey between the Atea sink and its resurgence undertaken; and a preliminary speleological study was made of the Atea system. Covered in this paper are the various results of this investigation : area physiography, hydrology, cave map and description, geology and the caves future potential as a contender for the Southern Hemisphere depth record.

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AN INTRODUCTION TO THE LIMESTONE RANGES OF THE CANNING BASIN, WESTERN AUSTRALIA

Robert S. Nicoll,
C.S.S.

A series of low limestone ranges extend for 275 km along the northern margin of the Canning Basin in the northern part of Western Australia. To the north of the limestone ranges lie the mountains and plateaux of the Kimberley Block.

The limestone ranges are exhumed reef complexes of Late Devonian Age. They extend in a discontinuous belt, that is rarely over 15 km wide, from 175 km NW to 100 km SE of Fitzroy Crossing In some areas the ranges may stand as much as 200 m above the surrounding plains.

Karst features, including caves, are abundant in the region but very few major caves have developed.

ADVANCES IN VERTICAL TECHNIQUES

Chris Parr,
C.Q.S.S.

With the introduction of petzel gear at the start of this year we had to change our ideas on gear application. Out of all the petzel we have imported, the outstanding bits have been the handled ascender and the shunt.

The ascender is pressed out of high tensile aluminium with a cast cam. The locking lever on the cam locks it shut as well as open. It has a load limit of 400 kg. The outstanding point of the design is that the attachment point is directly below the rope channel. It can be taken off the rope to ger over a knot by one easy thumb movement of the hand.

The shunt is an abseil protection device. It works on a smooth cam to which a tape is attached to the Whillans harness. A spring puts slight pressure on the cam when it is in position. When moving, the shunt has to be held by the trailing hand. When the shunt is let go, the spring pressure stops the device on the rope. The body weight then comes on to connecting tape which locks the cam in position. To release the shunt, the body of it has to be pulled down.

Another device we have developed is called the C.Q.S.S. descender. The reason for doing this was the need for a safer device. The problems with stich plates, hopf rings, whaletails etc., is that when you let go the rope, (rock falling on bash hat) you travel to the bottom at the same speed as the rock.

Our idea was for a device which locked up when you let go of everything. The short pitch device (70m) has had the first production models produced. I am still working on the 300m device. I am the only one making these at the moment as I have access to (1) a large quantity of tough, medium tensile aluminium plate,(2) Argon Arc M.I.G. welders, (3) ultrasonic flaw detector, and (4) an engineering workshop.

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THE SAFETY OF VERTICAL CAVING EQUIPMENT

John Bosler

The single rope technique (SRT) is now widely used in caving. However, it remains a potentially hazardous occupation, because of the relative absence of any back-up safety devices. If the anchor or rope fails, there is no back-up. If a jumar fails, while the other jumar is not on the rope, there is no back-up.

The search for safety in SRT should be an ongoing process. The perfectly safe SRT system has not been built. It is an impossibility.

The person who claims it can be built is at best, using his terms loosely - at worst, woefully ignorant of the limitations of his equipment.

The task of the SRT designer, is to develop a system, where the chances of failure are reduced to an acceptable level. The questions he must answer are : what dangerous situations can arise using SRT, and how can these dangers be reduced?

Up to now, these questions have been answered in an ad hoc manner. The philosophy has been : "if it looks O.K., give it a go". Unfortunately, intuition does not produce the safest systems. It is time the design of SRT systems was placed on a more scientific footing.

The speaker will explain, in non-technical language, the principles governing the safety of SRT equipment. Using these principles, the importance of the "fall factor", and the unimportance of the "breaking strain" quickly become obvious.

The strengths and weaknesses of the individual components of the SRT system - the karabiners, jumars, whaletails, ropes and anchors will each be studied in turn.

In conclusion, the speaker will offer several recommendations for improving the safety of SRT systems.

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HIGH ALTITUDE PHOTOGRAPHY IN CAVES

Lloyd Robinson,
I.S.S.

This paper describes equipment and techniques in photographing "inaccessible" places in caves, such as the upper levels of high caverns or avens; the Gunbarrel aven at Wyanbene being a prime example. A brief account is given of the events that led up to such photography and the reasons for same.

A full description is given of constructing the lightweight equipment used i.e. camera, flash unit, electronic control unit, power supply and mountings. An operational run-down of taking a high level photograph and the people involved is described with problems and pitfalls discussed. Attention is given to various methods employed to aim the camera in the desired direction. The types of film used and the problems encountered in developing same are described. Examples of actual photographs taken and equipment used will be shown.

Finally improvements to existing equipment and more ambitious additions are dealt with.

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ELECTRO-MAGNETIC UNDERGROUND POSITION LOCATION

Greg Hurst,
U.N.S.W.S.S.

The technique of electro-magnetic underground position location using induction coupling (often referred to somewhat incorrectly as Radio Direction Finding) has been tried and used with varying degrees of success by a few people over recent years.

However it appears that the full capabilities and limitations of this technique have not always been appreciated. This paper outlines the theory and problems with the technique and will attempt to show how optimum performance and full use of the techniques capabilities may be achieved. A recently constructed apparatus with the capability of accurate position location through at least 250 metres of limestone will be described. This sort of range renders this instrument very useful indeed as a means of externally closing long survey loops as well as other obvious and not so obvious applications.

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CAVE DIVING IN AUSTRALIA AND THE DAVE DIVING ASSOCIATION OF AUSTRALIA

Peter Stace,
C.E.G.S.A. and C.D.A.A.

Since the advent of self contained underwater breathing apparatus (S.C.U.B.A.) a new form of cave exploration has become possible. Aided with this valuable new tool many caves have been lengthened, and indeed many new caves located because exploration can now continue where once it ceased at water filled sections. These discoveries however have not been without difficulty since the cave diver in comparison with his 'dry caver' counterpart is faced with a more physically and mentally arduous task which leaves no room for error.

True cave diving is still performed by a select minority of divers many of whom have considerable caving experience in contrast with the more popular sink hole diving (as carried out in the South East region of S.A.) which is more available to the general diving fraternity the majority of whom have never seen a real cave. Sink hole diving although not as extreme as cave diving is however still far more demanding than ocean diving.

In the late 60's and early 70's an uncontrolled boom occured in sink hole diving and in 1973 after several fatalities it appeared that the South Australian Government might intervene. This resulted in the formation of the Cave Divers Association of Australia. Although still in its infancy the C.D.A.A. has provided a united front for all cave divers with full recognition from the State Government and has implemented standards by which members are tested before entry is allowed into the corresponding category sink hole. While the C.D.A.A. was initially formed to prevent either closure or government control of sink holes in the Mount Gambier area it now looks to providing a long needed forum for the promotion of education and self discipline in all forms of cave diving throughout Australia.

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THE COPPERMINE SYSTEM, YARRANGOBILLY

Andrew Pavey and Alan Warild,
U.N.S.W.S.S.

The history of cave exploration is discussed, together with a detailed description of the caves thought to make up the drainage basin which resurges at Coppermine Cave (Y12). The prospects for further exploration and study are also discussed.

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PRELIMINARY REPORT ON DRAINAGE MODIFICATION IN THE DEEP CREEK-EAGLES NEST BASINS, YARRANGOBILLY, NSW

Robert S. Nicoll,
C.S.S.

To account for the present distribution of cave systems in the Deep Creek-Eagles Nest area of the Yarrangobilly Cave Area significant modification of drainage patterns must have taken place. The size of drainage basins have changed significantly in the past 22 million years. The drainage basins now feeding the North and East Deep Creek cave systems have decreased in size, but the West Deep Creek drainage basin has greatly increased in size.

Three upper level cave systems, Janus, Restoration and East Eagles Nest, are identified and are correlated with the One Tree Hill Strath developed in the Yarrangobilly River Valley. Lower levels of North Deep Creek, East Deep Creek and Eagles Nest Caves appear to be related to the present level of the Yarrangobilly River.

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PRELIMINARY ACCOUNT OF TRIPLE DYE TRACING AT YARRANGOBILLY

A. Spate, J.N. Jennings, D.I. Smith and J.M. James,
Y.R.G.

Over 30 cavers from several clubs, a fluorometer and 3 automatic water samplers were combined last October in an attempt to quantify part of the Y46 catchment at Yarrangobilly employing rhodamine WT, leucophor and fluorescein simultaneously. Sampling was not upset by heavy rain but flood water carried dye from Traverse Creek into Yarrangobilly River before it had disappeared underground and rising natural background fluorescence interfered drastically with the whole exercise. Since the latter happening is of considerable methodological importance, people's efforts were not wasted.

QUATERNARY KARST AT BAT RIDGES, VICTORIA

S. White and M. Pierce, V.S.A.

Bat Ridges is an area of Quaternary calcareous dunes near Portland, Victoria. The dunes have karst development which appears to be syngenetic as karst processes have occured concurrently with the consolidation of calcareous sand into aeolian calcarenite. Features related to syngenetic karst development such as solution pipes, cap rock, horizontal cave development, low solutional ceilings, roof collapses and secondary features are described. The Victorian Speleological Association is currently engaged in detailed exploration and documentation of the area.

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KARST AT NEW GUINEA, SNOWY RIVER, VICTORIA

R.K. Frank and A.G. Davey;
V.S.A.

One of the features of the Snowy River Gorge north east of Buchan, Victoria, is a small but spectacular area of karst, at New Guinea. This is developed in an isolated occurrence of massive limestones of the Middle Devonian Buchan Group, down-faulted into the Lower Devonian Snowy River Volcanics; and is one of several small outliers of the Buchan basin.

The limestone occurs as a dissected bench along the gorge and is characterised by substantial cliffs, well developed dolines, and a number of interesting caves.

Speleological investigations at New Guinea in recent years indicate that the geomorphology, hydrology, cave biology, and surface vegetation of the area are of considerable interest. This paper summarises the discovery and exploration of the area, and describes the main characteristics of the karst and associated features. A number of issues in land use planning and management of an area such as this are discussed.

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CONSERVATIONISTS - AND THEIR BLIND SPOTS

Elery Hamilton-Smith
Victorian Speleological Association

A shortage of funds and other resources to support conservation action, coupled with the impact of irresponsibly discontinuous (= necessarily flexible) governmental policies, means that conservationist movements are particularly vulnerable at the present time. Yet, there has probably not been a time when there is more need for such movements to operate in the most active and effective way open to them. The present paper points to some directions in which conservationists might strive for greater impact.

Many conservationists are politically naive. Even to distinguish conservationists from "preservationists" and to argue that, as conservationists, we are presenting a truly balanced picture is a potentially dangerous piece of rhetoric. There has also been a general lack of awareness of the need to build general and widespread support - more often, it has been alienated. More disastrously, conservationists struggle for power with each other, rather than focussing their efforts outwards and directing these towards key power foci.

Emotional over-identification with one's own cause, or ignorance of ecological principles, or lack of time to even see the overall picture, or a combination of these leads, at the best, to a poorly developed case, and at the worst, to neglect and eventual sacrifice of features of greater value than those we fight to save.

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POLLUTION OF MOONS CAVE, BUCHAN, VICTORIA

A case study in cave reserve management

N.J. White and A.G. Davey, V.S.A.

Moons Cave (B2) is a former tourist cave in the main reserve at Buchan. It is downstream of the camping area; effluent from toilet and shower blocks flows through the cave.

This paper summarises the history and management of the Buchan Cave Reserves and describes investigations in this and other management problems. Legal and practical aspects of reservation, management, pollution control and cave protection are discussed.

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MOUNT ETNA CONSERVATION

Glenn Pure
U.Q.S.S.

Mount Etna is a large cave complex, north of Rockhampton in Central Queensland, containing over 150 caves.

A brief history of this 15 year old conflict is given with special emphasis on interpretation of government and public response to tactics used. In particular, attention will be focused on the local response to a land use plan developed for the Mount Etna complex and to Queensland government response to an economic report saying that mining at Mount Etna is uneconomic.

Let's look at the bright side - perhaps we could make artificial caves and bats with cement produced from Mount Etna limestone!

KARST RESOURCE MANAGEMENT

A.G. Davey,
Convenor, ASF Commission on Conservation

Karst is a complex natural resource which can be used and abused in a vast number of ways. Resource management techniques provide a basis for reconciling the different needs of the various uses competing for the same resource.

This paper offers a perspective on the rationale for management and conservation of caves and karst landscapes. A number of issues with important implications in karst resource management are discussed, including: land use planning and management, decision-making processes and public involvement, environmental law, and political reality.

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SCOUT CAVING IN N.S.W.

Peter Dykes

(No abstract received)

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MICRO-ORGANISMS ON CAVE WALLS IN THE DEEP TWILIGHT ZONE

Guy Cox
S.U.S.S.

A greenish tinge is often observable on cave walls well into the 'deep twilight zone', where human vision requires considerable dark adaptation. To study the organisms responsible for this colouration a site in Hennings Cave, Jenolan where day time illumination does not exceed 0.002 lx was chosen. In the surface layer of rotten limestone 4 photosynthetic micro-organisms have been recognised; a unicellular green alga (Chlorella sp.) and 3 unicellular blue-green algae. The electron microscope reveals that the Chlorella and one of the blue-green algae (Gloeocapsa sp. ?) show extreme modifications for photosynthesis in this very low light intensity.

Various non-photosynthetic organisms are also found in the colonies. A fungus is occasionally seen, and there is a range of gram-negative and gram-positive bacteria. One of these bacteria also forms extensive colonies on limestone and mud in the dark zone. Another resembles no type previously described, and may have evolutionary significance. These organisms together represent a complex ecosystem which has never previously been studied.

STRUCTURE AND FUNCTION WITHIN THE TWILIGHT ZONE

Glenn D. Campbell
School of Zoology
University of N.S.W.

The twilight zone of a cave, while showing a microclimate intermediate between the surface environment and the cave aphotic zone, often has its own characteristic fauna. Thus, this zone becomes an ecological entity and can be described in relation to its structure and function. The basic eco-physiological factor of light, temperature, humidity, and wind direct or influence the biological activity within this zone. A comparison can be made between the faunas of the surface, cave twilight zone, and cave aphotic zone based on responses to these factors.

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SILVERFISH IN AUSTRALIAN CAVES

Graeme Smith

Silverfish as part of the world's cave fauna is briefly described. Cases of silverfish in Australian caves are given along with discussion of their status in the ecology of the cave. Included is comment on assessing an organisms adaptions to living in a cave when the entire family is normally depigmented and eyeless. Specimens of the Bungonia Caves silverfish are used as a case study of these animals and their behaviour.

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A REVIEW OF THE BAT BANDING WORK OF BARBARA DEW

Ian Wood
U.N.S.W.S.S.

Barbara Dew died in 1968 and her last entry in her field notes is dated 4/5/68.

Her first entry is the 30/10/60 where she banded 14 bats in the North Sydney Railway Tunnel.

Over these 8 years she banded at Wombeyan, Bungonia, Jenolan, and Wellington all well known sites, but other areas such as Woni Tunnel, Katoomba Coal Mines, Seven Hills, Hill End and other areas are mentioned.

This paper summarises all the areas visited by Barbara with details of banding, and subsequent recoveries.

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CAVES AND ABORIGINAL MAN IN TASMANIA

Albert Goede
Department of Geography,
University of Tasmania

The survival of archaeological evidence in Tasmania owes much to the suitable preservational environment found in shelter caves and to a much lesser extent in limestone caves.

Cave art is almost unknown. Hand stencils have been recorded from two sandstone shelter caves in the Derwent Valley one of which has since been flooded by a hydro-electric scheme. Recent work suggests that mainland aborigines may be responsible for the paintings.

Ancient sea caves at Rocky Cave have been the scene of extensive excavations and have revealed an occupation history beginning some 8000 years ago and lasting until historical times. The stratigraphic sequence has revealed significant changes with time in diet and in source materials for stone tools. A most spectacular find was the discovery of a 'living floor' found in an enclosed chamber which had become sealed by debris some 6,700 years ago.

Of outstanding significance in recognizing the antiquity of Man in Tasmania has been the excavation of Cave Bay Cave on Hunter Island off the northwest coast. During the last three years this cave has yielded an archaeological record going back nearly 23,000 years.

Archaelogical evidence from limestone caves in increasing. A bone implement was recorded from a cave fill, exposed in a limestone quarry at Flowery Gully, that may have accumulated some 7,000 years ago.

Last year, following the exploration of Beginners Luck Cave in the Florentine Valley, investigations of bone deposits by Dr. Peter Murray and the author led to the discovery of an underground archaeological site. Finds include four stone implements associated with charcoal, charred bone fragments as well as spirally fractured and butcher-marked bones. C14 dating of the associated charcoal has provided a date of 12,600 $\pm$ 200 years B.P. This is the first clear evidence of the presence of Aboriginal Man in the interior of Tasmania during the last ice age.

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CAVCONACT 76

List of Registrants

(NR- Non Residents)

Name	State	Room
AGNEW, Max	ACT	NR
ALLUM, Ron	SA	NR
ALLUM, Robyn	SA	NR
ANDERSON, Neil	ACT	NR
ANDERSON, Ted	ACT	NR
ARNOTT, Dale	SA	313
AUSTIN, Tony	NSW	314
BATEMAN, Judy	ACT	NR
BELL, C.	NSW	NR
BELL,Peter	WA	316
BERGERSEN, Frank	ACT	NR
BOGG, Ian	NSW	107
BOSLER, John	NSW	117
BOWERS, Phill	ACT	NR
BROWN, Leslie	QLD	235
BROWN, Lex	QLD	235
BRUSH, John	ACT	101
BUNTON, Steve	NSW	327
CAMPBELL, Glenn	NSW	213
CAMPBELL, J.	WA	NR
CHAPMAN, Ross	NSW	NR
CHRISTMAS, David	QLD	320
COGGAN, Marjorie	ACT	101
COX, Guy	NSW	227
CRABB, Evalt	NSW	340
CROCKER, Martin	WA	124
CULBERG, Tony	TAS	NR
CUNDY, Jim	SA	333
CURTIS, Roger	ACT	204
DANN, John	ACT	NR
DARGAN, Gary	NSW	207
DAVEY, Adrian	VIC	321
DIXON, Owen	QLD	208
DOWNES, Bill	NSW	132
DOYLE, H.M.	ACT	NR
DUNKLEY, Jeanette	ACT	NR
DUNKLEY, John	ACT	NR
DUNN, Bob	ACT	118
DUNNE, Christopher	NSW	NR
DUNSTALL, Syd	WA	NR
DYKES, Peter	NSW	NR
DYNE, Bob	ACT	120
FERGUSON, Graeme	NSW	307
FINGER, M.L.	NSW	NR
FISHER, Neil	ACT	NR
FRANCIS, Geoffrey	NSW	NR
FRANK, Rudy	VIC	108
FULLERTON, Pat	TAS	NR
FURLONGER, John	ACT	NR
GOEDE, Albert	TAS	NR
GORTER, John	ACT	NR
GOULDING, John	NSW	130
GREENFIELD, Paul	NSW	128
GRIMES, Ken	QLD	114
HALLAM, Mark	ACT	NR
HAMILTON-SMITH, Elery	VIC	NR
HANDEL, Katherine	NSW	206
HARDING, Allan	ACT	NR
HART, Peter	ACT	NR
HART, Ray	WA	NR
HART, Rosalind	WA	NR
HAWKE, David	NZ	NR
HAYDEN, Rose	SA	125
HINE, Judith	TAS	NR
HOPE, Jeanette	ACT	NR
HOPKINS, Gerry	NSW	209
HOPKINS, Mrs	NSW	211
HUNT, Glen	NSW	105
HURST, Greg	NSW	201
HURST, Liz	NSW	201
INNES, Geoffrey	NSW	NR
JACKSON, A.	SA	NR
JENNINGS, Joe	ACT	NR
KING, Randall	NSW	337
LAMBORN, Neil	VIC	325
LANCE, Ken	WA	129
LEFOE, Brian	NSW	102
LESLIE, Bruce	VIC	328
LOVEDAY, Barry	WA	326
LOVEDAY, Frank	WA	304
LUTHERBORROW, Ian	NSW	NR
McCLAREN, Jeanette	WA	NR
McQUILLAN, Brian	NSW	NR
MADDERN-WELLINGTON, G. Rhys	VIC	222
MALEY, Ian	QLD	NR
MALEY, Sandra	QLD	NR
MASALA, John	ACT	NR
MATTHEWS, Margot	VIC	240
MATTHEWS, Peter	VIC	240
MATTHEWS, Ted	NSW	NR
MAKARY, R.	VIC	336
MILL, Lloyd	VIC	308
MINCHIN, John	NSW	NR
MOORE, Barry	ACT	NR

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Name	State	Room
MOTT, Kevin	SA	127
MURPHY, Christopher	VIC	131
MURPHY, Rosemary	QLD	111
OWEN, Mike	ACT	NR
OZSDOLAY, E.	WA	NR
NELSON, Gloria	QLD	232
NICHTERLEIN, Dorothy	NSW	202
NICOLL, Bob	ACT	134
NIELSON, Leslie	QLD	302
NIELSON, Ronald	QLD	302
PAIGE, D.	WA	NR
PARR, Chris	QLD	334
PATERSON, David	NSW	126
PATTISON, Graeme	NSW	112
PAVEY, Andrew	NSW	NR
PIERCE, Miles	VIC	318
PILKINGTON, Ann	SA	NR
PILKINGTON, Graham	SA	NR
PORTER, Jeff	QLD	332
RADCLIFFE, Peter	NSW	NR
RIEDER, Ludwig	NSW	NR
ROBERTSON, Annette	ACT	203
ROBINSON, Lloyd	NSW	NR
ROTHERY, David	NSW	315
RYLAND, Val	WA	NR
SAMBRAILO, F.	WA	NR
SAMUEL, Janeen	QLD	116
SANDS, Noel	QLD	234
SAUNDERS, John	ACT	NR
SCOTT, Jane	WA	NR
SCOTT, Roger	WA	NR
SEFTON, C.	WA	NR
SEFTON, R.	WA	NR
SEFTON, Mark	VIC	220
SHANNON, Henry	QLD	221
SMITH, Dave	VIC	303
SMITH, Graeme	NSW	212
SPATE, Andy	ACT	122
STACE, Peter	SA	cancelled
STEENSON, Robin	NSW	226
SURRIDGE, Jan	QLD	NR
SYNNOTT, Derek	NSW	NR

Name	State	Room
TAYLOR, Gordon	ACT	NR
TAYLOR, John	NSW	202
TEW, Helen	QLD	301
TOOMER, Phil	NSW	109
TOOP, John	QLD	228
TOOP, Pauline	QLD	230
VASEY, Alan	NSW	215
WALKER, Mike	NSW	311
WALLIS, Helen	NSW	219
WEBB, John	QLD	301
WEIR, John	NSW	225
WELCH, Bruce	NSW	312
WHALEY, L.	SA	224
WHEATLEY, Steve	NSW	NR
WHITE, Nick	VIC	140
WHITE, Sue	VIC	140
WHITEHOUSE, T.	VIC	210
WILLIAMSON, Greg	QLD	NR
WILLIAMSON, Kerry	WA	NR
WILSON, Gray	VIC	218
WILSON, Jim	ACT	NR
WILSON, Vickie	ACT	NR
WILTON, Bill	NSW	217
WINGLEE, Peter	NSW	322
WOOD, Ian	NSW	239
WORBOYS, Graeme	NSW	331
YOUNG, John	SA	123.

!!!!!!!!!!!!!! ADDENDA !!!!!!!!!!!!!!

HARRIS, Chris	TAS	NR
SUHN, John	VIC	NR
SUHN, Julie	VIC	NR