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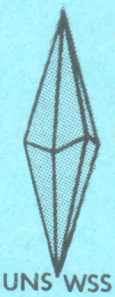
AUSTRALIAN SPELEOLOGICAL FEDERATION



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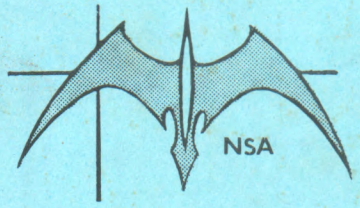

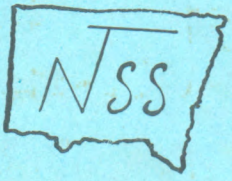

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Number Fifty — December 1970

A S F N E W S L E T T E R

AUSTRALIAN SPELEOLOGICAL FEDERATION

Editorial . . . . . .

THIS IS THE 50th ASF NEWSLETTER; THE HALF - CENTURY ISSUE THAT IS A HISTORIC ONE FOR SEVERAL REASONS. IT IS THE BIGGEST ISSUE THERE HAS EVER BEEN AND IS NEARLY AS BIG AS ALL THE 1969 ISSUES PUT TOGETHER. IT WILL ALSO QUITE LIKELY BE THE LAST.

SINCE ITS INCEPTION IN 1957 AS A ONE PAGE SHEET, THE NEWSLETTER HAS CHANGED DRASTICALLY IN FUNCTION, QUALITY AND QUANTITY. ORIGINALLY IT WAS SEEN MAINLY AS RECORDING WORK IN PROGRESS IN SPELEOLOGICAL RESEARCH. LATELY MEMBERS HAVE WANTED IT TO BE ALL THINGS TO ALL MEN AND THAT HAS BEEN HARD TO ACHIEVE ON A BUDGET OF 35c. FOR A YEAR. WHATEVER YOUR INTERESTS, THOUGH, I AS EDITOR HAVE COMBED THE SPELEO SCENE TO BRING YOU SOMETHING WORTH READING WHILE AT THE SAME TIME FULFILLING THE OTHER FUNCTION OF GIVING OUR MANY OVERSEAS READERS AN OUTLINE OF SPELEOLOGY IN AUSTRALIA.

HOWEVER THE JOB IS ENERVATING TO SAY THE LEAST. FEW PEOPLE SEEM TO APPRECIATE THAT THIS IS BY FAR THE BIGGEST SPELEO PUBLICATIONS JOB IN THE COUNTRY, WITH AN OUTPUT IN 1970 GROSSING 102,000 PAGES. EACH ISSUE RUNS 800 COPIES. I HAVE EDITED AND TYPED EVERYTHING IN NOS. 43-50, DUPLICATED ABOUT HALF THE TOTAL AND HELPED ASSEMBLE SOME. BUT WITHOUT THE ASSISTANCE OF SYDNEY ASF SOCIETIES THE NEWSLETTER STAFF COULD NOT HAVE BROUGHT IT UP TO DATE - TO MAKE THIS THE FIRST ISSUE IN AT LEAST 6 YEARS TO REACH YOU ON TIME. WE ARE MOST GRATEFUL TO bmsc, hcg, mss, sss, suss AND unswss AND THE MANY INDIVIDUALS WHOSE EFFORTS WERE ACKNOWLEDGED ON THE BACK OF EACH ISSUE.

NEVERTHELESS, AS I SAID, THIS MAY WELL BE THE LAST ISSUE. COSTS HAVE ROCKETED IN THE LAST YEAR OR SO, ESPECIALLY POSTAGE RISES WHICH IN THE LAST FEDERAL BUDGET INCREASED OUR POST COST FROM ½c. TO 2c. EACH. ON THE PRESENT BUDGET, ONLY 8 PAGES PER ISSUE COULD BE AFFORDED NEXT YEAR. THIS YEAR'S BIG ISSUES EXHAUSTED AN ACCUMULATED SURPLUS FROM 1968-9. AS WELL, GENERAL ADMINISTRATIVE COSTS WILL RISE SHARPLY NEXT YEAR ON FIXED COMMITMENTS.

NEITHER THE NEWSLETTER MANAGER NOR THE EDITOR IS OFFERING FOR RE-ELECTION NEXT YEAR BECAUSE THE JOB IS GETTING TOO BIG UNDER THE PRESENT SYSTEM. YOUR SOCIETY HAS BEEN SENT A DETAILED ECONOMIC ASSESSMENT OF THE NEWSLETTER. MY RECOMMENDATION IS THAT IT BE ABANDONED, FOR THE DOUBLING OF FEES NECESSARY TO MAINTAIN IT AT A RESPECTABLE QUALITY IS UNLIKELY TO BE FORTHCOMING. SOCIETY DELEGATES ARE NOTORIOUSLY STINGY ABOUT A MATTER COSTING A WHOLE 1 PACKET OF CIGARETTES A YEAR AND PERHAPS TO SOME OF THEM THAT IS ALL ASF IS WORTH. IF IT COMES TO A VOTE IN YOUR SOCIETY, I URGE YOU TO CONSIDER CAREFULLY WHAT I HAVE MENTIONED ABOVE, ASK WHAT YOU REALLY WANT FROM ASF, AND DECIDE WHETHER TO SUPPORT A DECENT NEWSLETTER, OR NONE AT ALL.

. . . . . .

NEW AUSTRALIAN DEPTH RECORD

-- see p. 28

NSW CO-ORDINATION COMMITTEE

A new step forward was taken by holding a meeting of the Coordination Committee outside Sydney: NUSS hosted delegates from 7 societies in Newcastle on 22/8/70.

Cave numbering proposals were discussed and another report will be made at the next meeting. The route of the Snowy Mountains Highway at Yarrangobilly was argued and further information is being sought before representations are made to the Department of Main Roads. SSS announced that it had assumed control of access to Walli Caves and that permits would be granted for responsible caving in the area under certain conditions. Attention was drawn to several recent instances of otherwise quite responsible societies who have represented the actions of other ASF clubs or individuals in an unfavourable manner. The Meeting recommended that an appropriate clause be added to the ASF Code of Ethics to cover this undesirable practice. It was reported that a preferred path had been marked through a Yarrangobilly cave using green paint. The Committee recommended the use of red PVC covered electric cable or similar material which could be laid along the path and be capable of being removed without damage to the cave. The perennial problem of caving outside ASF societies raised its ugly head again and a small subcommittee was formed to report on possible means of reducing this trend and to investigate present ASF membership policies in the light of NSW experience.

ACCESS TO CLIEFDEN CAVES

For several years Orange Speleological Society has controlled access toCliefden Caves for the property owner Mr B. Dunhill. Recently a rapid increase has occurred in damage to several smaller caves and special restrictions have now been placed on visits to Boonderoo, Trapdoor and Yarrowigga Caves:

1. A card issued for a trip must specify that these caves are available to the visiting group. An ordinary trip card does not mean that keys to these caves will be available. They will only be handed over on the authority of OSS.

2. Only six full members are permitted into the abovenamed caves at a time. No prospectives are permitted. One of these people must be a member of OSS, whose presence is to ensure the safety of cave formations. Two of the three caves are in very good condition and it is hoped we can keep them this way.

The owner of the property is interested in conserving these caves and it is up to OSS to try to do this. We are also responsible in other ways. The landowner has to make his living from the land. Without OSS controlling the area he would be faced with many difficulties which could force him to close the area. OSS have the task of taking this load off him and ensuring the welfare of his property.

SEARCH & RESCUE PRACTICE, YESSABAH

A small-scale practice was organized at Yessabah by Newcastle University Speleological Society on October 3-4-5. Despite short notice about 20 members of 5 societies attended. Accommodation was arranged by Kempsey SS at a local scout hall and all were very grateful for the unaccustomed luxury of electric light, refrigerator and stove. They story was that a very keen caver had gone to Yessabah on Saturday and not been seen since. A very hot Sunday was spent thrashing up and down the worst lantana and limestone this side of Mt Etna. The fellow was located in a 60' deep pothole half way up the mountain and unceremoniously hauled out on a rude, rather basic stretcher. As well as being the first S & R for the Newcastle people this trip was an excellent opportunity to meet cavers from other clubs.

S&R CALLOUT, COLONG

Several SSS members were called from their beds at an unearthly hour on the morning of Monday 13 July, 19 70, with a report of a missing person on the surface at Colong. They arrived at Batsh Camp at 0800 to join police and a party from Lithgow and were about to join searchers when a call was received stating the missing boy had been found. They were able to assist with food and drinks. It appears that the boy had visited Colong Cave with two others on Saturday night. After leaving the cave they climbed the long steep hill. Two became tired and the third decided to push on alone. He reached the top but made a wrong turning at a fence, blundered through the bush, along the base of a cliff and through a swamp, apparently in the direction of Kanangra Walls. On Saturday night he slept in a hollow log. The mid-winter night was extremely cold and it is fortunate he was found on Monday. Read the editorial to ASF Newsletter 45 (Sept. 1969) and don't say I didn't warn you.

CENTRAL REGIONAL COUNCIL OF SPELEOLOGICAL SOCIETIES

BMSC, MSS and HCG announce the formation of the Central Regional Council of Speleological Societies. The Council will consist of 2 members from each of the three clubs and functions as an advisory body in matters of management and procedures. Its objectives include

A unified Search and Rescue procedure
Free interchange of information between member clubs
Membership standard recommendations
Inter-club participation in trips and projects

The three clubs held a "mini-conference" under the auspices of the Council at Mudgee on October 3-4-5, 1970. Co-operation was received from several local organizations and a number of caving field trips were held to local limestone areas.

Editor's Note: The editor applauds this excellent example of interclub liaison and co-operation but earnestly and sincerely commends to the three clubs his personal view that the best interests of the constituent clubs, their members & Australian speleology generally would benefit still more from an amalgamation of the three clubs into a single unit with all the resulting economies of large scale.

A NOTE ON THE NAME "JILLABENAN"

GREG MIDDLETON, SSS

In his article on reeent discoveries at Yarrangobilly in the March 1970 issue of this publication (A.S.F Newsletter 47, p. 9) Mike Webb stated: "The Jersey was, until 1899, known as the Jillabenan ...". I do not believe that this is correct, although some confusion is understandable.

According to Leo Hoad (pers. comm.), a guide at Yarrangobilly from 1904 to 1954, the entrance now numbered Y23 was first located in 1861 by the Marshall Brothers, graziers from Rankins Springs, but Jack Gibb and a New Zealand friend named Dickson were the first to descend into the section known as 'Chaos' and discover the rest of the cave in 1884. The cave was first publicised as a result of a visit by Charles Kerry (the famous photographer) and party in 1891 (Anon., 1891). The name Jersey was suggested by a member of Kerry's party, in honour of the new State Governor, the Earl of Jersey, and a telegram was dispatched to his Lordship seeking his approval. This was subsequently given and Lord Jersey opened the cave personally in 1892 (numerous contemporary newspaper accounts).

In the meantime, Messrs Anderson and Leigh of the Mines Department inspected the cave and, apparently unaware of the name assigned by Kerry, suggested 'Jillabenann' for the reason Webb states (Anderson & Leigh 1891). There appears to be no further official comment on the matter but the suggestion was obviously not adopted as the next published report (Leigh 1892) refers to the cave as the Jersey.

The name 'Jillabenan' was suggested by Charles Kerry in 1910, during a discussion with Oliver Trickett and Percy Hunter, Director of the Tourist Bureau, for a cave (Y22) which had recently been opened by Leo Hoad and others (Hoad, pers. comm.). In this case the name was immediately adopted. Undoubtedly Kerry was aware of Anderson and Leigh's earlier suggestion of the name and thought it would be suitable for Y22.

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ANDERSON, W & W.S. LEIGH (1891) : Report on newly discovered Caves at Yarrangobilly Creek. Ann. Rep. Dept. Mines NSW, 1891 : 249-252

Anon. (1891) : A Buggy Ride from Gundagai to Cooma and how we discovered the Jersey Cave. Illustrated Sydney News, 11 April 1891

LEIGH, W.S. (1892) : Progress Report by Mr W.S. Leigh, Superintendent of Caves Ann. Rep. Dept. Mines NSW, 1891 : 280

* * * * *

Editor's Note: Mr Middleton has, for the past few months, been employed by National Parks and Wildlife Service of N.S.W., straightening out the historical and other records relating to Yarrangobilly In N.S.W. at least, very little of the history of our caving areas has been properly researched in a scholarly or even a systematic manner. Compared to the situation in the U.S.A. or U.K. this is a noticeable gap in Australian speleology.

BONES OF EXTINCT MARSUPIALS IN CAVE AT NARACOORTE

ROD WELLS
UNIVERSITY OF ADELAIDE

The Victoria Cave at Naracoorte in the south-east of South Australia was discovered and developed for tourism as far back as the late 1890s. Although only a small cave, it has some attractive formation. Notes on the original map of the cave produced by CEGSA draw attention to the absence of fossils and lack of potential for further extension. However, on the 3rd August, 1969, the situation was changed when a small group from the Cave Exploration Group (South Australia) penetrated a hitherto unnoticed squeeze and scrambled up onto a rockfall in the centre of a large chamber. Below and stretching into the gloom wws a long silt-filled passage. At first the surface appeared to be studded with rocks but gradually they began to take on the form of huge vertebrae, leg bones, jaws and skulls; skulls of extinct kangaroos and cave lions. The excitement was tremendous. We had stepped back six or seven thousand years into a huge marsupial graveyard. Everywhere we looked there was bone and it all appeared to belong to extinct animals. We carefully picked a course across the chamber, the scrunching of bone-filled sediments beneath our feet indicating a deposit of enormous potential.

A report to the S.A. Government Tourist Bureau on the scientific and tourist potential of the chamber, followed by negotiations on thd plan of approach, and another CEGSA project was under way; this time sponsored by the South Australian Government. Every month now for well over a year, 15 to 20 club members have made the trip to Naracoorte to carry out the delicate work of excavating and preparing the bone material. Others have been involved in mapping, photography and exploration. Rarely a trip goes by without some new discovery; we have collected fossils representative of almost every major group of extinct Australian marsupials,as well as reptile bird and rodent remains. There are diprotodons (large quadrepedal herbivores about the size of an ox), giant kangaroos both browsing and grazing forms, and including Procoptodon, the giant of all kangaroos, cave lions, giant koalas, wombats, possums, bandicoots and the Tasmanian wolf. To date most of the material consists of disarticulated skeletons, but recently in a trench approximately 2 feet deep we uncovered the intact pelvis, femur and vertebrae of a kangaroo. A series of bores indicate a sediment depth of at least 8 feet so hopes are high of obtaining more skeletons.

During the year the Tourist Bureau installed electric light and work benches underground as well as providing us with a surface laboratory in their new ticket office and museum recently built at the Caves Reserve. It is eventually planned to open the fossil chamber to the general public; they will be able to look down upon the excavations from a viewing platform above the dig. The immense size of the deposit - 250' x 60' x 8' deep - will mean that it is unlikely that it will ever be fully exploited; in fact half of the chamber at least is to be left in its original condition.

As well as the palaeontological work, exploration of this new extension has continued. In November 1969 a club member squeezed through an 8" crevice off the fossil chamber to pave the way to what is undoubtedly the largest cave yet discovered at Naracoorte, in excess of a mile of passages so far with no end in sight. Chambers with beautiful formation unequalled in this area; passages with calcite floors like

ice, straws, columns etc.; one chamber so completely filled with crystal white formation that it necessary to remove trog gear to pass through. The journey to the last explored areas takes many hours and further work is going to require setting up underground camps.

All in all, CEGSA can look forward to at least several years more caving inthis complex, but apart from the significance of the discoveries, the next most important aspect of the work has been the co-operation and support given us by the South Australian Government Tourist Bureau, and it is our hope that the fossil chamber can be a notable first in Australian speleology and cave tourism.

(A longer, more detailed assessment of the scientific significance of these finds will be presented at the Hobart Convention of the Federation later in December)

* * * * *

PASSING THROUGH . . .

. . . Two well-known identities in caving overseas visited Australia recently . . .

ASF and member societies were honouredto welcome Bro. T. Nicholas Sullivan of La Salle College, Philadelphia, Pa, U.S.A. on his third visit to Australia in August this year. Bro. Nicholas is a past President of the National Speleological Society of the U.S.A., author of many books and papers on speleobiology, and has participated in many speleological expeditions, notably those to Rio Camuy (Puerto Rico), Guatemala and Mexico. His itinerary included Sydney where the ASF NSW Co-ordination Committee organized a smorgasbord and lecture at the Graduates Club, several private dinners with local cavers and a one day trip to Wombeyan. In Melbourne there was a dinner and lecture with VSA, then on to Adelaide to meet CEGSA and make an inspection of the palaeontological excavations in Victoria Cave, Naracoorte, the main purpose of his visit. All were impressed by the marvellous places he manages to get to (on this trip he was returning to the USA from a survey in Kodiak, Alaska, and his slides included remarkable close-ups of the Russian invasion of Prague, Czechoslovakia on 21st August, 1968). None who attended his lectures will soon forget his excellent photographs and lucid description of the expedition to remote limestone areas of Guatemala. It was something of an eyeopener to hear the drooling news that this expedition was funded by ABC Broadcasting co. to the tune of $100,000!

Well-known New Zealand caver Les Kermode (editor of the NZSS Bulletin) made a 3 week trip to Australia also in August. His itinerary was nothing short of a whirlwind tour of Australian caves. Arriving in Sydney on a flight at 10 at nighthe was whisked off to a party by Julia James (SSS) which went on to the early hours. After seeing John Dunkley next afternoon he was off to Perth on the 6pm flight. Peter Bridge met him late that night and next morning he was on a two day caving trip to Margaret River. Somewhere along the line he fitted in a thrash to the Nullarbor, and I think South Australia and Victoria. Then he popped up in Hobart for a quick trip to Exit with Albert Goede and others. Next weekend he fitted in Jenolan, Wombeyan and Bungonia all in two days before lifting off to New Zealand again.

BIOLOGICAL ASPECTS OF CAVE CONSERVATION

ELERY HAMILTON-SMITH
HONORARY ASSOCIATE IN ZOOLOGY
SOUTH AUSTRALIAN MUSEUM

THIS IS THE TEXT OF A PAPER READ AT THE SIXTH BIENNIAL CONFERENCE OF THE AUSTRALIAN SPELEOLOGICAL FEDERATION, MIRBOO NORTH, 1966 .

The preservation of cave-dwelling fauna presents a special problem in conservation. This fauna, from the present viewpoint, may be considered as two separate issues. In the first place, many caves house large bat populations and corresponding populations of guanophilous invertebrates, often of the greatest scientific interest.

Bat populations are of wide ecological significance, are subject to specific types of threat, and as a result, have been seriously reduced in many parts of the world. Recent research on Miniopterus schreibersii, the widespread Bent-winged bat, in south-eastern Australia provides a basis for a suggested conservation programme in respect of this species. It seems likely that many aspects of this programme might usefully be generalised to other species of temperate climate cave-dwelling bats.

Although the cave invertebrate populations are perhaps less obviously threatened there is little doubt that they are in fact extremely vulnerable. Thus, although their conservation is of considerable importance, it also presents great practical difficulty. Adequate conservation measures may in some instances even be incompatible with adequate exploration of a cave system.

THE SIGNIFICANCE OF BAT POPULATIONS

Apart from the intrinsic value of preserving all native faunas, two special factors make the adequate protection of bat colonies a matter of particular importance. Firstly, the gregarious cave-dwelling bats provide an invaluable living laboratory for research into a wide variety of biological problems. Such a population is more readily accessible to study and more readily delineated as a population than those of most mammal species. The well-known work of Peter Dwyer in Miniopterus schreibersii in New South Wales indicates something of the wide range of basic data which can be obtained from the intensive study of these bats.

Secondly, there is no question that bats have a very appreciable effect upon the balance of insect populations, and are therefore of ecological significance, especially to the agriculturalist. Davis, Herreid and Short (1962), using extremely conservative figures, estimated that the free-tailed bat in Texas consumed some 6600 tons of insects per annum. Dwyer (1964) estimated that the M. schreibersii of the Macleay Valley (N.S.W.) consume two hundredweight of insects per night, and this too appears a very conservative estimate.

One of the obvious possible threats to a cave-dwelling bat population is destruction of its maternity site through guano mining. The maternity cave inevitably develops the deepest deposits of guano, and if readily accessible to mining, is likely to be exploited. However, this does not necessarily result in damage to the population. Guano was mined from the Bat Cave, Naracoorte, South Australia for a number of years, but the bats have remained. In this instance, no structural damage was done to the cave, and it is likely, for aesthetic reasons, that mining was confined to those seasons when the bats were absent. Similarly, many of the bat caves of the southern United States are mined clear of guano each winter and are re-populated (and the guano replenished) during each summer.

On the other hand, it is fortunate that proposals for mining of two other sites in Australia which would have resulted in destruction of the caves concerned did not come to fruition. Dwyer and Hamilton-Smith (1965) have indicated that the selection of a maternity site is intimately related to the cave structure being such as to retain warm air. If this meteorological character of a cave is destroyed by structural alteration of the cave in mining, then there is little question that the cave would be abandoned. A suitable new site would prove difficult to locate; it may be that the traditional movement pattern of a population is comparatively inflexible, and there is every likelihood that a large death toll would result. Certainly, it is now well established in M. schreibersii that many of the pregnant females only arrive at the maternity site immediately before birth of the young, and in a few instances perhaps within a day or so following birth. It is most unlikely that these individuals would succeed in rearing their young if the normal maternity site was destroyed.

Caves may also be destroyed from the viewpoint of a bat if filled in at the entrance. J. Hood of Naracoorte (pers. comm.) has expressed concern that many caves are filled by farmers to facilitate cultivation. If this process limits the caves available to a bat population significantly, then there is likely to be both negative effects upon the number of bats, and a resultant upward trend in insect population.

Deliberate vandalism in various forms may kill large numbers of bats. I have personally encountered one instance of small boys lighting a fire in a cave to kill the bats which were there. Davis (pers. comm.) reports one instance where a party of three people killed over 10,000 bats in a single afternoon. The bats, roosting in a Kentucky cave, were swept from the ceiling and trampled. Sporting magazines occasionally encourage the shooting of bats as being good practice for clay bird shooting!! Such activities are, of course, illegal in Australia, as all bats except Pteropus are fully protected species, but any legislation is only as effective as the machinery for its enforcement.

It has been suggested that the widespread use of insecticides is likely to contribute significantly to mortality in bats, both through direct contact with insecticides and through feeding upon insects carrying recently applied chemicals. This factor is currently the subject of number of studies and it is a little early to know just how significant the use of insecticides is in this regard. However, Greenhall and Stell (1960) have shown that many insecticides are fatal to bats and can be used where deliberate reduction of populations is necessary. Luckens & Davis (1964) have also shown that Eptesicus fuscus is 10 times more sensitive to DDT poisoning than any other mammals tested.

Regretfully, depredations can also occur in the name of science. Excessive collection of specimens or disturbance of colonies at vulnerable stages of the annual cycles may both have a truly appreciable effect. One third of a small population of the sparsely distributed and apparently comparatively rare Myotis adversus was collected to provide specimens for one of our research institutions. The remainder of the population subsequently disappeared. The same institution decimated a nursery group of Rhinolophus megaphyllus with a twelve gauge shotgun, collecting over 200 individuals but doubtless killing many more. This sort of collecting is both unnecessary and completely undesirable. Seebeck and Hamilton-Smith (in press) have also described high mortality during the disturbance of a wintering colony. In this case, the disturbance was unavoidable, but it highlighted the vulnerability of a wintering population.

A long-term study of bat populations in the Netherlands showed a considerable decline in population from 1942 to 1957 (Sluiter & van Heerdt 1957) but this trend reversed over the period 1958 to 1962 (Sluiter & van Heerdt 1964). The authors attribute this to three factors: the cessation of a banding programme, cessation of quarrying in the vicinity of certain caves, and the cessation of mushroom growing or other commercial use of caves within the study area.

Many other European authors have attributed reduction of populations to banding activity, and this appears valid in certain countries. Hooper (1964) warns that banding should only be used when absolutely essential to a research programme. Beaucornu (1962) in examining the dangers of banding, suggests that mortality has resulted primarily from the rough handling of animals or from banding in itself. Every care has been taken to avoid banding mortality in Australia and such data as is available (e.g. Dwyer 1965) suggests that on the whole the precautions taken have been successful. Considerable care is exercised in the registration of banders as outlined in Simpson & Hamilton-Smith (1965). Banding at vulnerable stages of the annual cycle has been reduced as valuable periods have been noted. Weight reductions have been noted in animals banded during wintering by various banders and so winter banding has been mirimised Nursery colonies have been disturbed as little as possible until the young are weaned.

A CONSERVATION PROGRAMME FOR CAVE-DWELLING BATS

Although these suggestions are based primarily upon Australian experience with Miniopterus schreibersii, it seems reasonable to assume that similar principles could be applied to the conservation of other cave-dwelling species in temperate climates. Basically, it is suggested that the periods of maximum vulnerability during the annual cycle must be given high priority within the programme.

The first and most significant period of vulnerability is the three or four months from the birth of the first young to the weaning of the last. In the first place, the maternity colony serves to concentrate within one site at least the adult females of a population, and often an even higher proportion of the total. At no other time of the year will an equal number of bats be congregated in the one cave. However, more important than this perhaps is the fact that the young are particularly helpless (Dwyer 1963) and may easily be killed by undue disturbance. Davis (1966) and other workers who have studied the population dynamics of bat populations show that minimal infant mortality is necessary for the maintenance of stability in population numbers.

Accordingly, every effort should be made to ensure the protection of maternity sites, including the limitation of visiting such caves to a minimum during the

maternity season, and the complete protection of the cave from any structural damage which may alter its meteorological character.

It is fortunate that in south-eastern Australia, most maternity sites have at least a degree of protection already, as summarised below. However, this is no reason for complacency, and active steps should be taken to ensure more adequate care of these sites.

Table I

The maternity sites of M. schreibersii in S-E Australia

Naracoorte	situated in a caves reserve under supervision; entry to cave requires ladder.
Warrnambool	access through private property, gates of which are locked; cave difficult to locate and difficult of access.
Nowa Nowa	situated in forest reserve; location not well known; access tracks obscure and deteriorating.
Wee Jasper	cave well known and readily accessible, but entry during breeding season usually prevented by foul air.
Bungonia	cave well known and often visited, despite ladder pitch; foul air normally protects maternity site within cave.
Willi Willi	cave in reasonably inaccessible terrain and not well known.
Riverton	location of cave not well known.

The second period of high vulnerability is clearly during wintering, when the animals must conserve their energy reserves to survive. Any disturbance which awakes wintering groups will reduce the fat reserves available to each animal further and so result in an equivalent reduction in the chances of survival. Fortunately, wintering populations are dispersed in a large number of sites, each housing a comparatively small number of animals. Nevertheless, disturbance of wintering colonies in any way should be minimised.

There is also some evidence that handling of pregnant animals increases the probability of abortion and subsequent loss of at least the young. As each adult female bears only one young per year in most species (McKean & Hamilton-Smith, in press), this could readily have an appreciable effect upon the population. It cannot be proven at this point that handling will cause this, but it appears likely from observation. This gives reasonable ground for minimal handling of bats in late spring when adult females are pregnant.

The three points already made are of particular importance to cavers, bat-banders or others who may visit caves containing bats or handle bats for any reason. It is implied from the above that handling should be concentrated in late summer and autumn In fact, this is the most useful period for banding, as the animals tend to be concentrated in a small number of sites, and juveniles are still readily identifiable as such so that this fact may be recorded during banding and subsequent recoveries are then of known age. Experience has shown that banding at maternity sites also is most effective in terms of providing meaningful results on migration patterns.

The wise framing of protective legislation and its adequate administration or enforcement is obviously also of considerable importance. For example, maternity caves should be given the highest legal protection, and the enforcement of this protection adequately policed. Although such legislation should not unduly restrict research programmes, unnecessary or excessive collection should never be allowed to occur.

This in turn suggests that there is a need for an adequate programme of public education. In the widest sense, there is a need for the public to learn that bats are extremely cheap and useful insecticides, rather than beasts of ill omen. In a more specialised sense, it is perhaps even more important that research workers, cave explorers and others who come into contact with bats develop an understanding of the factors which may adversely affect populations.

THE SIGNIFICANCE OF CAVE INVERTEBRATES

Invertebrates within caves may be visitors from the surface; they may live out their total life within the cave, but be indistinguishable from other individuals living on the surface; or they may be species which are confined completely to the cave environment. Although in Australia we have few true troglobites i.e. species which are completely confined to caves, and which exhibit clear morphological adaptation to the cave environment, we do in fact have a large number of species reported only from caves. This group of species is the one of greatest concern from a point of view of conservation.

Many such species are apparently relicts of populations which once lived on the surface, but have not survived changing climatic or other environmental factors. Study of these may therefore help to elucidate lines of evolution and relationships within their particular zoological classification. Overall studies of their distribution may assist to throw some light upon historical changes in climate or even

upon geological changes. Intensive study of certain species or species-groups may help us to understand more clearly the processes involved in adaptation. The cave community is often as close to a "closed community" as can be found in nature, so again, a truly valuable living laboratory is provided for the study of population ecology.

Many studies of cave fauna might be cited from other countries to illustrate the above, but a useful summary is provided by Vandel(1965).The science of biospeleology in Australia is in its infancy, but Moore (1964) has provided an interesting examination of the evidence which is offered by our cave beetle fauna to the study of past climates. Mees (1962) also shows how a study of cavernicoles may yield evidence in relation both to evolution of a species-group and to geological change.

THE VULNERABILITY OF CAVERNICOLES

The first and most obvious point of danger is that many cave species are extremely limited in number. For instance, quite extensive searching for the now well-known "Nullarbor Caves Cockroach" has yielded very few living specimens. Although many dead specimens are seen, it must be remembered that a dead cockroach is likely to remain in the dry and scavenger-free caves of the Nullarbor for many years, and the number of such specimens in Mullamullang is probably theaccumulation of many years. On the other hand, such accumulations are absent in Abrakurrie where a number of scavenging insects occur. Similarly, the Idacarabus beetles of Tasmania are confined to one cave system, and are never seen in large numbers. It is easy to see that such a population could easily be exterminated,as the total number of living individuals may be extremely small.

Secondly, it seems that many cave species have extremely limited climatic or other environmental requirements. Mason-Williams (1966) has demonstrated the variability of environment which may exist within one cave. Observation shows equally clearly just how limited the range of some species may be within a cave. The Phreatoicid of the Dogleg Cave, Wee Jasper, N.S.W. is apparently confined to one pool within a running stream. Within 100 square yards of guano on the floor of the Naracoorte Bat Cave, S.A., some species are confined to an area as small as one square foot, and have appeared in similar distributional patterns for 11 years. When cave M35 at Murrindal, Victoria, was first entered, it was an extremely humid cave throughout and a number of very interesting species were found living on the cave walls, many of which were quite wet. However, on the next entry to the cave and ever since, the atmosphere has not been saturated, the walls have been comparatively dry, and the insects have apparently vanished, perhaps for ever. Although this cave was not completely sealed prior to entry, and the digging required to enter was small in relation to the overall size of the cave, the meteorological environment has changed markedly, and this was probably due to the entry made for exploration.

Thirdly, the balance between species in a cave population is a delicate one. One has only to consider the havoc which changes in balance have wrought upon the Australian mammal fauna to appreciate the significance of such changes. Studies of island populations have shown that limited and isolated populations have an enhanced sensitivity, and caves are very small islands from an ecological point of view.

Ecological balance could be upset in a wide variety of ways. Organic debris left in a cave may enable certain species to increase greatly in number, but then having disposed of the debris, make heavier inroads than previously upon other inhabitants of the cave because of their greater numbers. Weaker species may be exterminated before balance is restored. If a successful introduction of a new

species occurred, then it may either feed upon a previously existing cavernicoleor come into competition with an existing species. Such an introduction might well occur purely through eggs upon the boots of an explorer.

Caumartin (1963) has demonstrated the presence of autotrophic micro-organisms in caves, and it seems likely that these are a significant component of the overall food cycle within the cave. In a cave where this was true, even the introduction of moulds, fungal spores or other micro-organisms could cause a significant imbalance and have ultimate repercussions upon the total population.

A CONSERVATION PROGRAMME FOR CAVE INVERTEBRATES

The high vulnerability of many cavernicolous populations poses a special problem and probably its solution for many caves will be incompatible with cave exploration, Brother Nicholas reports (pers. comm.) that during the ecological study of the Cathedral Cave, Kentucky, conditions were observed almost comparable to those of a surgical operation. Clothes were changed at the entrance and only freshly laundered clothing used in the cave to minimise the entry of fungi, moulds, insect eggs etc. Smoking was forbidden and only electric lighting used. Any foreign matter introduced into the cave e.g. plastic markers for study areas, was previously sterilised. Obviously, this sort of care is impractible in normal caving practice.

Rigid observance of such principles as never leaving organic debris of any kind in caves is certainly justified and should be maintained in all caves. However, even here the demands of major systems upon the explorer may necessitate underground camping and some debris must often be abandoned in the cave if effective and safe exploration is to be achieved. The use of explosives should be as limited as possible, as the resulting gases are likely to be noxious to cave species.

Perhaps the greatest sins are committed in the name of science again. Over-collecting of species must always be avoided. If traps are used, they should be used with care and discretion. Their removal after use is essential.

However, in addition to taking all reasonable precautions to avoid damage to the biotic environment and over-collecting or other direct destruction of fauna, I would suggest that the time has come to look towards further measures. Serious consideration should be given to complete reservation of particularly significant caves for biological purposes. This may be on a short term basis as in Dan Y Ogof (Coase et al. 1966) where much of the explortaion of a new system was halted pending the completion of a programme of biological study. However a small number ofparticularly significant caves should probably be made permanent reserves for this purpose.

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BAT CAVES AS NATURAL LABORATORIES

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from DOWN UNDER 9(4) : July 1970

The idea of using a cave as a natural laboratory is not a new one. The first biological laboratory was set up in a cave in Paris in 1897 and was called the "Laboratoire des Catacombes". Other caves have since been set up as laboratories throughout Europe and North America but primarily as an aid to culturing cave animals and studying their biology and adaptation to their special subterranean conditions.

With the amassing of large amounts of descriptive information, mainly collected by amateur speleologists over the years, together with the identification and describingof many groups of cave organisms,biospeleologists turned their interests more to ecological problems. Particularly in the U.S.A.,biospeleologists have renewed their interest in the utilization of caves as natural laboratories in which to study the functioning of animal communities in caves where, theoretically, research can be carried out under relatively simple conditions akin to a laboratory. The reasons for extending ecological studies underground has been well summarised byPoulson and White (Science 165, 1969): "The cave climate is stable and easily defined. The cave communities are simple and can be studied in toto ... Here the community boundaries are discrete, and most of the species can be studied and manipulated in the field and in the laboratory". The laboratory referred to here is the constant temperature room close to the comforts of home.

First, I shall consider in a little more detail the reasons why ecologists have turned their attentions to caves. Then with these reasons in mind, I shall look at bat caves, or more specifically bat-guano caves, as potential natural laboratories.

When studying animals, it is essential to remember that an animal is part of a "system". This is a hard word to define but all will be familiar with ecosystems in which animals, plants and their physical and chemical surroundings (which we usually think of as environment) are continually interacting. The separation of animals from environment may seem natural to us because we think of ourselves as separate from the environment. However, it is becoming obvious to an ever-growing number of people that this is just not the case. Although animals and their environment form a single functional unit, it is still convenient to talk about them separately (a common trick of ecologists but dangerous because it is then only a short step to forget theirunity altogether). On land there is almost an infinite number of possible environmental situations available to an animal and it is often very difficult to determine an animal's precise environment. The relatively constant environment of caves makes simpler this situation

The cave environment may be conveniently divided into a twilight zone near the entrance, a middle zone of complete darkness and variable temperature and a zone of complete darkness combined with constant temperature. The last zone is usually emphasized as being the "cave environment" and is of special interest to ecologists. The temperature approximates the mean annual temperature of the region in which the cave is situated, the relative humidity is usually constant and high (95-100%) while silence and darkness are absolute.

Temperature has such a marked effect on the metabolic rates of organisms, their reproductive rates and rates of development that it is of great advantage to work on organisms living in relatively constant temperatures. Fluctuation in temperature is the normal state of affairs in almost all surface situations and experiments carried out in the laboratory under simulated field conditions are always difficult to interpret. Either by working in caves or by simulating the cave environment in constant temperature rooms these problems can be minimised. I might add that it is also very pleasant to work in a field situation where you know it will not be either raining, snowing or blowing a gale.

Another reason for working in caves is the fact that they possess relatively few simple communities of organisms - simple in the sense that there are oftenfewer species and numbers of individuals present in the caves due primarily to a shortage of food which must be brought in from the outside. These communities also are isolated from other surface communities by the walls and roof of the cave which form boundaries. Consequently, no immigration or emigration of individuals occurs across these boundaries which can be a problem in surface situations. The animals being studied remain confined and can be studied more or less at leisure. With the study of whole communities of organisms receiving increasing attention by ecologists and assuming that certain principles are common to all communities whether above or below ground, then the isolated cave communities would appear to offer unique opportunities for ecologists. By studying the cave ecosystem (the cave community and its environment) easier and quicker progress may be made to elucidate and understand the functioning of ecosystems in general.

MEASUREMENTS IN CARRAI BAT CAVE

It was with these thoughts in mind that I began working on cave ecosystems in Carrai Bat Cave (a limestone cave near Kempsey, N.S.W., at latitude 30°S). I was interested in the utilization of food (energy) by animals and the efficiency with which they channelled this energy into growth, reproduction and respiration. In the process of this study I have had to modify my ideas concerning caves considerably. Bat caves, or more specifically bat-guano caves, are a special class of cave. Many of the normal cave characteristics just discussed which are so helpful for biological studies are not present. Nevertheless, I hope to show that these caves may still be utilized as natural laboratories but of a different kind than Poulson and White's.

Bat caves occur throughout eastern Australia where Miniopterus schreibersii, the bent-winged bat is the most abundant cave-dwelling bat. Temperatures in the caves may be markedly modified by the activities of the bats; however, a combination of factors is necessary before temperature change will occur in these caves. The degree to which a bat may heat up a cave depends on the bat's temperature regulation, numbers and activity of individuals occupying the cave, and the cave's physical structure. If the body temperature of a roosting bat falls to the ambient temperature ofa cave then the cave temperature will not be influenced. Even when the body temperature of bats is maintained above the cave temperature, it is only when the structure of the cave is suitable for the generated heat to be conserved that bats will influence temperature.

The extent to which bats may heat up caves is best shown in nurseries of the bent-winged bat and the American free-tailed bat Tadarida brasiliensis mexicana. Their nursery caves usually possessdomed ceilings and the capacity to house nurserycolonies of many thousands of individuals. Temperatures in these caves may fluctuate more than 10°C annually and are often 10°C greater than the mean annual temperature of the surface location.

The other obvious influence that bats have on caves is the build-up of guano deposits which increases the food supply to cave animals enormously. However, large permanent guano deposits are only built up in those caves that are important to the bats' physiological and/or social requirements and where there is an absence of frequent flooding and free water. These specific caves, because of their importance to the bats' way of life, are occupied regularly by many thousands of individuals at almost precisely the same time each year. Examples are nursery caves, caves which are used for acclimatizing pregnant females to high temperature prior to giving birth at nursery caves, or caves which are used for mating. The permanent deposits found in these particular caves support permanent communities or organisms distinct from transient communities that are associated with less permanent heaps. These latter deposits are often found scattered throughout large caves where bats roost in many different positions.

My work has been concerned with a permanent deposit of guano that occurs in a small inner chamber (Chamber C) of Carrai Bat Cave. Chamber C is only 25' long and about 14' wide with a domed ceiling rising to a maximum height of 12'. Between 1000 and 3000 bent-winged bats roost in the dome of the ceiling from late January to June and again from October to early December. These seasonal patterns of occupancy of Chamber C are known to have been repeated, with little variation, over the years 1960 to 1969. The air temperature measured near the Chamber wall almost level with the height of the heap of guano varies only 14 $\pm$ 2^{o}C annually. The Chamber is always a few degrees warmer than most other parts of the cave due to the presence of bats. Measurements of relative humidity within Chamber C indicate that it is almost always 100% and, of course, darkness is absolute.

"The Mountain", 5' high, is situated immediately below the domed ceiling of Chamber C where the bats roost. It is composed of an inner core of old reddish-brown guano and an outer layer of fresher black guano. In some places on its steep sides the inner core is exposed to the surface. The heap is very moist except towards the bottom of its steeply sloping sides. Organisms inhabiting the Mountain include fungi bacteria, protozoans, nematodes, mites, beetles, flies, moths, spiders. Estimates of numbers of bacteria and fungi indicate that they occur in largest numbers close to surface of the heap. There is a fall off in numbers, sometimes quite marked, with depth from the surface. This trend is also shown for protozoans and nematodes. Mites and beetles occur throughout the heap and large numbers of the former may be found up to 9" into the heap. Flies and spiders are only found close to the surface in or on the fresh guano while moths predominate on the drier parts of the heap.

From July to September, when bats are present, there is no guano falling on to the heap. The faecal pellets which fall on to the heap prior to their leaving in June are broken down quickly and the activity of organisms on the heap is reduced. The organisms either become quiescent, neither growing nor reproducing (e.g. mites) or fall to very low numbers (e.g. flies). Sessile histerid beetle larvae occur 12" into the heap. Almost all the organisms do not vacate the heap during this period. Theoretically there is still plenty of food available. The calorific value of the partially decomposed guano is around 3000 - 3300 cals/gm. However, it is not as highly concentrated as in the case of freshly fallen guano which is about 4700cals/gm and it is in a difficult form (primarily chitin) to utilize. The majority of organisms cannot efficiently utilize the partially decomposed material (efficient in the sense that sufficient energy is available after body maintenance requirements to grow and reproduce). Breakdown of the heap must continue but it is a slow process. Measurements indicate that the Mountain is slowly increasing in size since the rate of decomposition and erosion of the guano heap is not keeping up with guano accretion.

The temperature at 3 depths in the heap and the air temperature of Chamber C has been monitored continuously with readings being taken 5 minutes in every hour after the arrival of bats in October 1969 using a 6-channel automatic temperature recorder. Bats arrived in the chamber on 5 October, 1969, and from this date to 31 October the combined metabolic activity of the community of organisms increasedthe temperature of the surface layers of freshly fallen guano from 14.6°C to 23.9°C. During this period the individual faecal pellets of the bats and large interstitial air spaces between them were obvious. These air spaces formed an insulating layer of air which conserved the heat generated within the surface layers. The air temperature during this period only increased from 13.9°C to 15.2°C (due to the presence of bats) while the temperature about 5cm and 15cm. into the heap increased from 14.9°C to 16.6°C and 16.1 to 19.1° respectively.

About 1½ months after the arrival of the bats there was a drop in temperature of the surface layer of fresh guano from about 24°C to 14-15°. The bats did not vacate the chamber for Willi Willi nursery to give birth to their young until 6 December - 2 months after their arrival. The fall in temperature is thought to be due to fly larvae Cyselosoma australis that tunnel into the freshly fallen guano breaking up the individual faecal pellets so that the fresh guano becomes a consolidated mass with minute holes (left by the larvae) ramifying it. This compaction excludes the large air spaces and decreases the capacity of the surface layers to insulate. Metabolic heat is conducted to the surroundings and the decrease in surface temperature depresses microbial activity.

In addition, the fall in temperature limits the build up of the mite population. The degree of this limitation may be gauged from the fact that the time for a mite to progress from a larval stage to an adult at 14°C is 81 days, while at 24°C it takes only 27 days. This interaction between microbs, mites and fly larvae indicates the high degree of complexity and intimacy that may occur between organisms and their environment. After this drop in temperature to about 14°C the temperature of the surface layers of guano remains relatively constant in the range 16 ± 2°C.

We are now in a better position to understand what changes occur on the Mountain after the arrival of bats in October. When the bats arrive the organisms which are "waiting" on the heap respond to the sudden arrival of fresh faecal pellets. The microbes build up quickly, temperature increases. The large number of mites that were quiescent as nymphal and adult stages, feed on the rich food source, grow andreproduce quickly. Because they are initially in very small numbers, the flies take longer to increase in density. Approximately 1½ months after the bats arrive, the density of flies has increased to the extent that they interact biologically and/or physically with the mites and microbes. In the meantime, a large proportion of the previously quiescent nymphal mites have become adults and are added to reproducing population. The large numbers of fly larvae have a tremendous influence on the physical structure as well as on the biological composition of the heap. They act as the primary food for staphilinid and histerid beetles and spiders, increasing the community complexity considerably. The initial "bloom" period of 1 - 2 months is followed by a dampening of fluctuations in temperature and numbers of organisms.

When bats leave Chamber C to give birth to their young at Willi Willi nursery there is some slowing down in activity on the heap. However, it appears that sufficient fresh guano falls from October to early December together with that deposited by nocturnally roosting bats (primarily males) to tide the guano community over till bats return to the chamber in large numbers towards the end of January. From this time till June the guano community keeps up with its food supply and the fluctuation in numbers of individuals of each species becomes relatively stabilized.

Normally in a cave the animals are mobile and have the ability to locate a food source very quickly. Their very existence may depend on their being first to a food source. At least, in order to survive, they need to find food. This is not thecase in Chamber C. The majority of organisms remain on the heap and the heap and its fauna may be said to "expand" and "contract" in phase with the cyclical pattern of food input. The species composition remains almost constant throughout timealthough the numbers of individuals may fluctuate markedly. The edges of the heap maybe looked upon as almost a discrete boundary with little emigration or immigration acrods it.

It is these bat-guano caves which I think have the greatest potential as natural laboratories in which to study ecological problems. They provide opportunities to study whole communities in which the energy input can be measured accurately. In addition, it is often of one form since the majority of cave bats are insectivorous. The rate of utilization will give information on the functioning of communities, especially decomposer communities.

Bat-guano caves are not natural constant temperature laboratories in which ecological studies can be carried out on simple animal communities.Their environment is complex and difficult to simulate, but with the increasing sophistication of equipment to measure environmental data and the handling of this data with computers, bat-guano cave communities could be studied in situ. Bat caves, in fact, provide ecologists with a range of laboratories. The relationship between communities of organisms and their environment may be studied over a range of conditions from still relatively simple (e.g. Chamber C) to a more complex set of conditions in nursery caves. A comparison between the utilization of two food sources, the guano of insectivorous bats and that of frugivorous bats, is even possible in some caves (e.g. Tamana Caves, Trinidad). In all these caves the advantages of studying communities that are isolated and the relative ease of monitoring the cave environment remain.

One final word must be said concerning the true occupants of bat caves.Bats are very sensitive to disturbance and great care will have to be taken not to upset their regular patterns of behaviour. Their sensitivity also causes great problems in elucidating their physiology and ecology. They are very hard to keep in the laboratory and would best be studied in their natural environment.However,ecologists working in bat caves will have to remember that they are sharing their laboratory with another temperamental mammal and without its cooperation their natural cave laboratory will cease to function.

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Editorial Postscript

John Harris, who is attached to the Department of Zoology, University of Queensland, has carried out much of his work at Carrai with the assistance of members of Kempsey SS and has written short accounts of his work in the club newsletter Trog. Trog 8 (9), April 1970, has a short piece on cave temperatures, while Trog 8 (7), Feb. 1970, has "Unlocking the secrets of the Skeleton Room" (reprinted in A.S.F. Newsletter 43 , June 1970).

INTERNATIONAL NEWS

JOHN DUNKLEY

At the January 1970 Committee Meeting, the A.S.F. resolved to affiliate with the International Union of Speleology. A.S.F. had supported the formation of the IUS at the 4thInternational Congress of Speleology in Yugoslavia in 1965 and its permanence and stature are now assured.

The average Australian caver may ask what possible benefits could flow from such an affiliation with an organization dominated by European speleologists. One reason parallels the relationship between ASF and individual clubs and members - it is a mark of the emerging maturity both of recreational pursuit and a scientific discipline when its practitioners seek to establish external contacts and liaison. Whether to compare achievements, establish standards, share discoveries and developments or generally exchange information, mutual benefits accrue. At the moment Australia has a favourable balance of speleological payments- we receive a good deal more useful information from overseas by way of books, journals and ideas, than we export in return payments Yet the standard of caving here is as good as any in the world and we can boast several technical developments. Australian speleological research is held in deservedly high repute abroad, particularly karst morphology and the developing field of biospeleology. Most of our contact to date has been with UK and USA for language reasons, but Europe has the most advanced systematic speleology and much pure speleological research. Membership of the IUS should further encourage the two way flow of technical, scientific and practical information.

Publications: The IUS has commenced publication of a regular biannual bulletin of international news. In addition we expect to receive from time to time reports of the various IUS Commissions. For example, detailed guidelines for organizers of large scale speleological meetings have been distributed and might be adapted to Australian needs. A new report is anticipated shortly on the world's longest and deepest caves.

Commissions: At the 1969 IUS Meeting in Stuttgart several new Commissions were set up and the current list follows. Australia has representatives on several of these and anyone interested may obtain addresses from E.Hamilton-Smith or J.R.Dunkley:

Statutes (G.T.Warwick, A.R.Anavy)	Documentation (H. Trimmel)
Karst Erosion (V.Panos, O.Stelcl)	Speleochronology (H.W. Franke)
Cave Rescue (A. de Martynoff)	Tourist Caves (L. Blaha)
Speleotherapy (H.Spannagel, H.Kessler)	Largest Caves (H. Trimmel)

The Commission of Karst Erosion arranged a symposium in Oxford, England, in August 1970. Participants included Drs Marjory Sweeting (co-chairman) and Paul Williams, both of whom have worked in Australia in recent years. A broad recommendation has been made on the form of future reports on karst denudation and the Commission is now concerned with methodology. Its first report, "Problems of the Karst Denudation", was published in Czechoslovakia in 1969.

The SubCommission on Terminology of the Documentation Commission is preparing a multilingual dictionary of terminology and translations will be discussed and fixed at a symposium in Austria in 1971. Close liaison is being maintained with the International Association of Hydrologists and the International Geographical Union.

IUS Bureau:	PRESIDENT :	Prof. Bernard Geze,(France)
	VICE-PRESIDENTS :	Drs G.T. Warwick (U.K.) & Vladimir Panos (Czechoslovakia
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	ASSISTANT SECRETARIES :	Prof. A.R. Anavy (lebanon) & Maurice Audetat (Switzerland

DOWN UNDER ALL OVER

NEWS FROM AROUND THE SOCIETIES

No less than 15 club reports this month is a new record for the ASF Newsletter. This an indication not only of the rapid expansion of Australian speleological work, but of the willingness of clubs to make some form of a record of their activity, even just a mention. The editor is indebted to several people who make the job a little easier for him by sending in a precis of their club's caving, or who offer, usually spontaneously, to summarise speleological work in a particular area over the last year or so and indicate directions of further efforts. Particularly in the crowded caving areas of NSW, this sort of information would be much appreciated by another member society caving in the same area, and as I have pointed out previously, this probably makes more interesting reading than an account of where each club went and a dreary repetition of what they did. So let's see what's been going on down under all over . . .

CSS Not much to report, but The Very Latest continues to appear every month (it's changed its size again). Trips have gone to Borenore (of all places!), Wee Jasper, Wyanbene and Bungonia. Joe Jennings wintered in the Kimberlys in Western Australia but does not seem to have done much caving, except for a chug around Geikie Gorge and a brief look at Koonalda Cave en route.

BMSC Members numbered Abercrombie Caves area. Usually dismissed as a superbly beautiful arch but little of speleological interest, this area has turned up no less than 24 caves worth tagging. In October members were busy with HCG and MSS in the Mudgee area, where the "mini-conference" and field trips organized by the Central Regional Council (see p. 3) for the three clubs went off extremely well. A joint publication is proposed to record the proceedings of this function.

CEGSA CEGSA reports a surge in membership this year and there has been a heavy diary of activities. The main news, of course, continues to be the monthly trip to Naracorrte to dig bones in Victoria Cave (see p. 5) but a lot of work has gone on elsewhere. No less than 45 fronted a trip to Curramulka and some 20 rolled up to a practice S & R at Punyelroo. The organizer's report on the latter should be required reading for all interested in S & R techniques. Social activities lately have included wine-tasting and the Occasional Dinner No. 3. The Group has reprinted two of its important publications and an advertisement (free, let it be noted) will be found elsewhere in this newsletter.

CQSS The Club's newsletter, "The Explorer", first issued in June 1970, has settled down to a regular monthly. Most caving has been done at Mt Etna and at Limestone Ridge nearby, where 31 caves are now listed. In his Annual Report, the President records no less than 16 new discoveries this year, a remarkable achievement for a relatively young group and indicative of the ease with which caves seem to turn up with a little effort in the remoter parts of the country. The finest new cave is undoubtedly Elysium, on Limestone Ridge (J26), whish is now acknowledged as the finest in Queensland.

HCG has concluded a mutual co-operation and friendship pact with a caving group from Sydney Teachers College. Trips have ranged widely, the most profitable being to Cooleman earlier this year,but the most significant were probably the field trips following the CRC "mini-conference" at Mudgee."Calcite" has reappeared after a long absence, under a new editorial policy. It is bigger and has been produced by multilith offset process.

ISS The drought of information about this club has broken. With much prodding I was finally sent no. 4-5 of a new newsletter with a note explaining that the editors were a bit bashful about circulating their handiwork. I can't see why; this is a newsletter of which a small club like ISS can be proud. It contains interesting information on Bendethera which is the club's main stamping ground. They have received a grant from Eurobodalla Shire Council to assist in their work there.

KSS assisted NUSS with the organization of a Search and Rescue at Yessabah (see p. 3). They have also continued checking thermometers at Carrai Bat Cave for John Harris of University of Queensland. Kunderang has been visited several times this year with the usual difficulties. From the reports in "Trog", this editor feels that the area might better be named Chunderang. Not only is access very difficult, but on one trip a temperature of $\overline{24}^{o}$F was recorded. So much for talk of the sub-tropical Macleay Valley compared with the rigours of a Yarrangobilly winter. The club has also followed up yet another rumour of vast caves in the Macleay with trips to Piper Creek. Needless to say, not only were no caves found but not even limestone. However this seems better than the average hot tip as the alleged caves are mentioned in a government report as far back as the 1880s. KSS still hopes to find its Jenolan beneath the Macleay rain forests.

MSS have been active I understand from their erstwhile Secretary but I have only one journal to peruse. Most trips have gone to Wyanbene where an attempt was made to find a connexion between Wyanbene Cave and Ridge Mine Pot, without success. At Jenolan, a number of trips have thrashed the southern limestone and several caves were entered in this relatively little-known area.

NUSS Most activities have continued in co-operation with KSS. The main news was the search and rescue at Yessabah (see p. 3) but there have been bone-collecting trips to Mt Pleasant and elsewhere.

SSS has been very busy, with continuing projects at Jenolan (RDF work and surveying for proposed tunnel into northern tourist caves), Church Ck (so they could "just happen" to be there when a Liberal Party committee fact-finding trip arrived), Timor (surveying), Wombeyan (photography), Colong (surveying), Yarrangobilly (you name it they're doing it) and Tuglow ("familiarisation").

SUSS has continued morphological work at Jenolan, including some auger-drill work in Mammoth, and the long survey of Taplow Flat at Cliefden too has kept going. Beyond that there seems little to report, except perhaps an attempt to write a definitive work on the pubs of NSW, continued in serial form under the title "Wanderings of an Inebriate".

TCC Most of the news comes from Junee-Florentine where the exciting news of a new Australian depth record of 800' in Tassie Pot overshadows the other systematic exploration of swallets in the area. When reading the reports over the months in "Speleo Spiel" about yet more active inflow caves in this area, anyone brought up on a diet of over-crowded NSW caves wonders how on earth the Tasmanians managed to miss for so long so many caves taking an active stream. Some light has been shed on this mystery in the October "Speleo Spiel", "rather reluctantly" they say. The technique is known as 'hairygoating'. Itseems you find someone with a degree in earth sciences, an unbalanced mind and a guardian angel. He must wear shorts. He leaps all over the landscape (quite a feat in most of Tasmania), excitedly screaming at intervals "I've got another one! I've got another one!" Mass hysteria builds up until the whole party is thrashing around. It is also necessary to appoint a "keeper of the trail" who will record their location for fututre reference. And why the shorts? So he'll know there's a cave by the cold breezy feeling up his legs, of course.

UNSWSS have spent most of their time at Bungonia surveying, water tracing and in general exploration. On one trip, freelance photographers John Davis and Gary Steer made a movie film in the Drum for TV. The otherwise uninspiring walls of this big cave looked superbly sculptured and breathtakingly beautiful under a 500 watt floodlamp and quartz iodine spot. A paper on continuing work in water tracing will be presented to the Hobart Convention.

UQSS The Society's major publication on the caves of Mt Etna and the case for their conservation is expected in December. This has naturally consumed a lot of member time but trips have gone. The record shows 25 trips for 1970, aggregating 3032 hours underground and 173,510 miles travelled to get there. Other than the usual haunts like Texas and Mt Etna, trips also went to Bunya Mt and to Binna Burra.

VSA August "Nargun" has a consumers test report on the Nikonos II 35mm underwater camera, suitable for the wet cave enthusiast. A start was made on a publication on the caves of the Buchan area. The club has obtained representation on the Conservation Council of Victoria and Miles Pierce was appointed delegate. In a ceremony conducted by the Governor of Victoria, Sir Rohan Delacombe recently, members Peter Matthews and Graeme Wilson received the bronze medal of the Royal Humane Society for their part in the rescue in Devil's Den, Tasmania (see ASF Newsletter no. 46, pp. 4-5).

WASG Actually I have not got any information whatever on what WASG have been doing. This is the eighth ASF Newsletter I have edited this year and despite several letters to Perth, not a word has emanated. But there is now a suspicion that they still exist as the Newsletter Manager told me just the other night that a parcel had reached Broadway from WASG, addressed to the Librarian and apparently containing some newsletters. So there is still hope and I trust that the poor members of WASG are not too upset at the lack of space devoted to their own club. It's not my fault, you know,

Sorry mate, not a peep out of OSS, NUCC, NTSS, or NSA for quite a few months.

B U C H A N

by Ian Cook, VSA

From June until September VSA had a concentrated effort on a resurgence flowing into the Buchan River. The flow is far greater than M4 and approaches that of Scrubby Creek M49, which added to the great amount of enthusiasm for the project. Efforts have lately been abandoned but will probably be renewed in 1971.

Surveying both surface and underground was undertaken in the Basin, an isolated patch of limestone NE of Buchan. Slocombs (BA1) and BA2 were surveyed and a surface survey to tie in the entrances was carried out. General exploration of the surrounding region failed to discover any other significant caves.

At Murrindal, voice contact has been established in Oolite Cave between two adjacent fissures in the bottom of the cave. The connecting crack is only a few inches wide but if enlarged could possibly open out further down. Explosives would be

Dalley's sinkhole was entered and apart from a general look around several members followed some of the small stream passages. Many water squeezes were encountered and a future trip is planned using wet suits to explore thesepossibilities. The MurrindalRi er was also explored up and downstream from Piranha Cave in the same weekend. A narrow fissure was found on a hillside which had an initial pitch of about 30'. It was too narrow for anyone to get down without use of digging implements.

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J E N O L A N

by Chris Fieldhouse, SUSS

Another new cave has been discovered near the parking area at Jenolan. It is by way of an extension of a previously known cave by about 150'. In January 1970 Graham Morrison relocated the entrance and it was first re-entered by Graham, Nick Vaal and Chris Hieldhouse. After a drop and short squeeze ip opens to a chamber 30' x 40' x 15' high. A hole dug in the floor is thought to have been the work of J.C. Wiburd if research by Ted Matthews is correct. Beyond the hole is another small chamber ending in another dig which had been worked many years ago.

During January the dig was extended by the four abovementioned and Jeff Francis. During Easter an auger was used to try to determine the depth of the soil but was stopped by large rocks. Shortly after this Ken Keck and other MSS members took an interest in the cave and after a rather dicey bit of work Paul Richards managed to squeeze through. Two more chambers were entered after yet another dig a little further in. The last has some excellent flowstone decoration and magnificant helictites. Further work is progressing. (Note: MSS suggested Coronet Cave as a name for this rediscovery but the guides prefer the appellation Toad Hall).

Australia's First Cave Happening

During October long weekend Australia had its first cave happening in the Grand Arch at Jenolan. On sunday night three hundred people were seated around coal fires to enjoy the sweet music of some imported Sydney bands and the unbridled talent of the Jenolan guides. The evening was made all the more interesting by the fact that the talent was on one side of the road and the audience on the other. You see, the road through the Grand Arch is a public road and the local friendly cop was there to see that it remained that way.

TASMANIAN CAVING AREAS -- LORINNA

KEVIN KIERNAN, SCS

Possibly the most urgent area with which Tasmanian cavers should concern themselves over the next few months is Lorinna. The interest in this district lies in the occurrence there of Gordon Limestone. While the limestone area is small, and much of it has been explored by cavers, more work remains to be done. But time to do it is fast running out, as this beautiful area is being slowly destroyed by the H.E.C. and most of it will shortly disappear under the waters of the Cethana Dam, to be lost forever to the speleologist. Little time remains to discover and explore any caves there, to photograph and if warranted, survey them,and record or perhaps preserve any other aspect of speleological interest, such as the fauna within them.

This spectacular and interesting area is approximately 200 miles by road from Hobart. Access is gained via Gowrie Park, from where a narrow and twisting road leads south, to plunge dramatically into the mighty Forth River gorge, where it clings to the precipi tous walls for some miles, crossing spectacular waterfalls and rushing creeks descending in steep gullies to the river, 1500' below. In places the road runs parallel to an old pack track and passes old mines driven straight in from the roadside and remaining as relics of the area's mining past. Then the road falls suddenly to the gorge floor, and the tiny township of Lorinna, a handful of houses, a number of which are abandoned, nestling on gentle limestone hills,and surrounded by paddocks many of which are slowly returning to their original bushland state.

The limestone at Lorinna occurs mainly in two narrow down-faulted blocks, one being situated along a creek near the post office, and the other ½ mile south of it trending north-west along Limestone Creek with an extension northwards to the showground, where basalt capped cliffs 100' in height rise from the alluvial flats beside the Forth River.

The Lorinna area is riddled with dolines, some of very large size. Many dry valleys exist to betray the presence of sinking creeks,and small effluxes are present at numerous localities. Over a large area underground drainage is aided by the presence of a thick cover of basalt talus and alluvium overlying the limestone, this allowing water to seep down to the limestone below. The only two reasonably sized streams, Limestone Creek and another near the post office retain their surface course across the limestone.

Investigation by SCS members prior to conducting the first caving trips to this district disclosed that at least two authors have referred to caves and karst phenomena in general in this district. Writing in a Mines Department publication of 1919, The Mining Fields of Moina, Mt Claude and Lorinna (Geol. Surv. Bur., 29pp.), W.McIntosh Reid states: "A small creek near the road enters caves in the limestone and does not emerge until within 3 chains of the river. At G. Sloane's farm also, the creeks pass below the surface and emerge at the base of limestone cliffs near the river". R.L.Hughes,in a later (1957) Mines Dep't publication Limestones in Tasmania Geol. Surv. Min. Res. 10, pp. 152-3) states of the Limestone Creek area: "Numerous caves may be found along the creek bank, and it may be expected that the limestone mass in general is cavernous".

So, armed with this information, SCS visited the area on 1/11/69 and 13-14/1/70. The showground area was investigated and a small stream nearby followed up to an impenetrable efflux. The area below the cliffs and a number of dry valleys and dolines above the showground were checked without success. Limestone Creek was then bashed and two small caves found. More impenetrable effluxes were found in this area. TCC also visited Lorinna on 24-26/1/70 and found a cave which, judging from the report in Speleo Spiel 43 (Feb. 1970) was probably Shawl Pot.

Thus little success has been met with in this area and the chances of a major find are not great. Several reports from local residents have been followed up without success. What price a resident's suggestion that some of the old mines in the district may have broken into caves, though?

So how about a few trips to Lorinna to finish work remaining to be done, before it is too late? There are still some uninvestigated reports, the scenery alone more than makes the trip worthwhile and while there's a chance it should not be altogether abandoned by speleologists.

— from Southern Caver 2 (1), June 1970

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A B S T R A C T

JENNINGS, J.N., Australian Landform Example no. 18: Ingrown Meander and Meander Cave. Aust. Geographer 11 (4): 401-2, Sept. 1970.

The ingrown type of incised meander results from lateral erosion accompanying downward erosion. In contrast to the symmetrical intrenched meander, ingrown meanders produce asymmetrical cross-sections at different levels. In place of the usual undercutting of banks on the outside of meanders, Boree Ck near Borenore, N.S.W. has produced Verandah Cave by asymmetrical down-cutting and lateral migration, undercutting the rock to a maximum width of 100'. About 300' of the creek's course lies beneath the overhanging cave roof. Temporary halts during the lateral and downstream migration of the meanders has produced a beautiful series of roof curves. (J.D.)

* * * * *

B E N D E T H E R A

ISS has adopted Bendethera as a major project and recently obtained a grant of $100 from the Eurobodalla Shire Council toward the work. The Council has shown interest in the caves for many years, for in February 1964 they dozed the road down the mountain so that council officers could make occasional inspections of theecaves to check on vandalism. The Council has offered to construct a lockable gate for the main cave BD1 and ISS hopes to instal it. Meanwhile they have been working on the Efflux BD2 with a little more success than attended the early days at THE EFFLUX at Bungonia. In August some awkward boulders were blasted clear and eventually 47' of cave entered. Readings of temperature, humidity and air flow suggest that a cave of considerable volume should exist further in.

CONSERVATION ACTION

COLONG

The rarefied air of the Windsor Room in Sydney's Hotel Australia did not have the heady effect that the group of cave-lovers had hoped for. The confrontation on November 5 between the hierarchy of the world's biggest cement combine, Associated Portland Cement Manufacturers, and some leading conservationists over the prolonged Colong Caves dispute resulted in a stalemate.

On one side were Sir John Reiss, chairman of the British parent company, and executives of the Australian subsidiary; on the other were members of the Save Colong Committee led by Father J. Tiernan and Professor R.N. Johnson, Professor of Architecture at Sydney University.

The Colong Committee went into the meeting with a decided psychological advantage - a recent statement by the Duke of Edinburgh criticised the company's plan to take over part of the Colong Caves Reserve, 64 miles south-west of Sydney. The Duke, as President of the World Wildlife Fund, said he hoped the company was not about to "desecrate" a large national park and wildlife reserve.

Sir John Reiss refused to surrender his company's lease but said his company would not do anything drastic at Colong pending investigations of the possibility of acquiring leases at Murruin Ck, 5 miles from Colong (in surroundings worth preserving at least as much as Colong - ed.). He also had words with the N.S.W. Minister for Mines, Mr Fife, about Colong, Murruin and Marulan, and had a quick aerial trip over the Colong area

MURRUIN CREEK

The NSW Minister for Mines released details on July 2, 1970, of possible alternatives to the mining of limestone in Colong Caves Reserve. The findings at Murruin Creek, about 5 miles away, amount to 34.61 recoverable tons in six scattered localities, compared with 49 million tons at Church Ck in the Reserve. This is a good deal more than the 600,000 tons of which the Minister had spoken previously. There are only a few minor caves a few feet long and several 30' deep dolines in this district but this editor, who has walked around there, considers that the scenic beauty of the area and its aesthetic attractions make it just as valuable an asset as Colong.

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INTERNATIONAL CONFERENCE OF THE SUBCOMMISSION OF TERMINOLOGY

Under the auspices of the International Union of Speleology in Stuttgart, 1969, the International Conference of the SubCommission of Terminology is expected to take place in Obertraun, Upper Austria, between 13-17 September, 1971.

The Conference will work out a multi-lingual directory of standardized and universally recommended definitions of the most important principles of speleology. Above all a clear definition of the following terms and principles is envisaged:

karst, development of karst forms, karst depressions (doline, uvala, dolje etc.), karst hydrography, caves, speleogenesis, speleomorphology.

Excursions to the Dachstein caves and karst will be provided.

NEW AUSTRALIAN DEPTH RECORD

Three Tasmanian cavers, John Morley (SCS), Phillip Robinson (TCC) and Arthur Clarke (VSA) bottomed Tassy Pot on 14th November, 1970, to establish a new Australian depth record of 800'. Another example of casual cave hunting Tasmanian style : Tassy Pot is barely 20' from the newsprint mill road in the Junee-Florentine area. The new record is subject to survey; the depth was obtained from an aneroid.

The pothole is a vertical tube of 700', broken by a few ledges, boulder chocks and steep scrambles. There are 4 main pitches of 130', 90', 80' (this one can be free climbed) and 270'. This last pitch must be third in Australia only to Mini-Martin and Big Hole. On a previous trip, cavers had rolled out 250' of ladder only to find themselves ending a tantalizing 20' from the bottom. The final assault team came equipped with 600' of ladder, 800' of rope, belay pulley, traces, equipment bag and aneroid barometer and the final push was a combined effort. Beyond the bottom of the last pitch Miracle Passage was pushed through loose rockfall full of falling water to a point at -800' where another stream joined, which was as far as they could go.

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NEW PUBLICATIONS

Two significant new publications in Australian speleology are expected in December; as well, reprints of two earlier publications are available.

Mt Etna Caves

A collection of papers covering several aspects of the Mt Etna and Limestone Ridge caves area of Central Queensland. Articles on geology of the area, descriptions and maps of caves, speleological work, accounts of cave fauna and surface flora and fauna, history of the area, and the case for conservation of the caves. Illustrated throughout with black and white photographs. Price $2-75. Enquiries to

University of Queensland Speleological Society,
c/o The Union, University of Queensland,
ST LUCIA, Qld 4067

Australian Speleo Abstracts

Proposed biannual indexed abstracts of all writings on speleology in Australia, edited by G. Middleton. First issue will cover the period January-June 1970. The editor proposes that ASA should be published jointly by SSS and ASF and this will be discussed at the Hobart meeting. Further details later. Preliminary enquiries to

Sydney Speleological Society,
P.O. Box 198,
BROADWAY, N.S.W. 2007.

1970 Subscription
(2 issues): $1.00
(Overseas: $1.20)

CEGSA has reprinted two successful papers on Nullarbor caving:

A Preliminary Report on the Karst Morphology of the Nullarbor Plain by J.N.Jennings $1-20

Mullamullang Cave Expeditions 1966
CEGSA Occas. Pap. no. 4

CURRENT AUSTRALIAN SPELEOLOGICAL PUBLICATIONS

This is not a free advertisement but a service to acquaint readers, particularly those overseas, with publications currently available on Australian speleology. In general only the self-contained publications dealing wholly or substantially with speleology will be included, and club newsletters will not be listed. Inclusions will be subject to space limitations from time to time.

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CONTRIBUTIONS TO THE STUDY OF KARST

"Syngenetic Karst in Australia" by J.N. Jennings, together with a paper on limestone solution in the Fergus River, Ireland, by P. Williams. 110pp., multilith.

$2.50 from Australian National University Press, Canberra

* *

H E L I C T I T E – Journal of Australasian Cave Research

Published quarterly by E.A. Lane, P.O. Box 183, Broadway, NSW 2007. Subscriptions $2.40pa (4 issues) (o/seas $2.60)

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COMMUNICATIONS Occasional Paper No. 3

Description of SSS expeditions to Chillagoe in 1966-67, with reprints from previous papers on the area. Only accessible reference on area. 3 plates, 3 maps, iii + 46pp. roneoed.

$1 from SSS

* *

SPELEO HANDBOOK

The bible of speleology in Australia. Summarises speleological knowledge of Australia, extensive cave lists, references, reports on cave science, equipment and techniques etc. 322pp.

$3.50 to members of ASF societies
$5.00 to approved non-members
from P. Matthews, Editor

CAVES OF THE NULLARBOR

Authoritative, comprehensive survey of speleological work on and under Nullarbor Plain in South & Western Australia

20 photos, 12 maps, vii +61pp
193 cave checklist

$1-35 from SUSS, O/seas $1-80

* *

TRANSCRIPT OF PROCEEDINGS, 7th Biennial Conference of Australian Speleological Federation, Goolwa, 1968.

12 papers plus summary of committee proceedings. 150pp.

$1 from CECSA

FOR ADDRESSES SEE INSIDE FRONT COVER

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