

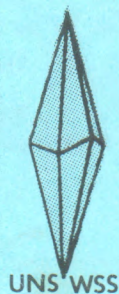
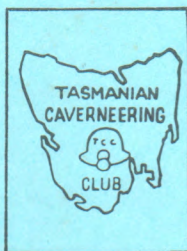
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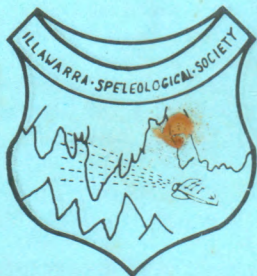
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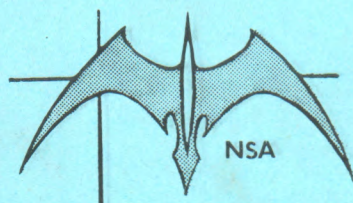
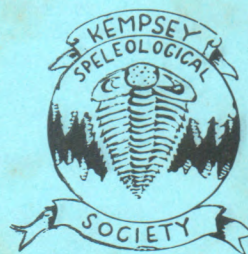
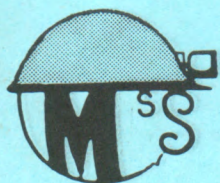
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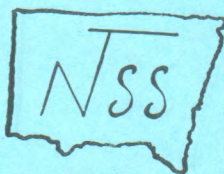
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Editorial

AT THE LAST COMMITTEE MEETING OF THE A.S.F. IN MELBOURNE A NUMBER OF IMPORTANT PROPOSALS WERE INTRODUCED AND DISCUSSED AND DECISIONS WERE TAKEN WITHOUT ANY PRIOR CIRCULATION.

IT IS THE POLICY OF THE FEDERATION THAT MATTERS NOT ON THE AGENDA MAY BE DISCUSSED BUT NOT VOTED UPON. THIS IS A SOUND POLICY FORMULATED TO AVOID JUST THE SITUATION WHICH STILL SEEMS TO BE OCCURRING WITH INCREASING FREQUENCY EVERY YEAR, DUE TO A VERY LIBERAL INTERPRETATION OF STANDING ORDERS.

IT DOES NOT SEEM REASONABLE THAT THE MERE APPEARANCE ON THE AGENDA OF AN ITEM SUCH AS THE REPORT OF AN EXECUTIVE MEMBER SHOULD BE AN OPEN SESAME TO AD HOC DECISIONS WHICH DEPART RADICALLY FROM ESTABLISHED FEDERATION POLICIES. AN INSTITUTION WHICH HOLDS REGULAR COMMITTEE MEETINGS ONLY ONCE A YEAR CANNOT AFFORD TO MAKE HASTY DECISIONS.

WHICH BRINGS US TO THE NEWSLETTER. THE PRESENT EDITOR AND MANAGER WILL NOT BE AVAILABLE NEXT YEAR IF THE NEWSLETTER IS CONTINUED UNDER THE PRESENT SYSTEM. BOTH ORGANIZATIONALLY AND FINANCIALLY IT IS GROSSLY UNECONOMICAL. IN ANY EVENT I PERSONALLY OFFERED ONLY TO REHABILITATE THE NEWSLETTER AND THEREBY GIVE SOCIETIES TIME TO CONSIDER WHAT THEY REALLY WANT FROM THE NEWSLETTER AND PERHAPS FROM A.S.F. GENERALLY. THERE IS A MOTION ON THE AGENDA FOR THE NEXT MEETING TO DISCONTINUE THE NEWSLETTER AND UNDER THE PRESENT SYSTEM THAT WOULD BE THE BEST COURSE TO TAKE. BUT IF THERE ARE ANY OTHER PROPOSALS AS RADICAL OR INSINCERE AS THOSE HEARD RECENTLY, LET'S SEE THEM CIRCULATED WELL IN ADVANCE. AT THE DECEMBER COMMITTEE MEETING, LET'S HEAR SOME RATIONAL DISCUSSIONS BEFITTING A NATIONAL FEDERATION. NOT SOME OF THE UNINFORMED, IRRATIONAL AND MYOPIC NONSENSE THAT HAS BEEN HEARD ON PAST OCCASIONS. SOME OF THE REALLY FUNDAMENTAL ISSUES THAT SHOULD BE CONSIDERED INCLUDE:

What do you really want from A.S.F.?

Is it time to reconsider some of the basic assumptions and policies dating as far back as 1956?

Is the Newsletter serving any worthwhile function?

Is the system of financing A.S.F. due for overhaul?

Are the standards of membership adequate?

Are some of the A.S.F. codes in need of updating?

What should be the relationship between A.S.F. and cavers outside Federation member societies?

THERE ARE SUBCOMMITTEES WORKING ON SOME OF THESE QUESTIONS AND PERHAPS MORE ARE NEEDED. MAKE SURE THAT ANY PROPOSALS WHICH YOUR SOCIETY HAS ARE PLACED ON THE AGENDA EARLY.

AUSTRALIAN SPELEOLOGICAL FEDERATION EIGHTH BIENNIAL CONFERENCE

The Eighth Biennial Conference of the Australian Speleological Federation will be held in Hobart, Tasmania, from 27th to 31st December, 1970. Field trips will follow to Mole Creek, Ida Bay, Junee-Florentine and Mt Anne. Details of the Conference arrangements, together with enrolment forms, were printed in the ASF Newsletter for March 1970. Further copies and information from:

The Secretary,
A.S.F. Convention 1970,
Box 641G, G.P.O.,
HOBART,
Tasmania 7001.

* * * * *

CONSERVATION ACTION

COLONG - The A.P.C.M. Ltd. Meeting

As the reporter in the "Australian" remarked, the April Annual General Meeting of Associated Portland Cement Manufacturers (Australia) Ltd is beginning to vie with the Royal Easter Show as an annual event in Sydney. Certainly it provides a couple of hours entertainment at the company's expense for no more than the price of a share (and it's pleasing to note that they have fallen from 98c. to 85c. in the last year). Speleological supporters included Martin Foster and Greg Middleton (SSS) and Harley Wright and John Dunkley (SUSS). Conservationists continued to harass the chairman with objections, points of order and forcing of polls on election of directors. The directors again showed their inability to comprehend the situation fully and the usual platitudinous assurances were made. The company agreed to thoroughly explore the possibility of expanding its present activities at Marulan instead of going to Colong even to the extent of discussing a joint pipeline to Maldon and Berrima cement works with its chief competitor, Southern Portland Cement (a B.H.P. subsidiary). Wait for the next enthralling episode in this continuing story.

Conservation Exposition in Brisbane

The first ever conservation exposition took place in the David Jones Auditorium in Valley, a Brisbane inner suburb, organized by the South Queensland Conservation Council. The opening was presided over by Professor Z. Cowan, Vice-Chancellor of the University of Queensland, and received plenty of publicity. The University of Queensland Speleological Society displayed a model cave inserted behind an 8' x 4' partition. The usual formations were shown and the whole was painted in oils and cleverly lit. Some bats were depicted and a few speleos descending ladders etc. The exhibit was accompanied by excellent enlarged photographs of cave decorations, bat certificates, a map showing the caving areas of Queensland and a chart setting out the Society's objectives and interests. Members were rostered to sell 'bat certificates'.

UNLOCKING THE SECRETS OF SKELETON ROOM

by John Harris (KSS)
from "Trog" 8(7) 10-12

Speleologists visiting the Skeleton Room of Carrai Bat Cave will have noticed additions to the large heap of bat guano - Sputnik. Brass spikes and glass rods that act as markers and jars of copper sulphate which are used to estimate the amount of guano falling onto the heap from roosting bats. Fibre glass sieves were imbedded into the heap to collect samples of mites, fly larva beetles and other organisms which live in the heap to a depth of 12 inches. The mites (red-brown adults and cream juveniles) are especially interesting because of their great numbers and because they have an important role in decomposing the energy rich bat guano. The numbers of mites present at any time during the year are determined by taking sieve samples out of the heap, extracting the mites from the guano and counting them under a binocular microscope. The method of extracting the mites from guano (or soil) is simple. The guano heap is placed on a wire mesh (strainer)is OK) in a funnel with a jar of methylated spirits (or water if you want to keep them alive) under the narrow end. A light bulb is set up about a foot above the top of the funnel. The mites crawl away from the light (and heat) into the jar.

Biologists still know very little about the organisms living in bat guano in caves, so any collections of troglaphiles (especially mites) would be welcome

The other major additions to "Sputnik" are three metal probes embedded into the heap, one half an inch below the surface, one 2 inches into the heap and a third embedded 6 inches. These probes measure the temperature of the heap at these depths. The temperature of the heap changes according to the activity of the organisms in the heap which comprise bacteria, fungi, nematodes, protozoa, mites, flies, beetles, moths and spiders. The bacteria and fungi generate most heat and can change the temperature of fresh surface guano by 17°F. The surface temperature of the guano on 6/10/69 prior to the arrival of bats in the chamber was 59°F, but on 3/10/69 it had increased to 76°F.

Two other temperature probes are in the Skeleton Room. One is placed on the side wall and one on the ceiling. They record air temperatures inside the chamber. The temperature changes of the ceiling are especially interesting because from them we can tell when the bats enter the room and what time they leave. When bats cluster on the ceiling they heat up the air near them by 8°F.

From October to the middle of November when up to 3,000 bats (adult females) **are present** in the chamber, arrival time is 4am and departure time 7pm every day. After these females leave for Willi Willi Bat Cave to have their young around the beginning of December, males rest in the chamber from 7pm to 4am (presumably in between feeding trips). The tenancy of the Skeleton Room is certainly well rostered. The leads running out of the Skeleton Room go to the temperature recorder and power source of four 6-volt batteries each weighing 59 pounds.

Note: the article above was reprinted from "Trog", February 1970. A much longer description of the research currently under way at Carrai and Willi Willi Bat Caves appears in "Down Under", 9 (4): 116-122 for July 1970. The recording equipment was removed from the cave in July, 1970. -- ed.

CAMOOWEAL CAVES

by Henry Shannon, UQSS

... The University of Queensland Speleological Society has been spending its 1968 and 1969 long vacations in the Barkly Tablelands region, mostly around the immediate environs of Camooweal

The Camooweal area has always been on the fringe of the unknown for Australian speleologists. The name "Nowranie" has been a word full of mystery, the huge cave that somebody says someone else has been to, set in a vast area of limestone (dolomite) second in size only to the Nullarbor, but too far away to bother with. In the time of the year when an expedition can be arranged most easily, the rain doth fall, the weed lies thick, the grass grows tall and you're bogged in the creeks. Who would be willing to go more than a thousand miles to a cave area which could turn into another Northern myth?

Introduction and History

The first speleological work in this area dates back to that of the Czech scholar J.V.Danes, who wrote up the results of his work in publications in 1910 and 1916. From then until 1954 there is no published information, but during this period the Great Nowranie Cave was often visited and the owners of Nowranie station were proud of their caves. While I was asking for directions, I telephoned an old woman who lived on a neighbouring station in her youth. She remembered the cave and the life. There were ponies by a waterhole on Nowranie Creek and people would go up to the cave from there. The son of the Nowranie people was very keen and had made up a ladder for the entrance shaft. The ladder is now broken and Nowranie station abandoned. Practically all the country, including Nowranie, is owned by Rocklands station.

The people at Rocklands (now run by a manager Mr R. Miller) did not know much either, and in fact were glad to get our directions to Nowranie caves. The lady who answered the phone knew of one cave south-west of the township somewhere up on the ridge and she had been shown one cave on Rocklands which had a shaft type entrance. So the local tradition is extinct, but some local people were involved in the Mt Isa Speleological Society which was founded in 1954, and flourished for a while before succumbing to matrimony. In the person of Dick Benson a remnant of the club persists to the present but he will be retiring and plans to leave Mt Isa. The Mt.I.S.S. knew of seven caves but concentrated their activities on the two Nowranies, the Two Mile and Four Mile Caves and also the Bat Shit or Haunted Caves (their names - Benson, pers. comm.)

The first trip in 1954 was to the two Nowranies and it was written up in articles in several places (Green, 1954; Benson, 1955; Blount, 1962). Mt.I.S.S. themselves did not produce a map. In 1964 some members of the unofficial Brisbane Cave Group visited the Four Mile Cave when passing through on a tour. In 1959, J.N.Jennings and M.M.Sweeting visited Camooweal and prepared a map of Nowranie No. 1 as well as looking at the hard entrance of Four Mile Cave.

Later in the 1960s, Lloyd Robinson, now of ISS, was actively caving in the area. He remembers about 15 caves but could not give any definite directions. The same applies to Antony Sprent (UQSS) who revived a caving group in Mt Isa in

1964 and who prepared a map of the Four Mile Cave. He recalls entering one cave twenty-two miles south and one mile off to the left of the Urandangie road. Michael Graham of UQSS also visited Two Mile (Tar Drum) and Four Mile Caves in 1968, prior to the first UQSS expedition. In 1966 Boyd Pratt (UNSWSS) and several others visited Four Mile Cave twice. On the second trip they found a boulder choked fissure near Nellie's Waterhole just north of the highway (Pratt, 1966).

The UQSS expeditions were greatly helped by the provision of copies of the 1959 field notes of Jennings and Sweeting. In 1968 we visited the two Nowranie Caves, Kaiser Creek, Niggle, Camooweal Four Mile East and Burketown Road Caves and some minor ones (Shannon, 1969). In 1969 we missed out on the Nowranies but added Danes Four, Canellan and Barwidgee Caves to the known list. Particularly on the 1969 expedition rigorous mapping work was done in all caves entered. The present state of knowledge about Camooweal area is summarised in the Revised Cave List below, but the main achievements of UQSS are as follows:

Niggle Cave: about 7000' passages known but extensions certain. 5000' mapped to Gr. 4-5, mostly in great detail. Depth about 240'.

Camooweal Four Mile East Cave: about 3500' known, 3200' mapped, Gr. 3-4, all in good detail. Extensions possible only by digging. Depth 240'.

Great Nowranie Cave: about 1500' mapped Jennings & Sweeting. No significant additions by UQSS.

Little Nowranie Cave: about 600' mapped Gr. 2 (Shannon). Depth abt. 240'.

Canellan Cave: about 850' mapped Gr. 4. Depth 240'.

The other caves are all small and have been mapped. None reaches the watertable

Description and Interpretation

The Camooweal area has a semi-arid savanna climate with summer mean temperatures around 85°F (diurnal maxima over 100°F) and winter mean 65°F. Annual rainfall of about 20" occurs mostly as short, heavy falls in summer. The main Barkly Tableland is flat Mitchell Grass plain with a heavy textured grey clay soil and no trees. Apart from the doline containing Canellan and Danes Four Caves, the known caves are all east of the Georgina River and in red soil country with spinifex and small gum trees. It appears that the caves are contained to a small area of the dolomite outcrop roughly following the meridian of Camooweal. It does seem that most of the Northern Territory section of the Barkly Tableland is caveless. Note that 'Barry Caves' are rock shelters only and are not even on the dolomite outcrop.

All the caves are swallets, but the creeks running to the watersinks are often only slight depressions. Some of the swallets have definite dry valleys leading to them but even the deepest of these is cut only 30' into the plain. It appears that the caves are geologically young and there are not many clear signs of abandoned river passages. Only one cave found so far by UQSS is fed by water diverted from a river (Barwidgee) but others are recorded. The rest take the entire runoff of small enclosed basins.

Basically, then, the caves operate as pipes taking the runoff from the surface creeks to terminal lakes on the watertable. Possibly all the caves fill up in wet years. The smaller caves are just interrupted upper sections.

I believe that any of the rocky sinks could be forced through to the watertable with a bit of luck. One cave (Camooweal Four Mile) has extensive and awkward upper levels. The complexity of this section has hampered the production of a map, and mapping of this section was attempted only because the surveyors were stranded at the cave. Niggle Cave is also troublesome since the original map covers 6' x 4'. All the longer caves require ladder at some stage. The entrance drop of Niggle can be done with rope only but it is a time wasting method. The terminal lakes, particularly the large ones, are eerie places. The water in them is dddly murky, giving the feeling that some large man eating kraken lives on the bottom, wherever that is.

The caves are generally unornamented but are first rate sport, one limitation being the climate which is extremely hot and humid. Speleos coming out of Little Nowranie were literally wet with sweat - it actually felt cold for a few minutes in the 110 F dry heat on the surface. The caves are like a Turkish bath except in the less humid big passages of the larger caves. In Niggle Cave there is a strong contrast between the main passage and Tods Passage, for example.

The only possible discharge points for the cave water are at Lake Nash and at Riversleigh. No water discharges at Lake Nash apparently, and a very large amount runs out at Riversleigh which is 140 miles away. More than 150 cusec was recorded early in the century but there is less now. So it would appear all the caves even as far south as Lake Nash discharge at Riversleigh. All the caves presumably connect with this link, which rather neatly accounts for the entrance distribution around Camooweal. Before people jump to conclusions, it does not follow that there is a master cave, and even if there is, there is no reason for it to be accessible. It is more likely that a general diffusion of groundwater goes on through a joint network. The character of the Riversleigh springs supports this hypothesis. There do not seem to be discrete effluxes which can readily be entered. Nevertheless, gigantic world record size caves are much more likely to occur here than on the Nullarbor in my opinion.

Logistics

The difficulties of expeditions to the area should be recognised early in planning. The gravel highways are crippling to cars; none of ours have escaped injury and mine required engine transplant and fracture splinting. Overheating is usual in summer, when it is better to travel at night if you can. Winter is the best season to go. The road is alternately made of football size hard chert nodules and car trap sized holes. The country is flat and uninteresting compared with Nullarbor. Prickly spinifex is ubiquitous and Turkey bush spears tyres and feet. Obtain water at Camooweal township - surface water is fouled by cattle both dead and alive. Anything within sight of the highway is likely to be pinched. If it rains when you're underground, you are likely to explore the terminal lakes posthumously. I think there are places where one could wait out a flood, which probably would be only a 3' - 4' torrent, but there are bits of grass on the walls in places which suggest complete filling of the caves. Another reason for visiting them only in winter.

... The University of Queensland Speleological Society is planning another expedition in May 1971. Speleos from other ASF societies would be welcome - any takers? ...

REVISED CAVE LIST -- CAMOOWEAL

The following list supersedes that published in Speleo Handbook (Matthews, 1968) and is a precis of the list published in Down Under 9 (2) : 37-44. Cave names in capital letters supersede any others. The origin of names is given in brackets following. Locations are not given except to identify the cave from sources. More detailed descriptions are available in Down Under ref. above. Alternate names for the cave and the sources are also given.

1. BARWIDGEE CAVE ("Glissans group of caves" - Danes 1911), ("Cave on Little Harveys Creek" - Danes 1916; Matthews 1968). Two sinkholes and silted remains of a third. Cave 80' across, mud floored except for rubble stream channel. Can fill up entirely in wet season for months. Map Bourke, UQSS, 1969.
2. "Cave on Emu Creek, 9 miles north of Rocklands station" (Danes 1916). Cave lost at present. Air photos show mark in right spot but not on or near Emu Ck.
3. "Hassells Caves, Elizabeth Ck, 5 miles NW of last cave" (Danes 1916). Also lost, searched for by UQSS in December 1969.
4. DANES NUMBER FOUR CAVE (UQSS name). Smaller of pair of caves in a sinkhole complex. One cavern, 150' passages, survey Gr. 4, Bourke et al. UQSS, 1969.
5. BURKETOWN ROAD CAVE (UQSS name). Daylight cavern 50' wide, 50' deep. Two holes in roof. Considered to be same as one described by Danes 1916. Survey Gr 4, Bourke et al., UQSS, 1969.
6. GREAT NOWRANIE CAVE (UQSS name). Equivalent to Nowranie Caves (Danes 1911 & locally), Nowranie (Landsborough) Cave (Danes 1916), Nowranie No. 1 Cave (Green 1954; Jennings & Sweeting 1959; Matthews 1968), Gum Hole (Waldegrave 1954) On 3 levels, extends to water table. Survey Gr. 3, Jennings & Sweeting 1959.
7. KARTE JOPPS CAVE (Danes 1916) "19 miles S Camooweal ..." Cannot be seen on air photos. May have silted up.
8. "Cave on Bustard Creek" (Danes 1916). Lost at present.
9. "Cave on Happy Creek" (Danes 1916). Lost at present.
10. CANELLAN CAVE (UQSS name). Equivalent to Ridge Cave (Benson, pers. comm.) In same doline as no, 4 above. Extends to water table, total length about 860' Survey Gr 4-5, Bourke et al., UQSS.
11. LITTLE NOWRANIE CAVE (UQSS name). Same as second opening of the Gum Hole (Waldegrave 1954), Nowranie No. 2 Cave (Green 1954; Benson 1955; Blount 1962; Matthews 1968). 200 yards from Great Nowranie Cave. 40' entrance shaft in doline. Very humid. Extends to water table. 400' long. Map Gr 2 Shannon.
12. KAISER CREEK CAVE (local name, adopted UQSS). Also Two Mile Cave (MtISS; Matthews 1968). 180' long, survey Gr. 5, Shannon, UQSS, 1969.

13. CAMOOWEAL FOUR MILE EAST CAVE (UQSS name). Also Camooweal No. 1 (Calder, 1961; MtISS), Four Mile Cave (Matthews 1968), Road Cave & P.O.W. Camp Cave (UQSS members). Extends to water table. 3500' passages, survey Gr. 5a Shannon UQSS, 1968.
14. WHIRLPOOL CAVE (Robinson, pers. comm.), also The Whirlpool (Benson 1955). In river (sic) one mile north of Nowranie Caves.
15. NIGGLE CAVE (UQSS name). Dug out and first descended by Pratt (1966) also see Bourke 1969. Extends to water table. About 250' deep. Survey Gr. 5a - 6b Shannon, UQSS, 1968-9. Total surveyed length 5000', explored length abt, 7000'.
16. PYTHON CAVE (MtISS name; Benson 1955 & pers. comm.). Possibly Barwidgee Cave but more likely another one somewhere a few miles from Rocklands station.
17. "Haunted or Bat Shit Cave" (MtISS name, Benson pers. comm.).
18. "Cave 22 miles from Camooweal down the Urandangue Road" (Sprent, UQSS; also MtISS).
19. "Cave 23 miles S of Camooweal" (Calder 1961).
20. "Cave near the boundary fence 6 miles north of the Urandangie Road; 20 miles out from Camooweal on the Rocklands side" (location Shannon from air photos; cave entrance information R. Miller, manager of Rocklands, pers. comm.).
21. "Blowhole near Dajarra" (Benson 1955). Persistent local rumours. M. Graham UQSS. Blowholes in wells and bores are common in this area.
22. THE GROTTTO, Riversleigh (F.W. Whitehouse, pers. comm.). Collapsed cave near the Riversleigh springs.
23. SPIKE CAVE (UQSS name). 20' crawlway from Dingo sink, presumably directs water into Niggle Cave.
24. "Cave near the Georgina-Rankin junction" (Information from Mr M. McNamara, driller, of Mt Isa). Suggests asking manager of Lake Nash station for direction.
25. "Cave in the horse paddock at Old Austral" (Lamond 1968)
26. "Cave about 4 miles east of Austral homestead" (Lamond 1968)
27. "Cave about midway between Gidyea Creek on Lake Nash and Dead Dog on Austral Downs". (Lamond 1968)
28. "Sinkhole 4 miles south of Niggle Cave" (Shannon, UQSS). Wide shaft entrance visible on air photos. Appears to drain area of about 7 square miles.
29. "Sinkhole 1 mile SW of last (28) sinkhole" (Shannon, UQSS). Small area of drainage only. Air photo interpretation.
30. "Sinkhole 1 mile SW of last (29) sinkhole" (Shannon, UQSS). Two well defined creeks enter enormous shaft. Air photo interpretation.

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HOW TO MANUFACTURE FLUORESCHEIN

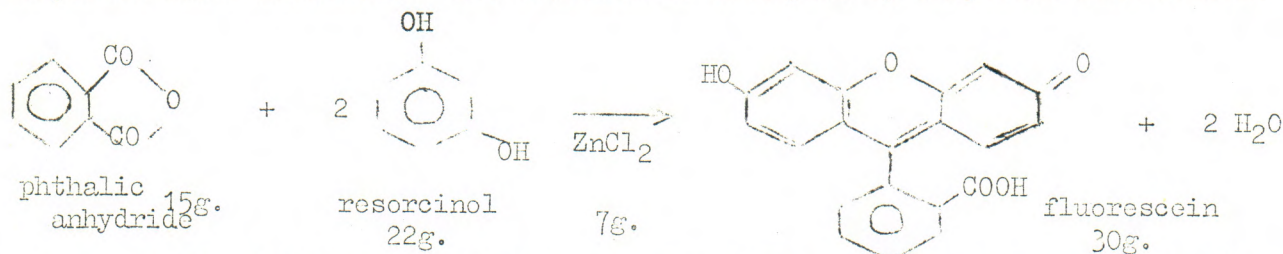
by N. C. White, NUSS

Introduction

Some time ago I was interested in obtaining large quantities of fluorescein for a major water tracing project. Enquiries made at the time showed the cost of purchasing fluorescein to be prohibitive, and so the possibility of manufacturing it was investigated. No difficulties were encountered in the manufacture of small amounts, and none are anticipated for larger quantities. Bulk prices quoted for the ingredients revealed that 40 lbs. could be made for less than \$1 per pound

Manufacture

Fluorescein may be easily prepared by heating together a mixture of phthalic anhydride and resorcinol. The reaction is catalysed by anhydrous zinc chloride



Mix the powdered phthalic anhydride and resorcinol in the correct proportions and heat to 180 C. At this temperature the mixture will be molten. While maintaining the temperature at or slightly above 180 C, the zinc chloride, preferably in the form of lumps, should be added gradually while stirring. The mixture will gradually darken in colour to a dark reddish shade and become very viscous. When too thick to stir stop heating and allow to cool. The product will contract and break itself up whilst cooling. This is crude fluorescein. The zinc may be removed by washing with dilute hydrochloric acid, however its presence will in no way affect the use of the dye for water tracing. As is usual the dye should be dissolved in sodium hydroxide solution before adding to the water to be traced,

Small quantities of fluorescein were twice prepared by this method, and no difficulties were encountered. The preparation was carried out in a backyard garage to allow the unpleasant fumes of HCl to escape. The mixture was heated in a pyrex beaker over a Primus kerosene stove. The temperature was checked with a 10 - 360 C laboratory thermometer. Each preparation required about 40 minutes

Anyone planning to prepare large amounts of fluorescein by this method should choose a well ventilated place to do it. With larger quantities, once a suitable means of heating the mixture has been found, temperature control should not present much trouble. One difficulty may be finding a suitable vessel. Do not use galvanised iron or aluminium. An unseamed iron vessel would probably be suitable, however a large pyrex beaker would be best. It is not recommended that individual batches be larger than 10 lbs. If using a pyrex beaker, do not place it directly onto a flame. A wire gauze should first be placed over the flame and the beaker stood on this.

Cost

The cost of manufacturing fluorescein will vary with the quantity required, and the price charged for the ingredients. This latter will vary somewhat between suppliers. One Newcastle bulk chemical supplier quoted the following prices for "pure" grade:

fluorescein	- \$5 per pound
phtholic anhydride	- 32c. per pound in 10 lb. lots
resorcinol	- 97c. per pound in 10 lb. lots
anhydrous zinc chloride	- 32c. per pound in 10 lb. lots

As it would be necessary to buy the ingredients in multiples of 10 lb. lots, the most economic quantity of fluorescein to prepare would be 40 lbs. This would require 20 lbs. of phtholic anhydride costing (at the prices quoted) 6.40, 29.3 lbs. (i.e. 30 lbs.) of resorcinol costing \$29.10, 9.34 lbs. (i.e. 10 lbs.) of anhydrous zinc chloride costing \$3.20. Thus the total cost of the 40 lbs. of fluorescein prepared from these ingredients would be \$38.70. Compare this cost with the \$200 which the same quantity of fluorescein would cost at the price quoted. Smaller quantities would, of course, cost more on a per pound basis.

Conclusion

The above method is recommended where large quantities of fluorescein are required. The method requires a minimum of equipment and is easily carried out at home. While quantities as large as 40 lbs. would seldom be required, the low cost would certainly place it within reach of some of the larger societies. With care taken in obtaining quotes for the ingredients, smaller quantities could no doubt be made at only slightly less favorable rates.

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LAVA CAVES AT HOLE CREEK

from "Southern Caver" 2(1)

Exposed in a cutting on the Gowrie Park Road, three miles beyond the Mersey bridge near Croesus Cave, are a number of tiny basalt lava caves. The basalt flow is quite extensive and overlies the limestone, is of Tertiary age and has amygdalae filled with azoollite mineral. The latter factor has resulted in the growth of some interesting formation in some of the caves.

The caves are all very small, the largest extending only thirty feet into the bank. Much of this cave is a tight squeeze, but it ends in a small chamber. The floor is covered with crystals and there is a ten inch long helictite in one corner. The caves are very wet.

As these are possibly the first lava caves found in Tasmania, they are worthy of note. Tasmanian cavers have been kept too busy in limestone country to be able to spend any time investigating basalt areas.

DETECTION OF CAVE-SURFACE CONNECTIONS BY RADIO

by M. G. Webb, NUCC
from "Speleograffiti" 6(0) 9-10

This is intended as a supplement to the paper "possible Methods of Cave Detection" presented to the 7th Biennial Conference of the A.S.F., Coolwa, December 1968

Limestone is an electrical conductor with a resistivity which varies from 4×10 and 7×10 ohm-cm. Consequently, its effect on electromagnetic radiation is to reduce the amplitude. A convenient measurement of the attenuation is the skin depth D, which is determined by the following equation:

$$D = \frac{1}{(Cu f)^{\frac{1}{2}}}$$

C = conductivity
u = permeability
f = emf frequency

The skin depth is the distance over which the amplitude of the wave falls to $1/e^{0.378}$ of the initial amplitude, and the received intensity falls to 0.136. The permeability of the limestone can be treated as constant over the radio spectrum as the only variation is in the susceptibility which is of the order of 10^{-6} E.m.u.s. The conductivity may also be considered constant, as variation with frequency over a factor of 100 range (100 kc/s to 10 mc/s) is less than 3%.

Values for the skin depth then become

Table 1

f	D
27 Mc/s	2 - 3 metres
8.5 "	4 "
3.7 "	6 "
100 kc/s	36 "
10 "	113 "
1 "	350 "

Consider a radio wave of frequency 3.7 Mc/s, transmitter aerial power 10 watts. After traversing 6 metres of unfractured limestone, the received signal power would be 1.36 watts, so we get:

Table 2

Distance from XMTR through pure limestone	Received Power
0 metres	10 watts
6 "	1.36 "
12 "	0.185 "
18 "	0.025 "
24 "	0.003 "

Therefore, the signal is likely to be attenuated until it is inaudible after a very short traverse through pure limestone.

Suppose, however, the limestone above the antenna is fractured. As any fractures will be small with respect to the waveguide dimensions no preferential

transmission will occur, but transmission along fractures and joints will be high compared to that through the limestone, due to the extreme difference between the skin depths of air and limestone.

Therefore, if a transmitter is placed inside a cave and a receiver on the surface at a distance from the transmitter, large with respect to D , and a strong signal detected with a loss of signal strength caused by moving the transmitter or receiver, there must be an airspace connection between the two points. The greater the signal strength, the larger the airspace.

Note, however, that unexplored shafts and tunnels are often blocked by clay and rubble. D for clay at 3.7 Mc/s varies between 1 cm. and 1 m. depending on the quantity of water in the clay, and that consequently high transmitter powers are likely to be required to force a signal through any appreciable distance of clay.

It is necessary that voice modulation be available. In fact the human ear is very insensitive to voice frequencies at low levels, and so a weak signal received is likely to be missed if it only carries voice. However, a frequency of 2 kc/s can even be painful at high levels and is still very noticeable at low signal levels, so a 3.7 mc/s carrier with 2 kc/s modulation is probably a good combination. If high power is available, higher frequencies are preferable, as although B is smaller (some penetration is necessary to penetrate rock chokes), directional antennas are smaller. During consideration of this system, I decided a carrier of 14 mc/s and antenna power variable up to 50 watts was probably most convenient. At this frequency, a half wavelength antenna is 10.5 metres. If the folded half wavelength antenna is used, the radiated power function is $\sin^4 \theta$, where θ is the angle the relevant direction makes with the antenna, which is the most desirable direction.

* * * * *

REVIEW

Chillagoe. Communications Occas. pap. 3. (Sydney Speleological Society),
1969. Qto., 3 maps, 3pp. photos., 46pp. \$1 from the Society.

This publication is an account of the Society's expeditions to Chillagoe, north Queensland, in 1966-67, supplemented by material reprinted from elsewhere.

The contents list includes a description of the local surface geography, flora and fauna, extracts from published papers on the geology, an annotated index of limestone bluffs and caves and a list of cave fauna collections, with a rather inadequately written but quite extensive bibliography.

The information in this publication is essentially a well organized description of an important and fascinating part of tropical Australia. Its value lies in the collection in one place of available information on tropical karst area in which very little exploration or scientific research has been done. It is one of the few publications integrating knowledge of an Australian caving area and despite its prematurity (systematic exploration is continuing), the overlap and lack of continuity in the contents and its essentially descriptive function, it is a valuable addition to the literature of Australian caving.

DOWN UNDER ALL OVER

. . . NEWS FROM AROUND THE SOCIETIES

VSA at Buchan, 1970

by Ian Cook, VSA

Rainfall at Buchan this year has been unusually high, and has curtailed activity in many of the wet systems. Trog Dip (EB10) was entered in February with the aim of penetrating the TrogVaults and then exploring fissures extending from this section. Water level prevented the party reaching the Vaults and a successive trip one month later found the level to be higher still. It will be another year before progress can be made.

The Potholes area has come under a more intensive exploration programme since John Taylor was appointed area convenor. Although most of the holes have been explored, the drainage pattern of the overall system has managed to conceal itself. It appears that the water disappears into inaccessible fissures and jointing planes in the limestone.

Scrubby Creek (M49) received an all out attack on its currently impenetrable rockfall. The party of four wearing wet suits remained in the cave for eleven hours. Remnants of an old stream passage were found but could not be followed up due to the compactness of the rockfall. Further exploration directly up the stream passage through several water squeezes failed to reveal any further leads. Btoom Water Tunnel (M43) which was assumed to have been a major underground tributary of Scrubby Creek was surveyed and was found to flow towards the Pot holes, which contradicts previous assumptions. Other caves in the Scrubby Creek watershed are also under exploration. New sections have been found in the Canyons (M18) and have ended in digs. M19, adjacent to the canyons was found to have a small stream flowing through it, spilling into a pool of water, its continuation unknown. Further work on both caves is still in progress.

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UQSS around Queensland, 1970

A very active year, with fortnightly trips to Texas except for long weekends at Rockhampton and occasional trips to small caves like Holy Jump. Tourist type trips have been ruthlessly eliminated in favour of surveying and data collection for proposed conservation publications. The Mt Etna book has reached the stage of consulting with the printers. At Texas we have now surveyed around 80% of the known cave passages in the area. We have found that the Glen Lyon River Cave is much bigger than was thought and it will probably be over 3000' in total passage length. There is more than a mile of cave passage in the area. The main piece of new exploration has been the diving of the Efflux Cave-Cloister Cave (formerly The Downstream Section) syphon. Air pockets above the syphon contain firedamp -- N_2 CH_4 , traces of CO and O_2 , which simply does not make a useable breathing mixture -- be warned.

At Mt Etna we have discovered Elyseum Cave in Limestone Ridge (a review in "Down Under" described it as possibly the best in the area - ed.). Most of the work has been concerned with surface surveying (Ant Sprent), underground

surveying (Mike Bourke, Lex Brown and Andrew Graham) and geological (Henry Shannon). We assisted in the first descent of Plumbob Hole, a newly discovered 120' shaft on Limestone Ridge, the deepest free drop in the area.

While a party was looking for the Flagstone Creek Caves, which were not found, we came across some unreported alluvium caves in the bank of Lockyer Ck. about a $\frac{1}{4}$ mile upstream from where a low bridge crosses the creek. There seemed to be about three entrances in a line along a semi collapsed dry gully leading to the creek, and on the top of the bank is what appears to be a shake-hole. One of the entrances goes in for at least 20' but we did not push it.

Victoria Cave Extension - Naracoorte

EDITOR'S NOTE: Rod Wells (University of Adelaide) is writing a more technical note on the extent and significance of the unparalleled bone deposits, discovery of which is described below. However something more than a mere mention of this outstanding discovery and its effects on CEGSA seems desirable right now. The notes below are collated mostly from the CEGSA Annual Report for 1969-70.

At Naracoorte, S.A., only a few hundred feet from the tourist section of Victoria Cave, Grant Gartrell dug out a few cubic feet of sand to crawl into what is possibly the greatest scientific cave discovery of the century in this country. Hundreds of square feet of Pleistocene bone deposits extending to a depth of 9' or so. (enough for 50 Ph.D.s, someone remarked to me, only half-jokingly -- ed.)

To date only the top few inches of sediment has been excavated over a very limited area but this work alone has yielded so much material that a halt was called to have it adequately mapped and catalogued. Interested CEGSA members have been trained to assist in excavation and a small grant from the S.A. Government Tourist Bureau helped defray regular travelling expenses from Adelaide to Naracoorte. Tourist Bureau Rep. on the CEGSA Committee, Ern Maddock described the find as opening up a whole new concept of cave exploration for CEGSA and a whole new concept of cave tourism for the Bureau. A dynamic display of an actively developing palaeontological dig is proposed as a unique underground museum.

Since discovery of the fossil chamber, Bob Henzell and Tom Persson have extended the cave about 2400' beyond with numerous passages remaining to be explored. This passage includes a number of large chambers up to 120' across with some of the finest formation in this state, all active.

It is very fortunate that the Victoria Cave is on a Government Reserve as this has enabled the Group to maintain strict control over it and thereby limit the damage done by indiscriminate exploration. One of the first tasks has been to construct marked pathways through the cave to avoid the danger of damage arising from having too many tracks. Even so, there are places in this cave where one false move means damage either to formation or bone deposits. It will probably be necessary to protect particularly valuable areas by bypassing them with tunnels.

CSS Trips have gone to Wyanbene, Wee Jasper, Cotter and elsewhere without really noteworthy results. CSS were impressed by the enterprise of one of the candidates in the A.C.T. By-election, Mr Alan Fitzgerald who offered to address the Society's monthly meeting. It was a matter for real regret that they were unable to accept.

NSA Several copies of "InFormation" have reached me recently, indicating that the club is still going, but although several trips have been run in 1970, including a long pilgrimage to Wyanbene at Easter, there are no dramatic results to announce yet.

NUSS More work in the Macleay Valley with KSS at Kunderang and Willi Willi and a great deal of work in Wallaringa Cave have occupied NUSS lately. Wallaringa is apparently the only reported cave of its type in Australia and has been formed by collapse of a large sandstone rock mass. Surveying of this cave is still under way and a report will be prepared later.

SSS The Society's 16th Annual Report shows an increase in membership to 73 with a further 44 prospectives. The 38 trips to 14 caving areas is a marked decline from previous years, but from the continuing increase in volume of publications, this appears to reflect a substitution of quality for quantity of trips. The new Journal is averaging around 25 pages an issue. An assault, including RDF work, has been made on the remote and rather difficult northern parts of Mammoth Cave, Jenolan, enabling positions of several important passages to be fixed.

SSS Two more trips to Mammoth Cave, Jenolan, have resulted in the dig being 8' deeper. Glenn Hunt's paper on the development of Mullamullang Cave (N37) (4 years in the making, cost of thousands --of man hours) has at last appeared in "Helictite". An offshoot of the Society, the Speleological Research Council met in June and despite very substantial assets, its future does not look very bright. Guest speaker at the Society's Annual Dinner in June was first President of A.S.F., Professor Brian J. O'Brien whose theme was conservation; a number of thought-provoking ideas on Colong as a manifestation of creeping environmental pollution.

TCC The May "Speleo Spiel" mentions the exhilaration of abseiling down Midnight Hole, 6 pitches aggregating 520'. Several members of TCC, SCS and TCCNB have been awarded medals from the Royal Humane Society for their part in the rescue of Timothy Walter from a dolerite cave on Mt Faulkner, near Hobart (see "ASF Newsletter", September 1969). They are:

Silver Medal

Peter Brabon, TCC
Bob Cockerill, SCS
Michael Cole, SCS
Brian Duhig, TCCNB
Eddie Guinan, SCS
John Morley, SCS
Bob Woolhouse, TCCNB

Bronze Medal

Frank Brown, TCC
Frank Brown jnr, TCCNB
David Elliott, SCS
Barry James, SCS
Doug Turner, TCC
Rien de Vries, TCC, SCS

It is good to see that the efforts of these cavers have been appreciated.

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

* *

HELICTITE - 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. roneocd.

\$1 from SSS

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CAVES OF THE NULLARBOR

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

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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

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from P. Matthews, Editor

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

12 papers plus summary of committee proceedings. 150pp.

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