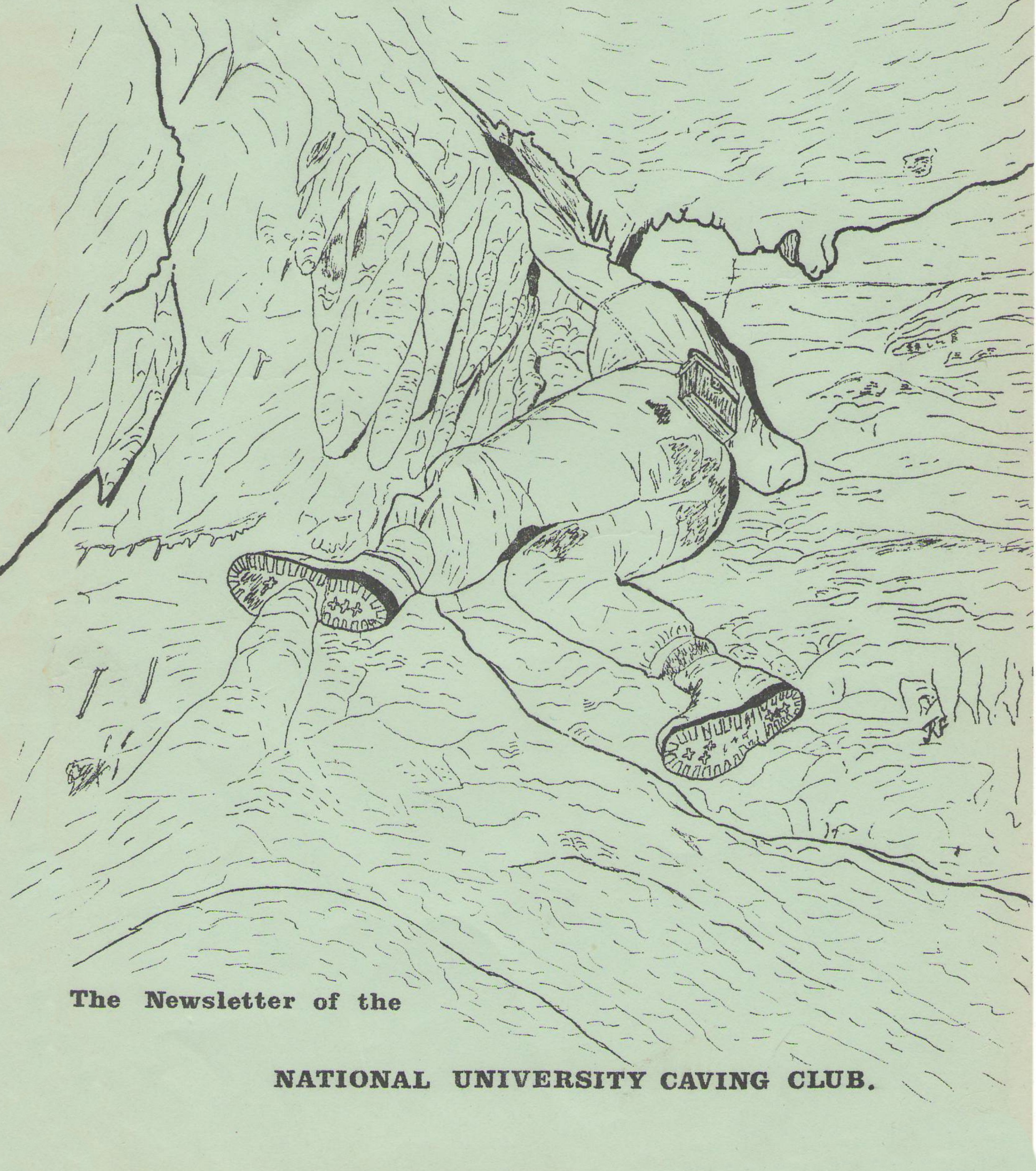
Vol. 9. No. 3.
July 1972.

# SPELEOGRAFFITI.



The Newsletter of the

NATIONAL UNIVERSITY CAVING CLUB.

JULY 1972. S P E L E O G R A F F I T I . Vol. 9. No. 3.

The Newsletter of the National University
Caving club.

Editor: Mich. Ellis and others.
Typing: John Brush, John Furlonger, Rosy Nicholson, Marj Coggan.
Graphics: Eugene Collins, John Furlonger.
Cover Design: From a lide showing KP in a cave?
Drawn by John Furlonger.

........................................

C O N T E N T S :

EDITORIAL

The 'lack of enthusiasm phase' through which the club is passing at present was strongly reflected by the numbers at the last monthly meeting. More 'indolent lighties' than 'contented heavies' were present but this is to be expected since the heavies comprise the minority faction of the club.

However, the point is that at the last meeting a quorum of 25 was not present which meant that the election which was necessary, was held unconstitutionally. So please turn up at future meetings- the club cannot function properly without your support. With regard to the present trend by the heavies towards the survey trips it is not imperative that all the lighties should immediately follow this juvenile pursuit! However enthusiasm for ordinary trips should be revived. In some cases these trips can be conducted in conjuction with survey trips with different caves or different parts of the same cave being 'done' by the non-surveyors of the party.

So c'mon all you lusty lighties.
Let's Trog up and Trip out.

Editor.
An 'Indolent Lighty'

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THE CLUB LIBRARY.

Believe it or not this club has a library! What's more you can even borrow from it! However, what is the point of maintaining it, and buying books for it if nobody uses it.

So far this year there have been only two(2) borrowings - The ASF Handbook, and the whole library, which was borrowed so that it could be properly catalogued.

Remember, we have a number of books, many maps, photos and much information on caving areas, as well as thousands(!) of Newsletters and other interesting articles just there for the borrowing.

At present, the library lives in Gus Campbell's room at John XXIII college.

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## THE GRAFFITI PAGE.

...and remember folks if you have readit before somewhere else, then you are wasting your time here....

yfyfyfyfyfyfyfy

FOR SALE (CASH).

For sale; One only, Brand new(never used) Oldham "G" Cap lamp. One as new(only used twice, on Sat. afternoons, by a little old caver) Oldham "W" Lead Acid Cell. The successful buyer is guaranteed hours of britelite. The Light is put together and ready for immed. use. Will sell to highest bidder, No Dealers please.

Contact J. BrusH.

££££££££££££££££££

Collect those empty aluminium and steel cans. Don't bury those cans on trips - bring them home and collect them for recycling. Give a damn about your environment(and make some money for the Club on the side). Aluminium cans are worth4ø a pound. Steel ones aren't worth anything, but save them anyway.

pdpdpdpdpdpdpdpdpd

KP & JF recently brewed up about 6pd of fluorescein. Rumour has it that they are now looking for a stream to throwit in, and subsequently traceit, to see where it goes/went.

MMMMMMMMMMMMMMMMMM

After our record high of 65 members last year to just on 40 this year our position has slipped to 2nd largest (after SSS), though certainlynot the 2nd most active group in ASF. What has happened to the other 20 odd bods who joined the club earlier in the year and have not been heard of since.

KKKKKKKKKKKKKKKKKK

The club recently purchased its first Lead-Acid cap lamps. We have two of them and a battery charger to charge them with. This is of course, in addition to the many (18½ at last count) privately owned lamps that are floating around.

dddddddddddddddd

BUSHWEEK IS COMING. HELP US WIN THE SCAVENGER HUNT AGAIN THIS YEAR. REMEMBER, FIRST(and only)PRIZE THIS YEAR IS A NINE GALLON KEG (FULL OF BEER). EVEN IF YOU DON'T DRINK, THERE ARE PLENTY OF WILLING HELPERS TO HELP DISPOSE OF YOUR SHARE. PEOPLE WITH CARS MOST WELCOME....

# PROBLEMS IN THE GROWTH OF SPELEOTHEMS.

Maurice W. Bell

## Part 1: The Calcite-Aragonite Problem

Crystalline calcium carbonate ($CaCO_3$) occurs in nature as calcite (rhombohedral), aragonite (orthorhombic) and vaterite (hexagonal). The above order indicates both their order of decreasing stability and their frequency of occurrence. Vaterite will not be further considered here as it is the two polymorphs calcite and aragonite which are found precipitating simultaneously in caves.

Speleologists have long wondered what determines the precipitation of one form or the other and what causes the wide variety of structures found in caves. (eg. Stalactites, stalagmites, helictites, flowstone sheets and botyroids). At the temperatures and pressures encountered in cave environments, calcite is the stable form of $CaCO_3$, while aragonite is metastable with a transitional free energy of -272 calories per mol at 25°C. (Jamieson, 1953). It is therefore thermodynamically possible for aragonite to invert to calcite at ordinary temperatures. It is reasonable to assume, however, that this transition is very slow, in the light of the discovery of large stalagmites with aragonite centres and calcite rims.

Identification of the two polymorphs is difficult and many mistakes have been made in the past. Calcite shows perfect rhombohedral cleavage, with cleavage fragments having symmetrical extinction and showing refractive indices $n_\epsilon$=1.486 and $n_\omega$=1.658.

Aragonite shows prismatic cleavage, the lath-shaped fragments having parallel extinction. Its refractive indices are 1.530, 1.681 and 1.685. These features are sufficient in most cases to identify the mineral present, however x-ray identification methods offer less room for doubt.

## Controlling Factors

Aragonite is 16% more soluble than calcite in any solvent (Curl, 1962). However, large differences in crystal size may change this relative solubility under otherwise normal conditions. Thus when aragonite is precipitating from a solution, the solution must be supersaturated with respect to calcite.

Consequently, it is the aim of this section to decide:

1. What factors inhibit precipitation of calcite.
2. What factors promote precipitation of aragonite.

To approach this problem, an understanding of the basic processes leading to the deposition of $CaCO_3$ is necessary. A summary of results from R.S.Harmon offers a good description of the overall processes.

Chemical Evolution of Cave Waters

There are 3 phases of cave water evolution:

1. Exposure to and absorption of $CO_2$ in the soil and atmosphere. Atmospheric air provides only about $1.37 \times 10^{-5}$ moles per litre of carbon dioxide (Franke, 1965). Since cave waters far excede this concentration, other factors must be relevant. Experiments indicate that it is $CO_2$ in the soil which provides the greater concentration in the solution.
2. Solution of carbonate bedrock.
   The space permitted here is too small for a full explanation. However, in summary, it is believed that the water percolates down through cracks and fractures and passes through a vapour phase, when $CaCO_3$ is taken into solution and loss of $CO_2$ is equalised by direct exchange with the atmosphere and soil. Garrels (1960) has adequately described the chemistry of this second pha-
3. Adjustment to cave atmosphere.
   Once the water has entered the cave environment, evaporation occurs and equilibrium is established between the $CO_2$ in solution and that in the atmosphere. Loss of $CO_2$ induces far more precipitation of $CaCO_3$ than does evaporation, for cave humidity is high (90-100%). Harmon also notes a constant Mg content of the water, both before and after precipitation, which again indicates that precipitation is due to $CO_2$ loss rather than evaporation.

The factors which control the development of calcite or aragonite have been studied by many people.

Supersaturation

It is found that supersaturation with respect to both aragonite and calcite is necessary for the nucleation of aragonite. It may be affected by temperature, the rate of supply of solution, rate of evaporation or loss of $CO_2$ from solution, initial concentration of reactants and rate of precipitation. However, while supersaturation is a necessary condition, it is not sufficient and other factors must enter(Refs. in Curl, 1962).

Temperature

This can have secondary effcts by increasing or decreasing the availability of other ions and metabolic products of organisms or by changing rates of reaction and diffusion. One implication of this is that the control of polymorphism of $CaCO_3$ by temperature may result from its effect on the ratio between ionic radii of calcium and of the carbonate ion.

Calcite is rhombohedral and aragonite othorhombic. The rhombohedral structure is suited to cations of small ionic radius and the orthorhombic to cations of large ionic radius.(Evans,1948)

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Table 1: Relation of Ionic Radii to Crystal Structure of Carbonates.

| Carbonate | Ionic Radius of cation. (Angstroms) | Rhombohedral crystal structure | Orthorhombic crystal structure |
|---|---|---|---|
| $MgCO_3$ | 0.65 | Magnesite | |
| $CoCO_3$ | 0.72 | Cobaltocalcite | |
| $ZnCO_3$ | 0.74 | Smithsonite | |
| $FeCO_3$ | 0.75 | Siderite | |
| $MnCO_3$ | 0.80 | Rhodochrosite | |
| $CdCO_3$ | 0.97 | Otavite | |
| $CaCO_3$ | 0.99 | Calcite | Aragonite |
| $SrCO_3$ | 1.13 | | Strontionite |
| $PbCO_3$ | 1.21 | | Cerussite |
| $BaCO_3$ | 1.35 | | Witherite |

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Table 1 lists carbonate minerals together with their crystal form and the ionic radii of the cations. Note that all elements with ionic radii less than 0.99A$^{o}$ form rhombohedral carbonates and those with ionic radii greater than 0.99A$^{o}$ form orthorhombic carbonates. Calcium carbonate is the only natural polymorphous carbonate. It is conceivable that at low temperatures $CaCO_3$ will crystallize with aragonite structure, but with a temperature increase, a corresponding increase occurs in the thermal vibrations of the ions, resulting in an overall increase in the effective ionic radii of calcium ion and carbonate ion. If the carbonate ion increases in size faster than the calcium ion, calcite is formed.

However, aragonite is favoured by high temperature within the normal range of temperature (Murray, 1954).

According to Zeller and Wray (1956), the formation of aragonite outside its stability range results from the presence of impurities including barium, strontium and lead.

Strontium, Barium, Lead

These three ions, if present in high enough concentration to precipitate under the existing condions, can provide a carbonate or other salt as a nucleus upon which aragonite will grow selectively. Large cations inhibit growth in both polymorphs, although calcite rather than aragonite would be most affected as large cations fit more easily into the aragonite lattice. They may also cause dislocations, thus providing growth centres for further propagation.

Magnesium

This appears to cause aragonite to preferentially precipitate. Curl states that the carbonate of Mg is unlikely to nucleate one polymorph over the other and so we must conclude that the primary effect must be during growth. This growth factor may be 3-fold in nature:

1. High concentrations on the surface of calcite during growth may inhibit spreading.
2. Interaction with the solvent may inhibit growth.
3. It may be possible that although it fits less easily into the aragonite lattice, what does enter may distort the lattice and therefore produce a higher rate of creation of growth-promting dislocations.

Sulphate Ion

This ion, together with $Ac^-$, $(PO_3)^-$, $HCO_3^-$, etc. plays some role as a growth inhibitor. Just what the role is is not as yet known.

Organic Solutes

These may act in a similar fashion as ionic materials. They may provide surfaces for oriented overgrowths to nucleate either polymorph, or they may poison growth steps on either by varying amounts. Large amounts of organic materials are present in the environment concerned and many authors feel that biological activity is the key to occurrences of aragonite.

Summary

Despite the recent work, a conclusion made in 1916 by Johnston, Merwin and Williamson is still the fundamental idea used at present: "The form which actually precipitates is, in the absence of nuclei ismorphous with any of these forms, determined presumably by whichever nucleus appears first. As to which this is likely to be under given conditions, nothing definite can be stated at the present time.....if we suppose that all of the types of nuclei are present simultaneously in the liquid, the question as to which appears is a question of the relative probability of the several nuclei, and hence is not likely to be elucidated until more is known about the real structure and mode of growth of crystals."

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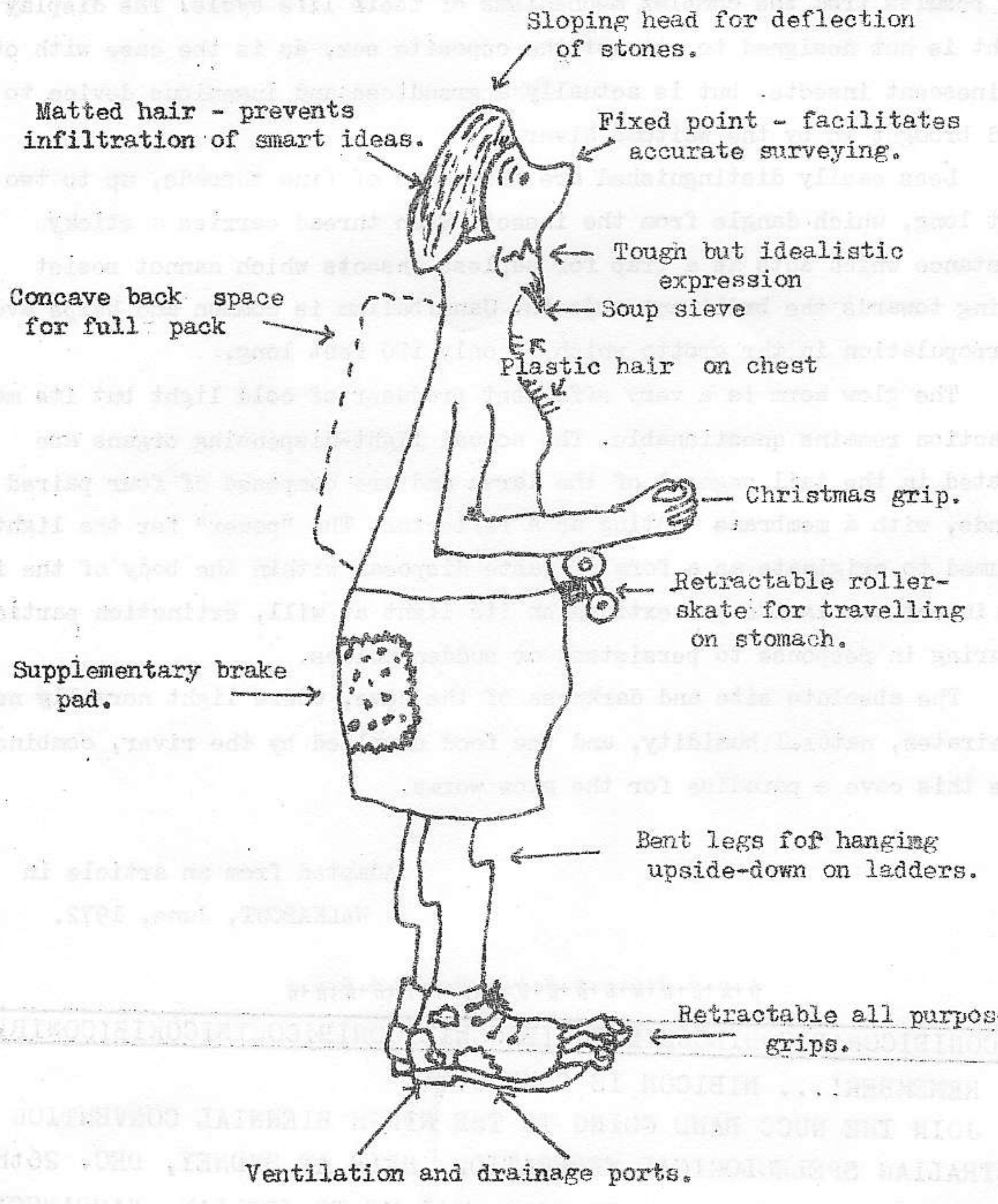
# PROTOTYPE CAVER.

Drawing of experimental model D/774 ;air cooled, food operated, fuel - high octane soups , with provision for alcohol after-burners.




Original thought M.Ellis

Captions E. Collins......

## THE CAVE OF LIGHT.

Waitomo is located 130 miles south-west of Auckland. To enter the cave a narrow path leads between damp, craggy, limestone walls, and wild-looking stalactite formations close around you, as water drips steadily from above.

Transferring to a flat-bottomed boat, complete silence is essential as you move through the silent blackness of the cave, hushed by the underworld river.

Without warning, an incredible display of a million tiny stars is exposed. This galaxy of blueish-green lights is composed of tiny creatures and results from the complex mechanisms of their life cycle. The display of light is not designed to attract the opposite sex, as is the case with other luminescent insects, but is actually a grandiose and ingenious device to lure food brought in by the Waitomo River.

Less easily distinguished are thousands of fine threads, up to two feet long, which dangle from the insect. Each thread carries a sticky substance which acts as a trap for hapless insects which cannot resist flying towards the brilliant objects. Cannibalism is common and helps avoid overpopulation in thr grotto which is only 100 feet long.

The glow worm is a very efficient producer of cold light but its mode of action remains questionable. The actual light-dispensing organs are located in the tail segment of the larva and are composed of four paired glands, with a membrane acting as a reflector. The "power" for the light is assumed to originate as a form of waste disposal within the body of the insect. The insect can ignite and extinguish its light at will, extinction particularly occuring in response to persistent or sudden noises.

The absolute site and darkness of the cave, where light normally never penetrates, natural humidity, and the food supplied by the river, combine to make this cave a paradise for the glow worms.

Adapted from an article in
WALKABOUT, June, 1972.

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REMEMBER!... NIBICON IS COMING!

JOIN THE NUCC BAND GOING TO THE NINTH BIENNIAL CONVENTION OF THE AUSTRALIAN SPELEOLOGICAL FEDERATION. HELD AT SYDNEY, DEC. 26th-30th. FIELD TRIPS AFTER THE CONVENTION WILL BE TO JENOLAN, YARRANGOBILLY, BUNGONIA, AND OTHER AREAS ACCORDING TO DEMAND. .... FOR FURTHER INFO. CONTACT: NIBICON, Box 17, The Union, University of NSW. KENSINGTON 2033.

TRIP REPORTS SECTION.

THE DOGLEG SAGA.

Over a period of some four Weekends, Alan Harding and his r have been digging in the first water/sand trap in Dogleg Cave a Wee Jasper. His report on these trips is reproduced here.

A report on a later trip by another mob is to be found els where in the trip report section.

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The opportunity of opening up the sand trap in Dogleg only arises after lengthy dry spells, as the sand trap is actually part of a 20' deep inverted syphon which is usually filled with water.

Weather permitting, and if the sand trap can be opened by Summer, evaporation may make the third water trap(25'long) pen trable by next summer. This will then give access to some 1000 of passage, as well as passages and chambers that have not been fully explored.

At the commencement of the dig the sandtrap was complete full, even the entrance being covered with sand. The sand trap is about 50' long.

18th. June 1972.

A party consisting of two 1st. Macquarie seniors and myself commenced the dig(which had actually been started the previous Weekend by another group) near the end of the Railway Tunnel. Four and a half hours later the dig had progressed about 20'.

24th. JUNE.

With the same party, eight hours were spent digging, and the passage extended to about 30'. Shovels were abandoned in favour of a five gallon bucket. This was pulled up the slope on the end of a caving ladder. The sand was spread along the floor of the Railway Tunnel as evenly as possible, in an attempt to stop it sliding back down into the hole.

25th. JUNE.

After an hour's work enlarging the existing length of the dig we called it quits and did a tour of Punchbowl. The cave was found to be bone dry throughout. This was followed by a trip into Ther cave (WJ.35,36.). Access to this cave was hitherto forbidden, the Landowner was not very approachable. However we discovered that the WJ.36 entrance is on an adjoining property, and permission to use this entrance is readily available.

2nd. JULY.

The final digging trip?

A party of nine: Dave Hughes, Geoff Southwell, six Macquarie Seniors and I arrived to find that rain during the week had dampened the cave somewhat, but the Railway Tunnel was still dry.

After four hours, we had gained some 18', bringing the total to 48'(2'to go?). With the larger party and the increasing depth, the air was becoming a little foul, so we returned to the surface by various routes intending to pay another visit to Thermal cave. However, the temptation of dry clothes and some food was a little too much for some, and by the time we had assembled at the cars half the party had changed and were ready to leave.

On the way back to Wee Jasper, Dave and I had a look in a likely looking hole just above the gravel quarry almost opposite the Sommerset Tourist Camp. We will look at this more closely on the next trip, time permitting. It is in the same valley as Thermal Cave and may be part of that system.

9th. July.

Fair go!

Too cold for caving, we went skiing instead....

ALAN HARDING.

YYYYYYYYYYYYYYYYYYYYYY

WYANBENE. 9th. JULY.

Party: Marj Coggan, Ken Palmer, John Furlonger, John Brush.

The aim of this trip was to continue the survey and take some height measurements, with Helium balloons, in the sectios already surveyed.

Due to a number of colds (common type), and a certain lack of enthusiasm around the place, the surveying bit was scrapped, and we contented ourselves playing with the balloons.

After filling the car with balloons, we headed for the cave, getting underground fairly late, at around 12.50pm.

The balloons, wrapped in plastic to form long sausages, were dumped at various points through the cave for later use.

Measurements started in Caesar's Hall using the"BRUSH"Mark I Balloon-o-matic sizeatometer.(!). Some interesting roof heights were:

S. end ,just before descent into Diarrhoea Pot ...160'.

Above the stream at the bottom ...90'

N. end, West wall ...84', (though the roof was much higher than this off to one side.At this point the floor is over 150' above the stream at the bottom ).

Measurements then proceeded into Rockfall Chamber, and here , perhaps the most amazing feature was a narrow solution tube,near the Gunbarrel turnoff, which went up some 96', and yet was only a couple of feet in diameter.

Returning to the subject of Caesar's for a minute. We found what appeared to be an old stream fissure in the aven mentioned above. It was up about 50', and exploration of it could prove interesting*1., though reaching it could be fun.

From Rockfall we moved into Gunbarrel(via the lower entrance). The height of this aven was remeasured and found to be 357' high, comparing with the 346± 10'from the rock in the 'centre', measured by Noel Call in 1970.*2. The height of the solution tube near the entrance was found to be 260'. Here, while putting the balloons back into the bags, 2 escaped. Ken saw it happen, but contented himself with just watching them rise, rather than waste energy in reaching out and grabbing them. They soon disappeared out of sight up the aven. These will have to be retrieved on a later trip, as they should have made their descent by then.

After some minor problems we made it into the avens (Aitcheson's) area where we managed to get a couple of balloons up about 160' on the second attempt, though this may not be the top, as they were scraping most of the way up(as the tube is not vertical),thus it may have only been a minor obstruction that stopped them.

The aven found by JF*3. was not entered due to a sudden loss of enthusiasm(probably due, no doubt, to the thought of climbing all the way up that narrow,mud lined fissure,).

After enriching the cave atmosphere with respect to Helium, we headed out after eight hours.

JOHN BRUSH.

*1. Speleograffiti. Vol9(2), 6/72. p.27.
*2. Speleograffiti. Vol7 (3), 5/70. p.4.
*3. Speleograffiti. Vol.7(1), 3/70. p.21.

WYANBENE. 15th. July .

Party: Mich. Ellis, Eugene Collins, Glen Murphy, Neville Windsor, Noel Call, John Brush.

The aim of this trip was to survey the Aitcheson's Bypass area, the Avens and the wet crawl. Amazingly enough, this was achieved on this eight hour trip.

After an early (?) start, we arrived to find another group at the second gate, and two guys, on bikes, at the entrance.

We headed under at 11.30 andwent straight to the bypass area, dumped most of the gear and all commenced mapping (apart from Noel, who decided to change his socks, possibly for the first in months).

The avens were next on the aggenda,and here the long narrow fissure was found to run approx. parallel to the stream (contrary to expectations). The hole in the floor of this fissure was explored by Eugene, who was volunteered for the task.

In the far aven an interesting hole in the floor was found and a 50' ladder subsequently thrown down. Glen, who was on the other side, wondered what the hell they were doing: throwing a 50' ladder down a 5' drop that just went back into the main fissure anyway!

The bit over the drop-off was then mapped. Here an interesting climb was found. I followed it up for about 40'. It was well formated(with brown flowstone and occassional helictites) and had not been previously entered. Towards the top of this climb, past a very tight squeeze,it opened out into an aven which was devoid of formations.

On the way back to the bypass ,a hole in the floor of the passage was found. However, despite our efforts it could not be enlarged sufficiently to enable someone to get through - anyway, it was found to drop directly into the bypass.

Back at the bypass we divided into two groups. Noel, Glen and Neville were to take out the gear,while Mich, Eugene and I were to survey the wet crawl on our way out.

The usually pleasant(?) dip in the stream becomes a real torture after lying in it for over half an hour or so.

After an uneventful trip back, we arrived home safely.

JOHN BRUSH.

WEE JASPER 17.7.72.

Party: Rosemary and Petter Nicholson, John Brush, John Furlonger, Eugene Collins & Mick Ellis.

Rumour had it that there probably was a trip planned for Sunday but a lack of contacts being made beforehand and a trip to Wyanbene the day before were not conducive to a punctual roll-up at the Zoo. car park at 8.45 a.m. However, people were dug out one by one to make up the numbers - John Furlonger with head injuries from a heavy night + J.B. who was still in a coma from Wyanbene.

About 10.30 a.m. we left J.B.'s residence after loading up with gear and, after an eventful trip via Sawers' Gully (many ugly corners and many pained expressions from J.F., who was determined to remain in a fully loaded condition) we ground to a halt at the W.J. shop. Giant pies and ice-cream consumed we ploughed on to the caves where lunch was leisurely consumed while J.B. and his Performing Bee, which was rather partial to J.B.'s drink, entertained us. Grunts were exchanged with another party which had emerged from a cave up the hill and after recuperation from the luncheon we got into gear and moved off to the higher entrance to Dogleg. J.B. had brought a nifty collapsible spade which we intended to use in extending Alan Harding's dig to the first sump after the Railway Tunnel. Although water was flowing out further down the gully near W.J. 12, the knowledgeable "heavies" present decided that we should persevre in our aim to see whether the sump was "digable". J.F., J.B., E.C. and I climbed down the fissure at the W.J. 16 entrance which proved to be rather pesky while Rosy and Pete back-tracked and came in via tha less pesky but wetter stream passage from lower down the hill.

After some debate as to which way was downstream - we thought J.B. was joking when he said he had been to Railway Tunnel and back while we (E.C., J.F. and ME) had been climbing down the fissure! After a wet and muddy crawl we arrived invigourated at the dig. J.B. went down first and began the dig with J.F. and E.C. as relays along the tunnel. We used the 50ft ladder, which would have been necessary had we got through the sump, to haul up the buckets. P.Nicholson and I took the first shift at hauling up the buckets at the top - I didn't think sand was so heavy!

The actual digging proved to be equally exhausting - a match would not light even in the Railway Tunnel itself and short shifts were a must.

After about 22 buckets of sand had been dug out E.C. on his second shift broke through. J.F.'s sensitive olfactory organ instantly detected fresh air from below! Digging continued in earnest but from E.C.'s obsergations it appeared that sand was banked up to some degree on the other side of the sump and on further digging it kept collapsing into the sump. It was decided then to call it a day as everyone was pretty pooped by this stage.

We all surfaced after some 5 hrs underground and proceeded leisurely into Yass for sustenance.

Yawn ....... ........... Mick Ellis

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## C O M I N G T R I P S . C O M I N G T R I P S.

Sun. 23rd July. WYANBENE. Surveying(no more wet crawls now! ).
Contact John Furlonger. ph. 494240.(W).

Sat. 22ndJuly. WYANBENE. Photographic trip to the lake.
Contact E. Collins, John XXIII College.

Fri. 28th. July. BUSH WEEK SCAVENGER HUNT. Nine gallon keg to win.

Sat. 29th. July. WYANBENE. Surveying again (should be finished soon, so if you want your name on the map , you had better come on this trip. ..Contact Garth Keppie, Garran.

Sat. 5th- Tue.8th Aug. YARRANGOBILLY. Mainly to do a dig near Coppermine. Contact Dave Hughes. ph. 862942.
...Subject to a permit being obtained.

Sat. 12th Aug. WYANBENE?,BIG HOLE?,CHEITMORE?,MT.FAIRY?, You name it.
Contact John Brush for details.

Fri19th- Sun21st. JENOLAN. Subject to permit being obtained.
Contact Frank Bergersen.

It is Likely that a Big Hole trip will eventuate fairly soon for allyou budding ladder climbers and belayers, so keep an ear to the ..........................ground...........................

## S T O P P R E S S .

On Sun. 23rd. July the dig in Dogleg was continued and the sand trap passed. The second water trap was found to be dry, but the 3rd. was full (of water). Full report to follow in the next big issue!

## THE COMMITTEE PAGE...

| | | | |
|---|---|---|---|
| PRESIDENT. | John Brush. | 149 Mugga Way,<br>Redhill.2603. | Ph. 956610 (H). |
| VICE-PRESIDENT. | John Furlonger. | Bruce Hall.<br>Room X30. | Ph. 494240 (W). |

....We have a new ...

| | | | |
|---|---|---|---|
| SECRETARY. | Peter Nicholson. | John's College,<br>Room ? | |
| TREASURER. | Garth Keppie. | Garran Hall.<br>Room 283. | |
| EQUIPMENT OFFICER. | Dave Hughes. | 225 Beasley st.<br>Mawson. | Ph. 862942. (H). |
| COMMITTEE MEMBERS. | | | |
| | Marj Coggan. | Garran Hall. (Room 340). | |
| | Sue Gibbings. | Garran Hall. (Room234). | |
| | Glen Murphy. | Burton Hall (Room 235). | |

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| | | | |
|---|---|---|---|
| RECORDS OFFICER(LIBRARIAN) | | | |
| | Gus Campbell. | John's College. | |
| PUBLICITY. | Jenny Clark. | 12 Hyde Pl.<br>Hughes. | Ph. 814175. |

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.....that's all for this month,fFolks.

It has been said before, but...

"Get your name in print; write something(for SpeleoG.), and give it to the Editor(s)".