FUSSI

Vol 4 No 1 MARCH 1992

Minimal Impact Caving - Some Ideas

Go slow - look where you are placing yourself
Follow the same path - stick to marked paths or trogged areas
Small groups
Don't take Mavis
Take a map - and use it
Armchair caving - enjoy other cavers photographs
Forget the Aeroguard - and the kneepads
Remove foreign matter
Through trips preferred to two-way trips
Wash trog gear between trips - and if possible between caves
Cave with a goal
Can you justify the trip ?
Can you justify the damage you will do ?
What is damage ?
Be aware of what others are doing
Use back of hand for leaning against things
Urinate and defecate before going into cave
Think cave first - desires second

The Quarterly Newsletter of the

Flinders University Speleological Society Incorporated

WHO'S WHO IN FUSS

President	Dr Lee Coshell	52 Main St., Henley Beach, 5022 Ph: 353-6018 ah
Secretary	Nathan Watt	17 Thorngate Dv., Belair, 5052 Ph: 278-1319 ah
Treasurer	Simon Schmidt	1 McLaughlan Rd., Windsor Gardens, 5087 Ph: 261-6497 ah
Safety Officer	John Callison	4 Colman St., Christie Downs, 5164 Ph: 384-1502 ah
Equipment Officer	Rick Jeuken	1 Anne St., Coromandel Valley, 5051 Ph: 270-1423 ah
Librarian	Di Brinsley	2 Helsinki St, Hackham West, 5763 Ph: 384-4981 ah
Newsletter Editor	Jonathon Walsh	P. O Box 489., Stirling, 5152 Ph: 390-3010 ah
ASF Liaison Officer	Richard Ewart	2/1 Sandhurst Ct., Brighton, 5048 Ph: 296-1581 ah
Fuss Mailing address:	C/- Clubs and Societies Flinders University, Bedford Park, 5042 S.A. 5042. Ph: 201-2276	
Electronic mail address:	heiko@cs.flinders.oz.au	

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Editorial

Well, another issue just scrapes in past the photocopier and into the mailbox. It's been a fun coupla months, with Bungonia, Yagby and the **ASF conference** in Jindabyne - hopefully, the conference in Tasmania will not have so much waffle, and will get to the point of the conference sooner than the last couple of hours! Thanks to Richard for his report on the conference.

One point of concern that came out of the conference is the issue of **blasting**. Fussi has a very clear view on the subject, ie: don't allow blasting in any circumstances. As blasting has been allowed in some instances in the ASF guidelines, I feel that this could be seen as tacit approval to excavate or use explosives just to improve access to a cave or passage. The basic aim of the ASF is to protect cave and karst - how can we do this when blasting is permitted? If entry to a cave is too small to allow access, then leave it like that! Enough said! (for now)

The latest on **Exit Cave** is that mining is to be stopped, we just don't know when - anything from nine months to three years time - so your support is still needed to put pressure on those who make the decicions.

The club has a limited number of Karst Indexes available - only $10

Jonathon Walsh

Free FUSSI MAG's

When you renew your membership to the club

$5

Trog Delights

News from where-ever Mavis found it

Troglodyte Vol 2, No 13, Dec 1991. Newsletter of the Northern Caverneers: Various trip reports from around the country and the globe.

Suss Bull Vol 31, No 4, Sep-Dec 91. Bulletin of the Sydney University Speleological Society:
Yessabah; Pooh goes canyoning; New Caledonia; Wyanbene - "Caving 1991"; Indonesia; Speleosports; various other trips from NSW; Cave diving.

Rimstone No 18, Jul-Dec 1991. Journal of the Top End Speleological Society:
President's Report; Limestone Gorge and Carlton Hill Station; Project Report; Blind Fish at Guy Cave; Cutta Cutta.

Scout Caver No 3, Jul-Dec 1991. Newsletter of the Scout Caving Group S.Aust:
First Aid in caving - Hazardous Gases; SASC; Bagalowie; Groundhog Kneepad; Old Homestead.

Australian Caver No 129. ASF Quarterly:
West Australian Cave exploration in the 90's; First Response for Caving Accidents; SASC; Karst Workshop; Various notes from the ASF Commisions; Middleton's Trickett - A Tribute; ACKMA Conference; Insert - Exit Cave.

Nargun Vol 24 No 7 Feb 1992. Newsletter of the VSA:
Some trips to caves around Buchan; VSA News.

Speleo Spiel. Newsletter of the Tasmanian Caverneering Club:
IDA Bay - Issues / Modified Mining Plan / Some Questions and Answers; Niggly Cave.

NSS News Dec 1990 Pt II. Journal of the National Speleological Society:
American Caving Accidents from 1989 - The title is fairly self explanatory but it gives a good idea of what can happen underground (when you least expect it)

NSS News Nov 1991.
Interesting letters on Carbide and Smoking in Caves; Caving in Indonesia (wet) and Switzerland (crystal); Up and Coming NSS Convention (Aug 3-7); NSS News; Index (1990); Local News and Admin in the NSS.

NSS News Dec 1991.
More about underground Smoking; Caving in Virginia - Search for Cathedral System; Cave Photography - some reminiscing: Report on the 6th International Symposium on Vulcanspeleology; An interesting discussion on Cycling and Caving with Panache!; Various News and Admin Details.

Caves and Caving Issue 54, Winter 1991. Bulletin of the British Cave Research Assoc:
Concern over the splitting up of the USSR and how it effects access to the five major caving areas; Review of the DMM 8mm Hanger - how to fix it using resin, its removal and how it fared after testing; Notes and News from caving areas in the UK; Reviews of the Mendip Cavers Ropework Guide; The book covers basic caving hardware - how to choose it from shops & how to care for it: There is a section on knots, SRT and rigging (Suited to the Mendip Area).

Helictite Vol 29 No 2 1991. Journal of Australasian Cave Research:
Articles on the caves of Eastern Fiji; Natural Cave Markings - and a review of "Geomorphology and Hydrology of Karst Terains", by W.B.White; The book deals with surface and underground land forms in Karst regions; physical chemistry of carbonate dissolution; karst hydrology; geo chemistry of karst waters; the models and mechanisms for the origins of caves and a final chapter on the evaporate rocks; The book is "an excellent text for the under-graduate course in karst morphology & hydrology". Avail from the NSS Bookstore: $43.00.

The Cavers Chronicle Vol 18 No 3 Dec 1991:
Notes on trips to Witchcliffe, Esperance and Crystal Cave; Press clippings concerning the World Heritage listing of the Nullarbor; and the ACKMA conference which was held in W.A. last Sep.

Mavis

Mavis : an unauthorised biography

The following report was received by this editor in a plain brown envelope, with no post marks - I can only assume that the author has some intimate relationship with Mavis, and does not want to be revealed.

The origins of Mavis are somewhat obscure. Nothing is known about her early years, and her parentage and family life are shrouded in secrecy. This biography must therefore begin one evening in January 1988, when Mavis was first sighted by FUSS members. Jim, Sackie, Ceridwen and Richard were driving along the road between Corryong and Yarrangobilly in the Snowy Mountains when a large furry animal ambled across the road. Their first thought was that the creature must be a bear. However, they quickly dismissed that idea when they remembered that there are no bears in the Snowy Mountains. Moreover, it was clear that the animal was not a wombat. Not only was the creature much too large, but it was also carrying a theodolite. It was the presence of the theodolite which led the foursome to the inescapable conclusion that the creature they had seen was a Funky Gibbon.

Having revealed herself to be Mavis and subsequently attached herself to FUSS members, this Gibbon became, over the next couple of years, an integral, though not always welcome, part of the group. When several FUSS members went on a bush walk to Mount Jagungal (named after a cat) shortly after that first sighting, they were unaware that Mavis had a treacherous and sneaky character. During the course of this trip, there was much talk about funky gibbons and theodolites. They only discovered that Mavis was in their midst after a couple of days of walking, when Sackie made the shock revelation that Clare was in fact Mavis in a Clare suit. Since then, Mavis's ability to adopt the disguise of any FUSS member has become a familiar and troublesome part of most trips.

For the next year or so, Mavis kept a fairly low profile. It wasn't until the Nullarbor trip of mid 1989 that Mavis's cleptomania and generally wicked ways became fully apparent. Mavis committed a long series of crimes during this trip, beginning with the removal of the oil filler cap from Richard's car, and including the theft of many valued possessions. She also managed to overturn Dave and Di's trailer and cause significant damage to Guy's van and Pam's car. One night, while wearing a Matt suit, Mavis woke everybody up with the words "I can hear the train!". But it was probably Clare who suffered the most during the infamous Nullarbor trip of 1989. She lost several possessions, including her pocket knife, her spondonicles (many times) and the white inner plastic bit from her cup. Sadly for Clare. the latter has never been found.

Since that trip, there have been endless experiences of Mavis's wickedness. A few examples will suffice. Whilst wearing a John suit, Mavis has been known to give people false directions on badly drawn maps and has led people astray whilst map reading. (I don't think Mavis is to blame for the poor maps -Ed.) She also sabotaged Jonathon's car prior to a recent Flinders Ranges trip after giving Jonathon and Ralph a specially drawn map to the campsite.

In view of her many crimes, it is easy to point the finger at Mavis and blame her for everything that goes wrong. However, it must be remembered that Mavis occasionally seems repentant and has, in fact, done some good deeds. For example, not only did Mavis buy Clare a brand new pocket knife after the Nullarbor trip, she also eventually brought back the old one. While driving to Margaret River last year, Clare, Heiko, Tania and Richard lost Clare's sunglasses and the Mobil card from the Uni vehicle. It was clear that Mavis was up to her old tricks. However, Clare took Mavis aside and persuaded her to retreat from society for a while so that she could contemplate her evil ways. Mavis did indeed retreat to the Himalayas, and she was expected to make a New Year's resolution to abandon her wicked ways and strive for peace and justice by doing good deeds. It seemed at first that Mavis had made such a resolution because Mavis (in a Heiko suit) appeared after New Years Eve and returned the Mobil card. However, it quickly became apparent that Mavis did not enjoy being good. Clare's sunglasses were never returned and, on the way home, Mavis caused the Uni vehicle to suffer a flat tyre on the Nullarbor.

Mavis'a most recent wave of terror began when Clare, Nathan and Simon were walking in Victoria. After spending several days walking in dismal conditions, they realised to their horror that Mavis had somehow increased her powers tremendously. Mavis had, in fact, become a weather god. These new powers were evident more recently when unseasonal rain thwarted FUSS's attempt to hold a map reading workshop .

During the recent Yarrangobilly trip, Mavis's car sabotage and map reading shenanigans were getting on everybody's nerves so it was decided, in an attempt to placate her, to hold a surprise party to celebrate Mavis's fourth birthday. In order to satisiy her cleptomania, Mavis collected a present for herself which consisted of, among other things, Guy's highly valued pocket knife, Simon's cutlery, Dave's underpants, Nathan's mug, Matt's bowl, And Ros's book. Despite this gift, and although FUSS sang Happy Birthday to Mavis and drank champagne in her honour, Mavis was not satisfied.

Unfortunately, it is necessary to comment on the unpleasant subject of Mavis's sex life, a subject which, as will be revealed, is about to cause scandal in the Australian Speleological Federation. Most FUSS members are probably unaware that Rauleigh Webb, a member of the Western Australian Speleological Group, and,

Mavis : Continued

until recently, a Vice President of the ASF, owns a gnome which was stolen from him some time ago. This gnome appears at every ASF meeting but always manages to elude Rauleigh's grasp. One morning after the recent ASF Council Meeting, a note appeared stuck to the dashboard of Richard's car. It said: "Mavis and the gnome had sex in the car last night. So there!" Needless to say, Richard, Clare, Guy and Sackie were deeply shocked and bitterly disappointed to discover that Mavis had been corrupted by Rauleigh's gnome. Their hope that this was merely a vitriolic and insubstantial attack against Mavis's character were dashed when they visited Cooleman Plain a couple of days later and, while they were caving, the following note was placed on the windscreen of Richard's car: "Dear Mayis & the Gnome - We know you had sex in the car - we saw you. You were very good too". The note was signed 'Los Trios Pervertus'.

The Mavis Sex Scandal is simply the latest in a long line of slurs against Mavis's character. Although Mavis's bad reputation is generally well deserved, it's hard to believe that she would stoop so low as to corrupt a gnome. Clearly, there are many questions to be answered about this latest disgrace: Who seduced whom? Who are Los Trios Pervertus? Did Mavis and the gnome practice safe sex?

Finally, it is important to note that Mavis has recently been asking personal questions about Simon. This has prompted certain FUSS members to ask whether there is something going on between Simon and Mavis. Some people are even asking if Simon is really Mavis. Simon isn't giving anything away, and little can be said about the Simon/Mavis relationship at this stage for fear of legal action. It can be revealed, however, that Mavis was recently seen driving Simon's car down Goodwood Road. Clearly, there is something going on. Unfortunately, it seems that the Simon/Mavis relationship, like Mavis's life, will remain shrouded in mystery.

Footnote: It has appeared that the Mavis / Simon relationship is over, either because Simon shaved his beard off, or because his mother was asking too many questions.

TAS TROG 1993

Tastrog '93 Update

Yvonne Gluyas - Northern Caverneers

Tastrog '93 will be held at "Glenara" in Youngtown, situated half-way between the airport and Launceston City, from Monday 4th to Friday 8th January 1993

A "package deal" of accomodation, meals and conference registration fee will be offered in four different categories, tailored to suit all attendees.

Option A: $220 - Motel Accomodation (Abel Tasman Motor Inn)

Option B: $180 - Hostel Accomodation at Glenara

Option C: $160 - Camping in own tent at Glenara

Option D: $90 - Organise own bed and breakfast

The "package deal" consists of:

Four nights bed and breakfast (except in D)

The welcome Bar-B-Que

Three Lunches, Morning and Afternoon Teas

Conference Registration

(inc handbook, papers and satchel)

Report from the ASF Council Meeting

by Richard Ewart

The Australian Speleological Federation Council Meeting took place at Jindabyne in the Snowy Mountains on the Australia Day long weekend. This was the second such meeting I had attended, although the first, at Margaret River, was as an observer only. FUSS was very well represented at this meeting. Jonathon and I attended as councillors, Clare was present in her capacity as newsletter editor and Simon, who loves this sort of thing, was very happy to represent the South Australian Speleological Council.[1]

Reports from the Executive and Commissions

The most important concerns of this meeting were forshadowed in a number of the Executive reports presented on the first day. Lloyd Robinson, the President, reported that cave conservation issues have dominated the past year. The seriousness of these conservation issues was evident later in the meeting when reports were presented by Convenors of the Conservation Commission. Lloyd also informed the group that caver accreditation has become a certainty in several states, and expressed a concern that we could end up with separate accreditation requirements in each state. Chris Dunne, the Secretary, said that the possibility of a national caver accreditation scheme has been raised, and he suggested that the ASF should lead the way in this area. Both Lloyd and Chris noted that the new ASF Constitution did not come into effect until October. Chris also reported on a decline in the number of individual memberships of the ASF, though Brendan Ferrari, the Treasurer, said that the number of members paid for by member clubs had risen from 511 in 1990 to 668.

Mike Lake, the Safety Convenor, spoke briefly about the improved Cave Accident / Incident Report Form which was published in Australian Caver, No 128. Mike is hoping for more frequent reportage of caving accidents and incidents. He is also hoping to contribute a Safety and Techniques section to future editions of Australian Caver, and is calling for ideas.

The convenor of the Cave Management Commission, John Dunkley, made a number of important observations in a written report. The first of these was that the ASF and ACKMA (Australian Cave and Karst Management Association) should establish a closer and more formal relationship. Clare agreed with this point, suggesting that the two organisations need each other in terms of their respective knowledge bases. She also suggested that the Executives of the two organisations should meet once or twice a year and that the membership of both bodies be informed of the resulting discussions. Andy Spate, the President of ACKMA, agreed with John that the ASF and ACKMA should form a closer relationship, but stressed that the two bodies have achieved a lot as complimentary organisations.

Andy disagreed with John's second concern, ie, that the two organisations have drifted apart, but agreed that the ASF should pursue the idea of reciprocal membership. He stressed that the ASF has been remiss in terms of recruitment of individual members and needs to undertake an individual membership drive. It was noted that the Executive now includes a membership secretary. Finally, Andy agreed with Clare that joint executive meetings would be desirable, althought Lloyd Robinson pointed out that such meetings would be difficult to organise. Nevertheless, it was clear from this discussion that there is some concern in both the ASF and ACKMA about the relationship between the two organisations. If logistical problems can be overcome, joint executive meeings might provide an opportunity for the ASF to become more involved in cave management.

To my mind, the reports given by convenors of the Conservation Commision raised some of the most important issues discussed at this meeting. In particular, the thorough and lengthy report submitted by Arthur Clarke on the consequences of the operation of Benders Quarry in Tasmania was immediately relevent. Despite the fact that the limestone karst at Ida Boy was afforded World Heritage status in 1989, this karst is mined for low grade limestone. Arthur indicates in his report that those who prepared the recently released Environmental Management Plan were not required to address the following factors: topography, soils, vegetation, surface or underground water courses, the affect of blasting on caves or the impact on the World Heritage Area. According to Arthur, the EMP also ignores or disparages certain significant research, such as a report prepared by Dr Kevin Kiernan which includes evidence of a hydrological connection between the quarry and Exit Cave and Bradley-Chesterman Cave and concludes that quarrying should cease. Although the introductory summary of the EMP concludes that "...the quarry has operated for some 43 years without any identifiable impacts to Exit Cave...",[2] Arthur's report to the ASF Council identifies a number of severe impacts, such as turbidity in both Exit and Bradley Chesterman Caves, which have resulted from mining at Benders Quarry. It is strongly arguable that this adverse impact is entirely inappropriate in a cave system within a World Heritage Area, especially since alternative sources of limestone are available.

The ASF considered various types of action which could be taken to prevent the continued operation of the quarry. The possibility of legal action was raised but was not taken up. It was suggested that a delegation of ASF members, including Sackie, Craig Hardy, Patrick Larkin and Keir Vaughan Taylor, should visit relevant people in Tasmania. Most importantly, it was stressed that clubs and individuals must continue to write letters to the people listed in Australian Caver No. 129 and at the

ASF Continued

by Richard Ewart

bottom of the recent FUSS agenda. It appears now that the intervention of the federal government is vital if quarrying is to cease. For this reason, it is particularly important that people write to Ros Kelly and Paul Keating as soon as possible.

On a more positive note, Keir Vaughan Taylor reported that mining has ceased at Yessabah as a result of a NSW Court of Appeal decision that the mining lease of David Mitchell Melcan Pty Ltd was unlawful. The basis of this finding was that an environmental impact statement had not been prepared by the company with respect to this mine. This case has considerable ramifications in NSW. All mines are now subject to environmental laws. A requirement that an environmental impact statement be prepared applies to both applications for new leases, and mines which operate on the basis of previous use.

Rauleigh Webb reported on a number of conservation concerns and initiatives in Western Australia. Of particular significance is the development of a marina at Cape Range. Concerns that this development may have an impact on rare aquatic cave fauna how so far been ignored. A number of new conservation reserves are being created in Western Australia, including a new National Park in the King Leopold Ranges. Rauleigh also reported on the release of a management plan for Yanchep National Park, the World Heritage Listing application for the Nullarbor, which is expected to proceed in September, and the expected release of a management plan for the South Coast region of WA (which includes the Nullarbor).

The newsletter editor, our own Clare Buswell, reported that the changeover in the production process of Australian Caver is complete. Clare still intends to make a number of changes to the style and format of the journal, such as increasing the page count from 20 to 28 and giving it a gloss cover. Clare also wants more ASF and club news, articles relating to karst, news from the Executive and a national listing of who is doing what and where they're doing it. Most importantly, Clare wants feedback on what people like or dislike about Australian Caver. The Council also discussed the possibility of wider distribution of Australian Caver, beginning with sales in Mountain Design.

Review of Code of Ethics

A draft Code of Conservation & Ethics was refined, and eventually ratified, by the Council. In general, this Code of Ethics is degigned to promote minimal impact caving. There was some disagreement as to whether certain activities, such as camping in caves, should be 'outlawed' completely, and it was eventually decided that there should be some leeway to allow for extreme circumstances in which camping might be necessary.

The most contentious issue concerned the use of explosives inside a cave or elsewhere on karst. Although FUSS members felt that blasting should not be permitted at all, the majority of people present at the meeting thought that the relevant provision should be worded to allow for blasting in certain circumstances. Although it was stressed by a few councillors that this should be only when absolutely necessary, the final wording of the provision was not sufficiently stringent. To my mind it is difficult to reconcile this licence to use explosives in caves with the aims of the ASF, the first of which is "to safeguard the karst heritage of Australia" The obvious response to this argument is that in certain extreme circumstances the use of explosives might be necessary to 'safeguard' karst heritage It could also be argued that, in fostering speleology, the ASF is allowing for damages to occur to karst, and the use of explosives is simply a further extension of this. Nevertheless, I personally feel uncomfortable with ASF approval of the use of blasting, no matter how stringent the wording of the provision, since the protection of karst is a stated aim of the organisation.

To a large extent, this problem points to the essential dilemma of producing a Conservation Code for speleologists who will inevitably have a significant impact on karst. As Evalt Crabbe stated in his report to the Council meeting at Margaret River: "Conservation would best be served if there were no caving; cavers following a conservation code lies somewhere between a paradox and an obsurdity".[3] For this reason, the Code of Ethics largely promotes minimal impact caving, and, in general, the Code is satisfactory.

Discussion of the Code of Ethics, though long winded, was valuable in the sense that it encouraged people to think about and discuss issues relating to their conduct within and around caves. On the other hand, this particular item also illustrated a flaw in the meeting process in that discussion often got bogged down in disagreement about the appropriateness of specific words. Arguably, although it is important that the intention of the Council should be expressed as precisely as possible, it is unnecessory to devote Council meetings to time-consuming argument on exactly how that intention should be expressed. I should also note that, although I think that the Council meeting was an appropriate forum for discussion of the Code, the other FUSS members present seemed to think that the discussion was a total waste of time. My view is that this discussion was valuable but at tines unnecessarily technical.

South Australian Speleological Council

Simon spoke in support of the SASC, suggesting that the advantages of this Council will be a united front and communication on a formal basis. Some members of the ASF Council were of the opinion that the SASC Charter is over complicated and unworkable, but it was agreed that this is the concern of the SA clubs. The Charter, which is subject to the ASF Constitution, was accepted by the Council.

ASF Continued

by Richard Ewart

Accreditation

Clare explained to the Council that in South Australia we have no choice but to develop an accreditation system within a few months. She suggested that because accreditation has become an important issue in several states, the ASF should be working towards the development of national standards. Clearly, many problems will arise if the requisite standards vary from state to state. Andy Spate agreed that national standards are desirable and stated that ACKMA is treating both caver accreditation and cave classification very seriously. He suggested that a form of caver accreditation currently exists in NSW in the sense that only ASF member clubs are allowed into certain caves. This system is a cop-out and has allowed the ASF to avoid the development of uniform caving standards. Consequently, standards for trip leaders vary from club to club. Andy believes there is a need for national standards and a mechanism for enforcement of those standards, and he suggested finally that the ASF should be pushing for a national permit system.

In view of this fact that access and caver accreditation have become hot issues in four states, it was agreed that it has become necessary to develop national standards However, it was also recognised that it will be very difficult to develop a workable system of national caver accreditation. Rauleigh illustrated one of the problems when he explainad that the system as so far developed in Western Australia, where the focus is on trip leader accreditation, is a nightmare. Five different categories of trip leader have been developed because of the varying nature of the caves. A further problem is that separate systems are already being developed in Victoria, Western Australia, Tasmania and South Australia. Integration of these systems may be difficult especially since we have been given a very short timescale in which to develop the SA system. Finally, it was also noted that there may be opposition from clubs which are not part of the ASF.

Despite these difficulties, it was recogniged by most in the Council that caver accreditation on a national basis is both necessary and desirable. To this end, a working group was set up to develop a national system. South Australia is represented on this group by Alan Jevons from the Scout Caving Group. In view of the problems which are likely to arise as a result of state-based differences, I would suggest that this working group should seriously consider the abolition of the states.

Election of Executive Officers

The election of several positions on the Executive resulted in Clare becoming one of the four Vice Presidents and Sackie becoming part of the Secretariat. I'm not sure whether we should congratulate or commiserate, but, either way, it's good to see two women, and two South Australians (or is Sackie a Northern Territorian?), on the ASF Executive.[4]

Conclusion

Apart from the election of Clare ond Sackie, the decision to develop national accreditation standards was probably the major achievement of ths meeting. The ratification of a new code of ethics and the concern to take action with respect to Exit Cave illustrate that the ASF has a significant role to play in conservation and management issues, and in the education of its members in terms of both these issues and minimal impact caving. These issues, particularly the need to establish a national accreditation system, also illustrate the need for a national body with sufficient organisation and direction to deal with matters crucial to the speleologists it purports to represent. On another level, these meetings are valuable simply because they provide a chance for clubs and individual members from different States to get together socially.

Footnotes

1. Simon's enthusiasm for bureaucratic procedure has been evidenced recently by his willingness to volunteer for *any* committee or working group which is formed.
2. *Benders Quarry: Quarry Development and Environmental Management Plan*, Dec 1991, p. 1.5.
3. Evalt Crabbe, "Report on Review of Code of Ethics and Conservation Code", 1991, p. 1.
4. Does the election of Clare to the position of Vice-President mean that Mavis (in a Clare suit) has finally infiltrated the Executive of the ASF? If so, what are the implications for speleology in Australia?

A Short History of Calcium Carbide

The following article was pulled off the computer network (see, it does work) from Frank Reid, Indiana.

An informal survey which I conducted reveals that many cavers don't know where calcium carbide comes from. Many believe that it is mined from the earth, and that carbide was used before electric lights were invented.
James Burke, historian of technology, writes:

Henri Moissan of Paris, France discovered calcium carbide in 1895 while attempting to make artificial diamonds in the newly-invented electric arc furnace. After many tests, he tried a mixtire of lime and carbon at a temperature of 2000 degrees centigrade. The result was uninteresting until he bought it into contact with water: It gave off a gas which burned with brilliant white light. Acetylene light was a sensational discovery in the era of dim coal-gas light and very expensive electricity. By 1899 there were nearly a quarter of a million acetylene gas jets operating in Germany, served by over 8000 acetylene plants. The gas cost half as much as electric light, and required a quarter of the space needed to provide the same illumination by coal gas. Before 1900 there were acetyleneplants near major sources of hydroelectric power where the electric arc furnaces necessary to produce the carbide could be operated cheaply. Acetylene was also used to produce lampblack, and as a substitute for coal gas in engines (it was four times more efficient), and together with oxygen it produced a very hot flame for welding.

Then Auer von Welsbach invented the gas mantle, which greatly increased the luminosity of coal gas. At about the same time electricity became much less expensive. By 1905, the acetylene industry was in trouble, and there was a great surplus of unused carbide. Chemists of the German BASF company, looking for new ways to make dye, heated calcium carbide to 1000 degrees centigrade and passed nitrogen gas over it. The nitrogen combined with the carbide to produce calcium cyanamide, an inexpensive fertilizer. (1, 3)

The process... utilizes calcium oxide (quicklime) and coke, and takes place in a modified arc-resistance furnace:

CaO + 3C --> CaC2 + CO

The carbon monoxide is usually recovered. Materials and energy required to produce one ton of calcium carbide are: 1900 lb lime, 1300 lb coke, and 3000 kWh of energy. These figures are accurate, since there happened to be a suitable reference book lying on my conference table.

Probably the most common use of calcium carbide today is the manufacture of cyanamide by combining it with nitrogen. The use of calcium carbide for production of acetylene has substantially declined. Acetylene is today more commenly manufactured from natural gas by pyrolysis and partial oxidation of methane. There are various processes operating on this principle, one of which (the Du Pont process) employs a special arc furnace with a rotating magnetic field for quenching the arc.

Union Carbide used to manufacture carbide and acetylene in Louisville, Kentucky. It's a dirty process; they were cited numerous times for air-pollution violations. Circa 1961, their tailings-pond of spent carbide (calcium hydroxide), approx. 1/4 mile square x 100 feet deep, broke its dam (a hardened crust of the same material) and flowed through the neighbourhood like cold lave, overturning trucks and knocking houses off their foundations. The newspaper published a photo of a sign on someone's front lawn reading, "Don't nudge the sludge." Much of the stuff was dumped into an abandoned quarry.

Perhaps the abovementioned decrease in carbide production, along with environmental-protection costs, explains the sharp price increase in recent years. Large metalworking operations still use carbide to generate acetylene. The producers could conceivably stop selling "miner's lamp" carbide if some lawer/accountant decides that liability risk exceeds potential profit. (This is not a rumour, only a speculation.) Hopefully, cavers will never be reduced (pun) to manufacturing their own carbide. Ronco (tm) is unlikely to produce a kitchen appliance fo doing so.

Thomas Edison's carbon-filament lightbulb was patented in 1879. French experimenters had made incandescent lamps previously (1854), using expensive platinum filaments. Electric mine-safety lamps were used as early as 1869. (2)

Among its virtues, carbide light is aesthetically pleasing. Although electric light is older, some cavers argue that carbide is more "basic" (true, in that the residue has a pH greater than 7.)

It takes about 1.5 kilowatt-hours of electricity to make a pound of calcium carbide (not counting the heat energy needed to make calcium oxide from limestone). A pound of carbide will fill a cap-lamp about 10 times, yeilding perhaps 30 hours of light under caving conditions.

A new Wheat Lamp (tm) battery stores 14 ampere-hours at 4 volts, or 56 watt-hours. One pound of carbide represents the electrical energy in24 Wheat Lamp charges (at 90% charging efficiency). With a 1.2 ampere bulb, thats 280 hours of light (but you must leave the cave to recharge).

Although carbide light appears inefficient by the above calculations it is still unbeatable for caving, in terms

of volume, weight, reliability and cost. A kilowatt-hour from the power company costs perhaps 10 cents at consumer rates in the U.S., far less for some large industries (There are large regional variations in cost of commercial electricity). One kWh from alkaline (*) D-cells at retail price is about $67 (calculated at 1.5 volts, 15 amp-hours, $1.50 per cell.)

* Alkaline cells contain mercury, and should be considered toxic waste. During cave cleanup projects, separate from the rest of the trash. They should not be disposed of in landfills. I'm not sure how to properly get rid of them.

Another safety note: Acetylene-air mixtures are explosive over an extremely wide range, which is why carbide cannons work so well. The following table is taken from the CRC Handbook of Chemistry and Physics.

Limits of inflammability (percent by volume @ atmospheric pressure and room temperature):

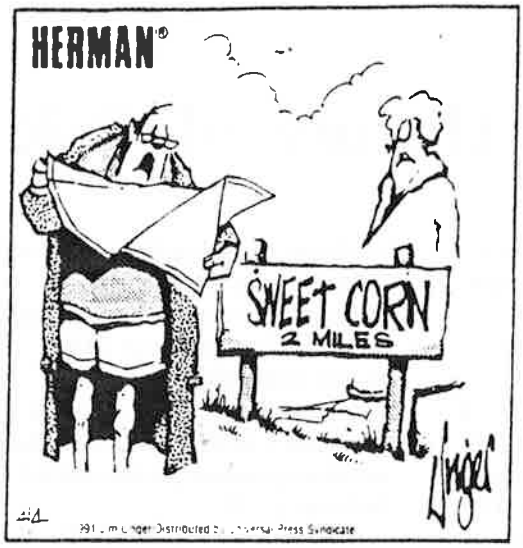
Butane	1.86	8.41
Propane	2.12	9.35
Methane	5.00	15.00
Hydrogen	4.00	74.20
Acetylene	2.50	80.00

References:

1. Connections by James Burke, Macmillan, London, 1978. ISBN 0-316-11685-8 (paperback). (Companion book for the PBS TV series)

2.Historical article on mining lamps by Chuck Young, Potomac Caver, 13 (1) 4-7, (2) 13-17, reprinted in Speleo Digest, 1970, pp 302-305. Partial reprint in Speleonics 15, v.4 no. 3, Oct 1990.

3.Young's article includes references from Scientific American, 9 Feb and 23 Feb 1895, about the invention and production of calcium carbide, and reports that Sci. Am. ran many articles about carbide and acetylene over the next 15 years.



"It's not even on the map."

"Did you have to hang the food right above the tent?"

Coming up...

How to make bread.

Why some people wear knee-pads

Bungonia / Yarangabilly trip report

Report on the Cave rescue week-end

Gear analysis - op shop over-alls

...and whatever anyone is inspired to write

First Semester Programme

SEMESTER STARTS 2nd March

Tue. 3rd March.	6.30	**General Meeting.** At university in the Kelly Morris Rm. Members slides and incriminating photos.
Sat -Sun. 21 -22 March.		**Naracoorte Skills Weekend.** All you old members have to come along and teach the new members what is is all about. Simon Schmidt co-ordinating. 261-6497.
Tue. 3rd April.	6.30	**Annual General Meeting.** At university in the Kelly Morris Rm. Slides from all over the country.
17 -20 April.		**Flinders Rangers. Spider Counting.**Co-ordinators: Heiko Maurer 388-6685 and Simon Schmidt 261-6497
Sun. 26 April.		South Australian **Speleological Council BBQ and Inaugural Meeting.** Scout Centre Norwood. More details later.
Tue. 5 May.	6.30	**General Meeting.** At university in the Kelly Morris Rm. Talk on Fossils, Terry Readen S.A. Museum. (Tentative)
Sat.-Sun.16-17 May.		**Corra Lynn.** Co-ordinator: Jenny Laidlaw 353-6018
Tue. 2 June.	6.30	**General Meeting.** Kelly Morris Rm. Talk on Old Homestead Cave.

Semester Ends June 10

July. Date to be announced	**Nullarbor trip.** Nathan co ordinating: 796127 More details later.

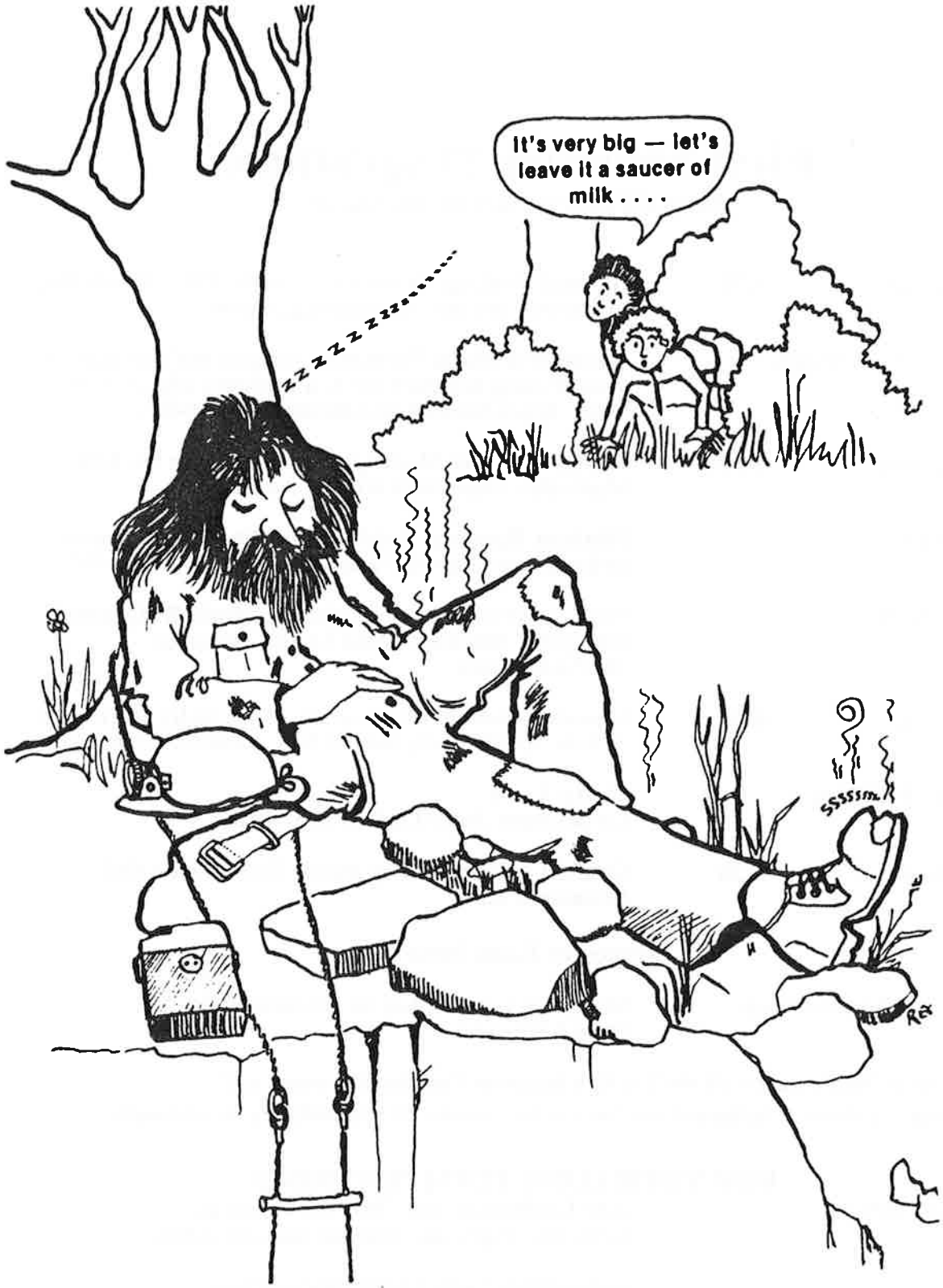
There is to be SRT practice off the Uni foot bridge on Tuesday afternoons and an evening trip down to Sellecks Cave later in the semester. It will probably be mid week.

FOR YOUR LONG TERM PLANNING

New Year. 1992	ASF Conference: Tas - Trog 93. Tasmania Book your flight now while air fairs are cheap.
1993	International Speleo Conference in China.

DON'T MISS ANY OF THEM!

If you want to attend any of the above trips ring the trip co-ordinator a week before the due trip date
New members are required to attend a meeting before coming on a trip.



The opinions expressed in this magazine are not necessarily those of the Flinders University Speleological Society