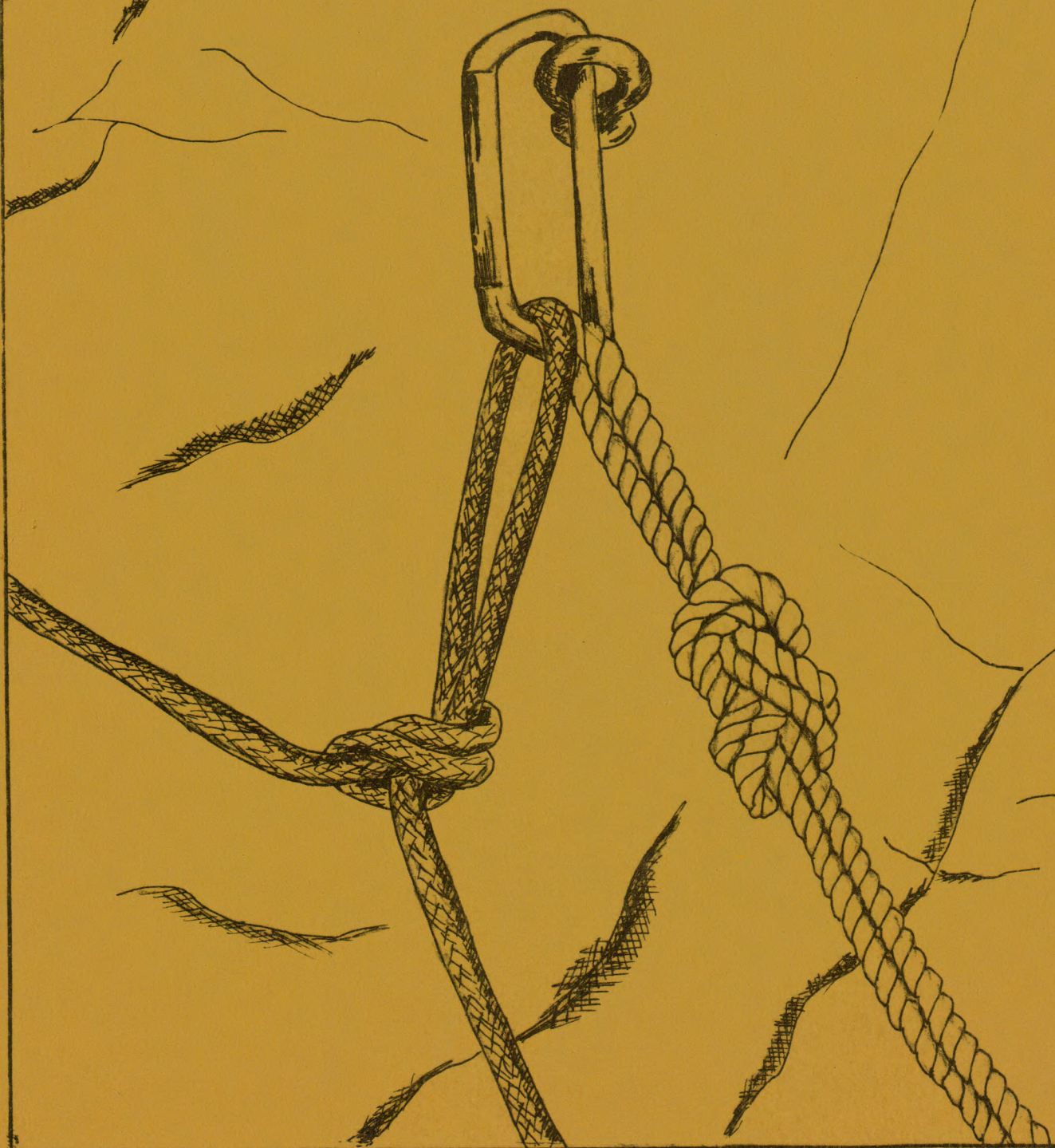


SOUTHERN CAVER

Volume 12, Number 1.



W. Eberhard

ISSN 0157-8464

SOUTHERN CAVER

Editor : Stephen Harris

Typing : Nell Gill

Published quarterly by the SOUTHERN CAVING SOCIETY

Postal Address: P.O. Box 121, Moonah, Tasmania, 7009

Club Room : 132 Davey Street, Hobart, 7000.

Registered for posting as a periodical - Category B

Price \$1.00

VOLUME 12, Number 1

July 1980

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MAN AND KARST IN TASMANIA (PART 2)

Kevin Kiernan

SOME THOUGHTS TOWARDS THE FUTURE

"Caves and karst landscape are one example of natural features whose beauty must be adversely affected if they are to be made useful to man."

- from "Heavy Hand of Modern Man",
Aust. Nat. History 18(6), 1975.

There has never been any great pressure on Tasmania's soils to date. Extensive use without the need for a particularly great yield has been the norm. There has been no real spur to inventory or study. Low population pressures and equable climate have meant karst water supplies have seldom been called upon, and then virtually only for a limited agricultural use. There has been ample scenery for tourism purposes without protecting every cave with potential for development and ample alternative caves for cavers should one be damaged by over use. Similarly there has been no real need to maximise the efficiency of our utilisation of the state's forest resources. Tasmania has approached nearly all its natural resource development programs as mining ventures: tree mining for woodchips; soil mining for agriculture and so forth.

That is not to say that the present situation will always exist. The options certainly should not be closed now, in this time of milk, honey and negligence.

The apparent formidable set of charges laid against forestry operations and agriculture, and the complications envisaged for settlement, communications and industry do not mean such activities can never occur on karst, for they are occurring at present, indeed with considerable success when viewed within present criteria, and any change to our approach must take into account that extant cultural landscape. However if future land use options are to be kept open it is necessary to identify problem areas and work towards appropriate management practices.

In countries where karst is extensive and population pressures are higher there is considerable government input to karst research. In quantitative terms, Australia is comparatively deficient in caves, although Tasmania

approaches the world norm (Jennings, 1975). Here only limited scientific curiosity and sport fills the research role. How limited that is, is evidenced by the number of question marks which still exist over such basic matters as the extent of karstic drainage basins even in areas settled and accessible for decades. Yet there is a need to direct development of Crown Land and have some measure of control over freehold.

Reserves to protect caves have been established under numerous Acts in Tasmania, firstly under the Crown Land Act 1890, which provided for exemption from sale and reservation to the crown of "places for the recreation and amusement of the inhabitants of any town or village". The Scenery Preservation Act 1915 provided greater security and appears to have operated in parallel with Crown Lands legislation but covering more "important" areas. It was superseded by the National Parks & Wildlife Act 1970 which incorporated reserves under the former Act through transitory provisions contained in the second schedule to S.53 (part 1c). It provided, under S.14(1) for private land to be gazetted as Conservation Areas with the concurrence of the owner, protecting fauna only (though there are current attempts to extend this) with the possibility of habitat protection through the additional declaration of State Reserve status over selected state-owned Conservation Areas. Other forms of reserve have been created under the exemption clauses in the Acts governing Forestry and Mining, but serve to protect the subject areas only from alienation for the purposes relative to the particular administration. Some apparent reserves have not been officially gazetted but appear to exist only by virtue of the concurrence of the relevant department head, and thus seem rather insecure. The general picture has been one of widespread public confusion. It is significant that no parcel of land so secured has ever been defined dominantly on ecological criteria such as drainage basin, but only by arbitrary linear boundaries, and problems have arisen which exemplify the need for broader based karst management and the shortcomings of usual land parcel delineation.

These then are the only cases of legislation specifically protecting karstic features, and none could practically be extended to overall management of total karst landscapes of any substantial size. However there are several pieces of legislation relevant to karst management on a broader basis together with one stagnant Bill.

Environment Protection Act: The general theme is to protect the totality of the Tasmanian environment, but in reality it is mainly concerned with pollutant emission, although also with research towards restoration and improvement: conceivably that might include efforts (if the issue were pushed sufficiently) towards reafforestation of severely damaged limestone slopes misused through ignorance.

Local Government Act: Local Government potentially has the power to greatly influence development of karst landscapes through council regulations. Moreover, on environmental matters regulations can be framed under the Environment Protection Act to increase punitive powers.

Underground Waters Act 1966: This Act provides in S.11(1) that no person shall cause or allow any potential contaminant to enter "any hole, cavity or excavation" and under S.6 for the establishment of protected areas to effect any or all of the purposes of the Act, namely the prevention of the depletion, waste or contamination of underground water, and its equitable distribution. It provides for an advisory committee consisting only of representatives of the Departments of Mines, Health Services, Agriculture, Rivers & Water Supply and a representative of primary producers. It certainly would not suffer for the presence of a speleologist.

Crown Lands Act: Under S.3 the Minister is given power to manage and dispose of all crown land, and S.69(a) provides for regulations under the Act to prescribe the care, management and protection of Crown Lands, under which terms a management plan has already been produced for the Central Plateau high country. The terms Regional Park or Protected Area have also been bandied about as a multiple use alternative to contentious state reserves, however, they have no proper basis in legislation and seem little more than a method for inter-departmental land grabbing. In those few cases where a karst area is hitherto unalienated land the Act provides considerable power to guide development, but in an area such as Mole Creek crown land accounts for only a tiny fraction in comparison to freehold, ever increasing State Forest, and some small areas of State Reserve. The Act does provide, however, for the voluntary assignment of land (S.46(6)) which has the advantage over similar provisions in the National Parks and Wildlife Act of allowing actual land management, although the likelihood of it ever occurring on a sufficient scale to be of utility for karst management is negligible.

Land Resumption Act: Karst management should certainly qualify as a "public purpose" for which land may be resumed under this Act, and theoretically it could then be passed to another authority, such as the National Parks and Wildlife Service. The political implications of sufficiently large scale application to allow this or permit rationalisation of holdings make it an unrealistic approach.

National Parks & Wildlife Act: The basic categories of the Act have already been briefly mentioned. The Act provides for management plans to be prepared, although this aspect lags in reality due to shortage of funds and staff. A number of cave areas are presently protected in reserves. Theoretically broader karst protection could be provided through management plans allowing wider development than generally permitted in State Reserves. However, there is negligible chance of sufficient large areas of karst ever being protected under this Act, and at any rate such an approach would probably be inappropriate: both outside the spirit of the Act and posing threatening implications for public attitudes to the sanctity of State Reserves. With the agreement of the owner the Service can now institute management plans for conservation areas which are binding on the owner and subsequent purchasers, but it is complex to operationalise. It can also exempt areas from the operation of other Acts.

State Planning Bill: This bill provides for the preparation of local development plans, but has been held up by resistance in the Legislative Council. Under its terms, planning permission would be required for any development of land subject to a local development plan or interim order requiring planning permission. S.54 however, provides that "permission is not required for any development of land for the purpose of agriculture or forestry" except with respect to certain stock matters, and this completely emasculates it as a mechanism for karst planning. Moreover, an assumption of co-operative collegiality among government agencies is implicit in the bill, whereas past experience has shown a tendency more towards interdepartmental competition. Bowman (1979) has used the term "Icarus style" to describe Tasmania's approaches and attempts at planning. However, Tasmania's farmer dominated Legislative Council seems unlikely to pass legislation offering such significant restrictions on allowing farmers to do what they like with their land. As Milligan (1963) has observed "if Albert Einstein stood for a thousand years in front of fifty monkeys explaining the theory of relativity, at the end

they'd still be just monkeys".

Thus the only really viable approach, given the advanced stage of land alienation on Tasmanian karst, lies through a modified State Planning Act, together with local council ordinances, solution of a large part of the problem through rigorous application of the Underground Waters Act, or the passage of either new legislation aimed specifically at karst or integration of relevant clauses in the Acts pertaining to forestry, agriculture and other land uses. The former appears the most logical, but logic does not always prevail in the realm of political and administrative realities. Whichever route(s) is taken requires accurate knowledge of karst areas and processes, farsightedness and a degree of political courage, all three of which appear in short supply in Tasmania.

In the Mole Creek area for instance, the advent of woodchipping was appreciated not only as a boost for local employment, but also as a means of maintaining the viability of the branch rail line. Any perceived threat to the industry may also face the ire and consequences involved in increased unemployment and the further short term disadvantaging of the rural community should the line close.

The preparation of an inventory of karst and karst resources is fundamental. (It is not envisaged as necessary or desirable in wilderness areas.) This would require geomorphological mapping of karst landscapes, oriented towards land use planning, hydrological engineering, civil engineering, soil surveying and conservation. Drainage basins form a natural unit for environmental management, but in view of the potential for wide discrepancies between actual karstic drainage basins and apparent surface divides, this would often entail preliminary photogrammetric surveys followed by detailed field research including groundwater stream tracing by fluorescent *Lycopodium* or similar techniques.

The aim would be to produce a map delineating hydrological layout, and critical areas such as swallet catchments, slope stability, soil development and similar factors, and study of the intrinsic suitability of areas for agriculture, forestry, recreation, and other purposes, aimed at producing integrated plans to optimise for a multiple rather than single use, perhaps similar to

the matrix form used by McHarg (1971) to relate degrees of land use compatibility, natural determinants and consequences.

In particular, prospective land uses should be examined against the degree to which they threaten soil stability or imperil the aquifer: those which do should be prohibited. Allogenic catchments also need to be considered. One submission to the 1973 National Estate Enquiry hopefully suggested the Mole Creek area would be a good area for a pilot karst management plan, and that even the opportunity for speleologists to be advised of and inspect land clearing operations would be of value (Kiernan & Harris, 1973a). Proposals for reserve status for the Mole Creek system have always envisaged a multiple use approach (e.g., Kiernan & Harris, 1973b). Reafforestation programmes should also be attempted where appropriate.

Even so, there is no simple solution for many of the problems which may be anticipated as karst areas become more desirable and heavily utilised with increasing population. Construction activities require careful planning, with adequate contingency funds and close design-construction contact. Standard foundation techniques may be inadequate, and open test pit excavation may be desirable to expose the rock. Costly close spaced drilling may be necessary. Komarova & Shtengelov (1977) cite research in the USSR into surface radiometric surveys for hydrological and construction engineering purposes. Adequately constructed sewers are far preferable to septic tanks. Consideration should perhaps be given to permeable road and car park surfaces in sensitive areas to minimise concentration of run-off, and tank storage of roof run-off for domestic use.

Some form of evaluation is necessary to identify desirable landscape for purposes of amenity and priorities regarding cave conservation, although to some extent protection would flow naturally from management oriented towards maintenance of the natural hydrological system.

As Le Grand (1973) suggests, "the question is whether man will continue to compound the problems of the karst environment or whether he will adjust to and improve it".

A hydrological approach to management seems likely to facilitate the broadest

possible range of concurrent land uses, and maximisation of the benefit from many of these options appears dependent upon such an approach. Under such conditions a truly remarkable land-use range from underground wilderness to surface agriculture or urban development seems possible. For the caver there still remains the massive job of managing what is frequently the single most destructive agent to the cave environment - himself.

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THE GROTTA DE ROUFFIGNAC

Janet Floyed

It was in the European winter of 1973 when a busload of us from the Tasmanian School of Art were travelling from Bayonne to Limoges, in the south of France. We took to the smaller country roads and headed for the Rouffignac Historic Monument to view prehistoric cave drawings. The famous Lascaux caves were closed so Rouffignac was to be our introduction to the art of European pre-history.

Unfortunately, we became lost and drew up to three elderly men concocting their own whisky in the bush by the side of the road. We asked the way but did not leave until a bag of oranges had been exchanged for some litres of the very strong whisky.

We were soon on our way and eventually arrived at a farm on which were the caves we were looking for. Before being shown into the caves we had to wait about half an hour while the farmer and his family finished making goose liver pate. This farmer then accompanied us down a dirt road to the entrance of the cave where there was a little desk packed full of postcards. It cost us about 4 francs (equivalent then to about 80 cents) to enter the cave.

We toured the cave by means of a small open electric train while the farmer/guide stood in the rear describing all. Fortunately a member of our party spoke French quite fluently and translated for us. We travelled mostly in the dark with our guide turning on spotlights every time we came to a feature such as an engraving or painting.

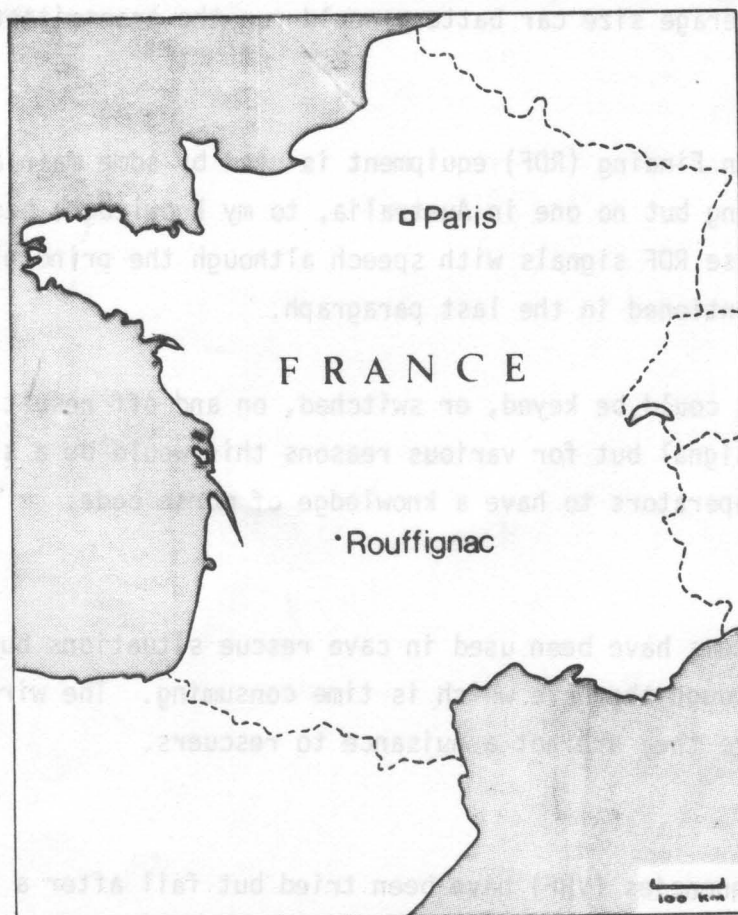
Apparently the true worth of the drawings and engravings were not immediately realised until 1956, but the cave was declared an historic monument in 1957. Before becoming an historic monument many of the paintings were badly damaged by smoke and graffiti placed there by people camping in the mouth of the cave.

On our way through, many depressions in the floor were pointed out to us. These were said by our guide, to have formed by bears hibernating in the caves

long before prehistoric man entered to leave his mark. Scratchings are also evident on the walls from the bear's claws.

There are vast frescoes of mammoths and rhinoceros as well as depictions of horses, bison and ibex. The cave is aptly described on tourist brochures as the "Cave of a hundred mammoths". The drawings were executed in charcoal or red ochre and engravings are scratched into the walls and ceiling. It was noted that many of the drawings were linear but correct in every detail. They were extremely realistic and perfect in proportion. A third dimension had even been attempted with the majority.

The Grotte de Rouffignac, comprising approximately 10 km of passages, is actually a network of vast galleries on two levels. We had visited the upper part of the cave which is older and contains the prehistoric paintings and engravings which date from middle and recent Magdalenien times. The lower level is active and very complex. Formation is non-existent in the cave.



TWO WAY RADIO COMMUNICATION FROM A CAVE

Ron Mann

The benefits that would arise with the availability of two way communication from the scene of a cave rescue incident directly with the surface have been realised for many years, however, to my knowledge not a great deal of investigation or success has been reported.

MAGNETIC INDUCTION

There is a report in the Manual of Caving Techniques of speech being transmitted through about 1,000 metres of rock, by magnetic induction, in the Gouffre Berger in France. Some of the drawbacks of this system are that the coils of wire used for the aeriels were 30 metres in diameter and the current drawn by the transmitter was 30 amperes, far too much for practical use underground - an average size car battery would run the transmitter for about one hour!

Radio Direction Finding (RDF) equipment is used by some mainland clubs as an aid to surveying but no one in Australia, to my knowledge, has succeeded in modulating these RDF signals with speech although the principle is the same as the example mentioned in the last paragraph.

The RDF signal could be keyed, or switched, on and off resulting in a morse code type of signal but for various reasons this would be a slow method and requires the operators to have a knowledge of morse code.

TELEPHONES

Telephone systems have been used in cave rescue situations but require wires to be laid through the cave which is time consuming. The wires also have to be placed where they are not a nuisance to rescuers.

RADIO

Very High Frequencies (VHF) have been tried but fail after a short distance through rock. Small hand held units on VHF would be useful for communication between the top and bottom of pitches or along relatively straight passages

but the attenuation of the signals due to bouncing off the rock and by absorption preclude their use in complex passage systems.

The system to be described was developed without any knowledge of other work that may have been done elsewhere. My recent involvement with the Wireless Institute Civil Emergency Network (WICEN) of southern Tasmania occurred through my interest as an amateur radio operator. Because of an interest by various WICEN amateurs in the technical aspects of underground communications, development of the system started late in 1979.

It was found that the only frequency available to amateur operators, known to penetrate rock to any distance, is 1.8 megahertz (MHZ). Lower frequencies around the local broadcast band are more suitable, however, approval to operate there would be virtually impossible to obtain.

Having decided on the frequency it now remained to agree on the type of equipment to use and to build two units. The equipment used in the test was a Citizens Band (CB) transceiver which had already been converted to the 28 MHZ amateur band. To this we added a transverter which was constructed from a kit and altered to operate on 1.8 MHZ. The signal is generated on 28 MHZ and transverted or changed to 1.8 MHZ by the transverter. The received signal is transverted back to 28 MHZ and received on the converted CB transceiver.

The next step was to construct an aerial and a two turn loop aerial with a diameter of about 0.5 metre and a small tuning unit attached was designed and built. This aerial, designed to be worn over the shoulder, is not very efficient, however, it worked quite well in the test situation.

The other aerial used was a random length of wire (about 20 metres) but to prevent the final amplifier stage of the transverter from "taking off" it was necessary to install an attenuator pad at the output thereby reducing the available power but allowing the random wire to be used.

The equipment was taken into Welcome Stranger Cave in the Florentine Valley and assembled at two points. The surface party set up on top of the small ridge above the horizontal cave system.

The first attempt at communicating proved successful. The vertical separation at this point would have been about 30 metres. A second attempt occurred further into the cave and resulted in slightly better signal levels and both aeriels worked well.

A small unit called a receive preamplifier that I had borrowed from another amateur (who didn't know where it was going) was connected between the random wire and the transmitter and raised the signal level dramatically.

The surface party then moved back to the cars and tried again. The signal level was very weak at this stage and two way communication was not possible, however, with a preamplifier connected to the surface transceiver this may have been achieved.

The power level into the aerial would not have been more than 3 watts. The mode of transmission used was single side band (SSB). Australian licensing requirements restrict the operation of these units to amateur licences which imposes problems in that there are very few cavers who hold an appropriate amateur licence.

During the drive back to Hobart the discussion over the two way radios of the WICEN members was on ways of achieving better results from a much smaller package and a new development programme is now under way.

Would anyone who knows of or has read of similar research please write to me at the Southern Caving Society's address?

HASTINGS

On the 3rd May Stefan Eberhard led Rolan Eberhard and a visitor to King George V Cave which was extensively explored throughout the surveyed sections. Photographs of the fine but somewhat vandalised formation were also taken. Several other very small caves in the general area were also entered including Beattie Cave, Flaglocker and Padre Pot.

The initial intention of Stefan and Rolan Eberhard on the 1st June was to descend Erebus (Waterloo Swallet) but after only a short distance down the entrance waterfall pitch the volume and temperature of the water was found to be too extreme. A retreat was made to the nearby Trafalgar Pot which joins Erebus at a much lower level.

On the 8th June Kevin Kiernan, with the assistance of Steve Harris and Stefan Eberhard, surveyed Bell Chamber, on the northern side of Cave Hill.

IDA BAY

On the 18th May Stefan Eberhard led a party of visitors to this area where the excavation of a small depression on Lune Sugarloaf was completed. A small entrance was finally revealed, which led to a 12m ladder drop into a spacious, elongated chamber. Further progress was prevented by an impossible squeeze. The cave was aptly named Excavation Pot. The remainder of the time was spent in Bradley Chestermans Cave and the mud filled passages of Loons Cave.

TIM SHEA

Adverse weather conditions on the 17th May did not prevent Kevin Kiernan, Phil Jackson and Stefan Eberhard from investigating the dolomite area on the south eastern slopes of Tim Shea. Several small caves were found but exploration is far from complete and potential remains for further discoveries. Future trips have been organized.

CRACROFT

During the first week in June a party consisting of Stefan Eberhard, Rolan Eberhard and a visitor undertook a three day trip to this very scenic area. Judds Cavern was thoroughly explored in the downstream section while the interesting Matchlight Cavern provided a pleasant trip. The 30m entrance

pitch to C6 was descended and several other smaller caves were visited. Numerous bone deposits, including some Thylacine remains, appear to be a characteristic feature of the caves in this area.

DANTE RIVULET

The 14th June saw the initiation of a three day trip to this remote area by Kevin Kiernan with Greg Middleton and Stefan Eberhard. In its course through the Sedgewick Valley the Dante Rivulet flows through a small but spectacular limestone gorge and several short stream caves. A very well developed karren surface is present on the floor of the valley. The area was only briefly investigated and a few of the caves surveyed.

BUBS HILL

Over the 28th to 29th June Kevin Kiernan led a party of Phil Jackson, Stefan Eberhard and Rolan Eberhard to the West Coast region. Unfortunately, heavy rain and subsequent high river levels prevented the possibility of day-trips to the Dante Rivulet and Nelson River limestone areas. Compensation was had in small but numerous caves, including Quarry Cave, on Bubs Hill.

BRADY'S LOOKOUT

As a brief diversion, while en route elsewhere on the 9th May, Kevin Kiernan investigated a maze of dolerite talus on Brady's Lookout, near the West Tamar river. Kevin succeeded in descending some 10m into some reasonably sized chambers.

MOUNT WELLINGTON

Dolerite topples, having relapsed into a horizontal position have formed a complex system of cavities on the eastern face of Mt. Arthur near Mt. Wellington. Some of these cavities are quite extensive and on 10th May Stefan Eberhard and Rolan Eberhard explored the Lost World Grotto and Dolerite Delight.

ANNUAL REPORT 1979/80

The past year has been one of consolidation for the Society. Levels of activity have been moderate but consistent with that of the previous few years. As usual, club members have shown interest in, and visited, karst areas all over the State. Many of the classic cave systems have been re-visited with some additional surveying and exploration work being done. The most significant exploration breakthrough occurred with Owl Pot (JF 211) which has now been extended to a vertical depth of 234 metres - the fourth deepest in this country!

The Society is still deriving much benefit from having the use of a centrally based clubroom, a fact no doubt envied by many other speleo groups. As always, the relatively small number of club members (especially active people) continues to pose a threat to the long term viability of the Society. Most of the administrative requirements, small though they be, continue to be carried by one or two without whom, the group would recede. Informal co-operation with the Tasmanian Caverneering Club (including several combined groups) has been to the benefit of both clubs and will I hope continue to develop.

The enlistment of a couple of new members into our ranks will no doubt mean at least a base level of activity for the coming year. In addition, it is expected that several members will be visiting Victoria at Christmas for the Conference. No doubt the number of interstate visitors to Tasmania will increase this coming year and our participation in many of their excursions can be expected.

Leigh Gleeson
President 1979/80

FINANCIAL REPORT

An amount of \$40.31 was carried forward from the previous financial year and to this was added \$438.02 in receipts.

Expenditure for the year was \$472.75 leaving a small balance of \$5.58.

The only purchase of equipment this year was some ladder bags at a cost of \$54.00. Fund raising realised less than \$50.00. However, an amount of \$98.00 received from the proceeds of the 8th. ASF Conference swelled the bank balance and further fund raising was not necessary.

To cope with cost increases I recommend an increase in members' subscriptions to \$20.00 for the coming year.

Ron Mann
Treasurer

Ladders

2 x 50ft
7 x 30ft
1 x 20ft
1 x 10ft
1 x 8ft

Headers

3 x 30ft
3 x 10m
3 x 5m
6 x 8ft

Rope

5 x 40m
2 x 20m

Survey Equipment

2 Suunto compasses
1 Suunto inclinometer
1 100ft tape
1 50m tape
1 compass/clino holder.

The society purchased some ladder bags this year to replace the old worn bags.

The 120m rope was finally cut up into 3 x 40m lengths to replace the three old ropes.

Equipment levels are satisfactory at the moment. However, consideration will have to be given to buying more rope in the next year or so.

Ron Mann