SPELEOGRAFFITI

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THE

NEWSLETTER

OF.....

N.U.C.C.

SPELEOGRAFFITI.

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The Newsletter of the National University Caving Club.

Editors- John Furlonger, Ken Palmer and John Brush.

Cover Design- John Furlonger and Ken Palmer,

from an original photo of John Brush? entitled;

"Say cheese!" .... "Coooon".

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EDITORIAL.....

With the annual exams finished for another year NUCC has come out of hiding again. We intend to continue with our work at Wyanbene and Yarrangobilly and we hope to be able to map Narrengullen at some stage during the vacation. (See coming trips page).

To carry out our objectives for these holidays we needs PEEBLES to come along on trips. If you are in Canberra, (even just passing through) during the holidays and have any spare time on the weekends, let one of ze committee know. We need your help.

Even if you dont come on trips, there will probably be social gatherings of one sort or another from time to time, so keep in touch.

...........gluglugluglugluglooglugluglugluglug.........burp!

............'ERE COMM DA TRIPS.........?

"Science" reprint cont.

The design of Poulson and Culver's study does not allow tests of niche relationship, though such tests are quite practical with simple cave communities. So far, conclusions about niche relationships in troglobites have been mainly inferences based on change in morphology or habitat of related species in parts of their geographic ranges where they occur in the same cave. However, Culver (2) is making a direct analysis of niche relationships of stream communities in 20 caves where the potential species pool includes three amphipods, one isopod, one salamander, and one crayfish. Within a single habitat the only pairs of amphipod species found are Gammarus minus/Stygonectes spinatus or S. emarginatus/S. spinatus, presumably because each pair involves a large and small species which avoid contact through predominant restriction of habitat to superficial rocks in the case of the larger species and to deeper gravels in the case of the smaller. In simple laboratory experiments in finger bowls, individuals of each species choose rocks over mud, possibly as an adaptation to avoid current and predation by crayfish and salamanders. Similar experiments with pairs of individuals substantiate some conclusions based on field data. With pairs whose members are of different species and use of a large rock, G. minus excludes S. emarginatus, which in turn excludes S. spinatus, but this dominance order is reversed when a small rock is used. In tests with pairs whose members are of the same species, only S. spinatus exclude one another. However, this microspacing does not explain the rarity of S. spinatus, since, in nature, this species is clumped in samples 0.3 meter square. In nature there is a constant order of abundance, with Gammarus minus very common, Stygonectes spinatus rare, and S. emarginatus very rare. Stygonectes is a weak swimmer, so part of its rarity is due to high mortality at the time of spring floods. The washout rate in an artificialstream is what one would predict from the swimming ability and relative abundance in nature; the washout rate for G. minus is less than that for S. emarginatus and S. spinatus, the latter two rates being about equal.

Rarity in a cave can be accidental or real. A species can be said to be accidental in caves if its presence in different seasons or years fits a Poisson or a negative binomial distribution. Some aquatic interstitial and terrestrial twilight-zone species may fit into this category (13).

There are two explanations for the rarity of a species that is a regular member of a cave community. Rarity of a troglophile or a recently isolated troglobite may result from marginal adaptation to caves. This rarity is accentuated by competition when one species is less well adapted than another. The troglophilic crayfish Cambarus bartoni is much rarer in the deep cave when the troglobitic Orconectes inermis is present. Similarly, the troglophilic fish Chologaster agassizi is restricted to entrance areas when Typhlichthus occupies areas remote from entrances, where less food is available. Such competition may restrict multiple invasions by a second or third species into caves -- for example, in areas of successive glacial advances and retreats -- if the first species isolated has been isolated for a very long time. Thus Typhlichthys has been able to invade cave areas occupied by Amblyopsis only in central Kentucky in the very large Flint

Ridge and Mammoth Cave systems, where the habitat is sufficiently diverse to allow segregation by habitat (21).

The rarity of recently isolated troglobites differs from the rarity of relicts. Recent invaders occur in many caves, show extensive variation where there are barriers to dispersal from cave to cave, and are only slightly modified; examples from the Valley-Ridge province of the Appalachians are discussed above. Relicts are often found in only one cave and have no closely related living relatives. They are highly modified and were isolated in caves as long ago as 100 million years, when their surface relatives became extinct. These two kinds of rarity must be considered in the context of adaptation to life in caves.

Caves as Evolutionary Laboratories.

We hypothesize that, when an organism invades the stable cave environment, selection no longer acts to maintain its ability to adjust ecologically and physiologically to variable conditions. The loss of adjustment on these levels may be associated with a decrease in genetic variability. There are also changes toward the lowering of population size, reproductive rate, and metabolic rate and toward the lengthening of life and development. These are strategies which do not lead to success in variable or unpredictable environments, where being an opportunist is important for survival. Consistent supporting evidence for our hypothesis is available for many groups of troglobites (22), but only two groups are well enough known to test the hypothesis (23). We will discuss the amblyopsid fish, because one of us has studied them in detail and because the whole range of cave adaptation is represented in a single small family (24, 25). Amblyopsids are large enough to be suitable subjects for physiological studies, and we know how long each troglobitic species has been isolated. The family includes one surface species, Chologaster cornuta, and one troglophile, C. agassizi. From the relative degeneration of eyes and pigment cells in different species, it appears that the four troglobitic species have been isolated for different lengths of time (26). Listed in the order of length of isolation, these species are Typhlichthys subterraneus, Amblyopsis spelaea, A. rosae, and a relict species described by Cooper and Kuehne from a cave in northwestern Alababa. In the discussion that follows we compare the troglophile to the older troglobites and then consider the oldest troglobite, the relict.

A number of traits of the Amblyopsidae have degenerated as a result of (i) reduced selection for maintenance in permanent darkness, (ii) lack of predators, or (iii) constant temperature and oxygen pressure in caves. We have already considered eye and pigment cell morphology. The older troglobites no longer show escape responses when they are disturbed, and they seem to have lost some resistance to pathogens. There is reduced regulation of metabolic rate when the oxygen pressure is sharply lowered. An older troglobite, Amblyopsis rosae, shows a fourfold increase in metabolic rate when the temperature rises from 10° to $15^{\circ}C$, in contrast to the more usual one - to twofold increase, with full acclimation, in the youngest troglobite, Typhlichthys. The older troglobites retain circadian oxygen consumption but have lost circadian activity, and their rhythms cannot be set by (entrained to) light-dark cycles. We view this as evidence that a circadian clock mechanism is basic to biological organization but that the coupling of the clock to the environment through entrainment of activity cycles, as seen in the spring-dwelling Chologaster agassizi, is not maintained by selection in a cave environment which lacks daily cycles (27). These kinds of degeneration and decreased genetic variability are associated with adaptation to an unvarying environment. A decrease in genetic variability is suggested by decreased phenotypic variance in eye size and in morphological traits, such as the lateral-line sensory systems, that are selected in caves (see 24, 25, and Fig. 2).

Among the traits that are selected in caves, we have recently studied endogenous annual (that is, circannian) rhythms of reproduction. Caves are without seasonal cues, so a circannian clock is adaptive in allowing females to be prepared to lay eggs when the chances for reproductive success are at a maximum. There is some evidence for circannian reproductive shythms in amblyopsids, but crayfish are more suited to experimental analysis since the reproductive state of individuals can be followed by external observation in the field or laboratory. Field data collected over a 3-year period suggested a circannian cycle. We have now confirmed the occurrence of such a cycle by following 36 crayfish for as long as 3 years under constant laboratory conditions. Individuals became slightly out of phase with each other, due to differences in the period of their free-running rhythms, but in nature their rhythms are reset and synchronized each year. The cue that resets the rhythm is probably the same one that triggers egg-laying -- possibly the subtle drop in temperature that is associated with spring rains, when food input to the cave is at a maximum (28).

Efficiency in utilizing and finding scarce food is the basis of many adaptations of troglobites. Less food is required when growth and metabolic rates are lowered (29), and there is evidence suggesting that utilization efficiency is also increased in troglobitic amblyopsids. For example, despite a metabolic rate only half that of Chologaster, Amblyopsis is no less active than Chologaster. Differences in food-finding efficiency are also important. As discussed above, this explains why there is an exclusion of troglophiles to areas near cave entrances and of troglobites to deep cave zones. We are analyzing this in the laboratory. To simulate the density of prey near cave entrances, we introduced ten water fleas into a fish's 5-liter aquarium. Chologaster agassizi found the first prey sooner than Amblyopsis did and had eaten the fourth one. However, in 100-liter aquaria with only one water flea for each species, Amblyopsis found the prey hours before Chologaster did. This situation is analogous to the deep cave, where finding food, which is scarce and widely dispersed, requires efficient searching.

Amblyopsis swims very slowly but, in contrast to Chologaster, is active 24 hours a day. Furthermore, it swims a greater distance before turning and so samples a wider area in its search. Finally, its more developed lateral line allows it to locate prey farther from its body and to achieve greater success in capturing the prey after locating it. In summary, Amblyopsis covers ten times as much territory and searches 30 times as much water as its troglophilic relative does.

Evolution of metabolic economy in troglobites is associated with lowered rates of population growth. Increased metabolic efficiency in amblyopsid troglobites has led to more frequent reproduction by a higher proportion of females, but population size and potential rate of increase are still markedly lower for these troglobites than for their surface or troglophilic relatives. For example, Amblyopsis lays larger and fewer eggs than Chologaster. This results in a longer period of development, but the fry are larger when they leave the mother's gill cavity and so can better avoid cannibalism and can feed on larger prey. Thus, more of the young survive. Despite the large eggs, the caloric cost of reproduction is less for Amblyopsis than for Chologaster becauuse Amblyopsis lays fewer eggs and is metabolically more efficient in producing them (see 24 and Fig. 3). A number of other life-history phenomena are associated with the small populations characteristic of most troglobites. Long life and low rates of development, growth, and maturation also result in an age structure dominated by the older age classes and thus also contribute to a low rate of population growth. The relict species of amblyopsid shows still lower rates of growth, longer life, probably lower metabolic rate, and definitely better development of its lateral-line system. This suggests that the rarity of other specialized relict troglobites also results from long periods of adaptation in a stable environment with low food supply (30).

In concluding this section we suggest that evolution in caves is similar in many of its aspects to evolution in other stable environments, such as the lowland tropics and the deep sea. The most striking parallels are the probable reduction of genetic variability and a reduction in the rate of population growth that must accompany parental care, longer maturation, longer life, and smaller population size (31). These two features limit the potential for fast evolutionary change, but this is not of major significance for species survival in an environment that changes only subtly and slowly over geologic time. Competition will be reduced, because of low population densities and low rates of population growth, and competitive exclusion is rare, or difficult to reconcile with the high species diversities found within single habitats (32). We suggest that the relatively low species diversity in caves and the extremely high species diversity in lowland tropics and the deep sea are due primarily to the span of geologic time over which each environment has been stable and, secondarily, to the species pool of possible colonizers. Thus, caves show the least species diversity because caves have the most variable "climate", the shortest geologic history, and the smallest species pool.

Microflora of Caves.

Cave bacteria are of interest to bio-speleologists because they are important to the survival of troglobitic animals and not because they are in any way unique. Caumartin has shown that the cave bacterial flora is a selected representation of noncave species. He believes that the deep-cave bacteria produce antibiotics which exclude many molds and higher fungi (33). This would explain the zonation of microflora from entrance zones to deep-cave zones, and it may be related to the use of bacterial clays by troglobites. Such clays have food value (34), but this is not enough to explain the impaired ability to survive observed in many troglobites not given access to them.

In the case of amphipods, Gounot has shown experimentally that something produced by the bacteria is responsible for the salutary effect of cave clays on the survival and growth of the amphipods (35). The important item may be a vitamin or an antibiotic. It is tempting to suggest that adaptation to a local microflora and its antibiotics explains why some terrestrial troglobites reared on soil other than that from their native cave habitat show impaired ability to survive and impaired reproductive efficiency (36).

Caves as Mineralogical Laboratories.

Once group of cave minerals is interesting because of its peculiar mineralogy and the possible involvement of bacteria in their formation. These are soft cottage-cheese-like masses found fairly frequently in caves and known by the collective name of "moonmilk". Moonmilk consists of a variety of carbonate minerals, some of which are associated with particular species of bacteria. Most of the moonmilks analyzed from temperate caves of the eastern United States have been hydromagnesite ($3\ MgCO_3 . Mg(OH)_2 . 3H_2O$), although nesquehonite ($MgCO_3 . 3H_2O$), huntite ($CaCO_3 . 3MgCO_3$), aragonite, magnesite, and dolomite have also been reported. Moonmilks from high altitudes may not be related to bacterial activities. These are mainly calcite and are thought to originate from the dehydration of the compound $CaCO_3 . H_2O$ (37).

Many cave processes are freshwater analogs of processes occurring on the ocean floor. Carbonate deposition, in particular, can be studied in siu, and the geochemical parameters of the process measured. The mineralogy of caves can be fairly complex if one takes into account the interaction of carbonate minerals with organic materials or with vein minerals in the wall rock. Most interesting are the "normal" cave minerals, which are calcite, aragonite, gypsum, a variety of rare sulfates, and a variety of hydrous carbonates (the moonmilks).

The deposition of calcite in the cave environment turns out to be a remarkably complicated process. Holland and his colleagues (38) have shown three stages in the evolution of the calcite-depositing waters: (i) the equilibration of the ground-water in the soil zone; (ii) the transport of the solution without loss of carbon dioxide through jointes to the cave passage; and (iii) the reequilibration of the solution to the carbon dioxide pressure of the cave atmosphere, which is probably not much higher than that of the surface atmosphere. The final step of calcite deposition takes place mainly through loss of carbon dioxide rather than through evaporation. This idea is confirmed by field observation that the most prolific and perfect calcite growth takes place in cave passages which are completely sealed from the outside, often by water traps in the channel. The humidities of these chambers remain at 100 percent, and evaporation should be negligible. The formation of an entrance and subsequent lowering of humidities often degrades the calcite deposits.

Aragonite is a common mineral in caves, and its occurrence in this environment is as much of an enigma as is its occurrence in sea-bottom sediments. Caves aragonite is deposited from fresh groundwater of low ionic strength. The relatively few available measurements of ion activity products (39, 40) indicate that the dripping waters are supersaturated with respect to aragonite. Which minerals are deposited depends on the unpredictable kinetics of the process. Deposition is not random; although quantitative data are lacking, aragonite occurs in profusion in some caves, while in other caves it occurs very sparsely if at all. Analyses of cave aragonites show higher concentrations of strontium in the aragonite than in coexisting calcite. In caves with gypsum deposits the dripstone seems to contain more aragonite than it does in caves that lack such deposits. It is commonly supposed that Sr^{++} and SO_4 --ions enhance the precipitation of aragonite, although a cause-and-effect relationship has not been conclusively demonstrated (41).

The sulfate minerals -- mainly gypsum, with occasional occurrences of mirabilite ($Na_2SO_4 \cdot 10H_2O$), epsomite ($MgSO_4 \cdot 7H_2O$), and a number of rarer minerals -- pose a different sort of problem. The chemistry of deposition seems to be a straightforward matter of evaporation of imperceptibly small seeping solutions. The sources of the sulfates are more difficult to assess. In many caves in the Southwest the gypsum and other sulfate deposits probably arise mainly from solution, transport, and redeposition of overlying evaporites. In the central Kentucky karst, the source of sulfates have been reasonably well established as pyrite in the Big Clifty Sandstone formation which overlies the cavernous limestones (42). Oxidation of the pyrite is enhanced by the action of the bacteria Thiobacillus thiooxidans and Ferrobacillus ferrooxidans. The sulfate solutions percolate down through the limestone but do not react with it until the solutions reach the cave passages. The reaction of sulfate ion with calcite under pH conditions near neutrality is very delicately dependent on the carbon dioxide partial pressure. The cave passage, with its good atmospheric circulation, acts as a sink for the carbon dioxide and allows the reaction to proceed forward. The gypsum precipitates in the wall rock of the cave passage, with much replacement of limestone by gypsum and with collapse of passage ceilings from crystal wedging forces. The gypsum flowers and other forms which give the caves much of their beauty appear to result from local recrystallization and transport of the primary deposits in the wall rock. Not all cave gypsum forms in this manner: in some of the caves of the Highland Rim country of Tennessee, in particular, there are gypsum deposits whose ultimate origin is still completely unknown.

Dolomite is rare in cave deposits, although depositing solutions are supersaturated with respect to dolomite. A few cave occurrences of dolomite have been reported, but it has not been conclusively demonstrated that any of these are primary in the sense that the dolomite was formed directly from solution instead of recrystallized from some precursor mineral phase (43).

The Future

Perhaps the most important use of caves in their use as limited and simple natural laboratories in which we can study the principles governing evolution in more complex stable environments, such as the tropics. Simple field and laboratory experiments should help us to understand the general features of niche structure, and comparisons between the distributions and biologies of cavernicoles from different cave regions should help us to understand the control of species diversity. For this work more detailed knowledge of both surface and cave distribution and of systematics is needed for a variety of groups which contain troglobites. Future studies should include consideration of relative abundances, number of caves inhabited, and variation within a single cave and between caves.

In a practical sense we need to know more about karst hydrology. Hydrologists and geological engineers in the United States have yet to come fully to grips with the problems of karst aquifer systems that have plagued portions of Europe for decades. As the urban development of the "northeast corridor" sprawls westward into the limestone valleys of Pennsylvania and Virginia, much more understanding of the hydrology of these valleys will be needed. Foundation subsidence from de-watering of karst aquifers has already been an expensive problem in Florida, and similar problems have occurred in Pennsylvania and probably elsewhere. Such problems will increase. Pollution will also become a serious problem as pollutants are carried longer distances, in unpredictable ways, in carbonate aquifers. It may be possible to trace the transfer of pollutants, even at low concentrations, by observing the structure of bacterial and protozoan communities, but prediction of the destination of pollutants will be possible only when we understand the geometry of the underground drainage.

In the course of urbanizing rural limestone terrains, many interesting cave systems and their unique faunas will be destroyed. Natural cave laboratories are going to be very hard to find. The delicate processes which are in need of study require an uncontaminated system. It is clear that certain of these cave systems should be preserved for scientific study. Some individual caves are being purchased to preserve unique and endangered fauna, but the undisturbed areas around them are too small to insure maintenance of a normal ecology. Mammoth Cave National Park is one obvious place where further measures for the preservation of caves should be taken, because it contains the longest and third-longest cave systems in the world, already partially protected. The longest -- the almost pristine Flint Ridge cave system -- should be set aside as wilderness; the third-longest -- the already heavily used and modified Mammoth Cave -- is large enough to accomodate expanded public tours and, in addition, a cave laboratory for studying and comparing the disturbed and undisturbed cave systems (44).

Extract from "Canberra Times", Wed. I8th. November.

RESCUE SQUAD.

A public meeting has been called for 7 o'clock tonight at the Chifley Primary School to outline the role of a proposed bush/cave/cliff rescue squad for the A.C.T.

Mr. Rick Price, former controller of civil defence for the Woden sub-zone, has called the meeting.

The nucleus of a rescue team has been formed under Mr. Price and includes a former president of the Australian National University caving club and an examiner in speleology.

Mr. Price said last night that he had been encouraged to organise a team by several bush walkers and cave explorers in Canberra who were alarmed at accidents in the bush caused by inexperience.

Tonight's meeting will record the names of potential members for field work, and for those unable or preferring not to work in the field, headquarters operations.

It will also enroll members for a series of lectures on fire-fighting and prevention.

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(Mike strikes again. -Ed.)

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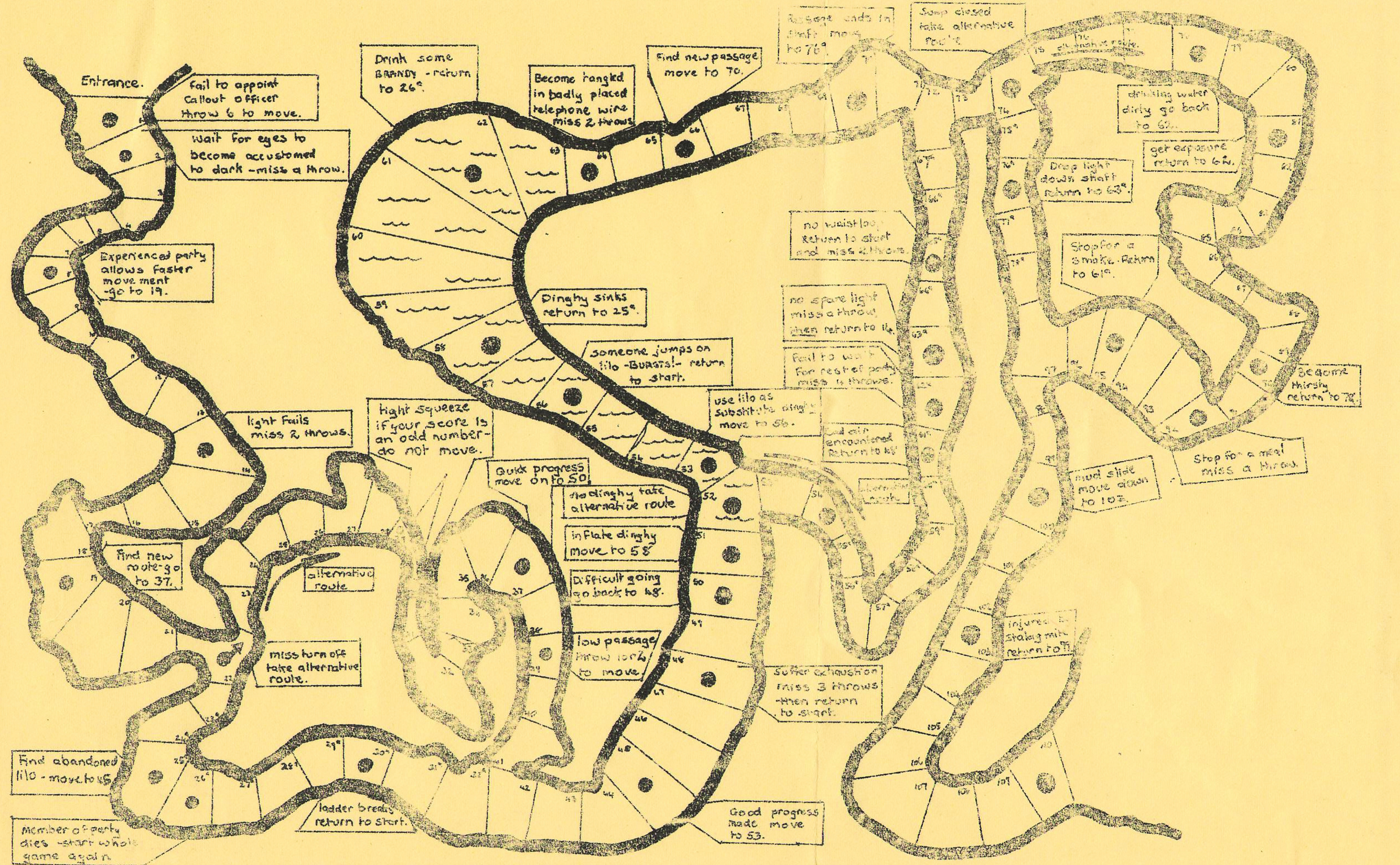
CAVİNG IN YUGOSLAVIA?

"There was a young man from Belgrave,
who kept a dead ---- in his cave,
he said I admit,
I'm a bit of a ----,
but think of the money I save.

- from our overseas correspondent.


Entrance.
Fail to appoint Callout officer throw 6 to move.
Wait for eyes to become accustomed to dark - miss a throw.
Experienced party allows faster movement - go to 19.
light Fails miss 2 throws.
Find new route - go to 37.
alternative route
miss turn off take alternative route.
Find abandoned lilo - move to 45.
Member of party dies - start whole game again.
ladder breaks return to start.
tight squeeze if your score is an odd number - do not move.
Drink some BRANDY - return to 26°.
Become tangled in badly placed telephone wire miss 2 throws.
Find new passage move to 70.
Dinghy sinks return to 25°.
Someone jumps on lilo - BURSTS! - return to start.
Quick progress move on to 50.
No dinghy take alternative route
inflate dinghy move to 58
Difficult going go back to 48.
low passage throw 1 or 6 to move.
Good progress made move to 53.
Suffer exhaustion miss 3 throws then return to start.
use lilo as substitute dinghy move to 56.
Fail to wait for rest of party miss 4 throws.
no spare light miss a throw then return to 16.
no waistloop. Return to start and miss 4 throws.
Passage ends in shaft move to 76°.
Sump closed take alternative route.
Drop light down shaft return to 63°.
drinking water dirty go back to 62.
get exposure return to 64.
Stop for a smoke. Return to 61°.
Become thirsty return to 78°.
Stop for a meal miss a throw.
mud slide move down to 103.
injured by stalagmite return to 71°.

THE GREAT CAVING GAME.

YES! here it is for the first time ever:the "Great Caving Game". Designed for all you armchair cavers, and those put off by inclement weather, this game should provide endless hours of enjoyment for the whole club (or even the whole family!).

INSTRUCTIONS.

1. Any number of players from one to 13 can play.
2. One die only to be used.
3. Recommended age limits are 9-29 years.
4. Now go to it and enjoy yourselves.......

THE MYSTERY OF EASTER ISLAND.

The mystery of Easter Island is still a mystery! But we hope to have the answer for the next issue.

TRIP REPORTS.

WEE JASPER. 1st. Aug.

Present- John Brush, John Furlonger, Ken Palmer (TL), Neil McAlister, Dave Shaw, Frank Bergersen, Bob McDonagh.

With the sudden cancellation of the Bungonia trip Neil and I, both determined to do a bit of caving, set forth for the Wee Jasper region in the early hours of Saturday morning.

Arriving at Punchbowl hill, we scrambled into Dogleg, encountering what is a familiar sight to Dogleg veterans - caramel mud and inhibiting pools of water. On reaching the sump, however we were to be dissappointedas the sump was brim full, and one would need little less than an aqualung and shovel to negotiate it,

On surfacing we headed for Signature, Neil still insisting that he could have conquered the sump if only he had thought to bring his rubber ducky - a must in all wet caves.

In signature we pushed a squeeze without getting anywhere, before returning to the wagon for a bit of lunch. It was then that we spotted a white Holden pull up beside the Vanguard, and who should it turn out to be, no less than J.B., Furry etc. which made the area a temporary NUCC stronghold. The words of welcome I will not relate for obvious reasons.

The whole group, under the guidance of trip leader Kenny Palmer, proceededto push every grotty hole on Punchbowl Hill.

The trip back home was not without incidents either, with Dave managing to run over a car bonnet giving'the Fellers' a Fireworks display. Neil apologises for the fact that the best he could do was to blow an exhaust weld, but he promises to do better next time.

FRANK BERGERSEN.

MICHELAGO. 27th. Sept.

Present - Frank Bergersen, Neil McAlister, Jeff Allen.

We started out with the usual conditions for a caving trip - rotten! The three of us were drenched but in high spirits as we reached the caves.

The day's thrills began with an exploratory dig at the base of a rockfall, this proved worthwhile as a small chamber of undetermined length was uncovered. Anyone who doesn't mind coming out as a soprano from this chamber-with-a-squeeze can find out for us just what the undetermined of this cave is.

Several other small caves were looked at during the day and were"interesting" if nothing else. It is obvious that these caves receive very little attention as a strong stench of decaying animal is prevalent in most holes, a fact which prompted my two fellow cavers to insist that I have the honour of trying all the caves first. The thoughts of being ripped to shreds by some enraged wombat did not really appeal to me but I had little choice in the matter after I was informed that I was trip leader.

Although the caves are of little significance, Neil and I agreed that it was a reasonable location for a field day due to the fact that it is only 30 miles from Canberra and the limestone cliffs bordering the river would be a good place for abseils. The walk necessary to reach the caves would also be good conditioning for club members. So this location is worth consideration in the future.

F. Bergersen.

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WEE JASPER. 15th nov.

Present - John Furlonger, Ken Palmer, Maurice Bell, Bruce Calran, John Brush and Dick Preece (visitor).

We left Canberra at about 8am. with the aim of getting away from it all after the exams, however, as usual Punchbowl hill was crawling with people - from HCG. and Sydney Teachers College.

After finding Dick and Bruce, who had stayed the night out there, we headed for WJ63. (Numbered by NUCC sept '69) where we proceeded to widen a breathing hole. Several hours and several hundred pounds of rock later the hole was judged to be wide enough to squeeze through, so JF did, and discovered a 10' shaft which ended in a number of small fissures, one of which had a breeze. This great discovery doubled the known length of the cave. The squeeze is extremely difficult on the way out - so be warned.

Three other holes were looked at after lunch, and are probably worth another look. One used by a farmer as a dump would require the removal of much rubbish and dead sheep. The second hole, about 35' long, slopes steeply downwards and gets progressively tighter. The third hole is a fissure with a false floor about 10' down, most of this floor was removed and a drop of about 15' found, however more rock will have to be removed before the lower parts can be entered.

On the way home we stopped to look at a deep gorge near the Taemas bridge. The gorge is reached from 'WYELBA' station on the Boambolo road. The creek drops several hundred feet in a number of stages and would be a good place for a field day or for canyoning practice.

JOHN BRUSH.

WYANBENE 5/9/70

Present: Phil Shepherd, Michelle Chanberlin, Joel Wollum, Bruce Calran, Neil McAllister, Noelene Smith, John Brush, Dave Shaw, Lindy Elliot, Noel Call, Phil Montgomery, Noel ..WEST.. , John Furlonger.

Left Canberra about 8.30a.m., after breakfast had been supplied at the Shaw residence, and arrived at Wyanbene at about 10.15a.m. We divided into two groups, one to start the survey of Caesar's Hall and the other to show around some of the visitors on the way in.

We had a quick trip in and started to survey the far end of Caesar's after some difficulty in locating the tie in point of the section already surveyed on a previous trip. We were joined by the second group after about one and a half hours and a quantity of soup was consumed greedily by all present.

Phil and Joel had to leave early and some of the less experienced people present were fairly tired at this stage so all except J.B., B.C. and I left Caesar's about 4.30p.m. heading for the entrance under Noel's able guidance. We stayed to continue height measurements in Caesar's Hall using helium balloons.

A loud bang signalled the end of our efforts about twenty minutes after the others had left, so we packed up and headed out as well. We caught up with the others at the Blowhole and everyone was out of the cave by 7.00p.m.

The trip home was quite uneventful for a change.

John Furlonger.

TUGLOW 7-8/8/70

Present: Noel Call (L), John Brush, John Furlonger, Bruce Calran, Frank Bergersen, Neil McAllister.

The drive up on Friday night went off reasonably well. Noel clocked up about thirty miles just picking up his two passengers. This feat was accomplished by driving from the Call residence (Chifley) to my rancho (Duntroon) past Mawson, and then back to Mawson to pick up Frank (Who, by this stage, had unpacked his Teddy Bear and was about to go back to bed).

Meanwhile, at Goulbourn, a certain well-known amateur mechanic and science teacher is said to have run his (now famous) bug up a gutter while his eyes were glued to the legs of a young lady!

Now for all you Boy Scouts,(which ones...? Ed.) Setting up camp went off like a well planned military operation. J.B. and Frank slept together(?) in J.B.'s canvas paper-bag, while J.F., B.C., Noel and myself slept in Noel's tent. We slept soundly until about 7.30 a.m. when Frank informed us that there was a filthy fog outside and it was bitterly cold. I thanked Frank for waking us to deliver the weather report. (Due to strict censorship laws,the exact text of Frank's reply can not be published).

Breakfast followed ye olde NUCC tradition known as 'cursing of the weather'. J.B., roughing it as usual, lit his nine-burner, fully portable, compact Porta Gas stove, cooked steak and eggs,and rounded off the meal with a cuppa (or was it 'Veuve Cliquot '59'?).

Everyone ate a normal breakfast except me. Due to the rotten and decidedly unfriendly climatic conditions prevailing at the time, I talked myself out of lighting my stove. Instead I devoured a quarter of a pound of 'Polish sausage'. (That's not what the rest of those present called it.-Ed.)

This I believe was my undoing; because, later on, my stomach, jogged by a solid hike and after about a pint of fruit juice, tea, dried apricots and chocolate, rebelled against me, resulting in the incident which I am about to relate.

While descending a fifty foot pitch, my stomach took its revenge, resulting in a short but embarrassing blackout. Noel came to my rescue, followed closely by J.B., and I soon found myself bound up by sundry pieces of rope. I recovered after about five minutes and was able to climb back to the surface without difficulty. On a serious note, I would like to thank Noel and J.B. for their fast and efficient help.

While climbing out, I realised how difficult it would be to move an injured caver up and down pitches, through squeezes etc. It is important for us all to remember that caving can be dangerous if proper precautions are not taken.

There were several groups of campers (cavers?) in the area of the caves. One group was stumbled upon by Bruce while they were in the process of polluting the lower reaches of the cave and river. It is some consolation (not much though -Ed,) to know that these people were not members of a caving club.

Now, so as not to disappoint readers, here it is; what you've all been waiting for:-

"VW REPAIRS MADE EASY" VOL.4 NO.296

"Repairing Shock Absorbers"

Yes, we saw it again. The now all too familiar figure of Bruce under his VW. This time it was the front left shock absorber. It fell off (Well, one end did anyway). Surprisingly enough, Bruce wasn't carrying a spare! (The fool! He should have learnt by now. That makes five trips and fivebreakdowns for his VW). Don't worry if you missed the event , it was captured in living colour on a set of slides.

FIN

NEIL McALLISTER

...ooOoo...

PADDY'S RIVER CAVES SHUT

The Department of the Interior has restricted access to the Paddy's River caves "in the interests of public safety and to restrict vandalism". A spokesman for the department said that the caves were not lighted and there was concern for the safety of unprepared visitors, especially unaccompanied children. Over the years, vandals had ruined stalactites and stalagmites which were some of the chief features of the caves.

Although the entrance gates to the caves had been locked, interested people and groups would be able to enter the caves by making arrangements with the Parks and Gardens branch of the Department of the Interior (Telephone 462332).

...ooOoo...

REPORT FROM THE PAST

Compiled by Ken Palmer.

-The discontinued saga of A.J.Shearsby's Wee Jasper trip.

To cut a long story short, he soothsaid and filibustered .... THE END.

...ooOoo...

You try to make him type it out. -Ed.

CAVE RESCUE GROUP FORMED. "Courier," I9th. Nov.

A membership-drive meeting of the newly formed Cave - Cliff - Bush Rescue Team was held at the Chifley Primary School last night.

Mr. Rick Price, founder of the team, said it's aim was to assist the Civil Defence movement in times of emergency.

In addition he said, the group would deal with small emergencies, such as a lost bushwalker, that Civil Defence would not normally cover.

Mr. Price also started the Civil Defence movement in the Woden Valley.

Membership stands at IO. All these have had previous experience with such organisations as scouting bodies.

Mr. Price hopes to build the team into four sections of II members each, so that one section can be on stand by each weekend.

Males between the ages of I8 and 30 are eligible to join the movement. "Physical reasons prevent us from taking people older than this for the rescue team," Mr Price explained.

However older men and girls could be trained as headquarters staff or to become members of the signals team.

Training for the team includes such operations as bush rescue, map and compass reading, cliff rescue, first aid, wireless training and headquarters procedure.

?&?&?&?&?&?&?&?&?&?&?&?

CAVES THREATENED BY MINING.......

The Colong scandal is not an original happening. Recall this earlier incident;

In a cavern, in a canyon,
Excavating for a mine,
Dwelt a miner, Forty-niner,
And his daughter, Clementine.

Percy Montrose. 19th. Century.

COMING TRIPS.

5th Dec. BUNGONIA. "To have a look at Hogan's Hole and so on."
Leader Noel Call.

12/13th Dec. WARRANGULLEN. "To map both ends of the cave, and do a surface traverse between them".
Leader John Brush.

31st Dec/1-3rd Jan. YARRANGOBILLY. "To remap part of Y58, and continue exploration therein. Plus more surface work".
Leader Ken Palmer.

Australia day Long weekend. BUCHAN. "Scrubby Creek? and so on.
Leader John Furlonger.

14/15th Feb. COOLEMAN. Leader Noel Call.

Many other impromptu trips will also be run (esp. to WYANBENE) so keep an ear to the ground.

If you are interested in going on a trip, please contact the trip leader concerned by the preceeding Wednesday at the very latest.

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Philis hepard)
Wike Mebb) not available.

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SAVE..........

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