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CONTENTS

	page
Editorial	1
The CEGSA Nullarbor Expedition 1959/1960 Archaeological Notes: Graeme Pretty	2
Caves in the Soviet Union: Chris Court	7
Nullarbor Plains Expedition 1959/1960: Marian Carpenter	8
Drama in Real Life. A Factual Account of a Dangerous Mission: K. Stillman, C. Court, A. Jones	10
The Evolution of the Jubilee Cave Jenolan: Warren Peck	13
The Third Theory of Cave Formation: Doug Miles	18
Irresponsibles Make Caving History, or The Drum Re-examined: Tom Landecker	19
With Sincere Apologies to W.S. Gilbert	20
Helictites: An Explanation on the Crystal Dislocation Theory: Tom Landecker	21
Two Recent Explorations at Jenolan: Henry Shannon	24
Central Level and Northern River Section of the Mammoth Cave Jenolan: Ian Williams	25
Report on Bendithera: Henry Shannon	27
Report on the Mount Fairy Cave: Hugh Minter	27
Map of the Bendithera Limestone	28
Index to SUSS Journals, Volumes 1 to 5	29
Abstracts: German	32
French	33
Latin	34
Russian	34
Indonesian	35
Maps: Jenolan: Section of Central Level Mammoth past the Skull and Crossbones	
Jenolan: Extension to Northern River Section, Mammoth Yarrangobilly. Surface Map	<u>Ian Carpenter Cave</u>

EDITORIAL

A speleological society should exist to foster speleology. As well as being a speleological society, SUSS is a university society, and as such should be a society of intellectuals. This imposes on its members the additional burden of maintaining a sense of proportion, that is of seeing speleology in perspective, as it were. Setting horizons entirely under the ground narrows the field of vision quite considerably, and the "speleology a science" myth might be dispelled if only the ostriches could pull their heads out of the limestone.

Raising then our heads above the ground, we perceive that our position places upon us a certain individuality, which we have a distinct duty to demonstrate. As university students we should be different because we are speleologists, and as speleologists we should carry a shadowy aura of academia about us, a sceptic's knife, a hedonist's goblet. Non-conformism is too simple a trap for us to fall into. Eccentric, bearded cavemen are insufficient. A cloak of esoterism is too transparent. Only an element of irresponsibility can lift us out of the morass of pottiness. To be bound by a sense of responsibility, to ourselves, to a human ideal, to a scientific ideal, condemns us to mediocrity. We are carrying forward the frontiers! Where to I ask. Speleology a science! Self delusion I say.

The fact that we are a society of intellectuals reveals itself in society politics. The issues are of such triviality as to lend the whole an air of harmless farce, and only the near-sighted inject purpose into the charivari, and carry jurisdiction beyond the society, for example. Cries of "Let's leave the poor old constitution alone and do some caving" are rightly treated as political slogans.

The fields of legal and ethical debate are well ploughed, which is a good thing. There is however a disturbing tendency to heap upon ourselves restrictions, which is not a good thing, on the grounds outlined above.

To get to the point, another outlet for intellect should be the society's publication, namely this journal. Here it is, then, this heavy piece of undergraduate humour.

Tom Landecker

THE CEGSA NULLARBOR EXPEDITION 1959/1960ARCHAEOLOGICAL NOTESGraeme Pretty

From December 1959 to mid-January 1960 a group of Australian speleologists explored limestone caves of the Nullarbor Plain, South Australia. The expedition, organised by the Cave Exploration Group of South Australia, was led by Mr. A. Hunt of the Sydney University Speleological Society. During a previous visit in 1957 traces of prehistoric activity were observed and so a group of students accompanied the recent party for the specific purpose of investigating the archaeology of the region. The group consisted of:

Dr. A. Gallus. St. Joseph's College, North Fitzroy, Melbourne, (Leader).

Miss E. Scott. Melbourne.

Miss P. Curtis. Melbourne University.

Mr. G. Pretty. Sydney University.

Investigations centred upon Cave Koonalda, two miles north of the Eyre Highway, west of Ceduna.* A diagram of the cave sufficient for the purposes of this article is at the end of the article. An accurate survey of the cave was made, but the map has not been published yet. The preliminary survey revealed several assemblages of microlithic flints scattered about on the surface. Seven of these sites had been investigated and numbered in 1957 and another, Site 8, was now added to the map. Within the cave human occupation seems to have extended no further than the north-west gallery. Here were signs that the cave had been used as a flint mine. At regular intervals up the cave walls were layers of flint nodules and throughout large areas of the gallery these had been chipped out of the limestone leaving the walls pock-marked with holes. In many cases the flint nodules had been only partly exposed by chipping and then snapped off leaving the remainder embedded in the wall. Most of this activity was carried on beyond the limits of daylight.

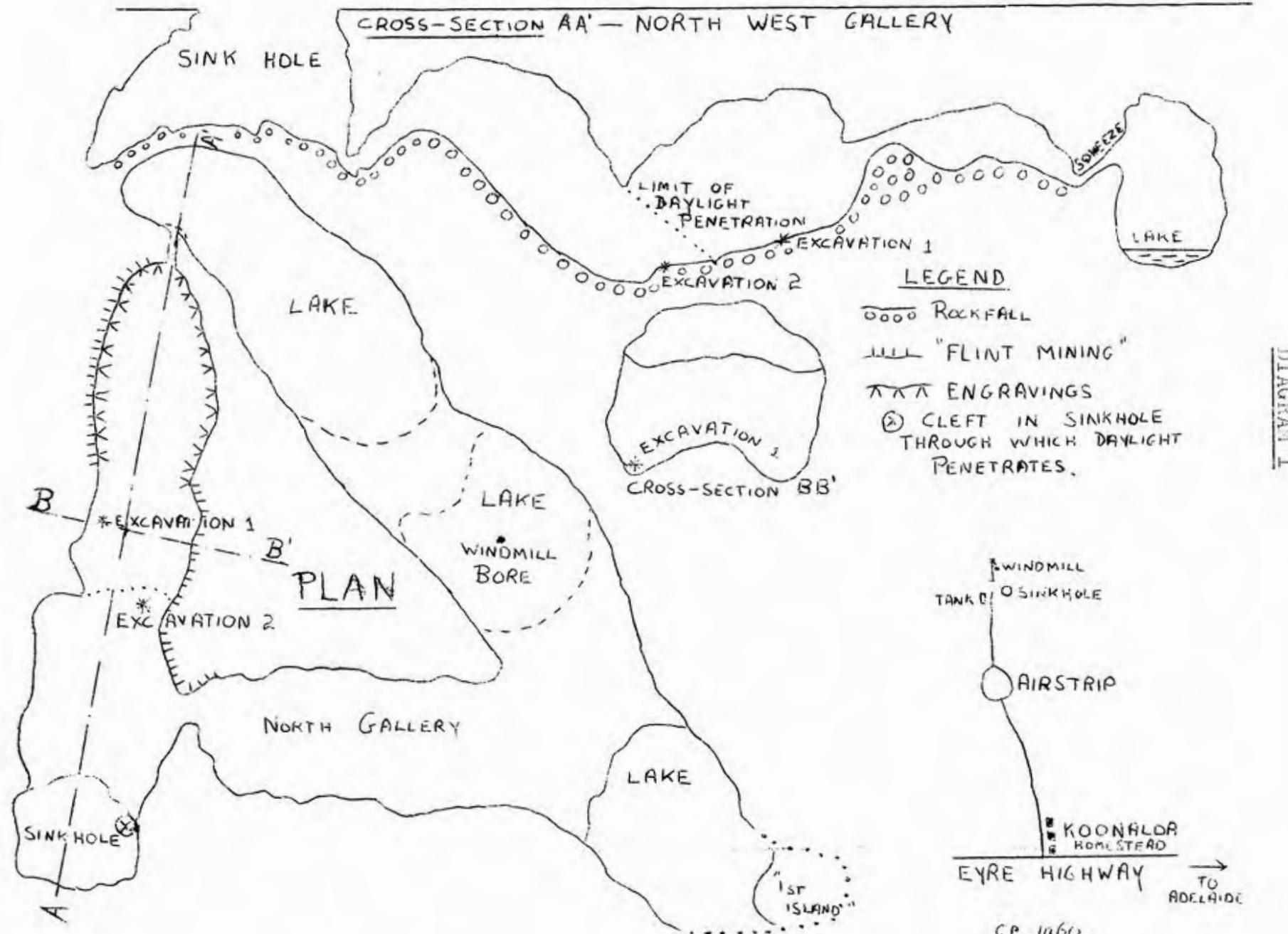
Diagram 1, cross section AA', shows the North-West Gallery to have been divided into three parts, an antechamber lit by daylight, the main gallery, and an extension chamber, filled almost to the roof by large broken boulders. Both walls of this extension chamber were covered with engravings, apparently utilitarian and not cultic, since bone points found between the boulders of the floor indicate that they are sharpening marks. Such sharpening marks, or "Abraded Grooves" are well known in Australia.** Charcoal and mouldered wood, evidently torches, and a flint scraper were also found in this extension chamber. Flint mining activity seems to have been more intense here than in any other part of the cave. As well as the engrav-

* The geology of the cave and a map (1947) are published in Trans. Roy. Soc. Sth. Austr. 1950. A description of the cave and directions are found in the Field Notes of the 1957 Expedition, obtainable from 31 Ian St., Broadview, South Australia.

** See Diagram 1.

** "Abraded Grooves"; see F. D. McCarthy "Australian Aboriginal Rock Art" Sydney 1953, pp. 14-17.

KOONALDA CAVE N4



EXCAVATION 1 PLAN.

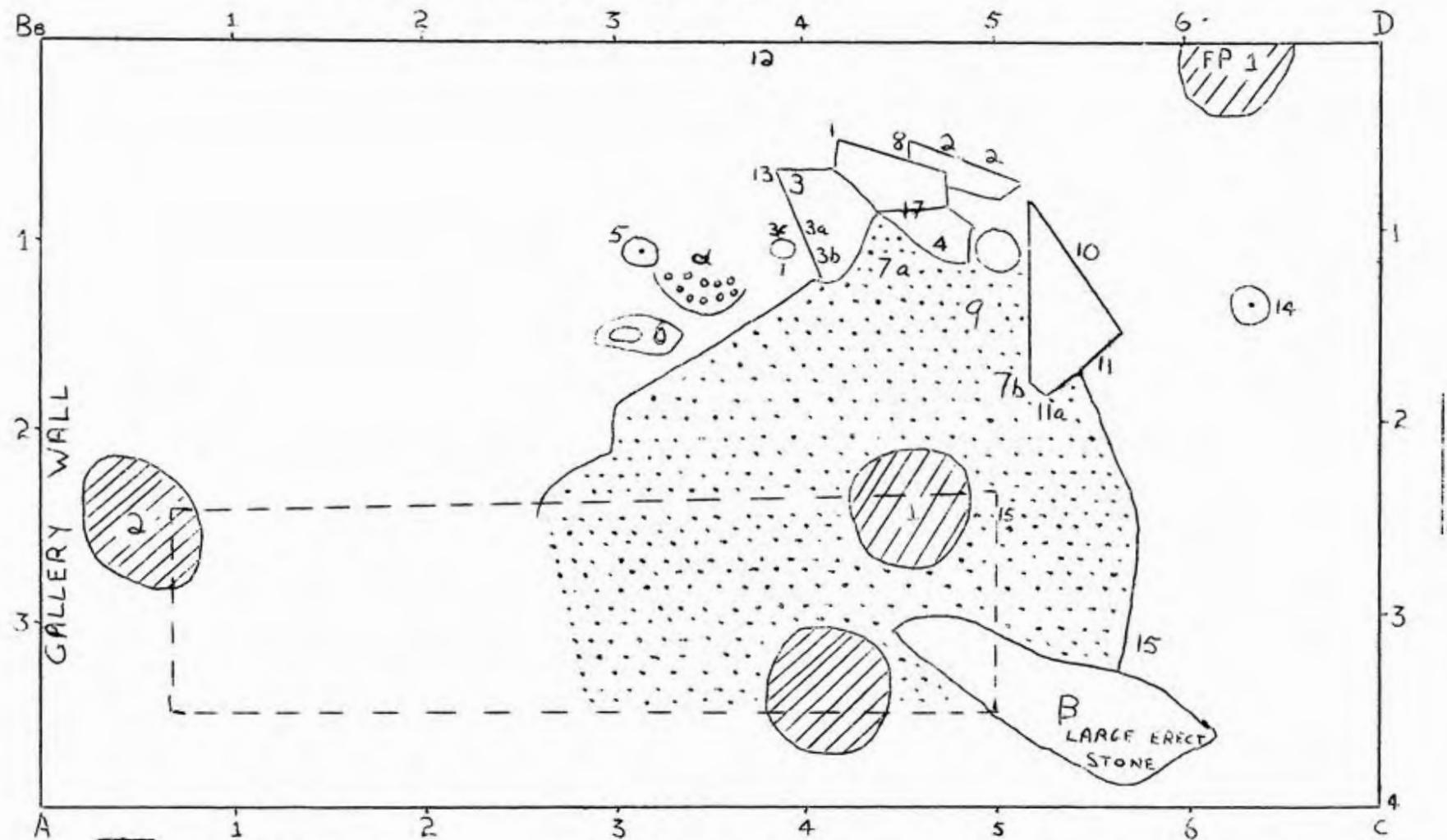


DIAGRAM 2

4

ings we were dismayed to find palimpsests of considerably lesser antiquity, e.g. "J. Broughton 1907!" Such evidence of European activity was not rare at Koonalda, and ranged from the engraved cartouche of the said Mr. Broughton to two intrepid brothers who reached the edge of the sinkhole in 1958 and (apparently failing to see the steel ladder giving access to same) daubed a record of their venture across a disused water tank nearby. Since the tourist trade is more lucrative than the sheep at Koonalda it is to be doubted that such activity will cease and makes a detailed archaeological survey of the cave ever more urgent.

Excavation 1 (see Diagrams 2,3)

Six levels were explored and digging ceased at a depth of 53 inches, with sterile layers not yet reached. Progress was slow due to the packing of the rockfall, particularly in the lower layers.

Dr. Gallus is at present classifying the flint material from this trench. So far he has distinguished three culture phases:

Koonalda A. Levels 1,2. Surface sites 1-8. Microlithic.

Koonalda B. Levels 3,4a,5,& 4b. Flint picks and scrapers.

Koonalda C. Level 6. Large hand axes.

Parallels to the Koonalda material have been found at Cape Martin in South Australia but as the analysis of flints is far from complete no typological information can be given.*

The most sensational discovery in excavation 1 was a stone workbench. Its outlines can be seen from diagram 2. As it appeared to Dr. Gallus the stone toolmaker sat on this bench with the large oval ambos (anvil) stone (9)** between his legs. The ambos was an oval shaped piece of chipped flint. At his left was a heap of flint nuclei (11,11a) and in front of him were his finished articles (in this case a stone scraper). Behind the bench were large quantities of small stone chips. The workbench was surrounded at various intervals by small stone fireplaces, probably for illumination.

Another feature was a large erect stone (B in diagram 2). Its significance is obscure. A cooking fireplace with charred animal bones was found directly behind it.

Excavation 2

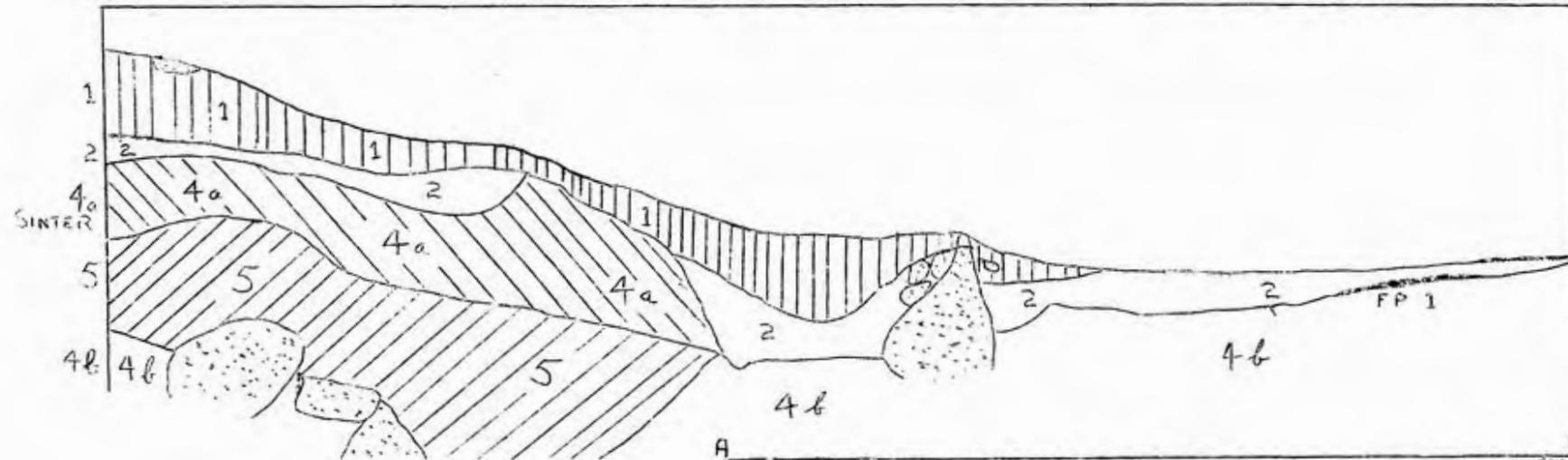
Another trench was later opened, nearer the entrance and within the area of natural illumination. Signs of a campsite were hoped for but little more than flint chips and some charcoal were found. Three levels were explored before attention was directed back to Excavation 1.

It seems then that what we have at Koonalda is a tool factory. All the evidence points towards this, the pocked cave walls, the artificial illumination, the workbench, the engravings. It should be mentioned here that among the artifacts unearthed at Koonalda were stone picks and that most of the tools were either half fin-

* See N.B. Tindale: A Dated Tartangan Implement Site from Cape Martin, South East of South Australia. Trans. Roy. Soc. S. Aust. Vol 80. Enquiries about typology: Dr. Gallus, 2 Patterson St. Nunamanding 6, Vic.

** Numbers refer to artifacts taken from the soil. See diagram 2.

KOONALDA
CROSS-SECTION BD — SEE PLAN OF EXCAVATION 1. D



SKETCHES, NOT TO SCALE.

G.P. 1960.

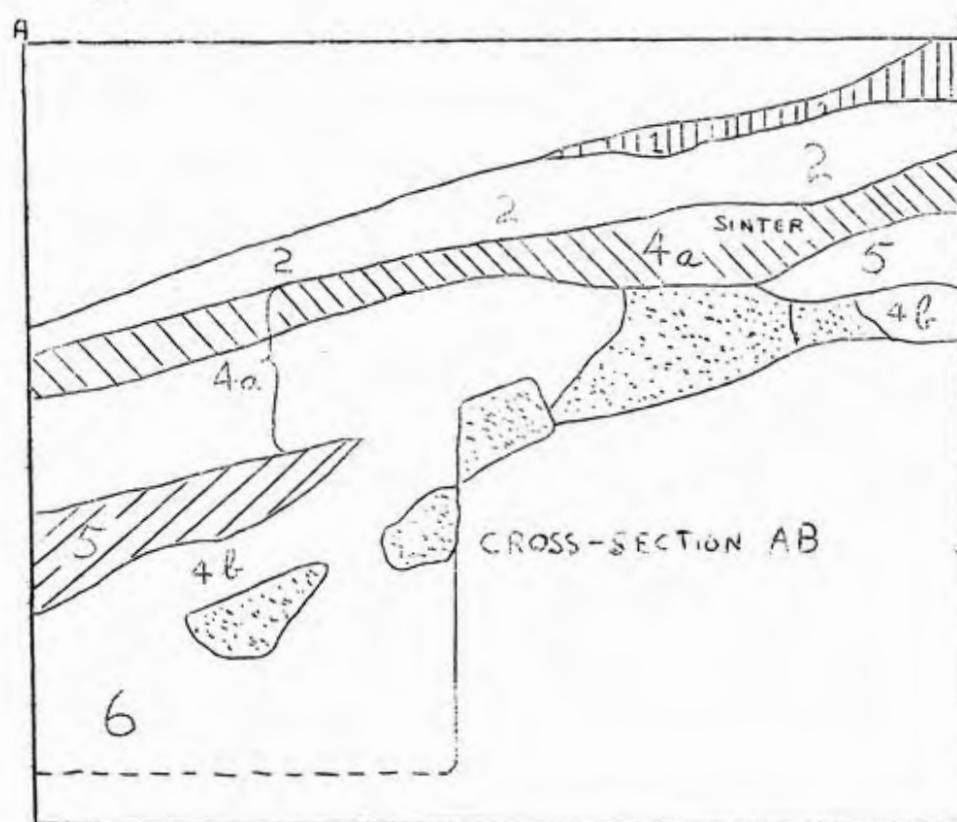


DIAGRAM 3

ished or rejects. Many tools whose cutting edge was worn away from constant use, and large quantities of stone chips were found.

During the period of digging the rest of the party looked out for flints and this produced one very interesting find. In one small cave, N31, were discovered parts of a human skeleton partly fossilised. This skeleton was found in association with flints from the upper levels, Koonalda A. Immediately nicknamed 'Sammy', the skeleton has since been shown to be female. Investigated by the Anatomy Department of Adelaide University the remains were declared to be those of a 27 year old aboriginal woman. A depressed fracture on the left side of the cranium had been made about 18 months before death. Two small punctures side by side in the femur are as yet unexplained. However a double pronged fishing spear fitted the holes perfectly. I understand that in Central Australia today it is obligatory for husbands to kill deserting wives. We may have here an earlier instance of this custom, but this is only speculation.

A Note on Dating.

Charcoal was found in levels 2 and 4a and will be dated later in the year at the newly established Radio-Carbon Laboratory of the University of New South Wales, Sydney.

Conclusion

It seems that during the first two cultural stages which we can distinguish the cave was a flint mine and a tool factory, and during the third phase, Koonalda A, settlement took place on the plain around the sink hole. At this stage the population was definitely aboriginal, as is shown by the skeleton from N31.

Koonalda however is one of many caves and even Koonalda is far from fully explored. Just before our departure, what seems to be a second workbench was discovered among the debris of the debris of the North West Gallery between the two excavation trenches. It is our hope to make further excavations at the end of the year.

CAVES IN THE SOVIET UNION Chris Court

I have often wondered whether the huge stretch of territory known as the USSR includes limestone caves and people who explore them. SUSS has no literature on the subject. However the *Zol'shaya Sov'etskaya Ents'iklop'ed'iya* under the headword CAVES mentions by name 2 in the USSR and says that many excursions are held to them. I give her a summary of the information on these caves the encyclopedia contains.

The Pakharden (or Kon) Cave is in the Kopet Mountains in the Turkmen SSR, and near the Persian border. The Kopet Mountains are composed of tertiary chalk masses, limestones giving karstic forms. The cave houses pigeons and bats and is quite deep but is known mainly for its warm sulphurous lake. This is 3000 square metres in area, 30 metres deep and maintains a constant temperature of 37°C. Its water contains H₂S.

The Kungur Ice Cave ("one of the largest caves in the world") is in the Central Urals, between the Sylva and Shavka Rivers. About 5 km. of the cave has been thoroughly studied by a karstic-speleological station of the USSR Academy of Sciences. It contains about 100 grottoes and 36 lakes, the largest about 200 sq.m., in a grotto, Druzhba Narodov, "Friendship of Peoples". The cave results from water solution of gypsum and anhydrides. The internal temperature produces ice formations.

NOLLARBOR PLAINS EXPEDITION, 1959-60.

The Nullarbor plain is a vast flat expanse of sand and saltbush running along the shores of the Great Australian Bight. The only trees are rather stunted mallee and mulga, and there is almost no grass. Hills rise about one foot per mile, and it is dry, hot and dusty; not, one would think, a good place for a holiday. However underlying the dust the heat and the saltbush are some extremely fascinating cave systems. The Nullarbor is composed of some hundreds of feet of soft white limestone, and the whole plain is riddled with caves and blowholes. It was around these that the main aims of the expedition were centred. Primarily it was intended to explore, survey and map as many caves and blowholes as possible and to correct existing maps. Dr Gallus and his party were interested in digging up and collecting remnants of the ancient aborigines and pre-aborigines who inhabited the Nullarbor, and we carried two zoologists, one investigating reptiles, the other insects.

The caves were of two main types: collapse caverns and blowholes. The collapse caverns were mostly very large, and often led off from great sinkholes. Most of our time was spent in Koonalda Cave. The access was from a sinkhole about 200 feet in diameter and 80 feet deep; the entrance opened onto the top of an enormous rockpile over which the roof was about 100 feet high, and the cavern measured about 300 feet across. Two passages led off from the foot of the rockpile: one, where most of the archeologists' work was done, led to a further rockpile, at the top of which was a squeeze. The other branched into two, one leading to a lake overlooked by a balcony reached via the squeeze in the archeologists' passage, the other to a chain of three lakes separated by islands.

The lakes ranged from one to twenty feet in depth and were up to 600 feet long. The island separating the second and third lakes was more like a mountain, consisting of another rockpile about 150 feet high and very steep. The third lake was the deepest and one of the largest. The soft white limestone of which the walls of these caves are mostly composed glistens and shines as it catches the light, but there was little in the way of formations: some small gypsum flowers were found in an extension from the second lake.

Several other large caves were visited. Weebubbie was remarkable for its lake which was very large, quite deep, and with very clear blue water; Abrakurrie was another notable cave visited by the expedition. It had no water, but one cavern was about 1800 feet long with a perfectly level floor composed of bat guano and water levels some 20 feet above the floor. We also went to Warbla Cave, which was one of the smallest, and certainly the smelliest, cave we visited. It had a magnificently wide entrance, covering almost the whole of one wall of the sinkhole; the inside was a zoologist's paradise, with live bats and swallows, bones of marsupials, rodents, sheep and a dingo, and also some mummified hawks.

An ancient nest of some kind of bird of prey was found with a bone pile 4 feet deep beneath it, and where some animal had burrowed into it the walls of the burrow were composed of bones as far as could be seen. Warbla also showed signs of flint workings near the entrance, and there were some formations. The only lake was very

small, and as the bat colony inhabited the roof above it the water had become a thick sludge of bat guano.

N31, though small, held perhaps the most interesting find of the trip. Scattered throughout an extension we found the bones of a 27 year old aboriginal woman. Unfortunately the complete skeleton was not found, but the bones found were partially fossilized, and we did find the skull, the pelvis, and some limb bones. There are two small holes in the thigh bone, evidently in no sense natural, and it may also be said that she received a blow on the head about 18 months before her death. The bones were presumably scattered by flooding, as there was no evidence that the sediment had been disturbed. There were also two aboriginal flints found in this cave, but lack of time prevented full exploration.

White Wells was similar to N31 in that it was relatively small and the access was by a hole in the roof of the main cavern and not by a sink hole. It had some interesting examples of resorption formation, and there were large areas of old flowstone and formation on the walls.

The blowholes were comparatively rather small and insignificant. Some had formations, notably N33, but all had air draughts through them which changed direction quite frequently and yet according to no definite system or for no obvious reason. Some idea of the strength of these air draughts can be gained from the fact that in one blowhole where we discovered some striped marsh flies we completely filled a net held over the blowhole in a matter of seconds with the flies that were blown out.

Several other places were visited by the expedition. We collected spiders from Chowilla, a blind sinkhole near Abrakurrie, and we looked at Koomooloobooka, aboriginal for small hole surrounded by many others, but did not go in. Weeke's Cave was visited by some members of the expedition. Naliwoodin, Bunburra and Noorilla were other rockholes we saw, one containing water, and many other rockholes and blowholes were marked and located on existing maps.

The work done on the trip included a complete Grade 6 map of Koonalda Cave and surface (Grade 4). The Weebubbie map was completed (Grade 7), and surface and location maps of Abrakurrie, Chowilla and all other caves and blowholes visited were made. The Grade 4 map of N31 is unfortunately incomplete, as are the Grade 3 maps of blowholes N32 and 33. Numerous insects, lizards, and mammalian and bird bones were collected. Water samples were taken from all caves for analysis. The full extent of the archeologists' work remains to be assessed.

On the next trip we hope to carry out further archeological, paleontological and surveying work, we would like some work done on air draughts in blowholes, there are water levels to be investigated and we could use a few geologists and systematic botanists.

MARIAN CARPENTER

DRAMA IN REAL LIFE
A Factual Account of a Dangerous Mission

Reported by:-

K. Stillman
 C. Curt
 A. Jones

At 10.15a.m. the telephone shrilled, intruding itself into the Saturday morning chaos that characterizes where I live on Saturday mornings. I picked up the receiver, breathless. "Hello" I said breathlessly.

"Get the lead out of your pants doc, we're going on a trip to Colong." rasped out a voice I recognized as belonging to the Convenor of the Subcommittee for Remote and Inaccessible Places. I played for time:

"This isn't another impractical scheme to extend the known limits of..."

"Precisely. Here's how it figures..." In the brief exegesis that followed the scheme was unfolded as one that required considerable daring, fortitude and, to put it bluntly, tons of guts. I was struck, however, by the engaging simplicity and straightforwardness of the enterprise. I felt that its boldness would guarantee success. Sober reflection, on the other hand, baulked my eagerness:

"Now look here, this is all very well, but these hazardous expeditions need weeks of planning - intra-Federation liaison, Thursday meetings - and besides, I don't own an independent source of light..." The Convenor interrupted me:

"The urgency of this matter is such that immediate and decisive action is mandatory."

"O.K." I acquiesced lamely, "Oh, before you go, how much grog can I take?"

"None." he snapped, and launched into a polemic on the evils of alcohol and the virtue of total abstinence, but I had hung up on him.

I left the phone dazed and reflective. Myself too, was dazed and reflective, and I couldn't help wondering how a few fateful words conveyed by such tenuous means as a wire strung between poles could alter the whole course of a person's life. Would I see again the smiling fields of my birth-place? Would I venture back to my Laros and Penates? Am I not too young to die? I stifled these misgivings with barely a tear and prosecuted the business at hand. We men of action pride ourselves that when there's a job to be done we get things done, but fast and flinging the barest minimum of indelible food into my pack, I set out.

In more time than it takes to tell (90 min. to be precise), the Convenor and I had hitched out to Liverpool and in 30 min. the residents of Camden could have seen a stirring sight. Two intrepid wonderers, jaws thrust out resolutely and eyes shining with that idealism that only comes from devotion to duty and lofty causes; radiant with that ennobling spirit that attends the saints in their

good works, drew gasps of admiration from the mangy flea-bitten mongrel asleep in the gutter. The other inhabitants paid us scant attention, being too hell-bent on an afternoon's alcoholism at the bowling club to risk such a rewarding experience as conveying Alex and me to Burratorang.

On effecting an arrival at Central Burratorang, we found our way blocked by a iron gate inlaid with a notice spelling doom, or more precisely, max penalty £50 to anyone with the temerity to camp, picnic, swim, light fires etc etc by order etc.

"What'll we try first?" I said.

"How about the penalty?" suggested the Convenor.

"Not very funny." I replied, "Look, they've reconstructed the fence since we were last here so why don't we burn a few fence posts?"

"Too much trouble," said the Convenor, "with all that water out there looking so inviting."

In the face of such a challenge to our irresponsibility we were, in a trice, thinking up clever ways of adding to the pollution of Sydney's water supply. This would be no mean feat since this precious water receives the sewerage outfalls of all the Blue Mountains towns, Lithgow, Goulburn and Mittagong. Fighting off bouts of nausea, we resolved to swim the Maitai on Li-los. Not since the landing in Normandy in '44 has the world seen a scabernic invasion to equal this. Navigationwise our course may have been erratic, but I know of nothing better to describe it as we dared the elements, all 103 of them, to make of us what they would.

"Is this the paunch that graced a thousand trips?" I wondered, admiring my companion's buoyancy as he drifted past to leeward with Li-los and pack in tow.

"Land ho!" he suddenly ejaculated.

"Why did you ejaculate land ho?" I enquired anxiously.

"Got any alternative suggestion?" he challenged. I hung my head in confusion and after several minutes hard heaving, I felt my knees knock against something hard - each other.

"I got here as soon as I could. Is he very bad?" said the Convenor on finding he could stand on the bottom.

"Who? What are you talking about?" I implored.

"Nobody. Nothing you dope. That's what I always say when I arrive anywhere. It's a habit I picked up from watching T.V."

In almost no time we had scrambled ashore, an egg and a few other things and were setting off summa cum celeritate for Coleng. How like Colossi did we bestride the narrow world! How the miles flew past! In barely an hour no less than five flew past in strict battle formation, each one dipping its wings in salute. And then it happened. In one of the brief instances when our feet touched the ground the Convenor stumbled on a loose rock and twisted his ankle. Vile imprecations rent the affrighted skies; foul cursings, anguished shouts, lamentations and execrations filled the air. Our expedition was sunk, kaput.

"I wish we had brought the first aid kit." groaned the Convener.

"Why? What could we do with all that junk?" I queried.

"Nothing I suppose," he answered, "but it does contain a spare ankle that's hardly been used."

"That's an angle (ankle) I didn't think of." I quipped. Even in the midst of adversities we adventurers enjoy our little jokes. We were now forced to camp, and after a sumptuous meal of dates and cheese - a meal fit for any king (King Kong for example) - we slept sub frigore Jove.

In the morning I noticed that the Convener seemed preoccupied, a prey to uneasiness and disquietude, as though he had had a premonition of an imminent disaster. My curiosity was piqued and I questioned him, choosing my words carefully.

"Hey, what's the matter with you, you mug. You haven't spoken a word all morning. You in a fog or something?" This question was more than merely rhetorical, as we were in fact beset by a swirling mist. He replied:

"I have been a prey to uneasiness and disquietude because of a dream I had last night. You know the Oldsmobile, in which an intrepid though largely irresponsible party was navigating to Celong from the west - well I dreamt that it crashed. I tell you it was madness to send a mere trip off in a crate like that."

"Heaven forbid!" I cried, and feeling some display of concern was needed I added: "And what happened to the passengers? Are they all right?"

"How the hell would I know? The dream transmission faded before I could get any details. I bet the Dept of Motor Transport will be pleased when it hears. Here have a piece of cheese."

We decided to press on to Upper Burragerang, which we reached in about an hour's walking. The bridge and river look pretty much as they did in '57. At the pub we were pleased to note that mine host's effusive hospitality is as good as ever, once you get used to the idea that the pub has vanished without a trace. Faced with such nostalgic memories we did not linger but began our homeward journey. After some miles we were picked up by a gallant trio in an L.R. and driven to Liverpool. These people described themselves as 'freelance speleos' and mere words can't convey how grateful we are to them. It struck me that if they joined some society then both parties could benefit considerably; but then how could they remain simple and unaffected if once plunged into the morass of society intrigue. And isn't their liberty and the fact that their activities are not circumscribed by a host of regulations something too precious to surrender? I felt that to offer them membership would only offend them.

Well, we duly returned home and, if nothing else, this affair should be an enthralling reminiscence for recounting in my senility. Such being the case I feel I have done the right thing by my grand-children, that theirs will be a happier world than ours. In the meantime I go about my daily sleep routine with my usual insouciance, wondering when I shall again be summoned by the Convener to accompany him on some perilous mission to heaven knows what remote and inaccessible place.

THE EVOLUTION OF THE JUBILEE CAVE, JENOLAN.

The presence of streams in the lower portions of many caves resulted in the belief, held by speleologists for many years (and still held by some), that all limestone caves were the result of the erosional work of underground streams (the Vadose theory). However W.M.Davis in 1930 expressed the view, based partly on theory and partly on observation, that cave development would take place while the limestone was below the level of the valleys and saturated with ground water. The caves produced by this solvent action of water in the phreatic zone would be drained of ground water if the water table was lowered as a result of the deepening of the surrounding valleys. Surface streams could then flow into some of these passages and modify them to suit the new conditions of erosion. The proponents of the vadose theory claimed that ground water in the phreatic zone, (i.e. the zone in which the rocks are completely saturated) was for chemical reasons not capable of dissolving the large amounts of limestone involved, but no quantitative tests of this claim have been made in spite of a lot of theorizing by various authors.

A more practical approach to the erosion of limestone caves was adopted by Harlen Bretz, who in 1942 published the results of his detailed studies of over 100 widely scattered cave systems occurring under varied geological circumstances in the U.S.A.. He found many cave streams eroding some sections and filling the intervening sections with sediment in their attempts to adapt themselves to inherited phreatic complexes of passages and caverns. Bretz also discovered that some caverns had been filled with fine sediment when a short distance below the water table. Finally he produced valid criteria for establishing whether a cave had originated above or below the water table. These criteria, which, as far as is known, have not been challenged, formed the basis of this investigation of the history of the Jubilee Cave at Jenolan.

Criteria of phreatic origin: five solution cavity patterns

Spongeworks (irregular interconnecting passages and caverns), Networks (regular pattern of passages in plan)

- * Horizontal chambers in vertical beds,
- Bedding plane anastomoses (small sinuous passages)
- Joint plane anastomoses (similar small sinuous passages, but developed along joints)

four features which solution has left on cave walls, ceilings and floors:

- Solution pockets
- Joint determined cavities
- * Tubes and half tubes
- * Continuous rock spans across caverns.

Vadose criteria

Discontinuous horizontal wall grooves and ridges unrelated to bedding or jointing

Scallops (oval shaped hollows of asymmetrical cross section; these can indicate turbulent flow below the water table if there are other phreatic features present)

Incised meanders.

* Domepits.

* not used in this work on the Jubilee Cave.

The Jubilee Cave

This virtual maze of interconnected passages and caverns is reached from the Imperial Cave, either from the Lily of the Valley Passage (horizontal at 55 feet above the level of the underground river), or the Gem of the West Passage (also horizontal at 80 feet above underground river level), by vertical shafts. In pattern it is a typical spongework with over 100 ft. difference in elevation between the highest and lowest sections. When portions were shown to tourists the cave was divided into a right hand branch (trending NNE) and a left hand branch (trending NW).

While examining the solution pockets and joint determined cavities with which the Jubilee Cave abounds and getting ready to dismiss the cave's history as totally phreatic the author suddenly became aware that residuals of river gravels with pebbles two inches across and larger occupied not only cavities in the walls and roof but also covered much of the floor. Although one or two examples of vadose features came to light after close scrutiny it was obvious that a considerable flow of water had brought the gravels and clays into the Jubilee, and subsequently vadose streams had moved much material out of the Jubilee into the Imperial Cave. The main problem was to establish where this great volume of sediment entered and exactly how it was moved through and out of the cave.

The history of the right hand branch.

While in the phreatic zone considerable solution produced a spongework of passages and caverns which rarely exceed 15 ft. across with some up to 40 ft. high. The Sydney Smith Caverns (Series 2), (map ref.2), are typical. Low crawls connect small but lofty caverns and further progress is blocked by small unnegotiable holes in harder parts of the limestone, by formation blocking small tunnels or by a rockpile at the end of the cavern series. It is impossible to forecast if any of the unnegotiable holes lead to further caverns owing to the completely unpredictable nature of phreatic solution. The tunnels leading off from the higher parts of the cavern walls could repay investigation with a scaling pole. The Sydney Smith Caverns (Series 1), 1 on map, are blocked by formation to the NE and a small hole to the west.

As the water table neared the level of the Jubilee, a gravel-clay fill started to filter into the phreatic spongework. The meandering passage (3 on map), demonstrates this stage very well. As it winds its way upwards to a height of 125 ft. above the underground river solution pockets can be seen occupied by gravel with pebbles over one inch in diameter and rock pendants (which Bretz regarded as indicative of the fill epoch), up to 1 ft. long hang from the roof and walls. Their formation is a result of the accumulation of the gravel-clay fill forcing solution upwards, the passages being completely filled with ground water during this time.

In all previously described examples of the fill stage the material carried below the water table was clay, free from gravel, but in the Jubilee Cave gravel was definitely included. The probable explan-

ation is that fast flowing vadose streams in the limestone above the Jubilee Cave were carrying great quantities of clay and gravel which were deposited on reaching the water table and slumped down shafts and inclined passages into the Jubilee Cave. Near these areas are boulders up to one foot across, but the grain size rapidly decreases away from these areas as only the smaller particles would move along the near-horizontal passages.

The two suggested sources for the clay-gravel fill are firstly the winding passage mentioned above (3 on map), which is completely blocked by coarse gravel and clay at the far end, and secondly the shaft at the Gem of Jenolan (4 on map), which apparently consists of gravel in the ceiling as well as the walls, since the few patches not completely coated with formation are of gravel composition. The gravel pebbles here, as elsewhere in the Jubilee, are similar to those to be found in the bed of McKeown's Creek which runs parallel to the limestone outcrop.

With the draining of ground water from the right hand branch by further lowering of the water table the process of gravel removal began. Scallops in two side passages: a small vadose passage 12 yards from the Gem of Jenolan (5 on map) and a small vadose passage 4 yards from the end of the winding passage mentioned above (6 on map), record current flow into the main passage system. These streams at first washed the gravel through Cook's Cavern (7) and into the Gem of the West passage (8) as indicated by vadose features in a few localities. However when they reached a level of 105 feet above the present underground river (much of the passage shown as 9 on the map has a gravel floor at this level) another route to the water table via the shaft at the Pincushion (10) was used. Although partially obscured by a subsequent rock-fall and blocked by pool crystal floor formation, unmistakable signs of vadose flow (scallops and discontinuous groovings) indicate this to have been used during the final stages of vadose stream removal of gravel (see section 1 drawn along main passage).

From the exploratory point of view a number of conclusions can be drawn. The end of the winding passage and the Gem of Jenolan shaft (3 and 5 respectively) were not cleared of clay-gravel fill because the streams responsible entered the system a short distance downstream from them, and gravel was only removed by slumping due to undermining. The clay-gravel fill probably extends for a long way beyond the present cavities, and it would be a long dig from the winding passage into other caverns and an impossible dig, owing to formations and well-cemented gravel in the roof, at the Gem of Jenolan. A possible route from the Pincushion down to the Lily of the Valley passage (11) via the vadose shaft mentioned above is completely blocked by formation which it would be pointless to destroy. It is not possible to follow the two former stream passages upstream from where they enter the system as one (5) is blocked by formation and the other (6) by a rock fall.

The history of the left-hand branch.

This is very similar to that of the other branch. The phreatic stage is reflected by the spongework nature of the passages and caverns and by the solution pockets and joint-determined cavities which completely cover the walls and ceilings. All sections received a clay-gravel fill except the Water Cavern whose clay and fine gravel deposits belong to a later series of events. The fill came down two shafts, one called the Alabaster Hall (12) and the other (13) midway between the Alabaster Hall and the Water Cavern.

When the water table sank below the Jubilee level a stream began to wash the gravel out of the system, firstly through Cook's Cavern and the Gem of the West passage as happened in the right-hand branch and subsequently down a shaft into the Water Cavern (14). Some of the sediment was washed down a shaft near the entrance of the Water Cavern, other portions were washed through the small vadose passages (15) which record flow away from the Water Cavern, while the rest was deposited on the floor of the cavern. The stream responsible entered the system via the shaft at the Alabaster Hall, which reaches a height of 180 feet above the underground river.

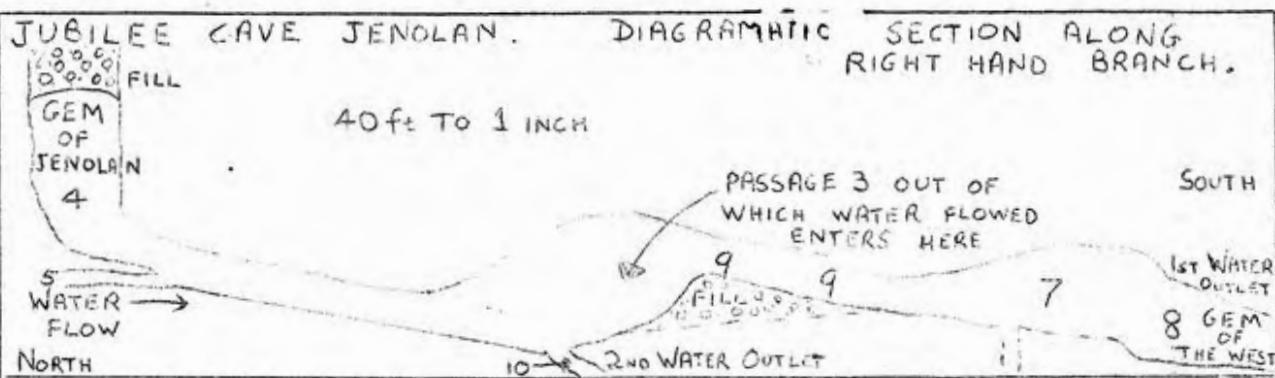
As regards further work in this branch a number of conclusions stand out clearly:

1. A scaling pole should be used at the Alabaster Hall to get into the higher level cave system from which the stream came.
2. The vadose passages (15) should be followed up. Although one is blocked by an impenetrable rock-fall the other is only partially blocked by formation and could well repay excavation.
3. The passage at the far end of the Water Cavern is phreatic and could either end or continue into further caverns.

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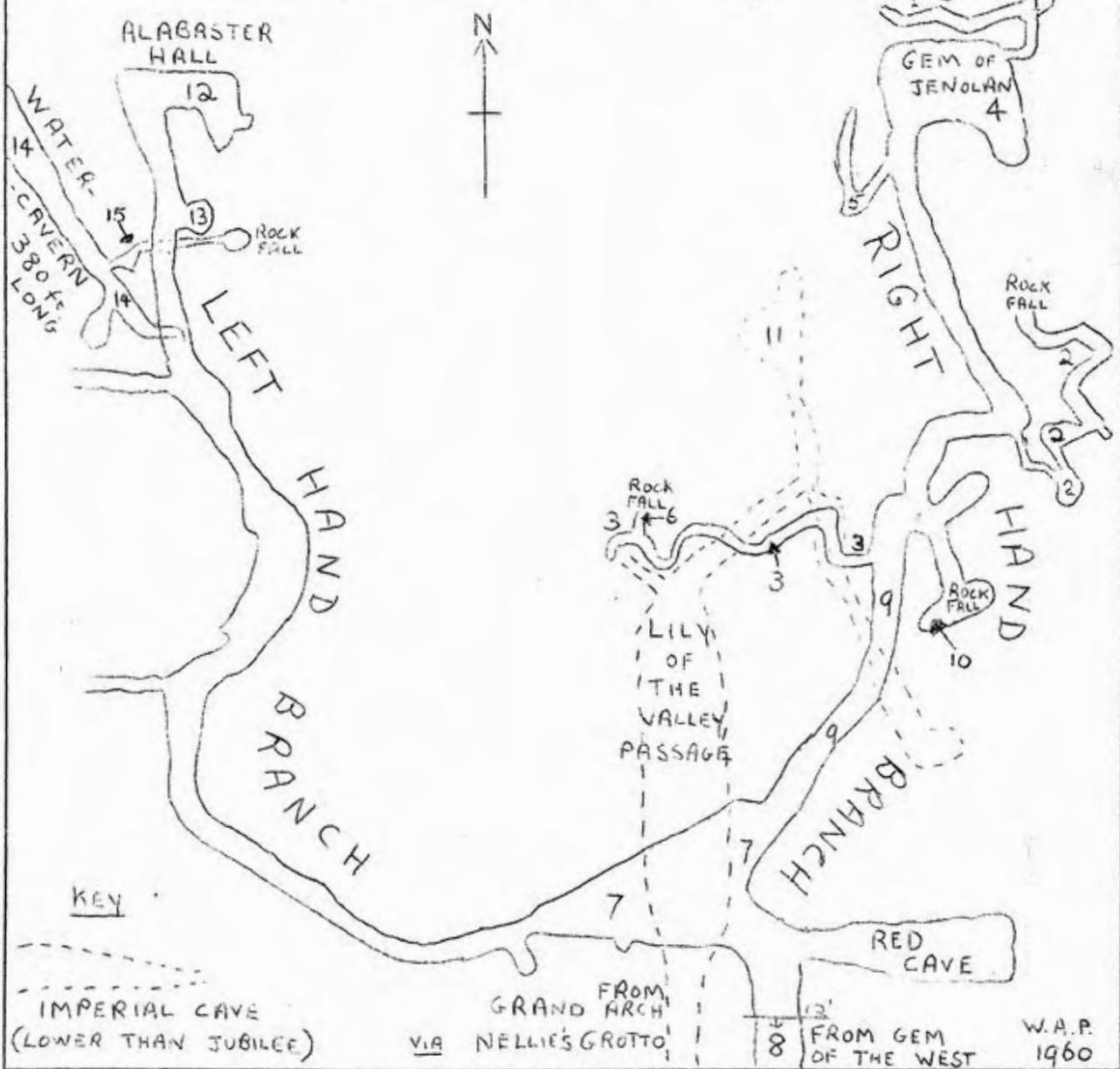
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WARREN PECK



JUBILEE CAVE JENOLAN

PLAN 40ft TO 1 INCH. GRADE V
(MINOR PASSAGES GRADE III)



THE THIRD THEORY OF CAVE FORMATION

The thin perahu slid out of the swamp and into the stream. There was no need to strain backs on the paddling now, for the current of the broad river was strong and the canoe required manoeuvring only to avoid the floating logs. Sidik knelt in the stern, I in the front. Neither of us had spoken for about half an hour, but I knew he was waiting and it was my turn. Dayaks always speak in turn.

I had merely asked him if he knew anything about the caves at Tengkiling. We had passed this place a few days before on our way downstream to Kuala Kapuas, one of the larger villages in central Borneo. There is no kampong at Tengkiling, just a cliff of limestone running for about two hundred yards along the bank, and another outcrop of stone of much shorter length a few yards out in the stream. All he had said at the time was that there were caves up there. So while we were weaving our way through the jungle swamp I asked if he knew anything about them; he had told me the story of how they had been created, and now it was my turn.

I tried to recollect the discussions I had heard on the theories of cave formation 'over there', ('over there' always being Australia) Unfortunately I had never listened very carefully and couldn't remember clearly, but these recollections, such as they were, came to constitute my story. But I knew before I began his was better than mine.

There is no kampong at Tengkiling now, but there used to be, for a long time ago there was a long-house there. A long-house is, in a sense, comparable to a block of home units, but with the households set side by side instead of on top of one another and with a common veranda, maybe a hundred yards long, instead of a lift well. Socially, I think the common veranda is a lot warmer than the lift well.

On the veranda in front of one of these households a young woman was cooking. This, emphasized **Sidik**, had been long ago. But the woman was irritated by the continual pesterings of her young son who was pilfering food from the rice pot. Irritation turned to temper as the mother suddenly jumped up to pull the boy away from the hearth, but in doing so struck him across the head with the sharp stone she had been using to crush seeds. Blood flowed; the boy fled. But he didn't run to sulk in the household of his grandmother but left the village altogether, and he didn't come back. He fled to a town on the coast where there were ships and merchants; he grew older and handsome and in time became a rich merchant himself with his own vessel plying up and down the inland streams buying jungle produce and selling it to the Moslems on the coast.

But one day, as this and probably thousands of other stories go, whilst paddling into the landing stage of one village he saw a number of women washing clothes in the river and amongst them a damsel of striking beauty. The village was called Tengkiling. He didn't depart that night, nor the next. In fact he stayed in the long-house for almost a month, and, as probably predicted by the reader, eventually married the damsel of striking beauty.

Not long after, the wife was carrying out that domestic chore of parasite hunting in the hair of the head of our hero and she saw a scar. As most wives would she asked him about it. He told her a story which he only dimly remembered, how when as a child he had stolen food, how he had been struck by his mother and how he had fled. Anxiously the woman asked further questions, and finally she stood flushed and fiery eyed staring at her husband sitting cross-legged on the floor. She said hoarsely 'saja Bunda' (I am your mother), and with those words Tengkiling and everything in it turned to stone.

It is still there today. The outcrop of rock in the stream is all that remains of the merchant's vessel. The mouths of the caves were formerly doors to households, but since they turned to stone no one has dared enter. For there are many spirits here, as many as the number of people in the long-house at the time of the catastrophe, and because no one survived to bear children to perform the ancestor rites enabling the dead to enter Paradise, they still linger to this day. Sympathetic villagers from neighbouring kampongs occasionally leave offerings nearby to console the spirits, and on these occasions our Dayak Oedipus and Jocasta have been seen to disappear into one of the caves.

There is no need for me to relate the story I told Sidik of how caves are formed 'over there'. The heroes Vadose and Phreatic aren't really very interesting, and Sidik, I am sure, thought the whole plot rather dull, and the theory of his people much better. I am not quite certain that I don't agree.

Doug Miles.

IRRESPONSIBLES MAKE CAVING HISTORY

or THE DRUM RE-EXAMINED

Tom Landecker

The second shaft of the Drum Cave at Bungonia was discovered one day in 1956 by a number of bottles idly thrown across the main shaft. With considerable skill the bottles could be made to land in water or on mud, neither of which occur at the bottom of the main shaft. Since then only chronic lethargy has prevented an attempt being made to reach the second shaft, several trips to this end getting no further than lying in the sun at the Lookdown. Rising from this lethargy in 1959, considerable mental energy was spent on devising schemes for bridging the main shaft, which is 140 feet deep, and, finally casting mechanics and caution to the winds, a climb was made around the top of the main shaft in December 1959. After climbing about 30 feet around a strongly sloping shelf over the 140 foot drop, we were confronted with an impasse in the form of a corner to be negotiated around a sheer vertical wall. Making a concession to mechanics, a steel spike was driven some inches into the rock and a ladder from here gave access to a gap over the main shaft narrow enough to chimney in. Reaching a perch over the second shaft, a ladder descent into the second shaft was made.

The second shaft, fondly named the Cesspit, is over 180 feet deep and thin vertical walls divide it into a number of vertical shafts, one of which connects with the main shaft. From the bottom daylight can be seen in the direction away from the main entrance, and there is thought to be a second entrance opposite the main one. Evidence of previous exploration of the Cesspit was found, and the second entrance may have been used.

WITH SINCERE APOLOGIES TO W.S.GILBERT

If you're anxious for to shine in a mild archaic line
 as a man of culture rare,
 You must grovel deep in grime, untold hours at a time,
 with a zeal beyond compare,
 Seeking carbon, flint and bones, or a mystic row of stones,
 of a race long dead and gone,
 But the Gurneys won't concede it as they think we should believe it
 is the work of them alone.

And every one will say,
 As we walk our dusty way,

"I wonder why they won't accept the neatest explanation-
 it's the only way the problem can be solved:
 The forebears of the Gurneys were those ancient stone-age people,
 from whom we all evolved!"

Through rough squeezes you must creep, fifteen hours without sleep,
 with a tape clutched tight in hand,
 Wade through mud that's six feet deep, clamber rock-piles loose and steep,
 with a tripod simply grand,
 Sailing swiftly over puddles drawing vaguely sap-like muddles
 with an instrument sublime-
 When you're tired of belaying then there's nothing like surveying
 just to while away the time.

And every one will say,
 As you walk your muddy way,

"Possibly he understands those hieroglyphic symbols
 which are quite obscure to me-
 Nothing ever was quite like Koonaldah's maps, nor ever more shall be!"

If you ever need to ask for navigation unsurpassed for
 finding sink-holes wide and deep,
 We confess we've found the master who could never be outclassed for
 missing huge ones at his feet.
 But we must be strictly fair-the tracks meandered everywhere
 and were impossible to trace;
 If by chance the way seemed clear we dropped right down to bottom
 gear-

to find again our starting place.

And all of us will say,
 As we go our noisome way,

"It doesn't really matter if the local yokels natter
 until their judgement day,
 Of a truck with chronic stutters and strange girls who sit in gutters
 a thousand miles away."

HELICTITES: AN EXPLANATION ON THE
CRYSTAL DISLOCATION THEORY

Tom Landecker

A number of types of calcite formation with growth form different to the normal vertical stalactite and stalagmite is grouped together under the title "mystery formation". Of these, the helictites, as their name implies (希利特), have a helical growth form, like a coil spring. This growth form is explained here in terms of the crystal dislocation theory.

Consider for simplicity a crystal with a three-dimensional, cubical crystal lattice with atoms at the corners of the cubes. (In the case of a crystalline salt such as calcium carbonate the units of which the crystal is built are ions or at least polarized atoms or atomic groups. Atom is used here in the sense of centre of force.) Deformation of a perfect lattice under load will be the sliding of one plane of atoms over another as in fig. 1a. The mechanical properties of such a crystal lattice are theoretically calculable from a knowledge of interatomic forces and force and energy field equations. Experiments, particularly with metals, show that the actual properties of crystals are different to those predicted on the basis of the perfect crystal lattice as the model. The actual strength of crystals is far below the theoretical strength of perfect crystals, suggesting that in actual crystals the lattice is not perfect. Crystal dislocation theory provides mechanisms on an atomic scale which account for experimentally observed crystal properties on a basis of imperfections in the crystal lattice.* This theory has been applied successfully to deformation and plastic deformation of metals, work hardening, etc. Examples of imperfections in a crystal lattice are vacancies (atoms actually missing from the lattice), and impurity atoms of different size to the atoms making up the lattice, both of which, by changing the force and energy fields in the region of the imperfection, cause a change of properties, usually a weakening, of the crystal. A dislocation is a distinct type of imperfection. The definition of a dislocation involves the consideration of three-dimensional configurations, not being essential for the purposes of this article, is not given here (see Ref. 1 for complete mathematical treatment). A pictorial representation of a dislocation is sufficient and is given below.

In the hypothetical case of a perfect crystal lattice deformation takes place by planes of atoms slipping over one another like cards in a pack. If however slip is not uniform over the whole atomic plane, the atomic configuration shown in figure 1b will result. (The Slip Vector shown in fig 1b is the unit vector in the direction of slip. The resulting imperfection in the lattice is a dislocation, representing the boundary within the crystal of a slipped area. The dislocation is not a vacancy, for it cannot be rem-

* Structural imperfections are to be distinguished from electronic imperfections, e.g. holes in valence shells of semi-conductors.

oved by adding an atom to the lattice. A dislocation such as that in fig.1b is called an edge dislocation, the line of the dislocation being perpendicular to the slip vector. A screw dislocation, where the dislocation line is parallel to the slip vector, is shown in fig.2. In a screw dislocation the plane of atoms is distorted into a spiral ramp. The relevance of screw dislocations to crystal growth is now considered.

Consider the mechanism of growth of a perfect cubical lattice from a (supersaturated) solution (see fig.3). The upper surface of the growing crystal contains a step and several reentrant corners or kinks. The mechanism of growth consists of the adsorption of atoms from the solution onto the growing surface where they diffuse (i.e. slide around) and may leave the surface. If the atom diffuses to a step, it has two neighbours instead of one and is held more tightly. If the atom slides into a reentrant corner it has three neighbours. If growth is to proceed the number of atoms sticking on the surface must be greater than the number diffusing off it. As growth proceeds the upper layer is completed and the step disappears. For growth to proceed further a new step must be formed by several atoms diffusing together and combining on the plane upper surface. The probability of the nucleation of such a step is clearly dependent on the supersaturation of the solution. The situation is analogous to the nucleation of water droplets in a rain cloud. It has been shown (see Ref.1) that a supersaturation of 20 to 30% is needed for growth to proceed at an appreciable rate. Experiments have shown that at supersaturations as low as 3% growth rates are appreciable, to an extent not accountable for on the growth mechanism described above. This indicates that a growth mechanism in which the steps on the surface never disappear is required to explain growth from solutions of low supersaturation, since, if the step in the surface never disappears, the nucleation of new layers is unnecessary. A surface containing a screw dislocation provides the basis for such growth since, referring to fig.2 it is clear that however many atoms are added to the surface the step never disappears.

As atoms are added to the front of the step in the dislocated surface, the step advances, rotating around the dislocation line. As the rate of growth may be assumed even along the edge, the edge twists itself into a spiral centred at the point of dislocation. Such spiral growth ramps have been seen under the electron microscope in suitably etched metal crystals and in the crystals of certain paraffins (see Refs.1&3 for photographs), evidence in support of the theory.

Clearly over very large numbers of atomic layers the addition of cubical lattice elements to the helicoid surface of the dislocation will result in a twisting of the crystal around the line of the dislocation. Calcite crystals are rhomboidal (see fig.4) and the rotation due to the helicoid surface of the dislocation is combined with the translation due to the displacement of the top of the rhomboid relative to the base to produce a helix.

Stalactites and stalagmites grow from water drops which evaporate quickly, and the crystals are small and of random orientation and are usually growing from solutions of high concentration. The growth form is thus concentrated in the region of the drops and the growth form is that determined by gravity, vertical. Helictites grow from the thin layer of solution covering other formations and occasionally the cave wall, and, on a surface covered with a solution of low supersaturation (ie below 20%) growth is possible only where a screw dislocation exists on the surface, and the growth mechanism described above will operate. Further, it is on a surface consisting of a large number of crystal faces that a dislocation is likely to exist, because of the large number of crystal boundaries. The stresses set up when two adjacent growing crystals meet tend to cause dislocations within the grain boundaries.

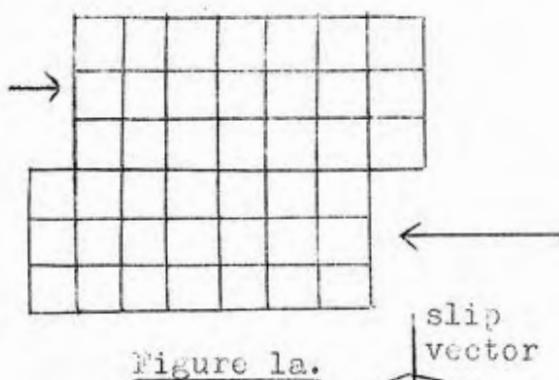


Figure 1a.

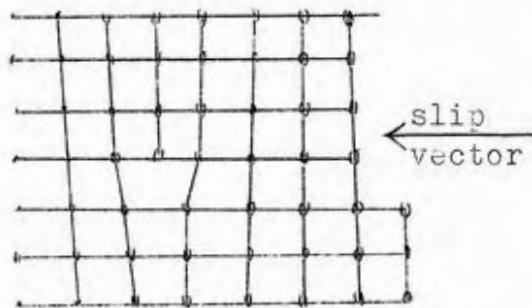


Figure 1b.

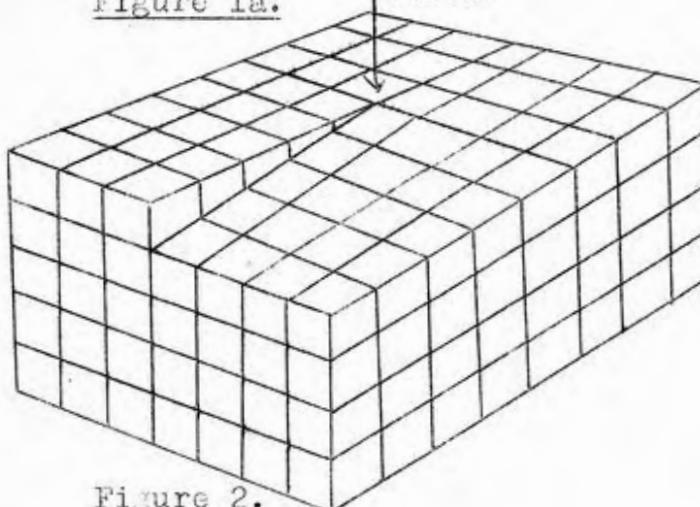


Figure 2.

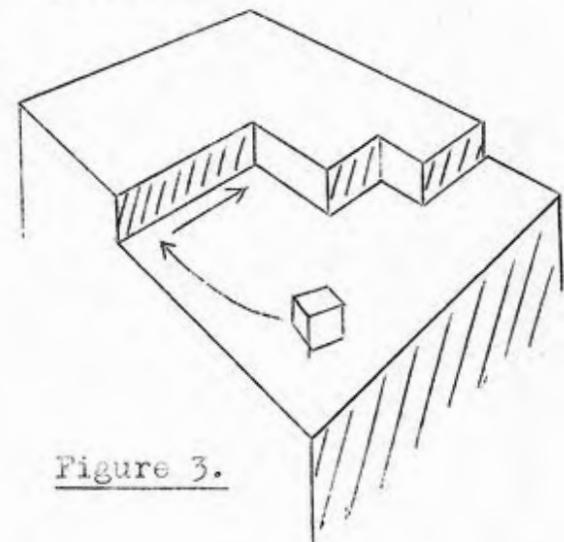


Figure 3.

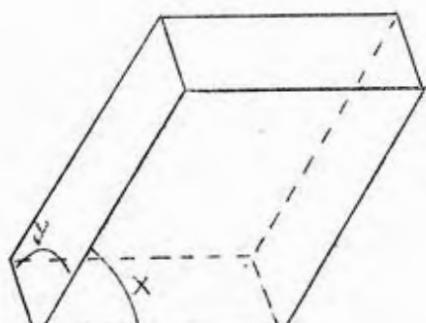


Figure 4.
Angles x and y are
not right angles.

Continued next page

The above theory is put forward, not as the explanation of helictite growth, but as a possible mechanism. Experimental investigations of helictites, beyond simple observations, have not been undertaken. It is also stressed that helictites are only a part of the group of unusual calcite formations, called "mystery formations". If other forms of calcite growth could be explained in terms of dislocations, this would be evidence in support of the dislocation theory of helictite growth. The lack of observations in this field and the general lack of classification of growth forms of cave calcite precludes this.

The effects of thermodynamic conditions on the evaporation of water in caves, and the chemical equilibrium conditions of the calcium carbonate solution may also be of considerable importance because of their effect on growth rates. Several members of the Society are at present engaged in a theoretical investigation of these problems.

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 5. Strukturen und Eigenschaften der Kristalle, von H.G.F.Winkler Julius Springer Verlag (1955).

TWO RECENT EXPLORATIONS AT JENOLAN

Henry Shannon

Exploration of the Ian Carpenter Cave

This cave was discovered by the late Ian Carpenter in 1957. The limit of the cave was then an impassable squeeze carrying a blast of air. In 1959 this was dug out, and shown to lead into the Rho Hole. A map of the cave is at the back of this journal.

"Hennings" Cave

During April 1960 a cave in the next limestone bluff upstream on McKeown's Creek from the Serpentine was entered and found to contain inscriptions "HENNINGS 1888", "LUCAS '76" and "STOP". Of the estimated 600 feet of passage most is without formation though there are quite good undamaged straws and flowstones. Most of the passages are large enough to run through. There are temporary river channels in some of the passages. Gravels in them showed no footprints but there were many tricouli marks in the mud away from the streams. A map seems needed to clarify the relationship of the cave to the cross-fault in the limestone between it and the Serpentine. This Society would appreciate information about the cave especially concerning any accepted name it may have.

The cave has at least seven separate circles of passages, starting from four separate passages near the entrance. These circles and the large passages should enable anyone who has been in the cave to recognise it.

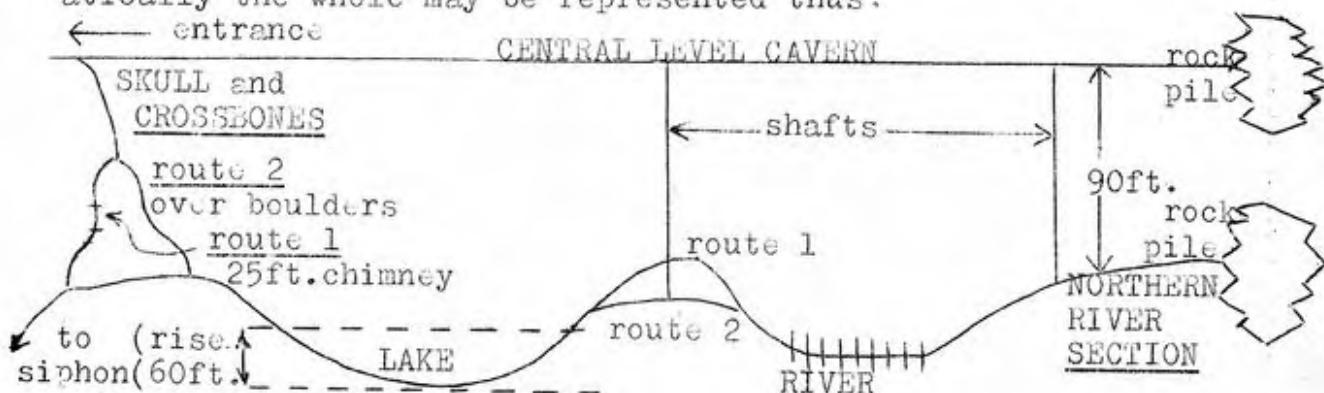
CENTRAL LEVEL AND NORTHERN RIVER SECTION
OF THE MAMMOTH CAVE JENOLAN

Ian Williams

Over the past two years a number of SUSS members has been engaged in a systematic survey of what was known generally as central level Mammoth. In this period confusions, some arising from the use of different routes to the same place, have been eliminated and several major extensions have been discovered.

The main path to central level, beginning with the Horseshoe Cavern and ending in a rock pile, a distance of 638 ft. (2), is well known. (Numbers in brackets indicate references given at the end of this article). The confusions arise beyond this point. A third of the way along Central Level Cavern the Skull and Crossbones Cavern moves off to the right. From here the Central Level "lake" is reached. There are several references to this lake in SUSS Journals, by H. Fairlie-Cunninghame (3) and by Leo Tattersal (4). The explanation of the confusion in these is as follows. From the Skull and Crossbones there are two ways to what is a large pool of water. One is down over boulders set in mud, the other, mentioned by H. Fairlie-Cunninghame, is a 25 ft. vertical chimney, and both these routes rejoin before reaching what is now called Central Level Lake. The confusion is added to by the habitual disappearance of the lake, leaving mud covered boulders and holes leading to water 20 ft. below. The difference of water levels is as much as 60 ft. and the only method of crossing the lake when full is by wading and swimming. Consequently some people have found the lake and others have seen no sign of it, although apparently using the same route.

A second source of confusion is a number of shafts, up to 90 ft. deep, descending from the Central Level Cavern. It has been found that all these holes link up with the passage leading past the Central Level Lake. Just past the lake the passage splits into two and joins again at the Underground River. This river was thought to join the Lower Level River but fluorescein tests failed to verify this theory (1). It is here suggested that the section beyond the river be known as the Northern River Section to distinguish it from the earlier known Central Level. The passage leading away from the river is also connected to Central Level Cavern by deep shafts (up to 90 ft.). This passage ends in a rock pile which appears to correspond to the rock pile at the end of Central Level Cavern. Diagrammatically the whole may be represented thus:



After the rock pile there is a long series of muddy passages, leading to the "dry" siphon (a sandy flattener which can fill with water), and the junction passage where the cave splits into a right and a left branch. The right hand passage leads after 150 ft. to the Second River Cavern, the apparent limit of the survey by Barry Mason (5). The left branch ends after 500 ft. (?) in a 30 ft. drop of which a rope descent is possible. Below the drop, down past the rock pile is a serpentinous passage, running in two directions. The right branch meets the passage leading to the drop and the left leads through an infinite squeeze (15 minutes on the stomach) to a chimney rising about 170 ft. Both branches are blind, and had been entered before except the squeeze and chimney. Numerous unexamined side passages leave much exploration to be done.

In March 1960 a previously unentered extension was found, leading off the right branch of the Northern River Section, about 30 ft. back from the river where it appears in the Second River Cavern. The entrance is at the top of a 40 deg. mud slope through a tight vertical squeeze, and considerable assistance is needed to climb it. A 12 ft. chimney and a 50 ft. mud slope lead up to a chamber)2(. Numbers refer to points on the map of the extension. This chamber contains the best formation yet found in the Northern River area, small but numerous white flowstones, straws, and stalactites. Off this chamber is a high cavern)1(with very good examples of "firtree" dog tooth spar and red flowstone walls. From cavern)2(, avoiding formations, an increasingly muddy passage leads to the 100% friction squeeze where the mud is so sticky that sliding in it is impossible. Digging out gravel past here gives tight access to chambers)3(and)4(Chamber)5(is mud, and the alternative at the branch is a triangular river passage containing formations, notably small and painful dog tooth spar

At Easter 1960 progress past the chambers)6(and)7(led to the continuation of the river passage. Considerable meandering past a number of helictites, among other formations, led to)9(, the largest cavern yet found in the extension, 50 ft. x 12 ft. x 50 ft. high. Exploration was finally stopped by formation completely blocking the river passage. Digging may enable progress to be made, and several holes in the roof of cavern)9(were noted.

References:

- (1) SUSS Journal Vol 2 No2 pages 20-21
- (2) SUSS Vol 1 No3 page 6
- (3) SUSS Vol 1 No3 page 3
- (4) SUSS Vol 2 Nol pages 18-19
- (5) Central Level map : Barry Mason

Further reference to Mammoth Cave

SUSS Vol 3 Nol page 11

REPORT ON BENDITHERAHenry Shannon

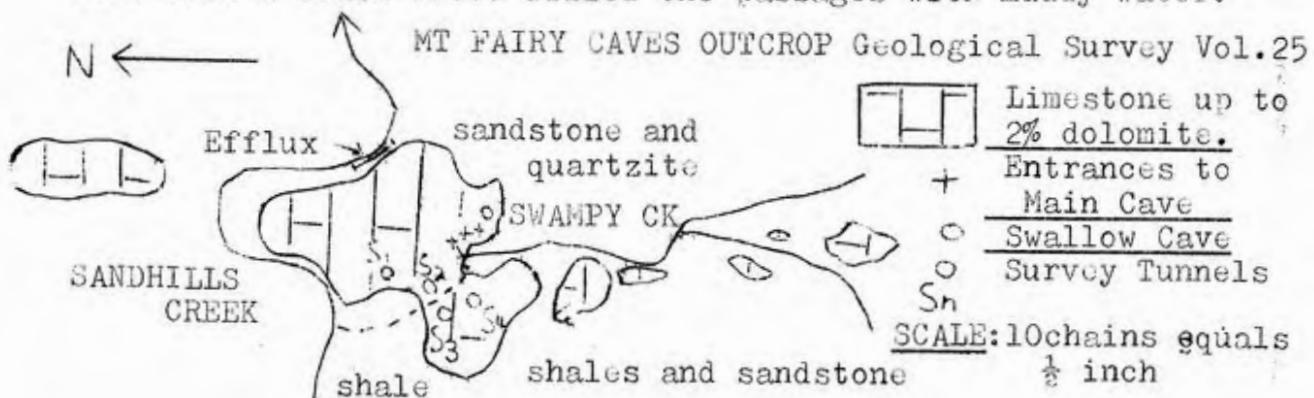
The Bendithera limestone lies in the coastal ranges 34 miles south of Braidwood (50 miles by road, mostly bad). Access is through Khan Yunis station, Krawaree. The rugged terrain, dropping more than 1000 feet from the main range to the creek valley, has patches of rain forest, complete with lawyer vine. Trickett's map shows tracks which are not visible in situ. The 2 SUSS trips there in 1959 (in May, led by Forbes Gordon; in September, led by the author) aimed to find the entrances to the caves but were hampered by lack of maps and air photos. The two trips located limestone in two places on a ridge which is probably the one the Krawarree track is supposed to be on. Shannon's trip crossed the divide about a mile north of Forbes's, and struck limestone further east on the ridge in a place which consultation of Trickett's map suggests was probably 300 yards from the Fig Tree Cave. (See map at end of this journal).

Since neither trip located the caves in the time at their disposal, it is suggested that people intending to visit the area allow three days for caving, anything less being unlikely to achieve much. It takes a whole day to get from the homestead to the caves, and vice versa.

REPORT ON THE MOUNT FAIRY CAVEHugh Minter

Mt. Fairy is near Bungendore, 27 miles from Canberra, east of Lake George. The Mt. Fairy limestone is impure and not favourable to cave formation. The caves are at the western end of a belt of limestone running south-east for four or five miles, characterised by rabbit infested outcrops and small sinkholes in valleys. As well as the Main and Swallows Caves, there are four survey tunnels in the rock several with dangerously rotten roof supports.

The Main Cave carries the water of Swampy Creek into Sandhills Creek, the efflux being a diffuse series of springs. The efflux is about 200 yards from the influx, and the natural watercourse is short circuited. Inside the cave, the passages, of estimated length 600 feet, end in rubble or in siphons. A survey tunnel provides an alternate exit from the cave, and it was found necessary to use this when a flash flood filled the passages with muddy water.



MAP OF THE BENDITHERA LIMESTONE

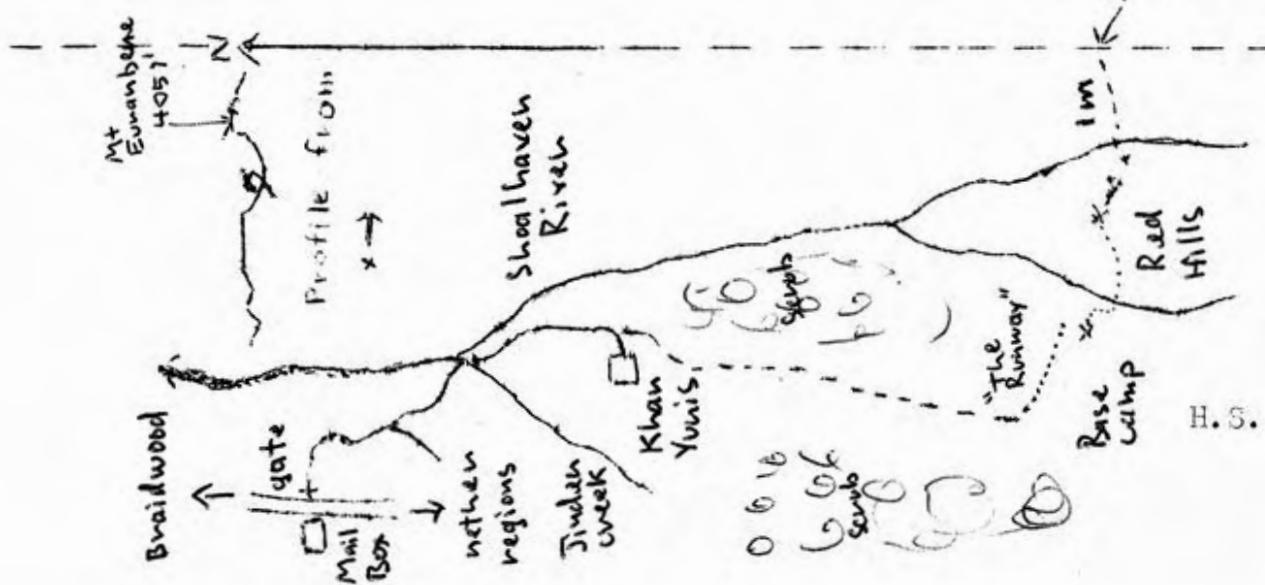
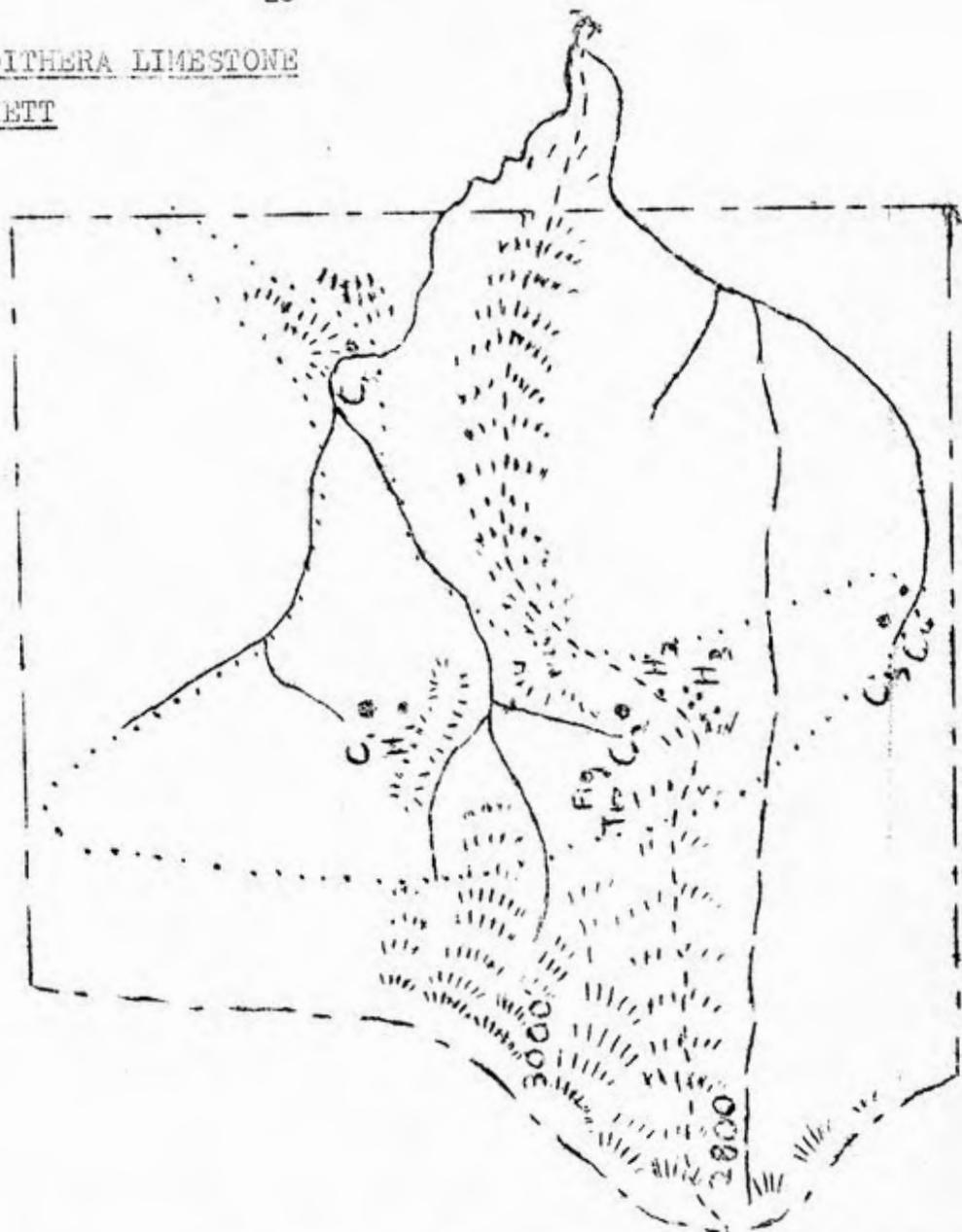
after C. TRICKETT

Key to map:

- C1 Bendithera
Cave
C2 Fig Tree
Cave
C3 Gin Cave
C4 unnamed cave
C5 unnamed cave
H1 explored 210'
H2 explored 90'
supposedly very
deep
H3 partly expl-
ored
C3 & C4 are blo-
cked by water.

SCALE

2" equals 1 mile



INDEX TO SUSS JOURNALSVOLUMES 1 TO 5

Numbers after entries refer to Volume, Number, and page number respectively. Authors of articles are entered in the index.

- ABERCROMBIE CAVES:General 2,2,6.
 AFTERGLOW IN CALCITE:3,1,18.
 ANET:Jenny 3,1,15;Ted 3,1,15.
 A.S.M.:General 3,1,14;Constitution 4,1,21;Exec.1957-58 4,1,20;
 Inaugration 4,1,3;Inter-Society
 Relations 4,1,7.
 AUSTRALIAN CAVES,Overseas Refer-
 ences to:4,1,8.
 BATS:General 1,3,15;Bungonia 2,
 2,13;Flight Navigation in 5,1,
 10;Narrangullen 1,3,5;Wombeyan
 5,2,11.
 BELL,Fred:4,2,18.
 BENDITHERA:General 1,2,5;2,2,11.
 BENSON,R.:2,2,8.
 BONWICK,John:2,1,20;2,1,35.
 BORENORE:General 1,2,7.
 BOSWORTH,Nola:5,1,10.
 BRADWELL,John:4,2,18.
 BRADSHAW,Richard:3,2,36.
 BRONZE AGE VASE,Donated to SUSS:
 Description of 5,2,9.
 BUCHAN:General 2,2,10.
 BUNGONIA:General 2,1,5;Bats at
 2,2,13;Drum Cave Survey 5,2,10;
 Fossil Cave & Hogan's Hole,link-
 ing of 3,1,17;Foul Air at 1,3,
 7;2,2,9.
 BURKE,Denis:1,3,7;1,3,17;2,1,26;
 2,2,6;2,2,19;3,1,10;5,1,20.
 BURRAN BURRAN:General 2,2,7.
 CALCITE:Afterglow 3,1,18;Hollow
 Formations 5,1,27.
 CAMOOWEAL:General 2,2,8.
 CARPENTER,Ian:4,2,3;Obituary
 4,2,31.
 CAVE AIR:Jenolan 1,2,23.
 CAVE CREEK:Fauna 5,1,11.
 CLIEFDEN:General 2,1,23;Main Ca-
 ve:Exploration 2,1,23,Map2,1,45
 CLYDE,Jeffry:1,3,15.
 COHEN,Leon:1,2,4.
 COLONG:River Cavern 4,2,18;Woof's
 Cavern,General 2,2,22, 3,1,19,
 4,2,18,Rediscovery of 3,2,19.
 COMBOYNE:General 2,1,11.
 COURT,Chris:4,1,4;4,1,15;5,1,14.
 CROOK,Alan:4,1,6.
 DEW,Barbara:2,1,26;2,2,10;4,1,9;
 4,2,29;5,2,11.
 DIGGING:In caves 5,2,3.
 DIVING:General 1,3,17.
 ETREMA GORGE:General 2,2,15.
 EUCALYPTUS OIL:in Helictites 5,
 1,24.
 FAIRLIE-CUNINGHAME,Henry:1,2,8;
 1,2,17;1,3,3;1,3,4;1,3,6;1,3,13;
 1,3,21;1,3,23;2,1,36;4,2,19.
 FAUNA:General 1,1,17;Cave Creek
 5,1,11;Timor 3,2,19;Wetas 1,3,21;
 Wombeyan 5,2,11;Wyambene 4,1,9;
 Collection of 4,2,29.
 FAUNCE,Ted:2,2,17.
 FERRIS,Ray:3,1,16.
 FIELDING,P.:1,1,4.
 FINCHS CAVES:General 2,2,7.
 FLASHPOWDER:4,2,12.
 FLUORESCIN:Quantities required
 2,2,19 (see also WATER TRACING).
 40,000 GROTTIES:4,2,14.
 FOSSILS:in S.A.3,2,11;in Casteret
 4,1,5.
 FOUL AIR:General 5,2,17;at Bungon-
 ia 1,3,7, 2,2,9;Dangers of 1,3,7;
 Effects of 1,1,11, 2,2,17;at Mol-
 ong and Wellington 5,1,3.
 FRANCE:Caves in 4,2,17;Aven Armand
 4,2,17.
 FRASER,Noel:5,1,3.
 FRIEND,Norman:1,2,3.
 GLOWWORMS:at Wheeney Creek 3,2,23.
 HALLIDAY,William:3,2,30.
 HAVENSTEIN,Doug:2,1,26.
 HELICTITES:Characteristic Features
 3,2,27;Eucalyptus Oil 5,1,24.
 HILL,A.L.:3,2,8.
 HINWOOD,Jon:3,2,7;5,2,10;5,2,14.
 HISCOX,Jennifer:2,1,23.
 HISTOPLASMOSIS:General 3,2,27.

- HOOPLR, J.H.: 2,1,33.
- HUNT, Adrian: 4,1,10; 4,1,11; 4,2,3; 5,1,2; 5,1,11; 5,1,27 5,2,2.
- HYDROGEN BALLOONS: Preparation of 4,2,19; use at Jenolan 1,3,6
- HYDROLOGY: General 1,1,4.
- HYPVENTILATION: 5,1,20.
- ISOTOPES: in water tracing 2,2,21.
- JEFFRIES, F.: 1,2,3.
- JENOLAN: General 1,3,6; Cave air at 1,2,23; Hydrogen Balloons at 1,3,6; Letters of Rachel Henning concerning 4,2,3; Report of Sub-Committee on 3,1,10; Underground River 3,2,13; Work in 1956 at 3,2,6; Aladdin Cave: General 3,1,12; Extension 3,1,17; Baal Extension: General 3,1,13; Binooma Cut 3,1,13; Casteret Cave: Discovery 3,2,6; Land snails in 4,1,5; Bottomless Pit 1,2,3; 1,2,9
- Cincair's Cave: General 3,1,10;
- Collapsing Cavern: General 3,1,10;
- Diggins: General 3,1,10; Elder Cave: General 1,2,13; False Frenchman's Cave: General 1,2,8; 3,1,11
- Foz Hole: Exploration & Map 3,2,7;
- Frenchman's Cave: General 1,2,8; 3,1,11; Glass Cave: General 3,1,12
- Discovery of extension 2,1,20;
- Map of Extension 2,1,43; Jubilee Cave: Digging in Water Cavern of 1,2,14; 3,1,12; Left Imperial Cave General 1,2,14; Lucas Cave: Moving Rock 3,1,12; Mammoth Cave: General 3,1,11; Central level 1,3,3; Flash flooding in 3,2,14; Relation to Blue Lake 1,2,9; Two lakes in 2,1,17; Water tracing in 2,2,20;
- Playing Fields Cave: General 1,2,8; 3,1,11; Nettle & Arch Cave: General 1,3,15; Rho Hole: General 3,1,12; Extension 3,1,17; Right Imperial Cave: General 1,2,14; River Cave: Exploration & maps 3,2,21;
- Serpentine Cave: General 3,1,10;
- Extensions 4,1,6; as water channel 3,2,13.
- JONES, Alex: 4,1,4; 4,1,7; 5,1,28.
- JONES CREEK: General 2,2,15.
- KANGAROO ISLAND: General 3,1,3.
- KARST TOPOGRAPHY: at Yessabah 5,1,15.
- KELLY, Jak: 1,2,5; 1,2,6; 1,2,7; 1,2,9; 1,1,7; 2,1,11.
- KIRKPATRICK, Tim: 3,1,8.
- LADDERS: Manufacture of 2,1,36.
- LIENA: 1,2,3; 1,3,23; Croesus Cave: Exploration 1,2,3; 1,2,16; 1,3,23.
- LONDON BRIDGE: General 3,1,17.
- McGREGOR, Peter: 1,2,10; 1,2,16; 1,2,23; 2,1,3; 4,2,17.
- MAPPING: 2,1,34; Accuracy in 1,3,13.
- MARSDEN, Basil: 5,2,3; 5,2,19.
- MASON, Barry: 2,1,34.
- MICHELAGO: General 3,1,16.
- MILES, Doug: 5,1,25.
- MOLONG: Foul air at 5,1,3.
- MOODIE, Peter: 1,3,11.
- MOORE CREEK: General 1,2,3.
- NARRANGULLEN: General 2,1,12; Correction to above 2,2,13.
- NATIONAL PARK: Limestone in 1,2,3.
- N.S.W. CAVES: List 2,2,13; Map 2,1,16.
- NULLARBOR: General 4,1,11.
- OKEY CREEK: General 1,1,10.
- O'BRIEN, Brian: 2,1,15; 2,1,16; 2,1,29; 2,1,30; 2,1,41; 2,2,13; 2,2,14; 3,1,4; 3,1,6; 3,1,14; 3,1,18; 3,1,20; 3,1,21; 3,2,4; 3,2,27; 3,2,28; 4,1,3; 4,1,7; 4,1,10; 4,1,13; 4,2,10; 4,2,16.
- ODE: To a helictite 3,2,36.
- ON HITCHING: 5,1,25.
- OOLITE: On first being an 3,1,21.
- PECK, Warren: 3,2,6; 3,2,13; 3,2,21; 4,1,16; 4,2,3; 4,2,12; 4,2,18; 5,1,15; 5,2,26.
- PEMBLE, Harry: 4,1,9.
- PHOTOGRAPHY: General 1,2,17; Flash Powder 4,2,12.
- PLEA FOR SINGULARITY: 4,2,16.
- RANGEFINDER: 5,2,16.
- RENWICK, Keith: 3,2,23; 4,1,5.
- ROPE: Alpine, use in caves 5,2,19.
- REVIEWS: British Caving 2,1,29; Caves of Adventure 3,1,20; Darkness Under the Earth 2,2,14; Descent of Pierre St. Martin 3,1,20; Surveying Papers 5,2,14.
- ROSEBROOK: General 3,1,16.
- ROSEDALE: Geology 1,3,5.

- SCALING POLE:2,1,35.
 S.A.CAVES:General 3,2,8;Fossils 3,2,11.
 SHAW,Trevor:4,1,8.
 SLATER,Edric:1,2,13.
 SMITH,John:1,3,5.
 SMITH,Ray:5,1,16.
 SPELEOLOGY:Abroad 3,1,22;Inter-Society relations 4,1,7;as a science 4,2,10.
 SPORES:in water tracing 4,2,26.
 STALACTITES:Haematite 3,2,23.
 STEWART,Fred:2,1,12;2,1,13;3,1,6.
 STILLMAN,Kel:4,2,14;5,1,13;5,1,24
 S.U.S.S.:Committee 1955 3,2,1; Committee 1956 3,2,3;Library 2, 1,30;Presidential message 5,1,2; Records 1957 4,1,18;State of Society 1956 3,2,4.
 SUSS DINNER:5,1,13
 SUSS PRODUCTIONS:5,2,26.
 TAPSELL,Alan:2,1,5.
 TASKER,Jim:2,1,12.
 TATTERSALL,Les:2,1,17.
 TAYLOR,David:3,2,8;3,2,11.
 TIMOR:General 3,2,15;Biology 3,2, 19;Botany 3,2,18;Geology 3,2,17.
 TRIPS:4,1,4.
 TUGLOW:General 1,2,6;Fauna 1,2,6.
 WALKIE-TALKIES:3,1,14;3,2,28.
 WALLACE,Chris:3,1,21.
 WARDROP,Ron:2,1,17;2,1,22.
 WATER TRACING:General 2,2,19;in Central Level Mammoth 2,2,20;by Isotopes 2,2,21;in Lower Level Mammoth 2,2,20;by spore drift 4, 2,26;at Yarrangobilly 3,1,6.
 WEBB,J:2,2,11.
 WEE JASPER 1958:5,1,28.
 WELLCOME TO THE CAVES OF ARTA: 2,2,16.
 WELLINGTON:General 2,1,26;2,2,7; Biology 2,1,28;Bone Cave:General 2,1,27;Gaden Cave:General 2,1,27
 Foul air in 2,1,28;5,1,7;Gaspipe Cave:General 2,1,27;Foul air in 5,1,6;Mitchell Cave:General 2,1, 27;Phosphate Mine:General 2,1,27.
 WESTERN U.S.CAVES:General 3,2,31.
 WETAS: see FAUNA.
 WHEENEY CREEK:Glowworms & Haemタイト stalactites at 3,2,23.
 WOMBEYAN:General 2,1,28;2,1,22; 4,2,3;Map 4,2,4;Basin Cave:General 4,2,7;Map 4,2,6;Bullio Cave: General 4,2,5;Exploration 2,1,22; Map 4,2,6;Bouverie Cave:General 4,2,10;Cave Fauna 5,2,11;Fig Tree Cave:General 2,1,9;4,2,9;Map 4,2, 8;Forest Creek Cave:General 4,2,5;Guineacor Cave:General 4,2,10;Junction Cave:General 4,2,9;Exploration 2,1,8;Kooringa Cave:General 4,2,10;Palace Cave:General 4, 2,10;Wollondilly Cave:General 4, 2,10;Exploration 2,1,9.
 WYAMBENE:General 4,1,9;Fauna 4,1, 9;Fossils 4,1,9;Wyambene Cave: General 4,1,9.
 YARRANGOBILLY:General 1,2,10;2,1, 13;'the Incident'2,1,15;Underground River at 1,2,10;Sinks 1,2, 12;1,3,4;Fauna 1,2,12;Tombstones 1,2,12;Coppermine Caves:1,2,11; 5,1,18;North Deep Creek Cave:General 5,1,18;Discovery of 3,1,15; East Deep Creek Cave:General 5,1, 17;West Deep Creek Cave:General 5,1,17;Deep Creek System:General 1,2,12;Eagle's Nest System:General 1,2,10;Eastern Eagle's Nest:General 1,2,12;5,1,16;Linkage with Western Eagle's Nest 4,1,10;Rock Fall in 3,1,13;Map 2,1,44;Western Eagle's Nest:General 1,2,11; 5,1,16;Extension 2,2,15.
 YESSABA:General 4,1,15;Geology 5,1,15.

Archäologische Beobachtungen über die Koonalda Höhle, Nullarbor Ebene, Süd Australien

Im Innern der Höhle hat Kieselgraben die Wände pockennarbig gelassen. Rinnen an den Wänden zeigen dass Knochenspitzen geschärft worden waren. (Solche Spitzen wurden am Boden gefunden.)

Eine Ausgrabung im Boden jenseits der Tageslichtgrenze zeigte drei Kulturschichten: A, Mikrolithische Kieselstücke; B, Kiesel-spitz-hammer und -Kratzer; C, grosse Handäxte. Ein steinerner Arbeitstisch wurde auch ausgegraben. Eine zweite Ausgrabung in der Tageslicht-zone, auch im Innern der Höhle, zeigte keinen Lagerplatz, obgleich man es erwartet hatte. Weitere Funde waren ein zum Teil versteinertes Skelett (später als dasjenige einer 27 Jährigen Ureinwohnerin identifiziert), welches in einer anderen Höhle zusammen mit Kiesel der Schicht A gefunden wurde, und mikrolithische Kieselab-lagerungen auf der Ebene um den Höhleneingang herum.

Es scheint dass, während der ersten zwei Kulturphasen (Schichten C, B) die wir erkennen können, die Höhle eine Kieselgrube und Werkzeugsfabrik gewesen ist, und dass während der dritten Phase (schicht A) die Ebene um die Senkgrube herum angesiedelt worden ist. Das Skelett beweist dass zu dieser Zeit die Bevölkerung aus Ureinwohner bestanden hat.

Die Entwicklung der Jubilee-Höhle, Jenolan, Neusüdwales

Bei einer Untersuchung der Jubilee-Höhle verwendet der Verfasser die Kriteria des H. Bretzs welche entscheiden ob Höhlen über (Vadöse) oder unter (Phreatisch) dem Wasserschlag ihren Ursprung haben.

Zusammenfassung: Der Ursprung der Höhle ist phreatisch. Nachdem der Wasserschlag unter die Ebene der Höhle gefallen war hat vadöses Wasser die Höhle geändert. Das vadöses Wasser hat, aus einer unbekannten Quelle, groben Sand und Lehm in die Jubilee-Höhle getragen und davon wurde etwas unter die Jubilee-Höhle in die Imperial-Höhle weitergetragen.

Schraubenförmige Kalzitformationen: Eine Theorie.

Der Verfasser postuliert einen Mechanismus der schraubenförmigen Kalzitformationen (Heliktiten) auf der Grundlage der Kristallversetzungstheorie.

Es ist bewiesen dass das Kristallgewächs aus einer Auflösung niedriger Übersättigung möglich ist, wenn die wachsende Fläche eine Schraubenversetzung enthält, da Kernformation neuer Schichten auf der Fläche unnötig ist. Über eine grosse Anzahl von Atomschichten gibt die Schraubenversetzung dem Kristall eine Achsendrehung um die Versetzungslinie herum, und die rhomboidische Kalzitkristall-form gibt eine fortschreitende Bewegung. Zusammen addiert geben sie ein Schraubenförmiges Gewächs.

Die Gründe der Wirkung dieses Wuchsmechanismus anstatt des gewöhnlichen Mechanismus sind postuliert.

L'ÉVOLUTION DE LA JUBILEE CAVE.

La grotte «Jubilee Cave» fait partie du système de cavernes qui se trouve du côté nord du «Grand Arch» (grand arc) à Jenolan Caves, N.S.W. (100 km. à l'ouest de Sydney).

Dans une étude faite sur cette grotte l'auteur applique les critères proposés par H.Bretz pour constater si une caverne calcaire donnée est vadeux ou phréatique, c'est à dire, si elle a eu son origine par-dessus ou par-dessous du niveau piezométrique.

Conclusion: la grotte donnée est d'origine phréatique bien que modifiée par des eaux vadeuses. Du gravier et de l'argile y ont été transportés d'une provenance inconnue et quelque quantité de ces matériaux a traversé la Jubilee Cave et est pénétrée dans la grotte «Imperial Cave» au-dessous.

Sur cette base on discute des voies de nouvelles explorations.

UNE AUTRE THÉORIE SUR LA GENÈSE DES HÉLICITES.

L'auteur propose un processus pour expliquer la croissance en forme de vis de la calcite de cavernes sur la base de la théorie de la dislocation cristalline.

On démontre la possibilité de la croissance des cristaux dans une solution de faible sursaturation si la surface croissante contient une dislocation en hélice, parce que la nucléation des couches atomiques de la surface n'est pas nécessaire. Quand elle porte sur un grand nombre de couches atomiques la dislocation en hélice imprime au cristal donné un mouvement de rotation autour de la ligne de dislocation et la forme rhomboïde du cristal de calcite surimpose sur ce mouvement un composant de translation, produisant ainsi une forme de croissance hélicoïde.

L'auteur propose des raisons de l'opération de ce processus de croissance au lieu de celle de la stalactite normale.

NOTES ARCHÉOLOGIQUES CONCERNANT LA GROTTE KOONALDA CAVE.

La Koonalda Cave se trouve dans la Nullarbor Plain à 110 km. environ de Eucla, la ville la plus proche. Les recherches archéologiques ici rapportées furent faites dans le cours d'une expédition qui eut lieu au mois de janvier 1960.

Du caillou avait été miné aux murs de la grotte et des pointes d'os y avaient été aiguisees, y laissant des sillons. Une excavation faite dans la terre au-delà de la limite du soleil révéla trois phases culturelles: A, des objets de caillou microlithiques; B, des pioches et des raclettes en caillou; C, une grande hache manuelle. On déterra aussi un établissement en pierre. Une seconde excavation pratiquée dans la zone de soleil ne réussit pas, comme on l'avait espéré, à révéler un lieu de campement.

D'autres trouvailles furent une squelette en partie fossilisée, identifiée comme celle d'une femme aborigène, trouvée dans une autre grotte ainsi que des cailloux de la phase A, et des dépôts de cailloux microlithiques dans la plaine en dehors de la grotte,

apportés à la phase A.

Il semble que pendant les deux premières périodes que nous pouvons distinguer la grotte était une mine de cailloux et une fabrique d'outils et que pendant la troisième période un établissement s'effectua autour de la doline.

DE JUBILE SPECUS ORIGIN.

Cavernarum est specus Jubilee catenae quae se in partem septentrionalem Jenolan Caves ab arcu superbo tendunt semotarum ad occidentem passum milibus sexaginta ab Sydney in NSW sitarum.

Quo de specu ex eis rebus ratiocinatus est scriptor quas proposuit H. Bretz ut decerneretur spelunca quae in calce constat utrum vadosa an phreatica sit: utrum, ut aliis verbis diceretur, flumine vivo an sub locis madidis telluris excavata esset.

Ita decretum est specum phreaticum origine esse quamquam satis aquis vadosis mutatus esset; calculos argillamque in eum ex partibus ignotis latos esse quorum per Jubilee specum perlatum esset aliquot in specum Imperial qui situs est infra ingressum.

ЭВОЛЮЦИЯ ПЕЩЕРЫ "ДЖЮБИЛИ"

В своём исследовании пещеры "Джюбили" /в пещерах "Дженолан", Новый Южный Уэльс/ автор применяет критерии Г.Бреца, чтобы определить произошли ли пещеры сверху /валоные/ или из-под /фреатические/ водоносного пласта.

Выводы: пещера является по происхождению фреатическое, хотя валоные воды не изменили. Гравий и глина были внесены в пещеру "Джюбили" с неизвестного источника, находящегося над пещерой, и известное количество из них были дальше внесены под пещеру "Джюбили" в пещеру "Империал". На основе этих выводов обсуждаются возможности дальнейших исследований.

АРХЕОЛОГИЧЕСКИЕ ЗАМЕТКИ О ПЕЩЕРЕ "КУНАЛДА" В РАВНИНЕ "НУЛЛАРВОР"

ЮЖНАЯ АВСТРАЛИЯ

Стены пещеры были как бы рябые, из-за ручной выемки кремешков, и течение остроконечных костей тоже оставило углубления на стенах /нашли на полу такие острые концы костей/. Экспедиционные работы на почве пещеры за пределами дневного света обнаружили три культурных фазы:- А, микролитические кремешки, Б, кремневые кирки и скреперы, В, большие ручные топоры. Выкопали тоже каменный стол. Вторая экспедиция в зоне дневного света не обнаружила место лагеря, вопреки нашим надеждам. Среди других открытий был скелет, частью окаменелый. Нашли его в другой пещере, вместе с кремешками фазы А. и после установили что это скелет двадцатисемилетней аборигенской женщины. На равнине вне пещеры нашли отложения микролитических кремешков.

Кажется, что в течение двух культурных эпох Б и В, которые мы можем различать, пещера была источником кремешков, и фабрикой орудий, и что во время третьей эпохи развелось поселение на равнине возле впадины. Скелет доказал, что население в то время былоaborigenское.

ГЕЛИКТИТИ: ОБЪЯСНЕНИЕ, ОСНОВАННОЕ НА ТЕОРИИ ДИСЛОКАЦИИ КРИСТАЛЛОВ.

Предполагается механизм в виде обяснения развития кальцита в пещерах, в геликоидальной форме /геликтити/, на основе теории дислокации кристаллов.

Находят, что развитие кристаллов возможно от растворов низкого сверхнасыщения, если развивающаяся поверхность содержит винтообразную дислокацию, потому что образование центров кристаллизации поверхности не нужно.

Винтообразная дислокация передает кристаллу вращение около самим кристаллом по большому количеству стоящих слоев и ромбической ячейки. Исталическая форма кальцита прибавляет поступательный компонент, создавая геликоидальную форму развития.

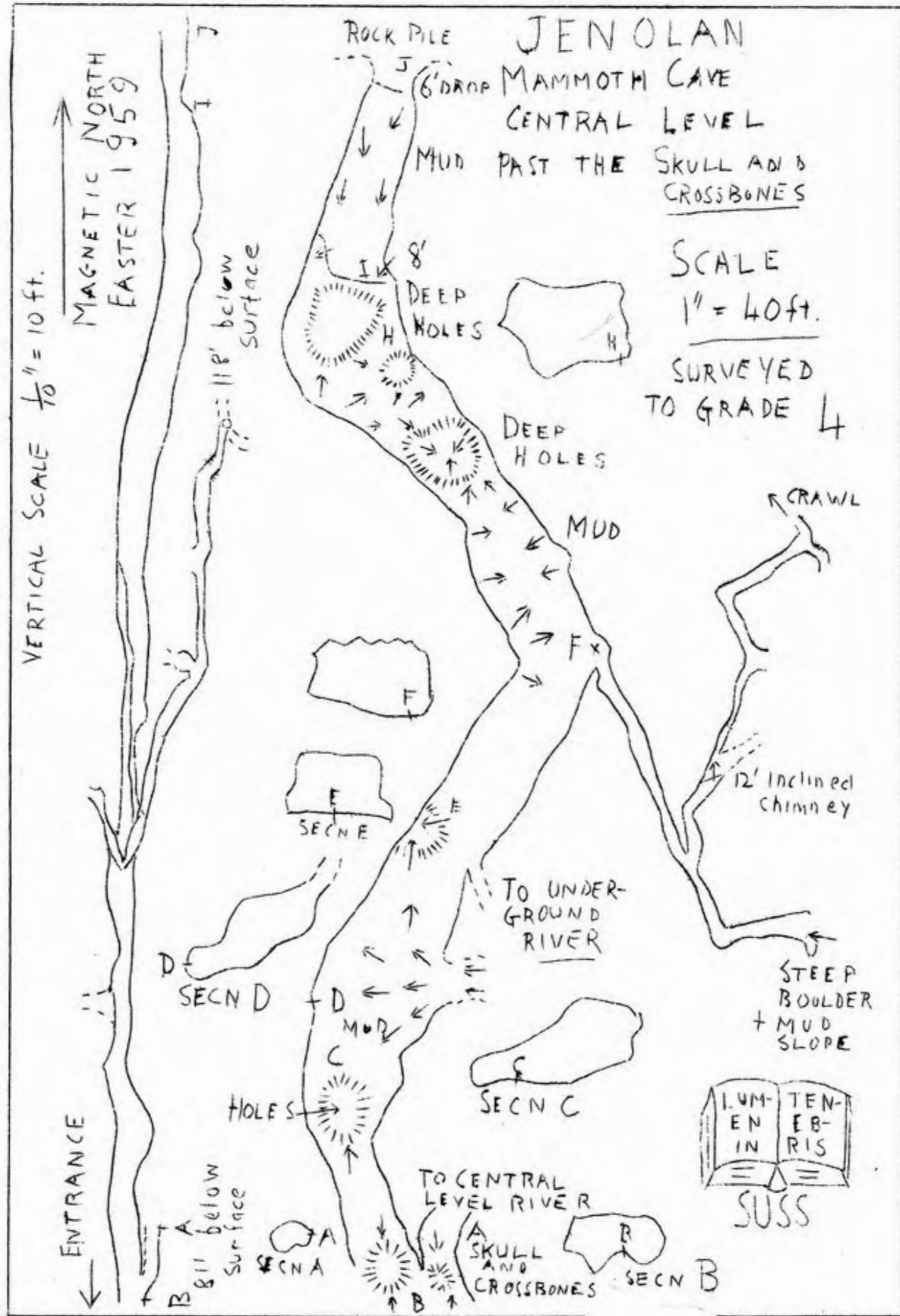
Преполагаются поводы к действию этого механизма развития, предположительно перед нормальным механизмом.

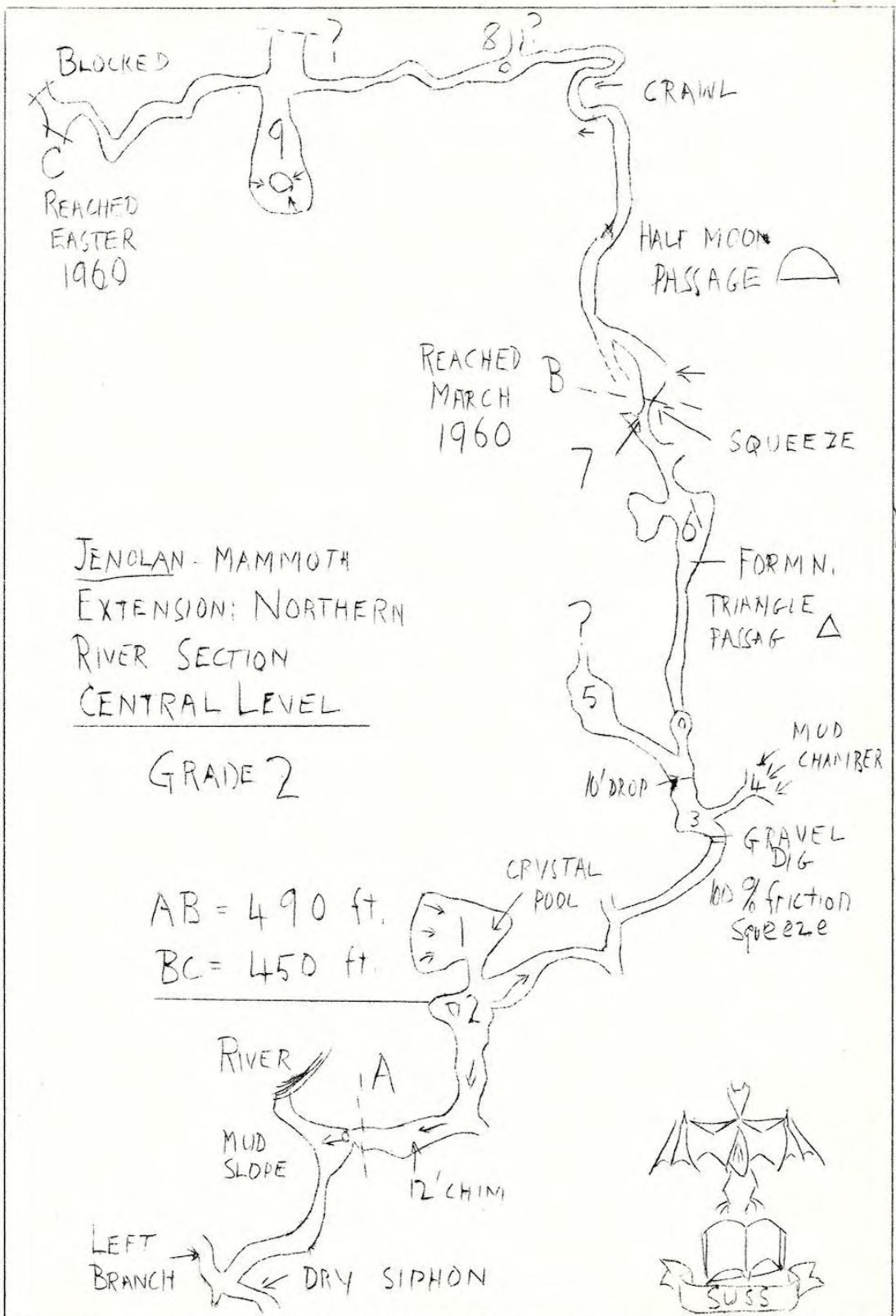
EVOLUSI GUA JUBILEE-GUA2 JENOLAN N.S.W.

Didalam karangan ini, pengarang memakai ukuran2 Tuan H.Bretz untuk menuntukan apakah asal gua2 itu dictas (vadose) atau dibawah (phreatic) perusakan air.

Kesimpulan: Gua tersebut berasal phreatic walaupun sudah terubah oleh air vadose. Krikil2 dan tanah2 liat telah terbawa kedalam Gua Jubilee dari suatu tempat yang tidak diketahui, diatas gua tersebut dan beberapa sudut dibawa lebih jauh kebawa Gua Jubilee dan masuk Gua Imperial.

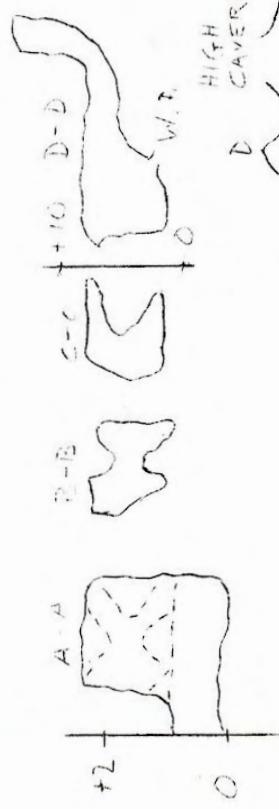
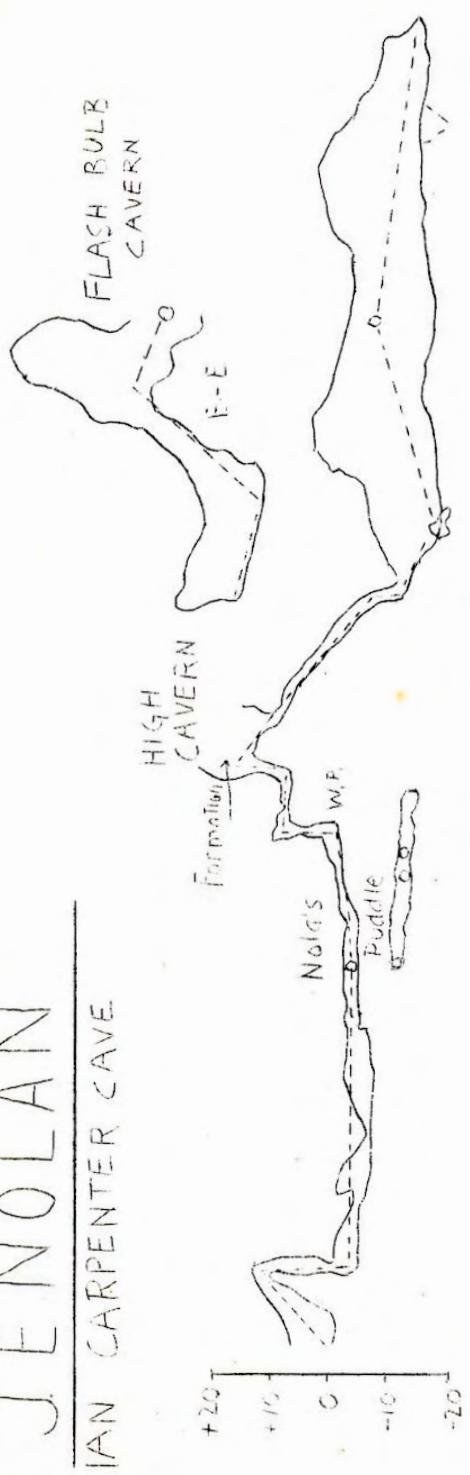
Dengan dasar dari pendapat tersebut diatas tjarat untuk mendjalankan penjelidikan lebih lanjut telah diperbindjangkan.





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