

November 1976

## Niugini Caver, Volume 4, No. 3, November 1976

R. Michael Bourke

Follow this and additional works at: [https://digitalcommons.usf.edu/kip\\_articles](https://digitalcommons.usf.edu/kip_articles)

---

### Recommended Citation

Bourke, R. Michael, "Niugini Caver, Volume 4, No. 3, November 1976" (1976). *KIP Articles*. 3717.  
[https://digitalcommons.usf.edu/kip\\_articles/3717](https://digitalcommons.usf.edu/kip_articles/3717)

This Article is brought to you for free and open access by the KIP Research Publications at Digital Commons @ University of South Florida. It has been accepted for inclusion in KIP Articles by an authorized administrator of Digital Commons @ University of South Florida. For more information, please contact [digitalcommons@usf.edu](mailto:digitalcommons@usf.edu).



NEWSLETTER OF THE PAPUA NEW GUINEA CAVE EXPLORATION GROUP

Volume 4 Number 3

November, 1976

## LELET

report of the  
1975 NEW IRELAND  
SPELEOLOGICAL  
EXPEDITION



Niugini Caver is the newsletter of the Papua New Guinea Cave Exploration Group, an informal association of persons engaged in speleology in P.N.G.

Volume 4 Number 3 November, 1976. Quarterly

Price This issue K3.00 or \$A3.00

Editor R. Michael Bourke, D.P.I., Keravat,  
East New Britain, Papua New Guinea.

Typist Jean Bourke

Map drafting John Webb and Lex Brown

Photographs Lex Brown, Michael Bourke and Paul Wilson

Production of last number Michael and Jean Bourke, Jim Farnworth, Hal Gallasch,  
Randell Champion, Anna Majdanska, Alan Olden and Tim Sprod

# CONTENTS

## Page

The Story of Sisida and Tengtengbo. L. Ismel ..... 86

Lelet: Report of the 1975 New Ireland Speleological Expedition.

A. L. Brown, R. M. Bourke and C.H.C. Shannon ..... 87

Overview of the expedition ..... 87

Sotpela toktok ..... 87

Introduction ..... 89

Diary ..... 94

Physiography ..... 102

Cave descriptions ..... 107

Logistics ..... 129

Conclusions ..... 133

Acknowledgements ..... 134

Appendix 1 ..... 135

Appendix 2 ..... 136

References ..... 136

The New Contributors ..... 136

\* \* \*

Editorial note. This special edition of Niugini Caver is devoted to last year's Lelet expedition. It is funded in part by a K200 donation from the members of the expedition.

\* \* \*

Cover photograph. John Webb and Lex Brown tandem prussiking the entrance pitch of Lowatkuameri Lemet Silot, the deepest cave explored by the 1975 NISE (102 m). Lex is travelling incognito behind John's glove.

\* \* \*

"... to stand on 1200 m of limestone and listen to the surf ..."

THE STORY OF SISIDA AND TENGTENGBO

Lakuna Ismel \*

The following legend illustrates the Lelet villagers' belief that it is possible to travel the 1000 m or so vertical distance from the plateau to the New Ireland coast underground.

.....

Up on the Lelet Plateau, there were once two men who were hunting companions; their names were Sisida and Tengtengbo. Sisida was married but Tengtengbo was not and rather fancied Sisida's wife. Tengtengbo decided to murder Sisida, and devised a trap by covering a cave mouth with leaves. The cave is at Lamlad which is near Lenkamin village. When he and Sisida were returning from the hunt, Tengtengbo invited Sisida to sit on the trap. Sisida fell in, and Tengtengbo left him there and went off to the wife and told her how Sisida had met with an unfortunate accident. Tengtengbo promptly married her.

Sisida however survived the fall and followed the water in the cave right through to the coast. In places the cave was too tight but Sisida waited till his skin had shrunk and could fit through. He came up in a cave in the cove at Lemeris where the local people get their water. This place has a single big stone in it like a table. Sisida was seen in the water by the local children who told their parents of the strange sight on the table rock in the water. The men of the village came and pulled Sisida out. He was weak from being in the water so long. He stayed with them for a few days till his strength returned. The people smoked him over a fire to dry him out. Then he went up the plateau playing on a bamboo instrument in his usual manner.

His wife heard him coming and warned Tengtengbo to hide in one of the piles of rubbish in the garden he had been clearing. Sisida asked the wife who had been doing all the man's work in the garden. She said it was everybody, but Sisida wasn't convinced. He ordered her to light the rubbish piles. Since she left the one Tengtengbo was hidden in till last, Sisida went up to that pile with a stone axe, found Tengtengbo and killed him. In this way he got his wife back.



Figure 1. "... emi go igo igo i kamap long wampela hol long Lemeris ..."  
Lakuna (centre) relates the legend.

\* Lenkamin village, Lelet Plateau, c/- United Church, Kimidan, P.O. Kavieng, P.N.G.

LELET: REPORT OF THE 1975 NEW IRELAND SPELEOLOGICAL EXPEDITION

A. L. Brown\*, R. M. Bourke\*\* and C.H.C. Shannon\*\*\*

OVERVIEW OF THE EXPEDITION

An eight man party spent a month exploring caves on the Lelet Plateau of New Ireland in July-August, 1975. Although the aim of exploring very deep caves was not achieved, the party regarded the expedition as successful. Exploration was in three areas: the Lenkamin-Liit-Limbin region of the village area of the plateau, the N.W. corner of the high plateau and briefly on the northeast coast of New Ireland.

Some 92 caves and shafts were explored, 20 in the village area, 70 on the high plateau and 2 on the coast. The four deepest caves descended were 102 m, 81 m, 66 m, and 60 m deep respectively. Thirteen caves over 25 m deep were explored, seven in the village area and six on the high plateau. The longest pitch descended was 81 m. The two longest caves, both river caves in the village area, were 500 m and 330 m long respectively. Tags were affixed to 46 caves. All except two of the incompletely explored caves from the two reconnaissance trips were bottomed. All caves explored on the plateau were pushed to the limit. Some legends, human bones and cave art were recorded.

The Lelet has now been established as a worthwhile vertical caving area. The trip was remarkably problem free with virtually no transportation, carrier or medical problems. Above all it was most enjoyable.

SOTPELA TOKTOK

Insait long dispela buk mipela givim tok save long wampela wok mipela i bin mekim long Lelet long Niu Ailan long yia 1975. Mipela eitpela ibin stap wan mun long Lelet long lukluk long ol draipela hol long graun. Na nau mipela toktok long ol hol na samting bilong dispela wok na raitim sampela piksa long sampela hol wantaem. Mipela i bin trai long painim sampela draipela draipela hol i winim ol arapela hol long Papua Niugini. Mipela ino inap painim ol long dispela taem, tasol mipela ibin bihainim sampela hol i go daun long graun long wei liklik. Aitink i gat planti hol tru long Lelet na sampela i mas winim ol arapela hol. Bihain sampela arapela lain i mas kam bek gen long painim ol hol ia.

Mipela i amamas tru long sindaun bilong mipela long dispela taem na ol bikpela helavim ol manmeri bilong Lelet i bin givim mipela olsem soim mipela ol hol, karim kago na givim nating kaikai long mipela. Mipela i laik tok tenkyu tru long Lakuna Ismel long ol bikpela helavim i bin givim mipela. Na tenkyu tru ol man i bin bringim mipela long ol hol olsem Thomas Palait, Lentuan Mesulam, Noah Kiptabu na Manase Manangong na ol arapela man i bin wok wantaem mipela olsem Stephen Gamu, Lilikas Paulo na Ezekiel. Em tasol.

\* 139 Victoria Avenue, Chelmer, Queensland 4068, Australia.

\*\* D.P.I., Keravat, E.N.B., P.N.G.

\*\*\* 44 McCaul Street, Taringa, Queensland 4068, Australia.



Michael Bourke (Leader)  
Agronomist  
PNGCEG/UQSS



Paul Wilson  
Electronics Engin.  
CCC/HEG



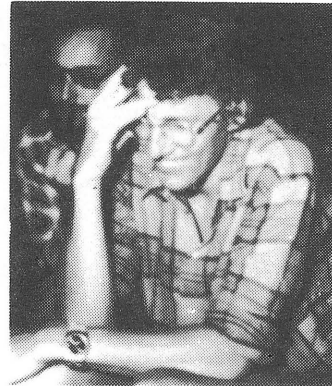
Leigh Gleeson  
Geomorphology student  
SCS



Jim Farnworth  
Fitter & Turner  
PNGCEG/HWCPC



John Webb  
Geologist  
UQSS



Malcolm Pound  
Civil Engineer  
PNGCEG/UQSS



Henry Shannon  
Geologist  
UQSS/SUSS

Lex Brown (Co-leader)  
Civil Engineer  
UQSS/PNGCEG

- CCC.....Chillagoe Caving Club  
(Queensland)
- HEG.....Harwell Exploration  
Group (England)
- HWCPC....Happy Wanderers Cave and  
Pothole Club (England)
- PNGCEG...Papua New Guinea Cave  
Exploration Group
- SCS.....Southern Caving Society  
(Tasmania)
- SUSS.....Sydney University  
Speleological Society
- UQSS....University of Queensland  
Speleological Society

## INTRODUCTION

Part of the Lelet Plateau of New Ireland is an area of some 400 km<sup>2</sup> of tertiary limestone at an altitude of 800 m to 1400 m a.s.l. The drainage of the area is underground and the water resurges in or near the sea on the northeast coast a few kilometres away. The depth potential for caves on the plateau is as high as 1400 m and is over 1200 m for much of the plateau (see Figure 2). It was the combination of depth potential and relatively easy access that attracted our attention to the plateau. In April 1974 Michael Bourke and Alan Keller did a 10 day trip to the plateau to investigate the caving potential. They operated in the vicinity of Lowatkana and Lenkamin villages. In 5 caving days they visited 30 caves, 5 of which were over 30 m deep and 4 of which they were unable to bottom because of lack of gear (Bourke, 1974).

Following this the expedition was conceived. A series of meetings to organize it were held in Brisbane and Chillagoe (North Queensland) in May and December, 1974 and January, 1975. It was resolved that Michael Bourke would lead the expedition and would be responsible for food and getting the party and equipment from Rabaul to the plateau. Lex Brown was to be the co-leader and was responsible for equipment and transportation to Rabaul. John Webb was to handle the medical aspects. The other members were to assist preparations in various ways. The aim was to explore and document deep cave systems.

In January 1975, Jim Farnworth and Kevan Wilde did a second reconnaissance trip to the plateau to obtain more information on access, transportation and caves. They managed to explore another 15 caves, but were seriously hampered by very wet conditions. They spent a few days on the high plateau and gained a lot of useful information for the main trip (Wilde, 1975). A flight over the plateau was made in April which yielded further information, although it ended in an unconventional manner when the plane crash landed in the sea after engine failure. The pilot and Mike in the front seats had some trouble getting out from the cabin underwater, but there were no injuries (Bourke, 1975). During 1975, expedition preparations proceeded jointly at Keravat (New Britain) and Brisbane, Australia. Members paid attention to fitness and practice with single rope caving techniques. Each member deposited K200 in a bank account and signed a legal agreement whereby the cost of an emergency evacuation could be met from this fund if necessary. The money was refunded after the expedition.



Figure 2. The dramatic drop off from the edge of the plateau to the northeast coast



The members were Michael Bourke (Keravat), Lex Brown (Brisbane), Jim Farnworth (Rabaul), Leigh Gleeson (Townsville), Malcolm Pound (Port Moresby), Henry Shannon (Brisbane), John Webb (Brisbane), and Paul Wilson (Chillagoe) (see page 88).

Most of the equipment and the donated food was shipped from Brisbane to Rabaul in July. The Australian and Port Moresby contingent flew to Rabaul on 23rd to 25th July. Our first base was at the Bourke residence at Keravat. Here food and equipment were packed for the air drop. However unusually windy conditions were to prevent the planned airdrop and gear was eventually carried in by plantation labour and the Lelet village people. Half of the party flew from Rabaul to Kamiriba at the base of the plateau on the New Ireland coast on 25th July. The remainder travelled with the gear by truck to Vunapope on New Britain, by work boat to Labur Bay on the west coast of New Ireland and thence by truck to Lamerika Plantation. Lamerika served as our base on the New Ireland coast. By bulldozer and trailer we were transported part of the way up to the plateau on a newly constructed road (see Figure 4). From the end of the road, all gear was carried to our camps (see Figure 5).

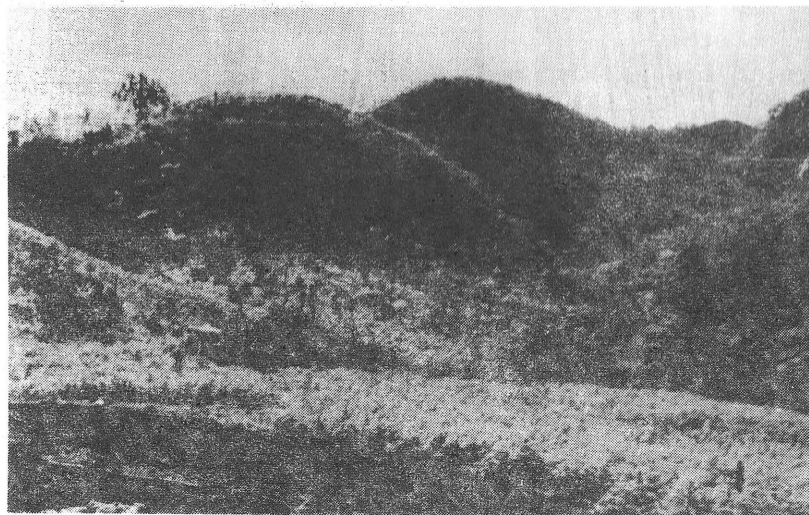
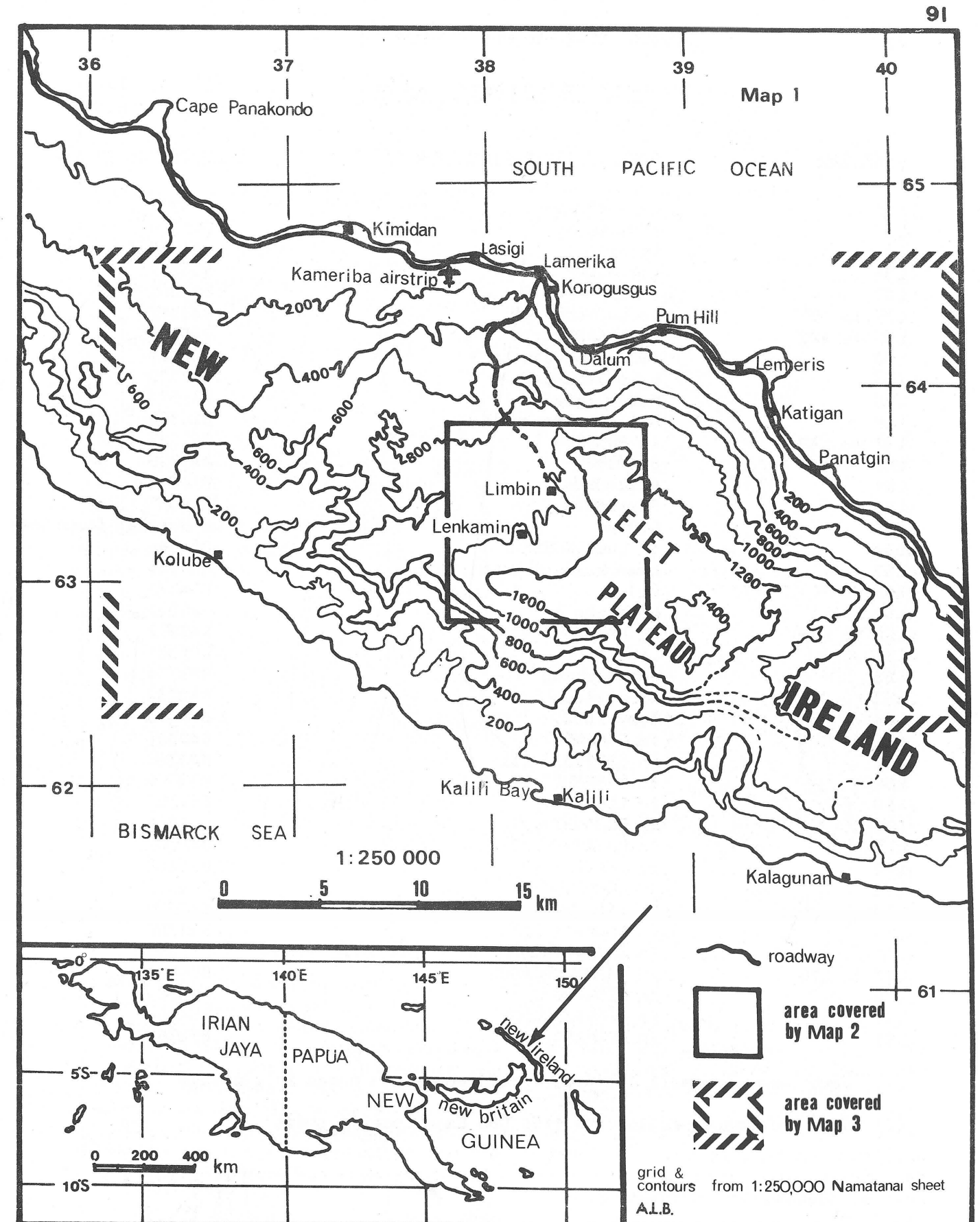


Figure 3. Cone shaped hills near Limbin Village

party moved up to Laranbut on the edge of the high plateau and caved in this area while another party operated in the Liit and Lenkamin areas. In the final week of caving both parties rejoined and the Laranbut camp was expanded. Again we mostly worked in two parties of four. The composition of the parties was rearranged several times during the expedition so all members caved with everyone else at some stage. A daily radio schedule was kept with Civil Defence personnel in Rabaul. The entire party and equipment moved from the high plateau to the coast on 18th August. After a day on the coast we travelled by truck, boat and truck back to Keravat. Four of us had another flight over the plateau to look at where we had been. From Keravat everyone dispersed and the gear was shipped back to Brisbane. The cost of the expedition ex Rabaul, including K200 for publication, was K1,485. Air fares to Rabaul totalled K1,635 giving a total cost of K3,120.

It took only four days from when the second party left Keravat until caving commenced. This can be compared with one to many weeks for earlier P.N.G. speleological expeditions. The first few days on the plateau were devoted to establishing the air drop site, finding a place for the base camp and reconnaissance of the high plateau. The base camp was established at Liit and we operated as two parties of four out of this camp for the first week's caving. In the second week a four man



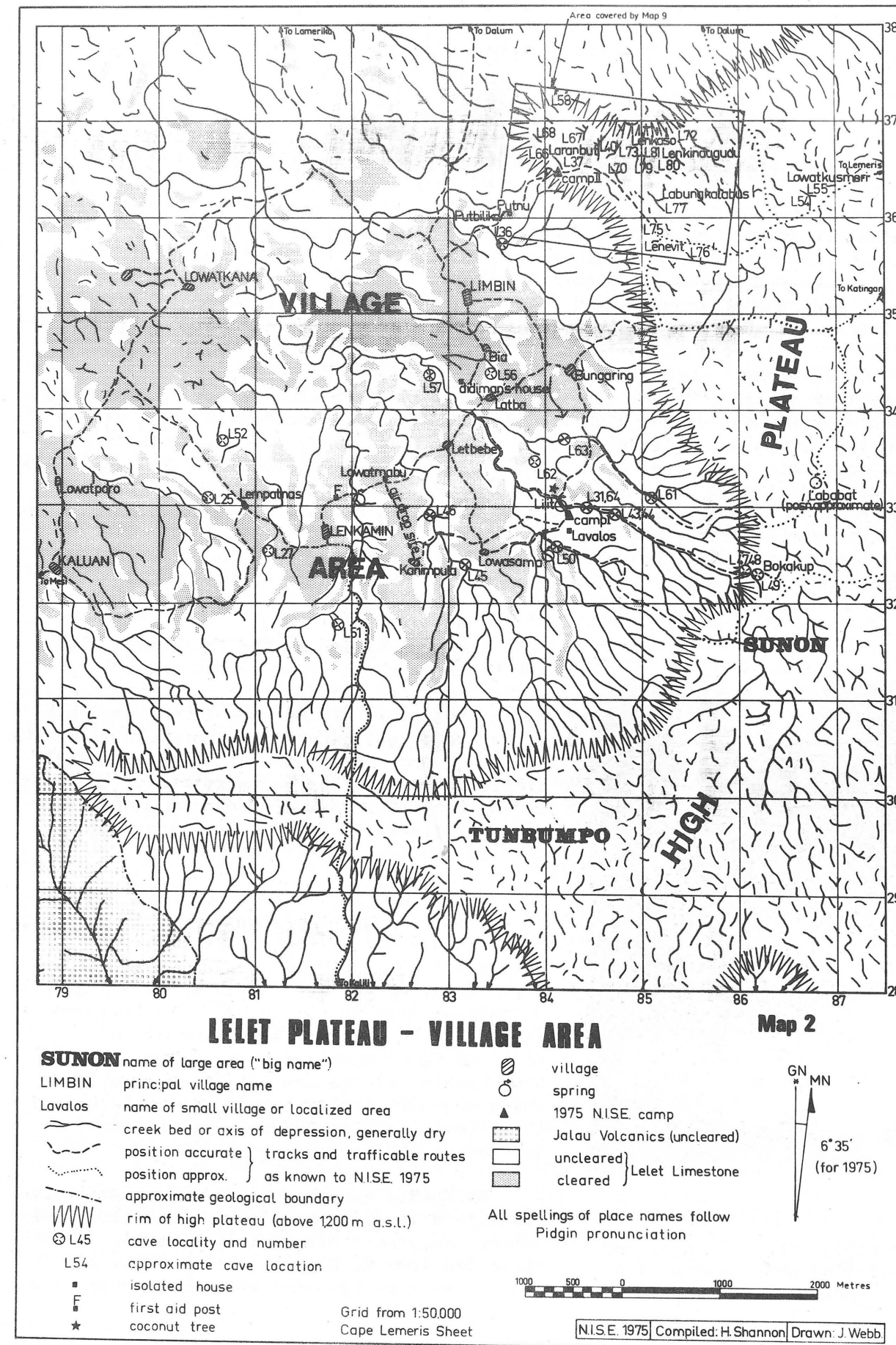


## CAVES LOCATED ON MAPS 2 AND 9

Cave tag	Cave or depression name (1)	Grid reference (2)
L25	Kanimetlavau	805331
L27	Awatbumbum	811325
L31	Meruklu 1	844330
L36	Lamangwat	835357
L37	in LARANBUT I	842365
L38 to L39	in LARANBUT IV	845367
L40 to L42	in LARANBUT IV	846368
L43	Kabotlabangabang 1	847329
L44	Kabotlabangabang 2	847329
L45	Kanimbigim	831324
L46	Kanameroborunda	828329
L47 to L49	in BOKAKUP I	861323
L50	Sep818	841325
L51	Putladung	818317
L52	Pesolik	806337
L53	Lakare	about 1 km west of Lempatnas
L54	in LOWATKUSMERI I	86-36-
L55	Lowatkuameri Lemet Silot	86-36-
L56	Bulu	834343
L57	Lematura 1	828343
L58 to L59	in LARANBUT VII	842372
L61	Lenbinbin	851331
L62	Lambelubung	839334
L63	Ninggalau	842337
L64	Meruklu 2	844330
L65 to L66	in LARANBUT I	840367
L67	in LARANBUT III	843368
L68	in LARANBUT II	839369
L69	in LENKASO I	852366
L70	in LARANBUT VI	846364
L71	in LARANBUT VI	847362
L72	in LENKASO II	854368
L73	in LARANBUT V	849365
L74	in LARANBUT V	847366
L75	in LENEVIT III	850358
L76	in LENEVIT IV	857356
L77 to L78	in LABUNGKALABUS	85-36-
L79	in LENKASO	85-36-
L80	in LENKINDUGUDU	85-36-
L81	in LENKASO I	853368

(1) Cave names in small letters; karst depression names in capitals

(2) Grid references follow the 1:50 000 Cape Lemeris sheet



## DIARY

To the Lelet. Wednesday 23rd July to Wednesday 30th July.

On Wednesday 23rd July, Jim flew to New Ireland and the first of the Australian members arrived in Rabaul. Thursday was devoted to packing for the airdrop at the Bourkes' place. At first light on Friday morning the advance party flew out of Rabaul in a Cessna 180, but after 10 minutes in the air it was decided to abort the flight because of heavy cloud cover over New Ireland. Jim walked up to the plateau from Lamerika.

On Saturday, again at first light, the advance party of Lex, John and Henry took off in a Cessna 207. Paul and Leigh were also on board. The south-western escarpment of the 1200 m plus plateau was an incredible sight rising from the almost non-existent coastal plain. Very windy conditions restricted reconnaissance to several high level circuits over what looked to be a suitable dropsite, just east of what was taken to be Limbin village. Paul and Leigh flew back to Rabaul. The advance party were met by Dave Larkin, the plantation manager from Lamerika, who breakfasted them and loaded the party on to a D6C bulldozer. With nine bodies and six packs strapped and hanging from the bulldozer, they trundled for an hour to about 600 m altitude to the head of the new Lelet roadway ... the only way to go caving!



Figure 4. The bulldozer and trailer of gear head up the Lelet road from the coast

Jim was waiting at the roadhead. With three carriers, the four cavers set off for Limbin carrying supplies for four days and the radio. Pleasure at the easy three hour walk turned to despair when it was realized that the on-the-ground Limbin was not the from-the-air Limbin. A further 1½ hours walk took the party to the First Aid Post at Lenkamin where camp was established. Lenkamin was recognized as the village near the dropsite.

On the way in the party became very aware of the extreme water shortage on the plateau and that a water source would be the determinant in selecting a base camp site (see Figure 12). Relating the day's walking to the aerial photograph that night led Henry to discover that Lenkamin village was marked on the 1:50 000 Cape Lemeris map as Limbin, and the true Limbin village was not shown at all. There was much excitement as the party traced their tracks and sorted out the geography on the aerial photograph.

On Sunday morning Lex and Henry went with Michael, a local school teacher, to examine the water supply near his hamlet, Lowasama. He first led them to a small stream about 40 minutes east of Lowasama which is perhaps the

only permanent surface stream on the plateau. The story was told that the villagers kept the existence of this water supply a secret from the Japanese during the occupation in World War II. The party then travelled the short distance to Liit where a suitable campsite was located about 50 m up-valley from a trickle spring which filled a gallon container in just over 5 minutes. In the afternoon Lex and Henry set up markers, fires and the radio at the airdrop site. John and Jim had set out that morning for a look at the high plateau east of Limbin in the hope of locating a water supply for a base camp in that area. They followed the same track that Kevan and Jim had done on the second reconnaissance trip. They quickly examined three dolines on the high plateau, all of which had entrances. No water supplies were found. Back at the First Aid Post, the advance party were met by Lakuna Ismel who had assisted both the reconnaissance parties. Lakuna was to prove invaluable to the expedition. Also waiting was Lekan from Lowatkana village, the councillor for Lelet. That night teachers and boys from the Lenkamin school entertained the party with guitars. The winds which had been blowing constantly since the advance party had flown in had been dropping throughout the day.

At 5.30 a.m. Monday everyone tramped out to the airdrop site to await the drop. No plane. By 9 a.m. John, Jim and Lex abandoned the airdrop to Henry's care and set off to reconnoitre the high plateau east of Bungaring, again with the object of locating a base camp. With Thomas Palait from Bungaring as guide, the three climbed up the escarpment to an old garden on the edge of the high plateau about half an hour from Bungaring. From there it was a forced walk, firstly east over country with negligible doline development and apparently heavy soil cover. There appeared to be few holes close to the track and on brief inspection, these appeared to be blocked. Thomas gave his opinion that most holes were to be found either to the northwest or near to the water supply where he was leading the party.

The party then travelled in a southerly direction through an area where there was stronger gully development. The permanent water supply at Lababat was 2½ hours hard walking from the top of the escarpment above Bungaring. The water trickles in many places from one cliff of a large flat-floored amphitheatre. It was only a half hour's walk southwest to the escarpment of the high plateau then a two hour slog down ridge and gully to Liit. A likely looking cave entrance, Lenbinbin (L61), was spotted near Liit. Before dragging up the last hill to the First Aid Post, spirits were raised by gifts of still-warm taro. Gifts of taro were to be part of the villagers' continuing generosity. But it was not the villagers alone who met the advance party. The main expedition party was there too. They had bulldozed and walked up that day. The airdrop had been abandoned and all cargo had been carried up to Limbin.

Two days previously back at Keravat, packing was completed. On Ren Fernmore's advice that high winds were likely to continue, and with new knowledge of the Lelet roadway, Mike decided not to airdrop. Gear was transferred to a workboat at Vunapope Mission and at midnight the party left Keravat for the boat trip to New Ireland. Beginning an expedition by travelling through tropical waters by moonlight was most pleasant. Dave Larkin met the party at Labor Bay and transported them the 100 km to Lamerika by truck. The rest of Sunday was spent swimming in the Dalum resurgence, drinking, eating and sleeping.



Next morning with the bulldozer towing a trailer, a large and motley collection of cavers, carriers and gear made its way up the Lelet roadway (see Figure 4). From the roadhead the carriers took the gear as far as Limbin and the cavers walked to the First Aid Post (see Figure 5).



Figure 5. Carriers arriving at Limbin

inflow cave, which was dry, only a short distance and on returning to the surface were surprised to find that a heavy downpour was rapidly filling the cave with water.

Looking around the camp we could not see where all the weeks of organization had been required. All seemed very simple and easy. Items on which most pre-expedition labour had been expended seemed inconsequential. The whole party was fit, happy and eager. The absence of concern about the walk out, unlike the Muller and Ora expeditions, meant that there could be full concentration on caving. Most of us read and rested in the afternoon sunshine.

Week one - in the village area. Thursday 31st July to Sunday 3rd August.

On Thursday 31st July, Mike, Henry, Leigh and Mal were guided by Lakuna to Kanameroborunda (L46), a river cave with passages of mostly stooping size (see Maps 4 and 5). During floods, big stones are apparently rolled up steep gradients in the passageways. The party left after exploring most of the cave. Leigh also entered a smallish cave, Kanimbigin (L45). Lex, John, Jim and Paul, guided by Thomas, had made off in the other direction from Liit to continue exploration of Lenbinbin (see Map 7). After the first 20 m pitch, the second pitch was only 12.5 m and the cave sloped down to a boulder choke at just less than 50 m depth. Lenbinbin, extremely well decorated, was surveyed and photographed (see Figure 13). The party moved on to Ninggalau, but with heavy rain falling the river cave was still taking water and exploration was chalked up for a dry day. On the way back to camp Thomas detoured to another entrance he knew on the ridge with the coconut tree. The party intended to descend at least the first pitch, but when a stone fell for 4½ seconds from the entrance, the shaft was left for morning. The shaft was called Lambelubung (L62).

Tuesday 29th July was camp building day at Liit. Leigh and ten carriers went to Limbin to ferry the thirty odd loads on to Liit. They decided to shift the cargo in two trips instead of three and the line, including Leigh, stumbled into camp each carrying incredibly heavy double loads of 40 kg or more. Building the camp made for an exhausting day, but not long after nightfall the basics were finished. Wednesday was devoted to finishing the camp and resting. John and Jim were anxious to start caving and with Thomas they investigated Lenbinbin (L61). They bottomed the first pitch (20 m). Thomas then guided them to another cave, Ninggalau. They entered this rainwater

The same party returned to Lambelubung on Friday with the 90 m rope. Lex and John descended. It was a beautiful 81 m pitch, free all the way (see Map 7). But the shaft terminated in a gravel floor with no possibilities of extensions. Each descent took about 15 minutes and ascent 20 to 30 minutes. Next it was on to Ninggalau again where Jim and Paul went through the stream passages for about 150 m to a flowstone constriction. The party arrived back in camp about 6 p.m. just as Mike's party walked in. They had spent the day completing the exploration and survey of Kanameroborunda. Surveyed length was 500 m.

On Saturday Lakuna led the entire party to the Meruklu (L31 and L64) and Kabotlabangabang (L43 and L44) entrances which had been spotted on the second reconnaissance trip. Lex's party was to explore these while Mike's party was to continue up the same gully into the part of the high plateau called Sunon. Kabotlabangabang 1 & 2 and Meruklu 1 & 2 were disappointingly small passages, mostly requiring crawling, although there was a tantalizing gale blowing out of the small entrance of Meruklu 2. The party returned to camp disheartened. Mike's party found nothing hopeful on the steep part of the escarpment, but cave entrances were located in large karst valleys on the edge of the high plateau. One (L48) contained about 200 bats in a rather dopey state. Some were killed for meat for Lakuna who was persuaded to enter the cave himself. But once inside he quickly decided he already had enough bats. Three caves were explored, one a 33 m shaft on the side of a hill. Other entrances seen were not examined. The party returned to Liit following a track one gully west of the one they used on the way up.

Saturday had been fine though cool, but on Sunday it rained on and off all day (see Figure 19). Henry, Leigh and Mal were the only ones to venture out. They explored Sepblis (L50), but it did not go far. For the others it was a lazy rest day. Fresh bread was baked. It was decided that cave entrances within striking distance of Liit were fast becoming exhausted and plans were laid to put half the party on the high plateau.

Week two - Lenkamin and Laranbut areas. Monday 4th to Saturday 9th August.

One half of the party moved to establish a temporary camp on the edge of the high plateau near Limbin, while the others remained at Camp I to work in the Liit and Lenkamin areas. On Monday 4th August Mike, Jim, Mal and John returned to Meruklu 2 where John and Jim pushed this tight crawl for about 150 m. Human remains were found an inexplicably long way into the cave. That afternoon they returned to Ninggalau where Jim and John pushed the flowstone constriction and dropped down the 22 m pitch. Their exploration continued for another two hours, but they were stopped again where flowstone filled the whole passage. Mike and Mal waited at the first constriction and chipped out the squeeze.

With only Ninggalau still to be pushed in the Liit area, the village area party was to investigate caves around Lenkamin, particularly those which had not been bottomed on the first reconnaissance trip (see Figure 6). On Tuesday after a long walk, the party arrived at Awatbumbum (L27). Mike and Mal descended the first pitch and Mike bottomed the cave at 49 m. Next day it was again back to Lenkamin to investigate Kanimetlavau (L25) (see Map 7). After Jim had nearly been clobbered by a falling rock, John descended to 60 m using



a bolt on the second pitch. Walking was taking too much time, so that after a return to Liit on Wednesday, it was decided to shift camp back to the First Aid Post at Lenkamin. On Thursday Manase Manangong, the guide, took the party to a supposed river cave, but it turned out to be only a single chamber 33 m by 24 m with a continuous water drip from the roof. Another Manase cave that day was also to prove disappointingly small. At Lenkamin that night the party was re-joined by Lex from the high plateau camp. He had returned to discuss plans for the last week. On Friday one last cave was investigated west of Lempatnas hamlet, but the shaft (L53) bottomed at 17 m. The village party then returned to the Liit base camp and were joined by the high plateau party.

On the previous Monday the high plateau party of Lex, Henry, Paul and Leigh had carried heavy packs out of Liit. After an unscheduled stop near Limbin where they vainly looked for rumoured caves, they pushed on to the high plateau behind Limbin. A comfortable temporary camp was established in less than an hour on the edge of the high plateau at Laranbut. The site was colder (an early morning temperature recording was 18° C) and windier than the village area. The ground was a spongy mass of roots and leaf litter and very pleasant to camp on.



Figure 6. Trek to a cave - village area

the ridges, track cutting was often necessary. Although pacing and compass traversing, the party walked a figure of eight (partly intentional), and in the day could hardly have been more than a kilometre from camp. Only one new depression was investigated, but six entrances were checked out.

On Wednesday, the party struck out in a northeasterly direction and traversed the short distance to the escarpment overlooking Dalum. Some clearing of the jungle produced the stimulating view of the coast and the Dalum resurgence, 5 km away and 1200 m below. In the evening when the jungle was quiet, it was possible to hear the sound of the waves breaking on the coastal reefs. The feeling that a 1200 m deep cave must be somewhere on the plateau was very strong. One more depression with multiple entrances was investigated that day. Lex left late in the afternoon to contact the village area party and to organize guides

Next day exploration of the incredibly dissected high plateau began (see Figure 7). The party dropped down off the campsite ridge into the first karst depression. It was a very elongated valley, more than 600 m long. There were eight holes along the axis and all were explored (L37, L65 and L66 tagged). Only L65 and L66 were more than 50 m deep. The caves were often filled with splash corroded rockpiles, and both the walls and the rubble were pitted and very sharp. On Wednesday 6th August surface exploration continued, this time northwards along the escarpment. The guides, Thomas and Steven Gamu, claimed they did not know the area and this made navigation difficult. Off

for the final week. The rest of the party moved back to Liit the next day.

On Friday the reunion at Liit developed into the day of the big feast. Hot taro and then hot bread were followed by a monstrous Lelet stew. Next day all eight cavers went to Ninggalau. Leigh, John and Jim attempted to push the second flowstone constriction and the rest of the party surveyed and photographed the cave (see Figure 15). The previous day's rain had caused no problem and surprisingly the water in the entrance cavern had gone down. Ninggalau ended in an unpleasant 50 m crawl, partially filled with water. The surveyed length was 330 m and depth was 66 m. It was a long day and the survey party did not return to Liit until 8 p.m.

Week three - on the high plateau. Sunday 10th to Sunday 17th August.

On Sunday 10th August the shift of people and equipment from Camp I at Liit to Camp II at Laranbut began. Leigh and Jim were the first to arrive at Camp II and they began erecting a second building frame. Mike, John and Lex had remained at Liit to pack and supervise the transfer. On Monday 21 carriers were engaged and the move up to the high plateau was almost painless. Camp was established at Laranbut in a couple of hours. Henry and Mal carried out some surface mapping to the northeast of the camp that day and the others investigated dolines near camp. L70 and L71 were tagged, but maximum depth was only 17 m.

High plateau exploration began in earnest on Tuesday. Three men, Noah Kiptabu, Lentuan Mesulam and Lilikas Paulo whom we understood to have some knowledge of the high plateau, were to act as guides. Although very amicable and genuinely helpful in most matters, the guides either truly did not know of the existence of major entrances (a distinct possibility as they preferred to keep to hunting tracks on ridges between depressions) or were a little lazy and did not want to guide far from camp. As a result, guiding was nominal only and depressions were investigated on speculation. By following the ridges, movement across the plateau was surprisingly easy. There was heavy undergrowth and little elevation change as long as one did not drop off into the depressions. However, as route finding was initially difficult, the presence of guides or trail blazing was essential.

Henry, Mal, Paul and Leigh made up one party and with Noah as guide they investigated a large depression southeast along the coastal rim. The depression contained some twenty odd holes, with about eight worth looking at. The deepest was 27 m. Examination of the depression was, as usual, time consuming and only one other small depression was examined that day. The other party had more success. They had walked for an hour and a half, firstly south to the Bungaring-Lemeris track, then east. They examined a depression just north of the track, following four small holes down the axis of the depression. The fifth one went. The area had the name Lowatkusmeri and the cave was tagged L55 (see Map 8). Mike descended one shaft and John an adjacent one, but they joined about 20 m down. Mike next spent an hour dangling from a rope "gardening" just below the top of the next pitch. After removing most of the large boulders, he descended the 33 m pitch. The party returned to camp just on dusk, leaving the cave rigged.



Next day, Wednesday 13th August, the same party continued exploration in Lowatkusmeri. After rerigging the first pitch and more rock clearing on the second, Lex and John descended the third pitch of 18 m. This was followed by a mainly horizontal scramble and the cave terminated in a rockpile at the bottom of another 7 m pitch. Depth was 102 m. Surveying commenced. The same day Henry's party had continued investigation of the Lenkaso area and one cave had bottomed at 34 m.

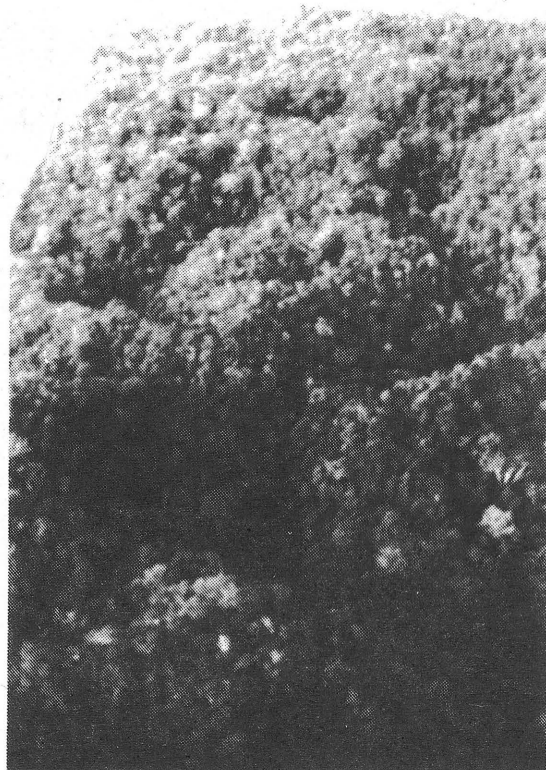


Figure 7. Polygonal karst on the high plateau near Camp II. The escarpment and village area can be seen at the top of the photo.

The second party descended to the village area to investigate caves near the didiman's hut and near Putbiliko (L36). None was hopeful. Sunday was to be the last day on the Lelet and no one had much heart for surface exploration. Henry and Mal returned to a cave near the camp which had been spotted several days earlier and descended 37 m. The remainder of the party relaxed, began packing, and spent the afternoon locating the position of all caves explored on the large aerial photograph.

A change of party was organized on the Thursday with Paul and Jim swapping. Lowatkusmeri Lemet Silot (the big hole at Lowatkusmeri) was the name we gave to L55. The survey was completed on Thursday. It was after 10 p.m. when the party returned to camp. Henry's party had another fruitless day examining depressions and entrances about half an hour's walk from camp along the coastal rim. The next day they continued the search in the depressions around the junction of the track from camp with the Bungaring-Lemeris track. As usual many enterable holes were located, but none opened up. Henry continued his pacing and compass traversing, sketching the divides of the depressions and details of the entrances along the axes of the depressions (see Map 9). The other party had a rest day in camp.

Saturday was the last day of major exploration. One party continued on the high plateau, concentrating on the area between the Bungaring-Lemeris track and the coastal rim slightly west of the Dalum turn-off. About six depressions and nine caves were investigated with the deepest at 26 m. Lex travelled down the Dalum track for about half an hour. Leigh volunteered to investigate a large proportion of the holes in his usual keen fashion.

#### Withdrawal. Monday 18th to Wednesday 20th August.

Packing and camp breaking commenced early on Monday morning. Leigh and Jim were off at 6.30 a.m. By 8 a.m. no carriers had arrived, so Lex set off to organize some. The three guides and five remaining cavers carried very heavy loads down to Limbin. As the men were busy, several women and children had been organized to carry, so finally the expedition with 11 carriers straggled into the road-head. The bulldozer trailer was loaded and after an uncomfortable but joyous ride down the steep roadway the party arrived at Lamerika for an enormous meal and cold beer.



Figure 8. Rope washing in the Dalum River

On Tuesday morning the party laboured for about four hours washing ropes in the Dalum River (see Figure 8) and only a few minutes could be spared to investigate the multiple entrances of the resurgence itself. However, it was enough time to see that the cave could be pushed and certainly would warrant major exploration. The resurgence is no more than a few metres above high tide level. That afternoon the party demonstrated rope techniques on the sea cliffs to Dave Larkin and his boss Jim Grose. Afterwards most of the party visited the nearby Kamerituk cave (N32) which contained human and ceremonial remains and art. The cave was surveyed and photographed (see Map 11). For the expedition's benefit, a party was organized that night, attended mainly by plantation managers from the nearby area.

On Wednesday everyone was up at 3.30 a.m. (we only went to bed at 2 a.m.) for the truck ride to Namatanai and Labur Bay. Goods were transferred to the workboat and by 1.30 that afternoon the boat pulled into the Vunapope Mission wharf near Pabaul with a very tired and very sunburnt party on board. Jean Bourke was waiting with transport to ferry us back to Keravat. One could say that the expedition was over.

#### Post-expedition flight. Thursday 21st August.

Another flight over the plateau was arranged to help piece together what we had seen on the ground. We were left with two major impressions. Firstly, we had examined only a minute portion of the plateau over 1200 m altitude. The enormity of the uninhabited, unexplored karst area was staggering (see Figure 9). Secondly, close aerial examination of the corner of the high plateau that had been investigated revealed that the topography was far more rugged than had been thought. Karst depressions were incredibly steep sided and interwoven. From the air one could believe a surface traverse to be near impossible, although traversing had been relatively easy by keeping to the ridges (see Figure 7).

# PHYSIOGRAPHY

## GEOLOGY

Virtually all of the Lelet Plateau is limestone, but there is a small area of the underlying volcanics in the S.W. (see Map 3). The volcanics outcrop up to c. 1000 m on the southern slopes but do not occur at all at sea level on the northern side so the base of the limestone is well below sea level along the northeast coast. The limestone is overlain by clastic sediments at the narrow point of New Ireland approximately 20 km E.S.E. of the plateau. Outcrops were not common, though enough to show that dips were always low, 10° or less, on the plateau itself.

Soil in the cultivated areas is crumbly and dark brown or grey in colour. In forest areas brown soft clay soil is common overlying compact pink clay which appears to form thick residual masses in level valley bottoms. Transported soils in valley bottoms amount to a mixture of leaf litter and mud. In virgin forest above 1000 m, soil was rarely seen because of a root mat, like a springy carpet, which covers most of the ground. The major exception is the bottoms of karst depressions and the steepest slopes.

Limestone outcrops occur adjacent to shafts, in creekside cliffs and sometimes in odd patches on hillsides and ridgetop pinnacles. The limestone is very inhomogeneous, typically containing large coralline fragments in a yellow matrix. In caves with drip-splash solution, very sharp etched boulders are a hazard. Bedded limestone, presumably lagoonal facies material, was seen in most of the caves, but there is a distinct possibility that the material around Laranbut is forereef talus and reef material.

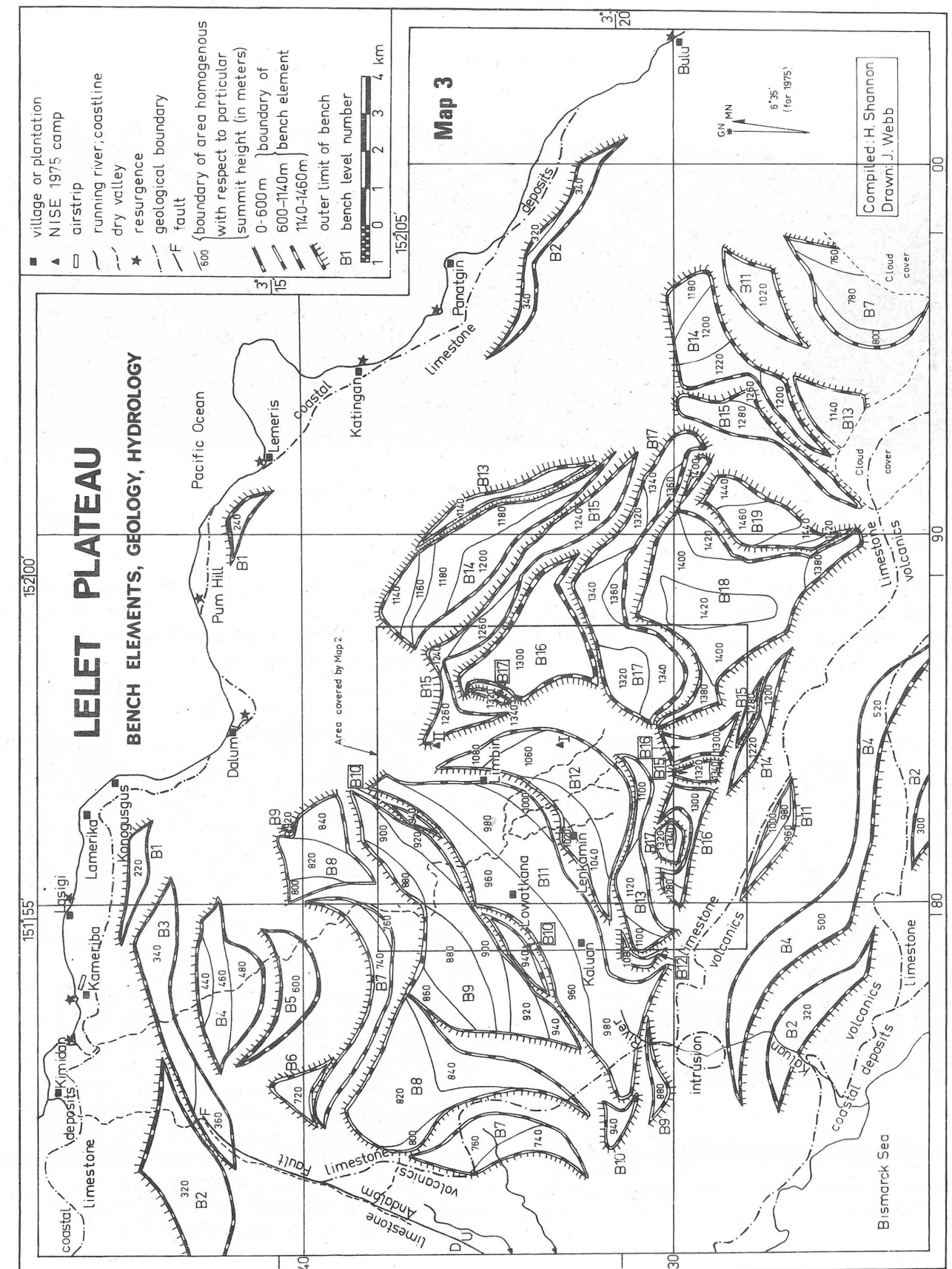
## GEOMORPHOLOGY

**Benches.** The plateau is a complex tableland made up of a series of bench elements which extend from the highest points on the plateau (c. 1480 m) down to the coast (see Map 3). Scarps between each member of the series are slight, and prominent scarps occur only where certain of the bench elements are missing in a particular area. The escarpment which separates the village area from the high plateau, for example, covers a height range represented by major benches further east. So it is not always easy to define the limit of the plateau. In the most difficult area, the northwest, the division can be taken at 720 m. The benched character of New Ireland was reported though not described by Hohnen (1970).

### Drainage domains.

(a) The high plateau (polygonal karst).

This is an area of polygonal karst with variation depending on the extent of clay plug development in the bottoms of the karst depressions. At Laranbut for example there is little clay plug, and the bottom of each depression has 20 or so vertical shafts and few dolines. At Bokakup the clay plug is sufficient to support creek channels which go into horizontal type caves. An area between Laranbut and Bokakup has thick soil cover and tends to have shallow choked dolines only (see Figure 9 and Map 9).





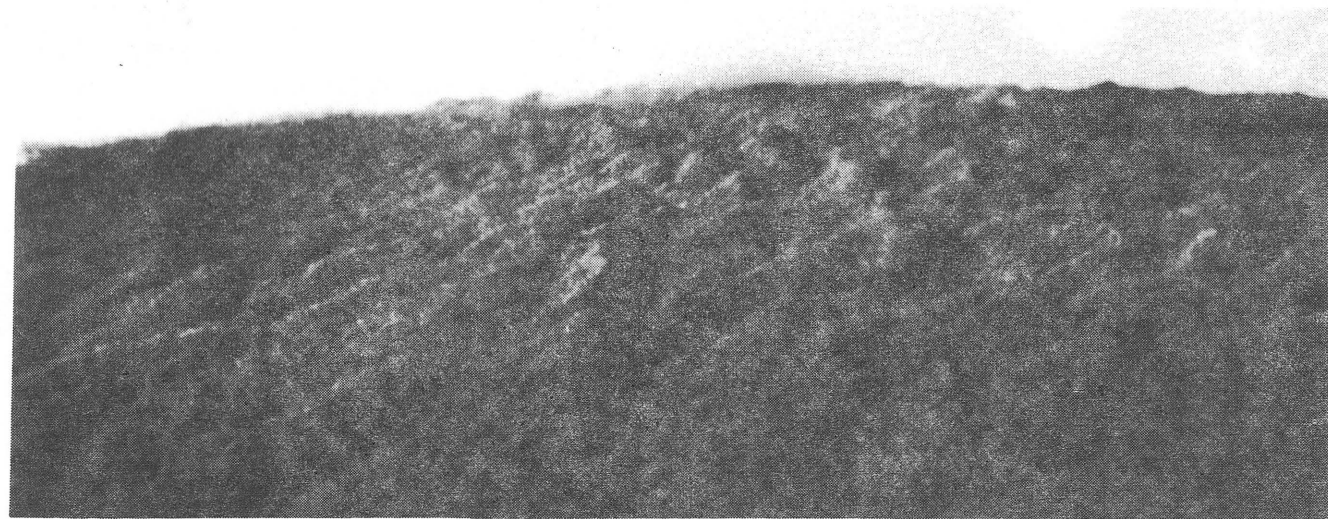


Figure 9. Vast expanse of polygonal karst on the high plateau

(b) The escarpments (gullies).

The arc of steep slopes enclosing the villages has a karst gully drainage, dry, but otherwise ordinary and without caves. The scarp on the north, from Larenbut down to Dalum, is just as steep but has karst depressions, not gullies, going down the slope. This area is thought to be on reef talus limestone.



Figure 10. Gully development, village area, looking towards the high plateau. The airdrop zone is in the centre of the photo and Lenkamin is in the centre right.

(c) Village area (complex doline karst).

This area is quite complex. Interfluvies are relics of a formerly base levelled surface with thick soil cover. Above this surface are several cone shaped residual hills, and doubtless the area could have been called a cone karst before rejuvenation (see Figure 3). The cones are relict landforms only. The rejuvenated creek system extends out on to the bench from the rim scarp and is incised some 20 m below the old surface (see Figure 10). Dolines of the classic form are now developing on the old surface, and these are prized locations for growing taro. The dry valleys are either blind (as in the case of the creek feeding Kanameroborunda cave) or else collect into the one trunk stream which reaches the coast

near Kameriba. According to the villagers, water sometimes reaches the coast along this valley.

The water supply situation for the villagers is based on trickle springs from cliffs or caves or on pools scoured in the hard pink clay deposit. This clay sheds water during heavy showers. The only permanent creek on the plateau runs 200 m from a spring to a sink. The most active streambeds have a stony bed, with small, mossy, angular boulders as a rule. Some soil covered streambeds may be dry at all times, though the villagers showed us one that sometimes carried water.

(d) Lower forest areas (polygonal karst).

The main cultivated area stops before the lowest areas on the plateau are reached west and north of the village area. The forest lacks the abundant root mat of the higher areas. Local people denied knowledge of caves here. From the air the polygonal karst looks similar to the high plateau. An area west of Kaluan close to the base of the limestone has cockpit karst.

### HYDROLOGY

Virtually all the runoff from the plateau goes underground. The flow is directed to the northeast coast because of the dip of the limestone. Few of the resurgences are much above high tide mark and an unknown but probably large proportion emerges in the sea (see Figure 11).

In the vertical caves, the water is lost through rubble chokes. The larger caves show evidence of leakiness, particularly in Kanameroborunda where floodwater is lost through bedding plane slots off the main passage. In Ninggalau a trickle disappears close to the entrance.

The seasonal rainfall pattern gives a runoff maximum in the northwest season (January to April) and a minimum in the south easterly season (June to September). Annual rainfall is 2500-3000 mm (Brookfield and Hart, 1966). The dry creek system apparently operates only in very wet weather.



Figure 11. The Dalum River looking towards the Lelet Plateau

## VEGETATION

Most of the plateau is covered in lowland rainforest. The vegetation on the high plateau is likewise rainforest. In the village area, secondary re-growth predominates as a result of subsistence gardening and burning. Bracken fern covers much of this area with forest in some of the gullies (see Map 2 and Figure 10).

Food gardens are common in the village area. The farming system is based on bracken fern fallow and is most unusual. The system apparently maintains soil fertility as crops are vigorous and gardens are located near the hamlets, that is, fallow periods are short (see Figure 18).

Taro (*Colocasia esculenta*) is the staple crop and provides both corms and green leaves. It is mixed cropped with diploid bananas, aibika (*Abelmoschus manihot*), and other vegetables. Around the hamlets orange trees and bananas, including cultivars of the usually uncommon *Australimusa* group, are grown. Small perennial stands of *Australimusa* bananas and sometimes Chinese taro (*Xanthosoma sagittifolium*) are planted in gully bottoms. Small quantities of temperate climate vegetables, such as cabbage and potatoes, are also grown in the gardens.

## WATER SUPPLIES KNOWN TO THE EXPEDITION

1. Putladung cave (L51). Villagers obtain water from two places in the cave (grid reference 818317).
2. Lamled cave (L24). The pig guardians used to obtain water from drips at the back of the cave (Bourke, 1974) although this couple are now dead.
3. A small stream which flows on the surface for several hundred metres. Name not recorded. (Grid reference 841325). (Map 2).
4. Liit. A trickle spring, probably permanent (grid reference 842330).



Figure 12. The watering point near Lenkamin Village

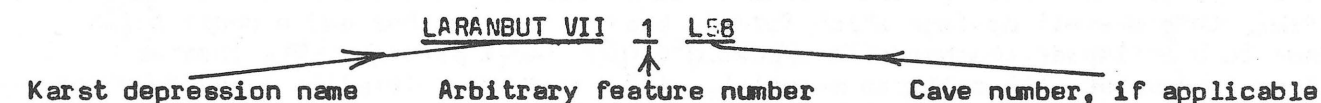
5. Near Lenkamin. A trickle spring used by the Lenkamin people, probably permanent (grid reference 820331). (See Figure 12).

6. Lababat. Multiple springs from a cliff face on the high plateau (approximate grid reference 869332).

7. Near Limbin. A trickle spring not visited but recorded by Wilde (1975). Name not recorded.

## CAVE DESCRIPTIONS

The prefix L is used for cave tags for the Lelet Plateau. Caves L1 to L30 were described by Bourke (1974) and L31 to L45 by Wilde (1975). Here we present descriptions of caves L46 to L81 together with some of those described earlier. L60 was not allocated. The numbering system differs in the village area and on the high plateau. In the village area numbers were not assigned to very small caves, but all others were numbered, tagged and described. Because of the high density of cave entrances on the high plateau, we did not number every cave. Caves were numbered and tagged in the karst depressions sufficient to make the depression identifiable. For example, in a typical depression with eight caves usually two would have been numbered, one at each end of the depression. Significant caves were usually also numbered. However, all caves and karst features in the depressions have been described and assigned an arbitrary Arabic numeral to assist cave descriptions. Local area names were used to identify karst depressions, but where several depressions were covered, they have been differentiated by Roman numerals. An example of a high plateau feature is as follows:



Metal tags were fixed near the entrances of all numbered caves on the plateau explored by the expedition. Some of the caves L1 to L45 which were re-visited were also tagged. Cave names were provided by our guides and are usually local names for small areas of land which include the cave. In the village area the density of caves is low and there are numerous small named areas, so a cave name will usually refer to only the one cave. By contrast, on the high plateau, cave density is much higher and area names refer to larger areas, so one name will cover several karst depressions containing many caves. As well as small area names, the villagers have "big names" covering a much larger area (e.g., Sunon and Tunbumpo).

The prefix N is used for caves accessible from the northeast coast. The two caves explored on the coast were not tagged.

## VILLAGE AREA (see Map 2)

L25. Kanimetlavau. (Map 7). Near a garden near Lempatnas hamlet (see Map 2). Name erroneously given as Canimelavow in earlier description (Bourke, 1974). The first pitch (16.5 m) leads to a small ledge which is followed by a 38 m pitch. At the base there is a chamber with a smaller chamber adjacent. Depth is 60 m.

L27. Awatbumbum. (Map 7). Northeast of Lenkamin. Entrance on side of a hill near a betel nut palm and is a shaft about 2 m in diameter at the top. The first pitch (25.5 m) leads into a large chamber. Then a rubble slope to the top of the second pitch (18.6 m). The cave was previously explored to the top of this pitch (Bourke, 1974). The cave is blocked off at the base of the second pitch by rubble and flowstone. Depth is 49 m. It is well decorated



with flowstone. Swiftlets noted at the bottom of the cave and animal bones (wallaby?) at the top of the second pitch.

L31. Meruklu 1. Previously referred to as Lemerukluk (Bourke, 1974) and described by Wilde (1975). Small cave entrance at bottom of a very small and collapsed sink. 10 m crawl to a tight squeeze, too tight to push. Strong draught from cave.

L36. Lamangwat. Previously recorded (Wilde, 1975) as Kanambu, which appears to be a "big name" covering this place and surroundings. A substantial watercourse sinks in the entrance. A climbable entry over rubble leads to a small cavern with headroom. At the far end, a hole in the floor goes to a flat oval section crawlway, then a narrow chute down 2 m to water. The pool is 0.5 m deep and is fed by a trickle. Water exits through a narrow slot below water level. Above the chute two swiftlets' nests complete with young were seen. Length is 25 m; depth 9 m; c. 970 m a.s.l.

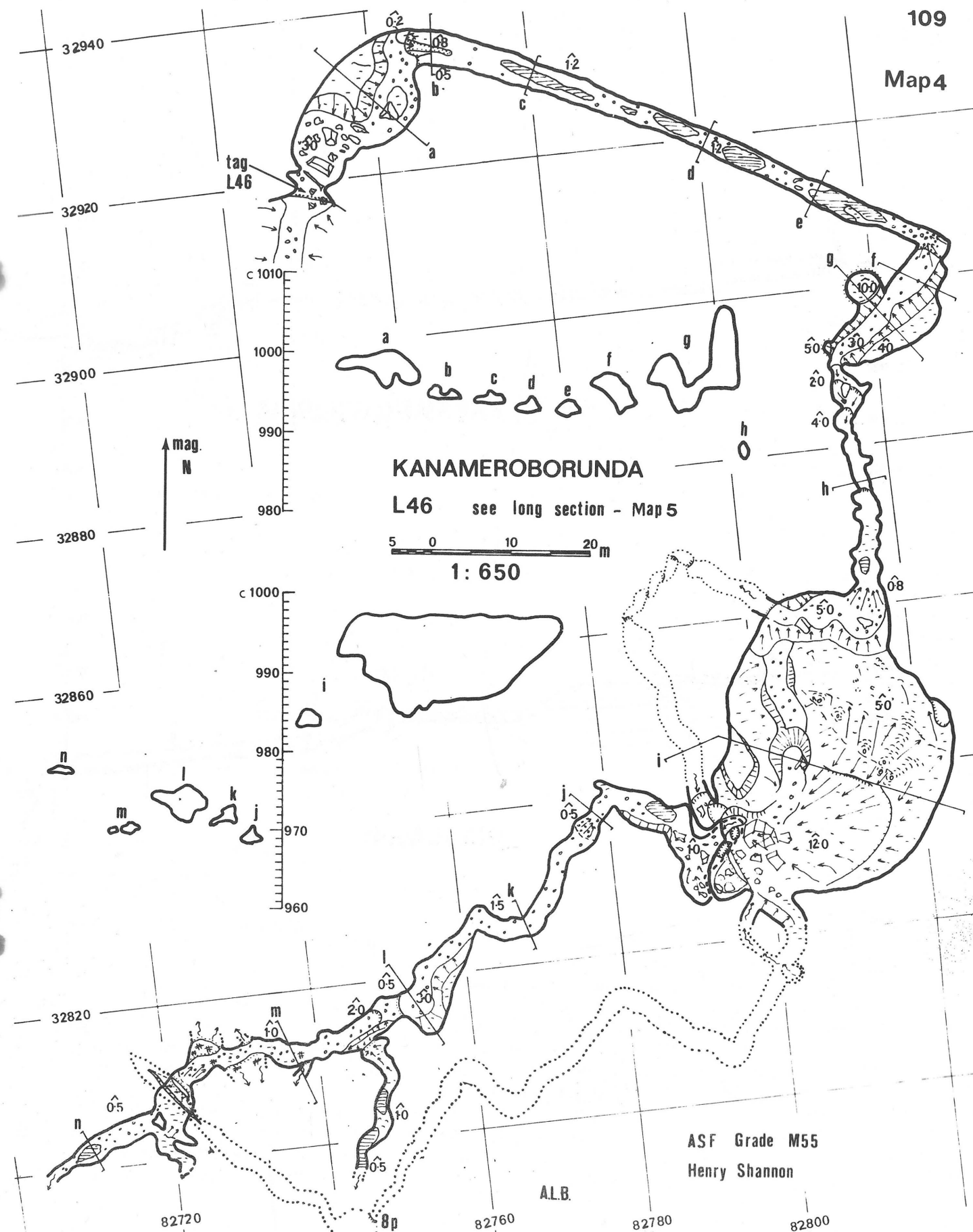
L43. Kabotlabangabang 1. Previously investigated by Wilde (1975). Entrance is on the northern side of creek bed. A climb down a 5 m shaft is followed by a crawl, then a small passage which forms a pool in wet weather and a short climb down to a collapsed chamber with a possible high level passage. The chamber floor is covered with collapse material, silt and guano. Crawling leads downwards from the chamber and is roughly horizontal for 30 m, and then through an unstable rockpile into another chamber. A low crawl through a shallow pool cuts through the bedding plane in a slot into a small chamber where an unpushed sump (with airspace) and a crawlway pressure tube lead off. The pressure tube (gradients in both directions) was inflow into the chamber. It was followed for 40 m but continues beyond this. Estimated 150 m of passage; little elevation change. Flooding danger.

L44. Kabotlabangabang 2. (See Wilde, 1975). Entrance is a 3 m diameter shaft in the base of the gully just east of L45. A 12 m shaft drops into a collapse chamber with several muddy crawls leading off. No go. From its position in the base of the gully, it appears this cave takes a lot of water.

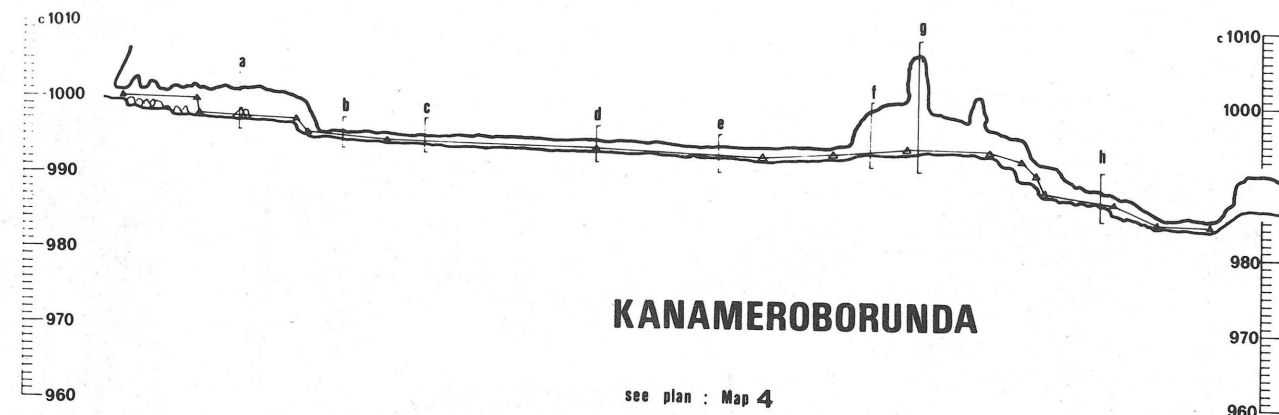
L45. Kanimbigim. Previously recorded by Wilde (1975). The entrance is a walk in one. A 14 m pitch follows then a muddy crawl which is too tight to negotiate. Depth is 27 m.

L46. Kanameroborunda. (Maps 4 and 5). The cave is the den of the "masalai" pig Kanameroborunda. It is in a blind valley. The creek bed changes into the horizontal cave entrance. The creek is a major one but runs only in floods.

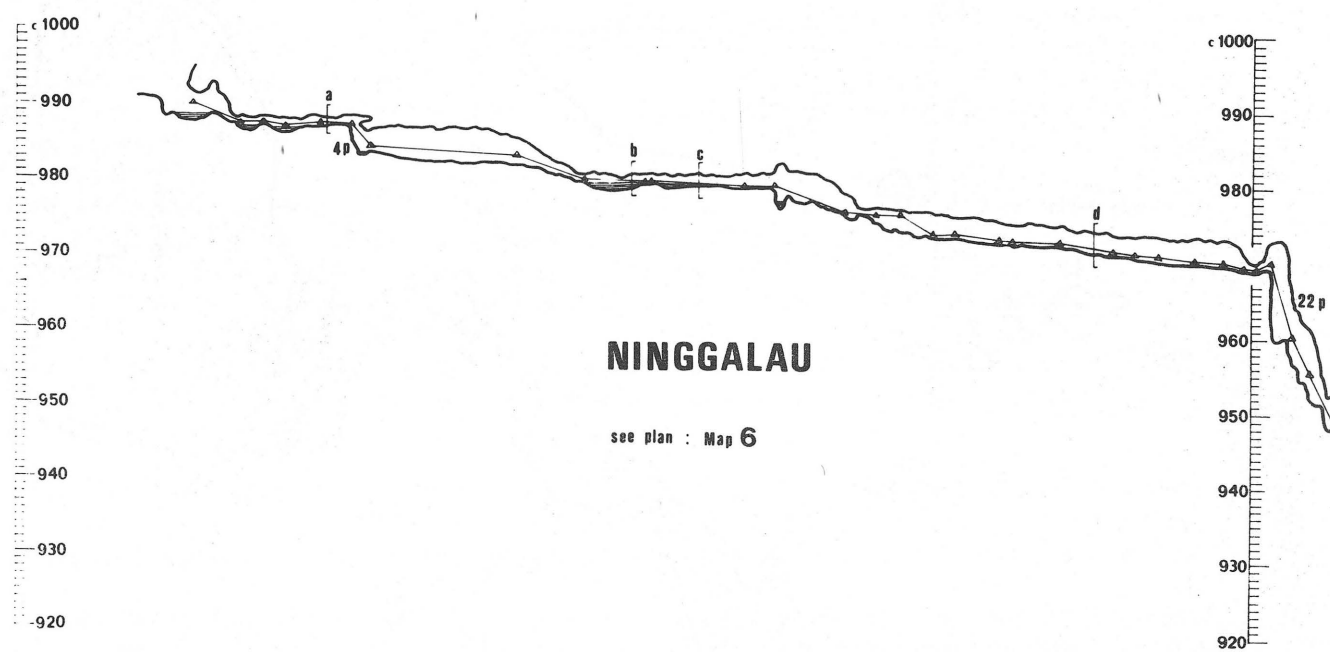
The entrance (c. 1000 m a.s.l.) is 1.5 m high, but is obstructed by logs and boulders. The first cavern has headroom. There is a high (3 m) mud bank and mud shelf on the left. The bank shows fresh scour marks. The cave continues as a straight crawlway with pools, mud, cobbles and vegetable debris on the floor, and a ceiling with a roof channel chopped by flat roof. At the end corner, there is a pressure tunnel with an up-slope of limestone cobbles leading into the second cavern. This is also walk-through, with scoured bank and mud shelf, mainly on the left but also below the big aven on the other side. The aven is the highest point of the cave and may go. The way on is first crawling, then a vertical slot.



ASF Grade M55  
Henry Shannon



developed long section



developed long section

1:1000

10 0 10 20 30 m

ASF Grade M55  
Henry Shannonaltitudes approximated  
from 1:50,000  
Cape Lemeris Sheet

A.L.B.

The modern stream bed hugs the wall in a small canyon, then exits. The stream bed can be followed, through a narrow chute in clean limestone and on to the further end of the cavern.

The third cavern is 37 m x 30 m x 15 m (maximum height). A mud ridge divides the cavern, and this is breached by a section of abandoned streamway which goes over a fossil waterfall 5 m high. Most of the mud from the higher levels is pitted with splash cups and is mostly covered by sparkling travertine crusts. There are also stalagmites and flowstones and some shawls.

At the further end of the cavern is a low point in a boulder choke. Two more passages go on from this area. The higher passage continues on the level with the modern streamway inlet. The level is marked by a wave-washed clean band on the cavern wall, and is mainly muddy crawlway to a pitch. Below the pitch the cave goes to an impenetrable slot where voice and light communication is possible with the other route. The passage starts from holes in the boulder choke. A trickle runs thru a no-go loop at the start of the mud passage and sinks before the first pool in the lower passage.

Floodwaters leak out of the passage through several joints and bedding planes in the latter section. These impenetrable holes are often covered with mats of vegetable debris. A belly crawl leads to the effective end which is a constriction caused by a fallen boulder just beyond an unavoidable pool. The draught is still obvious here, though less than back at the entrance. Total passage length is approximately 500 m or slightly over; depth is 38 m (+ 5 m, - 33 m from tag L46). Dotted line passage on Maps 4 and 5 is unsurveyed.

L50. Sep818. The entrance (c. 1030 m a.s.l.) is in a blind valley. From the entrance one goes over talus boulders to an earth floored antechamber, then a rock chute (4 m climb) to rubble floor with vegetable debris (some travertine), then crawlway to 7 m pitch. The chamber below narrows off. There is one aven from the lower level. Length is 33 m and depth is 18 m. The English rendition of Sep818 would be Sepperler.

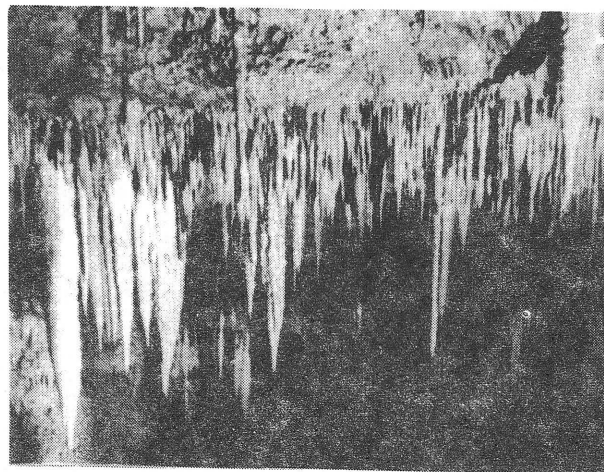


Figure 13. Lenbinbin. Most stalactites are over 3 m long.

L51. Putladung. From Lenkamin walk through Lakamun hamlet to the very deep gully northeast of Lenkamin. Follow gully for a few hundred metres and cave is on the left hand side of the hill about 40 m above gully floor. The entrance is a wide walk in one about 4 m tall. The cave consists of a chamber with maximum dimensions of 33 m by 24 m with an 8 m crawl at the back. The chamber roof is some 3 m high. There are two places inside where the villagers obtain water. Swiftlets and bats noted.

L52. Pesolik. A small grotto 3 m in, 5 m wide and 4 m tall with an 8 m shaft at the bottom. There is 5 m deep shaft 20 m from the entrance.

L53. Lakare. A shaft 17 m deep and 2 m in diameter at the base. An adjacent shaft is 7 m deep, 8 m long and 2 m wide.

L56. Bulu. A 7 m shaft in a karst cone, to the right of a gully. Very regular in plan section. Entrance is at c. 1030 m a.s.l. The cave was rumoured to go to the coast by some of the young men, but not by Noah who owns the area. Another cave is reported near the summit of Bulu hill. It is of interest because of its location and nature (a horizontal, walk-in cave) and use as a "ples bilong wokim san", that is, for making fine weather magic.

L57. Lematura1. Entrance at c. 960 m a.s.l. Up a side gully from Lematura 2. A 9 m pitch, then hole in rubble floor to a tiny chamber, no go. Birds' nests in alcove. Lematura is the name of the bird.

Lematura 2. A 8 m shaft which is climbable to a rubble floor. The entrance (c. 940 m a.s.l.) is marginal to a major creek bed and fills up in floods.

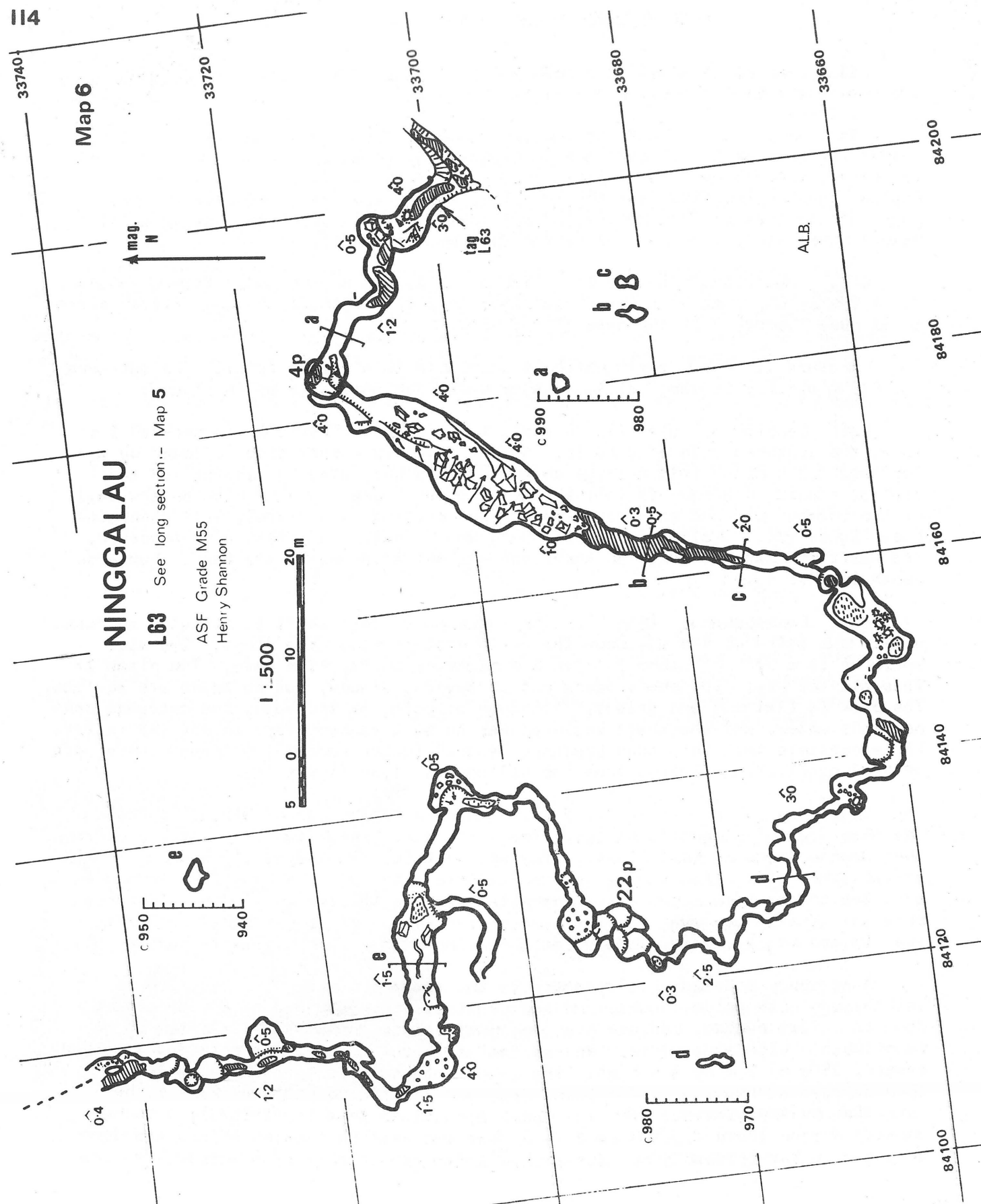
L61. Lenbinbin. (Map 7). A small 1.5 m diameter entrance is perched 6 m above the southern side of a gully. A 20 m pitch to a rockslide followed by a further 12.5 m pitch into a large chamber with a very steeply sloping mud and boulder floor. Drainage is into a small boulder choke. A hole high on the wall of the chamber was not entered. The chamber ceiling is extremely well decorated (see Figure 13). Small unidentified bats and a nesting swiftlet were observed. The swiftlet nest was built on the floor and not attached to the rock. Surveyed depth is 48.5 m.

L62. Lambelubung. (Map 7). The entrance to this shaft is situated approximately one third of the way down the north eastern side of a ridge. The slot entrance (1 m by 3 m) opens into an 8 m diameter shaft, 81 m deep. The pitch is free all the way. The shaft opens out in several places, but no leads are obvious. The base is flat mud and gravel. Although dripping at the base, the entrance does not take water, and the shaft would appear to be a remnant from an earlier relief. It is possible that this cave produces "smoke" (water vapour), although there were several conflicting stories from the villagers. (See Figure 14).

L63. Ninggalau. (Maps 5 and 6). The cave is the den of Ninggalau the "banshee dog" of Bungaring hamlet. The barking of Ninggalau gives warning of an approaching death in that hamlet. The entrance (c. 990 m a.s.l.) is a horizontal stream sink. The blind valley has very little closure. The clay flat continues past the entrance, but the creek channel itself is incised about 3 m. The creek runs practically whenever it rains, being fed by runoff from a local hard clay area in the valley floor. Water was trickling in during most visits to the cave.

A slippery mudslide gives access to the entrance. The first section is walkthrough with pools, rocks, mud and vegetable debris. The cave then closes down to a flat roofed, bedrock crawlway just before an awkward 4 m pitch which is climbable with a handline. Beyond the pitch the cave goes off in an elongated cavern, 25 m by 8 m by 4 m high. The cavern closes down to rubbly crawlway, then narrows at the start of a long, deep and low roofed pool unlikely to be forgotten by any visitor. In high water conditions this is virtually a duck-under. Beyond the pool, the cave is higher and bedrock floored before a sudden drop over water (probably not permanent) which can be chimneyed across. Narrow





winding passage usually with headroom continues the cave to a squeeze caused by a flowstone which had to be chipped to give access. The draught is very noticeable here. Just beyond is a 22 m pitch. The first half is free and most of the rest is a "giant winding staircase" climbable with a handline. The last 4 m is free hanging and needs a separate tie-off (see Figures 15 and 16).



Figure 14. The 81 m pitch in Lambelubung



Figure 15. The stream passage in Ninggalau

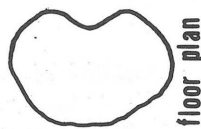
From the foot of the pitch, the cave narrows. Then, after a low chamber with a side passage and a winding channel incised in the bedrock floor, the cave becomes wet with plenty of mud brown travertine formation and pools of water. Then there is a short series of easily climbed drops to the last point where there is headroom and the end of the survey. There is an attractive colonnade, with many columns showing scalloping, but which blocks the dry alternative route. The cave goes on as a belly crawl in the water for another 50 m. At this point, a fallen block obstructs the passage. This is the lowest point. The draught is still strong at the end. Total passage length is 330 m, depth is 66 m (+ 3 m, - 63 m from entrance tag L63).

L64. Meruklu 2. Previously numbered L31a by Wilde (1975). A tight entrance in the northern side of the gully. A 12 m crawl to a squeeze and junction. A stream passage goes 25 m to a chamber with upstream and downstream passage. Downstream passage develops into stable stream passage with flowstone floor. It goes across a 3 m pit and on to a muddy crawl. It finishes in an unstable rockpile with a strong breeze. Human bones located beyond the muddy crawl. A strong wind blast out of the entrance was present in the afternoon (2 p.m. to 3 p.m. observation), but was not observed on the same morning (about 9 a.m.). Located a very short distance to the east of Meruklu 1.

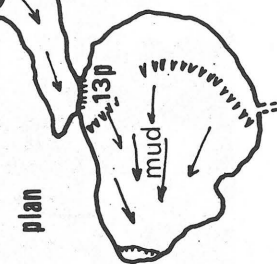


LAMBELUBUNG  
L62

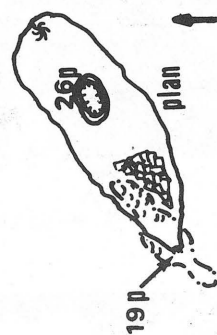
Map 7

ASF Grade M32  
A.L. Brown

floor plan

LENBINBIN  
L61ASF Grade M43  
A.L. Brown

plan

AWATBUMBUM  
L27ASF Grade M43  
R.M. Bourke

plan

KANIMETLAVAU  
L25ASF Grade M43  
R.M. Bourke, J. Webb

floor plan

## Other Village Area Caves

A.L.B.

1:500  
0 5 10 15 mmag  
N

## HIGH PLATEAU (See Maps 2 and 9)

LOWATKUSMERI I karst depression (location: see Map 2; detail: see Map 8)

Located to the north side of the Bungaring-Lemeris track 600 paces E.N.E. of the Dalum turnoff.

1. L54. 4 m deep shaft.
2. Entrance 5 m downstream of (1). 7 m shaft with out draught (11 a.m.).
3. 75 m downstream of (2). 12 m deep cave blocked by rockfall.
4. 60 m downstream of (3). 4 m shaft in gully.



5. L55. Lowatkusmeri Lemet Silot. The cave consists of a series of vertical shafts. Depth is 102 m making it our deepest cave. We gave the name to the cave which translates as "the big hole at Lowatkusmeri". The cave can be entered through either one of two dolines which connect about 25 m underground. Pitches are 17 m, 33 m, 18 m and 7 m. The second pitch required considerable rock-clearing to make it safe before descent. The cave terminates in a tight chamber with a rocky floor. There is a long, tight, muddy passage just above the bottom chamber. Plan passage length is 109 m. (See cover photo.)

Figure 16. Lex in a low passageway, Ninggalau

LARANBUT I karst depression

1. L37. Small earth collapse. Not quite the last hole at the S.E. end. Loose tag on tree only.
2. Five caves and sundry holes - not recorded properly.
3. L65. Cave. Small entrance to 7 m shaft, then ledge opening on to two shafts. One is 2 m in diameter and 8 m deep to rubble choke, the other is 3 m in diameter and an 8 m pitch to a boulder choke, then a further 6 m shaft to a rubble choke. Walls very pitted and sharp.
4. L66. (Map 10). Cave. Entrance on axis of depression and is about 2 m diameter. Drainage is down the vertical entrance shaft which terminates in a

dangerously unstable, but possibly penetrable, rockpile. A downward sloping side passage 5 m down the first shaft drops into a 25 m shaft which begins as a narrow rift and opens into a circular shaft. This shaft terminates in an earth floor. The rock throughout the cave is extremely sharp. Depth estimated at 40 m. A moderate draught was obvious in the sloping side passage. Swiftlets occur in the cave.

5. Cave. Two small holes connect under entrance; 3 m climb through boulders; then 4 m pitch to rubble choke floor.

#### LARANBUT II karst depression (see Map 10)

1. S.E. end. Small clay floored doline, 4 m diameter hole at N.W. end, small hole at other end.

2. Rocky canyon, 2 m by 3 m, 3 m deep.

3. Degraded canyon with two holes.

4. L68. Cave. Entrance in arc of scrappy cliff. A rockpile; squeeze; in under; then 0.5 m diameter passage with travertine lining for 10 m; then 60° angle slot through which 9 m shaft can be seen (not entered). No draught.

5. Cave. Entrances in complex canyon/doline. 6 m climb to rubble choke; then through slot to 3 m climb to bottom. Alternative 3 m shaft from slot. Rock very sharp and pitted. End hole going N.W. Tag number not recorded, possibly L69.

#### LARANBUT III karst depression

1. S. end. Hole, no go.

2. Hole with logs, 4 m to choke.

3. Reverse cliff.

4. L67. Cave. Long canyon, 7 m deep with rubble floor hole at centre of E. side to 7 m shaft, then 3 m climb to choke.

5. Low point of depression. Two small blocked holes.

6. Small rocky hole. N.W. of feature 5.

7. Muddy hole, no go. End hole N.W.

8. Small cave. Start E. branch.

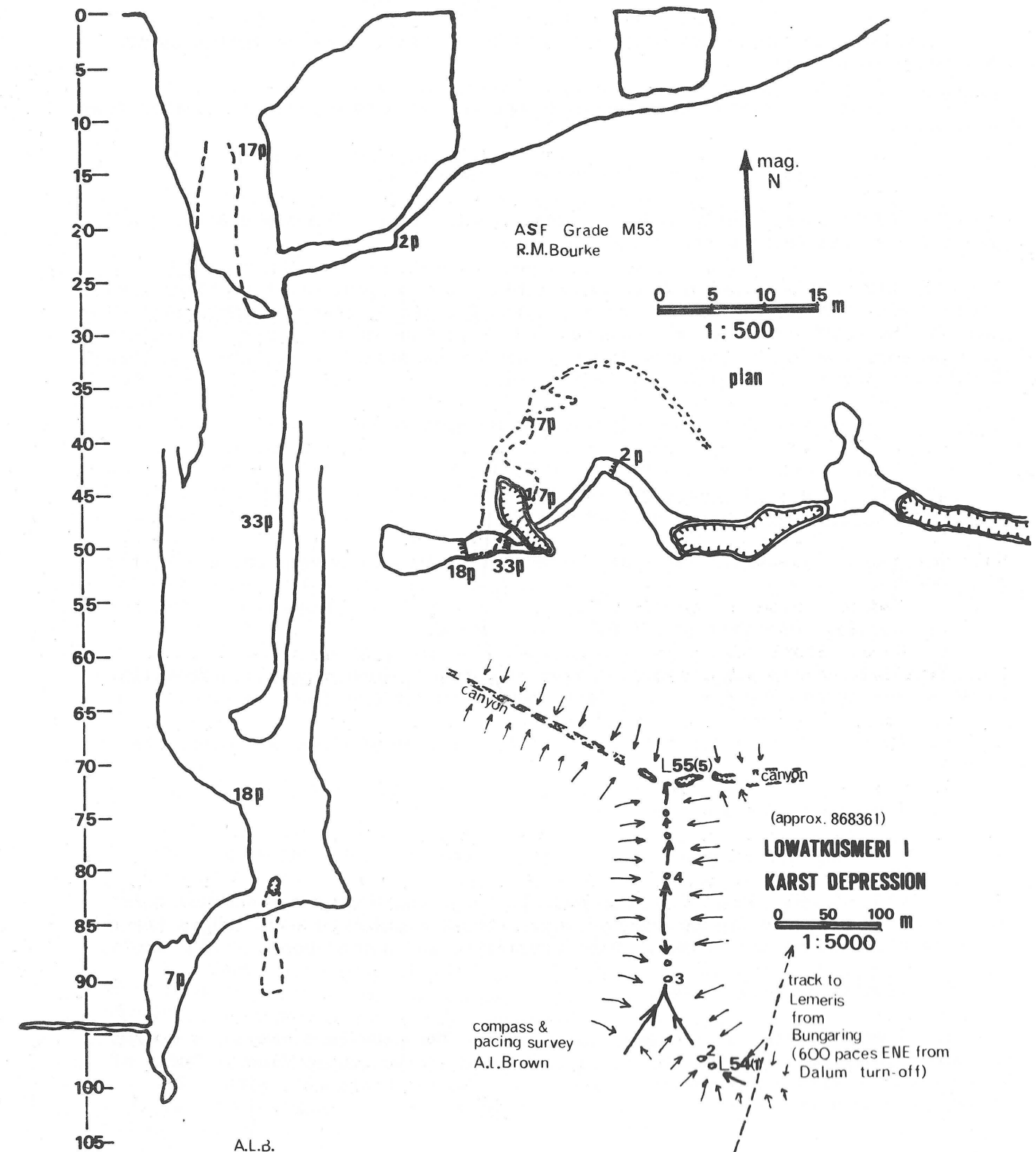
9. Hole.

10. Small horizontal cave.

## LOWATKUSMERI LEMET SILOT

Map 8

L55





LARANBUT IV karst depression

1. S. end. Gully sink. Not visited, but promising.
2. Chain of slot canyons between cliffs, typically 10 m to rubble floor. Not recorded in detail.
3. Cluster of caves and a degraded canyon near saddle. Floors visible from surface.
4. L38. Earth collapse. Tag loose on tree only.
5. L39. Cave. Gully sink, inclined rubble floor. Too tight after 4 m. Walls lined with mossy tufa. Loose tag only.
6. L40. Cave. Substantial gully sink. 7 m entrance pitch to floor with loose rocks then (a) right hand branch, clean 9 m pitch, then through rocks? 2 m down to impossible rock and mud choke. (b) Left hand branch. 8 m nasty pitch to rock choke, which can be seen through for 3 m vertically. Swiftlets go through. Considered diggable. (See Wilde, 1975.)
7. L41. Cave. 5 m rope climb to narrow slot, no go.
8. L42. Cave. 4 m canyon, rubble floor.

LARANBUT V karst depression (see Map 10)

1. Cave. N.E. end. Two holes connecting below. 7 m deep, no go. Small hole nearby.
2. Saddle. Branches go off S.E., S.W. and W.
3. Cave. Start S.W. branch. Group of 3 holes. One no go; others elliptical shafts connecting 8 m down. Cave chokes 4 m further down.
4. Cave. 5 m rope climb to rubble floor, two no go holes in floor. No draught.
5. Two holes, one 3 m deep.
6. Hole 5.5 m deep, 1 m wide at bottom. Chokes. S.E. end hole.
7. L73. Cave. Start S.W. branch. In large earth doline, entrance hole at S. end. 5 m rope climb to rubble ledge; then 7 m pitch to next ledge; then 5 m rope climb to bottom; choke. Some travertine and animal bone. 1-2 m shaft.
8. Cluster of three holes.
9. Cave. Cluster of 5 holes, gully sink. The cave is a canyon, 9 m drop to rubble floor then (a) 5 m shaft or (b) 7 m shaft to rubble floor. North of this is a hole with a 3 m entrance pitch, then impenetrable wall slot. The largest of the holes to the south is 7 m deep. End S.W. branch.

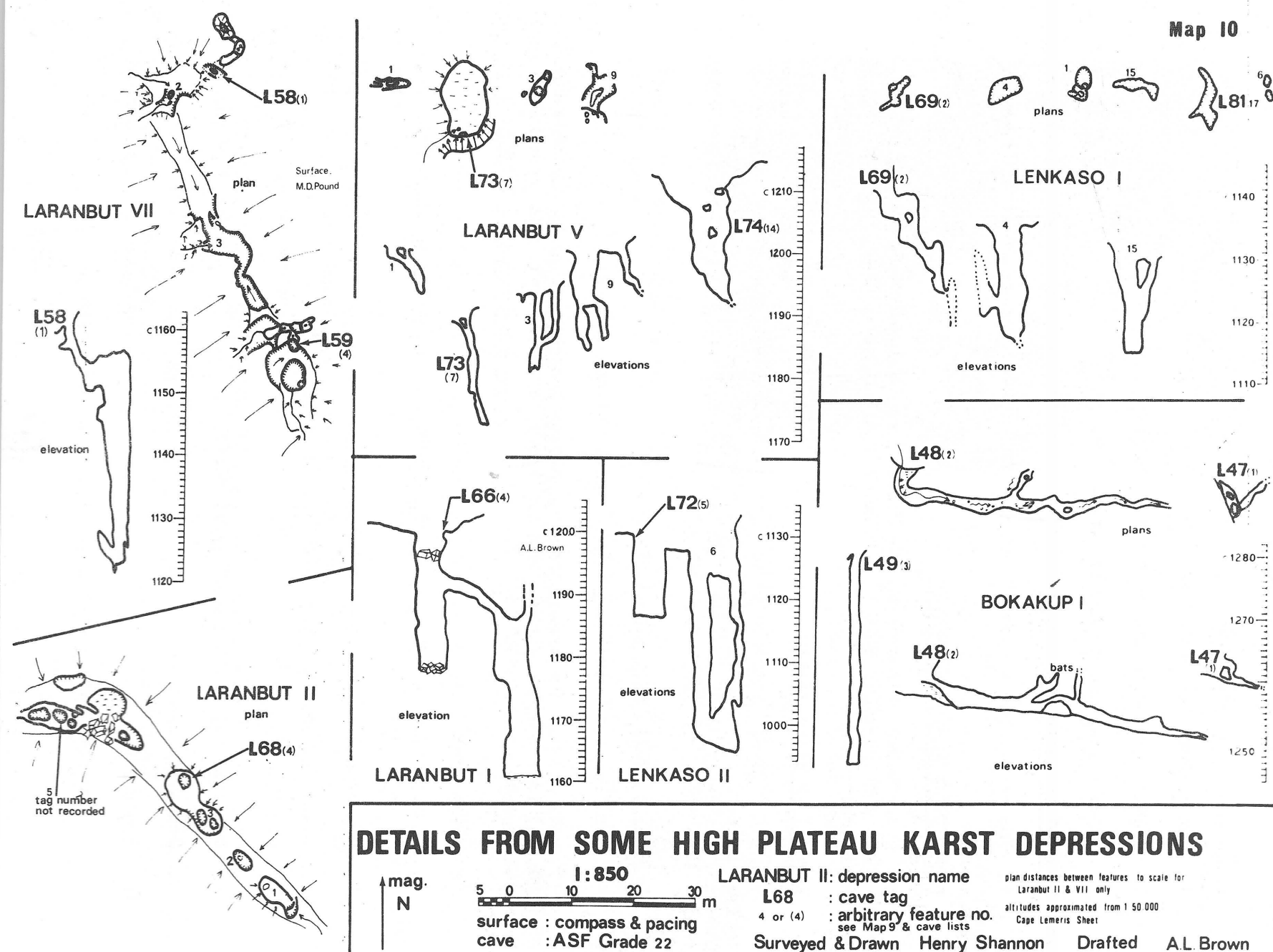
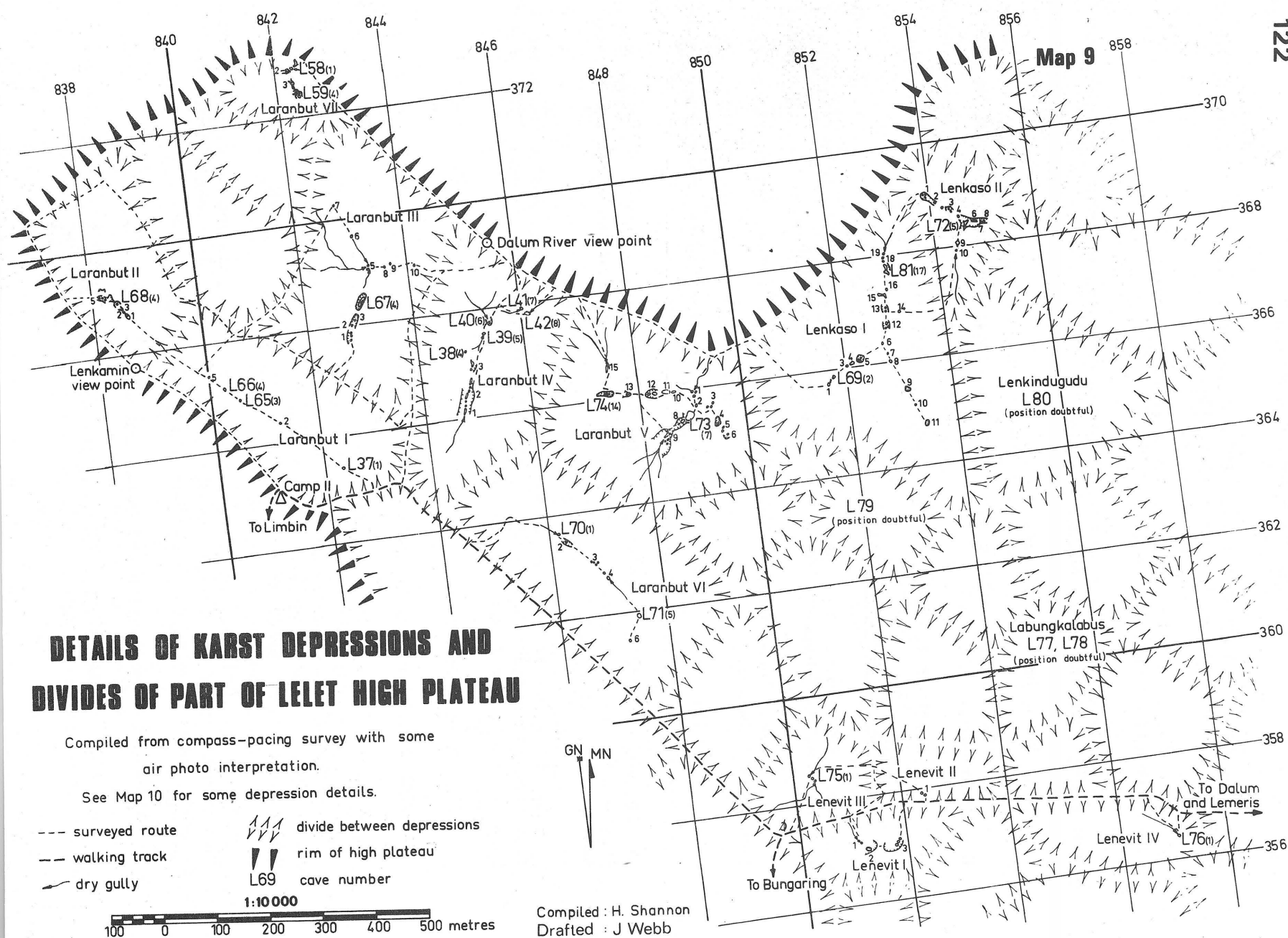
10. Cave. Start W. branch. 4.5 m entrance canyon 1.8 m diameter; floor of vegetable debris; small hole to 5 m climb.
11. Cave. Canyon 7 m long, 1.5 m wide, 9 m deep; then 5 m shaft at E. end to vegetable debris floor.
12. Cave. 3 m pitch to boulder choke, then (a) 4 m shaft and (b) another 4 m shaft, both ending in boulder chokes.
13. No go hole in alcove.
14. L74. Cave. 18 m pitch to rubble floor; two rock bridges, no go. End W. branch.
15. North of feature 14. 5 m canyon, not entered. Gully sink nearby.

LARANBUT VI karst depression

1. L70. Cave. 13 m free climb shaft into narrow rift, continues down for another 3 m, not checked. Sharp pitted walls, no draught.
2. Cave. Open fissure 10 m deep, 3 m wide, 6 m long; earth floor. Two impenetrable holes.
3. Complex of at least four entrances, all too tight; sharp rock. Not checked.
4. Cave. Vertical shaft with slight cool air draught. 15 m deep, 2 m wide to rocky floor. 8 m chimney from base of pitch; narrows to impenetrable squeeze; awkward. No draught.
5. L71. Cave. Boulder choke entrance to 13 m pitch ending on ledge; 3 m drop through narrow chimney not negotiated. Jagged awkward sides. Does not look promising; no draught. Old travertine on main shaft.
6. Undescribed hole.

LARANBUT VII karst depression (see Map 10)

1. L58. Cave. Inconspicuous entrance, upslope from a gully sink complex. 3 m shaft to ledge with logs leads directly into 7 m inclined pitch, into rubble floored chamber; then short archway through to 28 m pitch. Rubble floor with pig skeleton. Impenetrable hole goes down 1.5 m. Large active stalagmite near bottom. Knobbly travertine common on big pitch. Depth is 39.5 m.
2. Cave. Entrance in gully sink complex. Short climb to rubbly chamber; then through rocks to similar chamber with 5 m shaft, not negotiated. Slight draught, looks promising. Very sharp, brittle, jagged rock.
3. Gully sink complex and small cave.
4. L59. Cave. Gully sink complex with cliffs. Two canyons connect below, then horizontal branch passage. Total length 15 m.





LENEVIT I karst depression

1. Gully sink, two small holes.
2. Biggish canyon in arc of cliff. No go.
3. Three holes, one a sizable canyon. No go.

LENEVIT II karst depression

1. Two holes, one 6 m shaft, no go. Other 4 m hole, climb in with two small avens.

LENEVIT III karst depression

1. L75. Cave. Three entrances at low point between two gully sinks. Short climb into chamber; then 10 m pitch 2 m in diameter; then 5 m climb to end in boulder choke.

LENEVIT IV blind valley

1. L76. Cave. Entrance at sink of substantial gully, only shallowly incised below plateau level, which runs after most showers. Horizontal cave passage, mostly crawlway. Water visible in two holes during visit (it was raining). 10 m long, 5 m deep, 120° trend.

LENKASO I karst depression (see Map 10)

1. S.W. corner. Cluster of three small dolines in gully.
2. L69. Cave. 3 m climb; then 4 m pitch; narrow passage to 3 m chimney; slot (no go) into another visible shaft. Sharp, brittle rock. Tag possibly recorded wrongly (see LARANBUT II 5).
3. Small doline.
4. Cave. Big canyon entrance; 18 m shaft all in daylight. Mud choke floor with small hole.
5. Doline with three no go holes.
6. Small doline. Junction with S.E. branch.
7. Blocked canyon.
8. 5 m deep hole. At top of small cliff.
9. Doline in clay.
10. 5 m shaft.
11. Rock walled doline with clay floor, end S.E. branch.



Figure 17. Leigh abseils into a high plateau cave

12. Cave. Low point of depression. 8 m climb through rockpile. Start N. branch.

13. 4 m deep rubble choke.

14. 1.5 m diameter canyon, 6 m pitch, rope climb, narrow slot in side. E. of feature 13.

15. Cave. E.-W. slot canyon, divided by boulder bridge. 12 m rope climb to sloping rubble floor with vegetable debris. Ends in a choke with a faint draught. 15 m deep. Old travertine formations.

16. Small earth collapse.

17. L81. Cave. N.-S. zigzag rift 10 m deep. Rope climb to rubble floor with earth and vegetable debris; small hole off for 1.5 m then too tight, no draught. Animal bones present.

18. Cave. Two oval canyons, each 2 m by 1 m, connect 9 m down; cave continues to 24 m depth. Rubble floor, no leads.

19. Small doline/blind valley. End N. branch.

LENKASO II karst depression

1. N.W. corner. Big clay floored doline with three choked holes.
2. 2.5 m deep hole, no go. Clifed gorge between this and feature 1 above.
3. Cluster of four holes, the largest with an arc of cliffs around it and 4 m deep with horizontal passages off.
4. Cluster of small holes.
5. L72. Cave. (Map 10). 13 m canyon. Low point, junction of N.W., E. and S. branches.
6. Cave. (Map 10). Big double canyon between cliffs. Shafts connecting at bottom. E. shaft a clean pitch of 32 m. W. shaft is 34 m deep, interrupted by two ledges. Rubble floor. Start W. branch.

7. 5 m hole, choked.

8. Cave. 5 m climb to boulder choke, small chamber; 2 m climb through choke to loose ledge; 5 m rope climb down 2 m diameter shaft ending in rock choke. Sharp, pitted, brittle rock. End W. branch.

9. Cave. 15 m canyon, rubble floor, all in daylight. Start S. branch.

10. Gully sink; two small holes. End S. branch.

#### LENKASO karst depression

The position of this depression is doubtful. The following features are in the depression next to Labungkalabus.

1. Small hole 5 m deep and 1.5 m diameter at the entrance.

2. L79. 50 m N.W. of feature 1. Entrance in gully. Shaft 10 m deep, 1 m diameter. Very fragmented rock.

#### LABUNGKALABUS karst depression

1. L77. Cave 100 m west of Bungaring-Lemeris track. A 10 m crawl leads into a chamber 5 m wide, 9 m long and 4 m high.

2. 80 m N.W. of feature 1. Three entrances lead to a single mud and rubble chamber.

3. 30 m N.W. of feature 2. A small chamber 2 m deep.



Figure 18. The move from Camp I to Camp II. Note taro garden in the bottom of doline in background

4. About 150 m N.W. of feature 3. A steep gully/doline leads into an unenterable sink. There is a 25 m cliff on the N.E. side.

5. L78. Cave. A gully leads into a narrow passage which slopes downwards for 10 m at 40°. Then a 5 m climb to the top of a 7 m pitch, 2 m in diameter. Ends at the base of pitch in a mud choke. Unstable cave. 18 m deep.

6. 300 m N.W. of feature 5 along a stream gully. Doline 7 m deep in gully and 4 m diameter at top.

#### LENKINDUGUDU karst depression

1. L80. A canyon 26 m deep and about 20 m long at the surface. Choked off.

#### BOKAKUP I karst depression (location: see Map 2; details: see Map 10)

1. L47. Cave. Entrance at c. 1260 m a.s.l. Sink of watercourse from one area of the complex, clay floored depression. Entry through two holes with overhang connecting to streamway from the side. A horizontal crawlway which narrows down after 7 m. Draught present.

2. L48. Cave. Entrance at 1260 m a.s.l. Sink of a substantial watercourse which runs across the clay floor of the depression, much larger than the one that feeds feature 1. The entrance is large but the cave degenerates from stoopway to crawlway. There is a short rising branch to the left, cave narrows, then becomes too tight where a fallen block is in the way. Slope is gentle, perhaps 10 m fall in 50 m of cave. Draught is still obvious at the end. About 200 torpid bats of a large Rhinolophid species present.

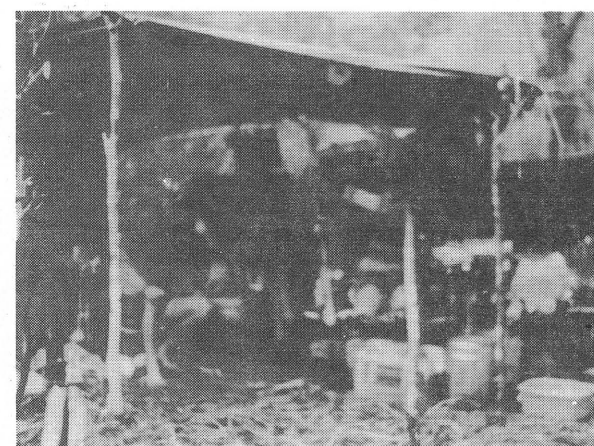


Figure 19. Camp I in heavy rain

3. L49. Cave. Entrance at c. 1280 m a.s.l. Shaft 33 m deep in hillside. Plan section 1.8 m, very regular with vertical grooves. Walls covered with algae at top, appear to be cave fill. Many swiftlets inside. At the bottom a rudimentary watercourse exits through a slot 2 m high by 0.2 m wide.

#### NORTHEAST COAST

N32. Kameribuk. (Map 11). This extremely interesting cave is located near Konogusgus village. Wilde (1975) recorded the name Buangmeriba for the cave. The entrance is 11 m wide and is on the side of a hill. There are swiftlet nests on the roof near the entrance. In the first chamber there is an old sleeping area said to have been used during the war when people hid in the cave. The remains of an amateur archaeological dig made by a local plantation manager can be seen near the left hand wall.

In the second chamber is located the rainmaker's equipment. A certain "big man" of the village comes to the cave and is said to be able to make rain by performing the correct magic. In the centre of the chamber, just below a daylight hole, is an enclosure 3 m long, 1.5 m high and 1 m wide. It is enclosed on three sides by timber and leaf walls. Inside is a coffin shaped enclosure made of stones with a human skull in it. Nearby is a large clam shell with four human leg bones in it.

There are paintings in two locations on the walls in the form of a number of hand stencils done with black paint against the white cave wall. In a corner

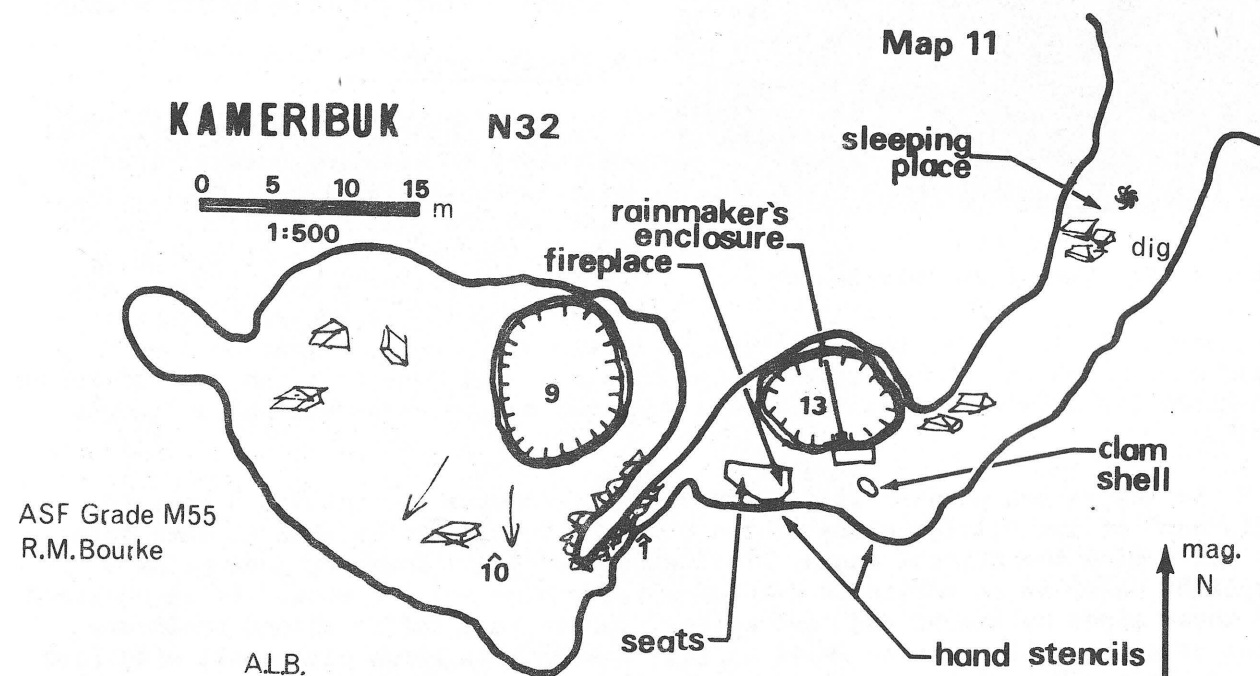


of the chamber a fireplace is surrounded by low timber seats. We were told that this is used for rain making ceremonies. Our enquiries about the ceremonies did not yield much information, except that the magic works.

A crawlway leads to the final chamber which has another large daylight hole and is inhabited by flying foxes. As well as flying foxes and swiftlets, the cave is inhabited by small insectivorous bats.

N33. Efflux caves of the Dalum River. At Dalum village, there is a large resurgence which was running at about 10 m/sec in August, 1975. It is said to become muddy and to flow at a higher rate when it is very wet on the plateau. The water is cold.

The river effluxes from a series of caves and springs some 400 m from the sea. One cave was followed for some 50 m before being abandoned because of lack of time. The passage is a metre or so wide and 2-3 m high. The water was 1-3 m deep, but it was possible to keep out of the water by walking on the walls.



## EQUIPMENT

**Ropes.** For vertical caves, the single rope technique was used exclusively. No ladders were taken to the Lelet. Approximately 500 m of Bluewater II 7/16" nylon rope, 50 m of 11 mm Mammut rope and 100 m of Kinnears 12 mm terylene rope were taken. All rope was owned by the expedition members except for the latter which had been lent by the 1973 Niugini Speleological Research Expedition. Most ropes were 45 m long, but one length of 90 m and one of 70 m were available. All ropes performed as required with little sign of significant wear.

**Vertical equipment.** Jumars and whaletail descenders were used by most members. All were satisfied with their equipment, but one problem developed that has not been reported elsewhere. Under extremely muddy conditions, difficulty was experienced with the jumar cam jamming shut on the rope. Occasionally it could only be moved with an upward blow of the hand. Many adopted the procedure of using the jumar as a safety belay on the rope while abseiling long pitches (see Figure 20).

**Protectors.** Seventeen canvas rope protectors were manufactured before the expedition. These consisted of variable lengths (0.5 m to 1 m) of double thickness canvas about 20 cm wide, which were wrapped around the rope and held with "velcro" (hook and eye fastening material). The protector was fixed to the rope at points of contact with the rock by prussik loops of small diameter rope. The protectors were superb, even under the most adverse conditions. The "velcro" held even if coated with mud before fastening. These protectors completely outdate other types such as split hosing.

**Bolting.** Bolting was essential in the Lelet caves. In some locations, the rock was severely pitted and razor sharp. Where suitable tie-off points could not be located, it was necessary to hang the rope off the wall to avoid difficult protection situations.

**Clothing.** Most expeditioners caved with only one layer of clothing, shorts and singlet or similar, under overalls. However it was felt that if longer durations underground were to be experienced, particularly with long waits at pitches, warmer clothing such as long-johns would have been desirable. Gloves were essential to avoid lacerations on the sharp rocks.

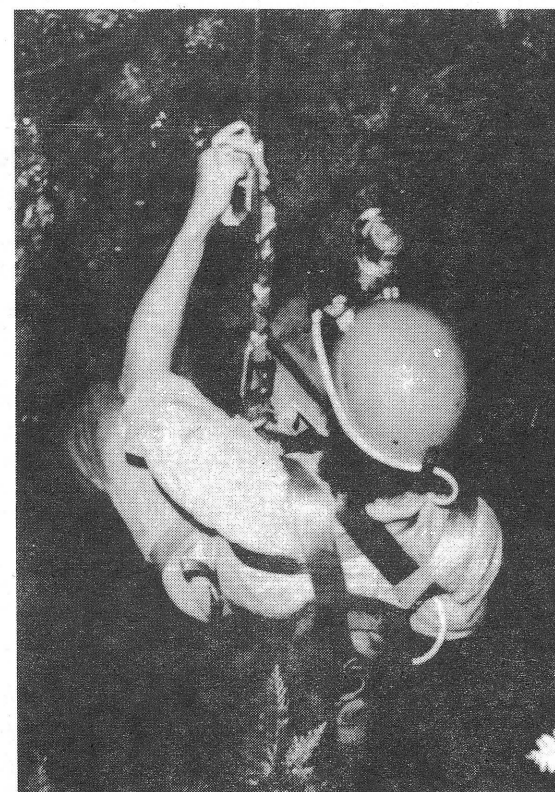


Figure 20. John abseiling the entrance pitch of Lenbinbin

Most took anoraks and found them useful, although some did not wear them at all. A jumper or warm woollen shirt was necessary. Air mattresses were not taken nor were they missed.

**Lighting.** Carbide and electric lamps were used by all expeditioners, and on any major venture underground both forms of lighting were carried. Both lamps were carried on the helmet. By mounting the lamps on separate brackets on the helmet, rather than both on the same bracket, it was possible to reduce the forward tilting moment (see Figure 20). Battery packs, holding Alkaline D cells, were specially manufactured for the expedition. Discarded miner's lamp wet cells had had the acid and lead removed, and were reamed to enlarge the internal volume to a size and shape where two commercially available D cell holders could be fitted. These holders held three D cells each, and were connected in parallel to provide 4.5 V to the headlamp. Standard wet cell battery covers fitted over the modified battery case. In this way each expeditioner used his own standard miner's lamp headlamp, cable and battery cover, merely replacing his wet cell with the modified battery pack. The dry cell battery pack was considerably lighter than the replaced wet cell, and with care, provided up to 20 hours lighting. This system eliminated the two major problems of "home-made" dry cell lighting of providing a reliable on-off switch and a strong connection between cable and battery. Both MSA and Oldham lamps were adapted, and some old Nife cells were also used.

**Surveying.** Suunto compass and clinometers and "fibron" tapes were used exclusively. Metal tags were fixed to caves using a hand drill and masonry nails. At no time did tagging slow cave exploration. It is felt that permanent tagging of caves by expeditions in remote areas is very important because the time span between visits by cavers to such areas may be measured in decades. Without tagging, the relocation of caves already explored, and an accumulation of knowledge about an area, will be much more difficult.

**Carrying.** On the plateau carriers and guides were employed as necessary. Very little difficulty was experienced in employing people. However the availability of villagers is very dependent on other activities, such as feasts, occurring at the same time, as the population is small. On both reconnaissance trips and when our party was leaving the plateau, some problems were experienced obtaining guides or carriers. Detailed knowledge of any particular area, especially of the high plateau, is confined to only a few people so we changed guides from time to time as we moved to different areas. Wages were K2 per day plus smokes. When employees are camped away from the villages, rations have to be issued. People prefer not to work on Sundays.

Some 870 kg of gear was taken in and 420 kg out from the plateau. Packs ranging from H-frame back packs to copra sacks were used to ferry goods on the surface. Villagers were prepared to carry virtually any form of load (15 to 20 kg) and back packs were not necessarily preferred (see Figure 18). Small underground back packs based on a design by Neil Montgomery (Sydney Speleological Society) were used extensively to carry ropes and equipment in caves. They were an essential part of the expedition equipment. The canvas material had begun to deteriorate by the end of the expedition through the abuse that these packs necessarily received.

**Photographic equipment.** Five brands of 35 mm SLR camera were taken on the expedition. All performed satisfactorily. Electronic flashguns and one bulb flash were used for underground lighting. Synchronization sometimes failed in wet cave conditions, and mostly open shutter flash shots were used. Condensation of water vapour from cavers' clothes and breath produced fog, and maximum separation of the camera and flashgun was found desirable. In those cameras (most) not kept in plastic with silica gel, trouble developed with the film sticking to itself on the wind-on spool, preventing rewind. Many films had to be rewound by hand in a sleeping bag, and a changing bag would have been a useful piece of equipment. As a result of sticking, blue humidity streaks affected many films. One solution was to use a roll of 20 exposure film on the one day, rewinding it as soon as possible. High speed Ektachrome or Ektachrome colour transparencies were the types of film mostly used. The higher speed was most necessary for surface photography in the rainforest.

#### FOOD AND CAMPING

**Food.** Some 300 kg gross of food was taken, calculated as sufficient for 200 man-days for the cavers and 125 man-days for employees, with generous quantities of vital items to allow for airdrop losses.

The ration for our employees was 450 g of rice, 140 g of tinned mackerel, 2 cabin bread biscuits and 10 cigarettes daily, plus tea and sugar. The cavers' breakfast consisted of breakfast cereal such as muesli or cornflakes followed by tinned baked beans or spaghetti or reconstituted egg powder. Lunches were based on biscuits and spread. Dinner was more varied, but was usually soup followed by a main course of one-pan dinner or dehydrated meat or a stew of tinned meat and local vegetables. Dessert and beverages finished off the meal.

The most popular food item was "Snack Paks", a 140 g tin of ready-to-eat dessert, closely followed by muesli. Hot bread prepared from a commercial mix was also disposed of most eagerly. Tea was the most popular beverage. We put away 1 kg of chocolate a day between us. Some local food was purchased and made a welcome change in our menu. However this was only possible when we were operating near the villages as the people did not bring much food to our camps for sale. Most cooking was done over open fires although a gas stove, two shellite stoves and two solid fuel stoves were taken. A copy of the food list with quantities taken and comments is available from the leaders.

**Camping.** Previous experience had shown that conventional tents were not necessary. We constructed wall-less shelters from a framework of saplings and 3 m wide polythene sheeting. We took 35 m of polythene which was adequate. Waterproof tape for joining the plastic was essential and the best design for the roofs involved the elimination of cross beams which tended to cause water to collect on the roof. Our Liit base camp consisted of the following structures: a large communal hut cum food store with a table inside; two sleeping lean-tos where personal gear was stored; a caving equipment store; a comfortable sit-down toilet; and assorted benches, tables and fireplaces. The Laranbut camp was slightly more modest, but was nevertheless quite comfortable. The multi-purpose 20 litre drums originally acquired for the airdrop served as seats as well as water and food containers. (See Figure 21.)





Figure 21. Camp I at Liit

The Liit camp was located near a good water supply, but being in a gully, it was somewhat damp and suffered from lack of sunlight. The Laranbut camp was located on the edge of the escarpment of the high plateau at c. 1240 m altitude and was extremely pleasant. Because of the lower temperatures, our guides preferred to camp lower down at a hut at Putnu. There was no water at the Laranbut camp and our guides carried water up daily, from a temporary pool at Putnu or from Limbin. We used about 50 litres daily for cooking and a little washing. If rain water were to be collected as the only supply for a camp, a large storage facility would have to be provided to allow for several days of dry weather.

One possibility would be to dig a pit and line it with plastic. A satisfactory conduit from a hut roof to the pit would be difficult to provide from bush materials.

In general we ate very well and our living conditions were comfortable. This paid off in that the entire party was out caving almost every day and our employees were contented.

#### MEDICAL

The contents list of the first aid kit together with comments on the usage of the various items (Appendix 1) indicates that no accidents occurred. Almost everyone suffered from minor infections or scratches; only Paul had a more serious infection which Mysteclin cleared up. Scratches were treated daily with topical antibiotic powder. More band aids would have been useful as they are very convenient for small cuts. Most members of the party contracted a cold at some stage on the trip; Paul spent a day in bed recuperating. This was the only day lost due to sickness. The only medical treatment requested by the villagers we employed was bandaging for cuts on their feet and legs, and the odd disprin. All cavers took antimalaria tablets before and during the expedition.

There was no gastroenteritis problem. This may have been good luck or it may have been prevented by the use of a disinfected hand wash after toilet use. In the Liit base camp, rats became a serious problem by the second week and our food had to be stored in closed airdrop containers. It is possible rats could transmit serious diseases and provision should be made for rat control on future trips.

#### CONCLUSIONS

The Lelet is well worth a return trip. There is no area of such potential in Papua New Guinea with such good access; the villagers are friendly and helpful; the climate is pleasant; local food is available; the karst topography is interesting; there are no particular health hazards; and most especially - the potential for caves of world class depth is undoubtedly there. One has to but stand on the edge of the coastal scarp and look at the Dalum resurgence on the coast only a few kilometres away and over 1200 m lower to be convinced of that. Access has improved since we were in the area and by now the road has been put through to Limbin, although the road can be expected to become unusable after prolonged wet periods.

In what area should a party operate on the next trip? The immediate areas around Lenkamin village and our camps at Liit and Laranbut are more or less caved out. The villagers know of many more entrances near Limbin, Kaluan and Lowatkana villages. The promising cave at Musumuras (L19) near Lowatkana has not been completely explored yet (Bourke, 1974). The greatest depth potential

exists on the high plateau, and most of it has not been looked at by cavers. We explored less than one per cent of it. At Lababat above Lavalos there is a permanent water supply which may be a good place to establish a base camp. Opinion was divided as to where effort could best be put. Lex likes the area just down from the edge of the coastal scarp. He feels that cave prospects might be better towards the escarpment where steeper gradients may encourage surface stream flow. Henry is keen on the fault that runs towards Lemeris and on the dolines seen adjacent to Lakuna's hunting track. The caves from which the resurgence at Dalum emerge should be pushed.

A party size of eight was found quite suitable. Future party size should not be much smaller and should be preferably slightly larger. The advance party was well worth the additional expense and is recommended for future trips.



Figure 22. Paul prussiking in Lenbinbin

## ACKNOWLEDGEMENTS

The following companies kindly assisted us by donating some of their products thus reducing the cost of the expedition for participants:

Cerebos (Australia) Ltd.; H. J. Heinz Company Australia Ltd.; Mallory Batteries (Australasia) Pty. Ltd.; The Nestle Company (Australia) Ltd.; Kellogg (Aust.) Pty. Ltd.; Cadbury Schweppes Pty. Ltd.; Foremost Consolidated Pty. Ltd.; Rheem Australia Ltd.; and Alcan Australia Ltd. John Swire and Sons Pty. Ltd. gave us free shipping between Brisbane and Rabaul; Steamships Trading Company in Rabaul gave a discount on food purchased there; Crowley Airways Pty. Ltd. gave a discount on air charters and their senior pilot in Rabaul, Ren Fernmore, gave excellent assistance.

As well we are indebted to the following who assisted in various ways:

Mr. Kipling Gombo of Civil Defence and Emergency Services, Port Moresby who arranged a loan of a transceiver and batteries; Mr. Emery Fekety of Civil Defence in Rabaul who held a radio sked daily and Mr. John Hunter of Kokopo who assisted in relaying at times; the University of Queensland Speleological Society for the hire of ropes and the loan of the first aid kit; the 1973 Niugini Speleological Research Expedition for the loan of packs and some ropes left over from their expedition; the Tasmanian Aero Club for advice on airdrop procedures; Jim Grose of Kamiriba Plantation who lent his truck for transportation on the New Ireland coast and from whom we hired plantation labourers to carry our gear up to the plateau; Phil Toomer in Sydney for picking up gear there; Jean Bourke for hospitality at Keravat before and after the expedition; Helen Tew in Brisbane for assistance in manufacture of underground packs; Neil Montgomery in Sydney who provided the pack design; Lesley Brown in Brisbane for assistance in preparation of expedition equipment; Steve Freeman in Rabaul who drew up our evacuation fund agreement; Ian Hotschilt at Vunapope for assistance in hiring the work boat; Brian Holt in Cairns for a donation; the staff of the Civil Engineering Laboratories, Uni. of Qld. for advice on the construction of underground lighting equipment; and Glen Pure of Brisbane who assisted with printing some of the photographs.

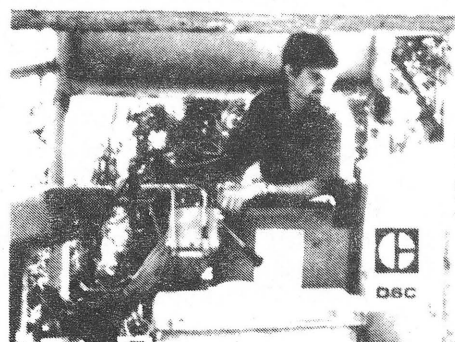


Figure 23. Dave Larkin on the bulldozer going up to the Lelet

Dave Larkin and Heather Anderson of Lamerika Plantation provided much hospitality, general help and transportation on the New Ireland coast. Without all their kindness, our time on the coast would not have been so enjoyable. Most of all we wish to thank the Lelet villagers who acted as guides and carriers, gave us gifts of food and in general befriended us, especially Lakuna Ismel who took us under his wing, our other guides Thomas Palait, Lentuan Mesulan, Noah Kiaptabu and Manase Manangong and our other employees Stephen Gamu, Lilikas Paulo and Ezekiel.

## APPENDIX 1. CONTENTS OF FIRST AID KIT

4	triangular bandages .....	Not used
4	crepe bandages, 5 safety pins .....	Not used
17	gauze bandages (10x3", 3x2", 4x1") .....	Not used
8	rolls Leukoplast (3x3", 2x2", 3x1") .....	Used: 2x1", 1x3", 1/2x2"
3	rolls 3" Flexiplast .....	Not used
8	doz. Band-aids .....	All used
3	doz. butterfly closures .....	Not used
1 1/2	rolls cotton wool .....	Used: 1 roll
1	pkt lint .....	Used: 1/2 pkt
1	roll micropore .....	Not used
1	tin paraffin gauze .....	Used: 1/4 tin
20	sterile dressings .....	Not used
	Sterile dressing pack (forceps, swabs, pad) .....	Not used
1	syringe .....	Not used
1	pkt needles, 1 needle holder .....	Used
2	pr. scissors .....	Used
3	pr. forceps .....	Not used
3	scalpels, 1 scalpel holder .....	Not used
4	sutures .....	Not used
1	medical glove .....	Not used
	Tourniquet rubber .....	Not used
1	eye dropper .....	Not used
	First aid book .....	Not used
4	pkts (140) aspirin .....	Used: 10
1	pkt (50) disprin .....	Not used
56	Lomotil (for diarrhoea) .....	Not used
10	Mebinol Complex (for diarrhoea) .....	Not used
2	containers Cicatrin (topical antibiotic) .....	Used: 1
5	containers Neosporin (topical antibiotic) .....	Used: 1 1/2
1	bottle Butesin Picrate (burn ointment) .....	Some used
1	bottle Lysol (disinfectant) .....	Some used
1	Xylccaine jelly (topical anaesthetic) .....	Some used
45	Mysteclin V tablets (antibiotic) .....	Used: 14
64	Penicillin V tablets (antibiotic) .....	Not used
1	tube Daktrin (anti-fungal ointment) .....	Used
1	tube Fungilin (anti-fungal ointment) .....	Not used
1	tube Ultralan-D (antihistamine cream) .....	Not used
50	Avil Retard tablets (antihistamine) .....	Not used
10	Phenergan tablets (antihistamine) .....	Not used
40	Digesic tablets (pain killer) .....	Not used
20	Novalgin tablets (pain killer) .....	Not used
100	Coloxyl tablets (anti-constipation) .....	Not used
100	vitamin tablets .....	Used: 80
1	tube Golden eye ointment .....	Not used
1	tube Savlon .....	Used: 1/2 tube
1	container baby powder .....	Some used
3	air splints (1 full arm, 2 full leg) .....	Not used



## APPENDIX 2. AIR DIRECTIONS TO THE DROP SITE ON THE LELET

From Rabaul track along the southwest New Ireland coast. Kalili is easily recognizable from its location on a circular bay. At Kalili turn due north. Once over the escarpment, Lenkamin village with its row of iron roofed buildings is seen off to the right of the aircraft. The airdrop ridge is located one ridge to the east of the ridge on which Lenkamin is situated. Airdrops should be made from south to north, with a left hand circle.

## REFERENCES

- Bourke, R. M. (1974). Some Caves of the Lelet Plateau, New Ireland. Niugini Caver 2(3):212-221.
- Bourke, R. M. (1975). An Aerial Look at the Lelet Plateau, New Ireland. Niugini Caver 3(2):62.
- Brookfield, H. C. and Hart, D. (1966). Rainfall in the Tropical Southwest Pacific. Australian National University, Dept. of Geography Publication G/3.
- Hohnen, P. D. (1970). Geology of New Ireland. Bureau Mineral Resources Record 1970/49.
- Wilde, K. A. (1975). More Caves of the Lelet Plateau - New Ireland. Niugini Caver 3(1):6-12.

\* \* \*

## THE NEW CONTRIBUTORS

Lakuna Ismel is a villager from the Lelet Plateau of New Ireland. He is deeply involved in traditional life on the plateau and is a village headman. He regularly visits and uses caves on the plateau.

Henry Shannon started caving in 1959 and has subsequently become one of the best known cavers in Australia. He has caved all over Australia, particularly in N.S.W. and Queensland, and in New Zealand. He came to P.N.G. for the '75 Lelet expedition. His main interests are underground geomorphology and hydrology, but caving interests cover a very wide field. He is a member of the Sydney University Speleological Society and the University of Queensland S.S.

John Webb has been an active caver and member of the U.Q.S.S. since 1971. He is especially interested in vertical caving and is also a rockclimber. He came to P.N.G. to participate in the 1972 New Britain expedition and again for the '75 Lelet trip.

Paul Wilson is an ex-British caver who settled in Chillagoe several years ago to explore the caves there and work as a cave guide. The Lelet trip was his first P.N.G. caving. He is a member of the Chillagoe Caving Club and the Harwell Exploration Group (England).

\* \* \*