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Contents

	<u>Page</u>
Introducing "Niugini Caver".....and This Issue	1
Bibima Cave, Porol Escarpment, Chimbu District. Kevan Wilde and Van Watson.	2
The Hinderburg Wall. Malcolm Robb.	7
The Contributors.	8
The Caving Scene.	9
Loniu Cave, Los Negros Island, Manus District. H. Gallasch.	10
Caves of New Britain. A Preliminary Report. R. Michael Bourke.	13

INTRODUCING "NIUGINI CAVER"

It has been evident for some time that a fair bit of caving is going on around P.N.G. but mostly it is not being recorded or published in a readily available form. It is also apparent that the cavers do not know what is happening elsewhere except when someone breaks a depth record or is injured on a trip and makes the "Post Courier". To fill this gap a P.N.G.-wide Newsletter produced on some sort of rotational basis was suggested. The Rabaul cavers have started it off.

We hope to report on caves and trips that otherwise would go unreported, to let other cavers around P.N.G. and overseas know what's happening on the speleo scene; and even to import a few facts and ideas.

So we want articles on Niugini caves. Anything from a review paper on Pleistocene petrography and phenocrysts to a trip report on the time you got lost in a 10m. overhang. We are mostly metric by the way.

Just one more thing. Niugini Caver isn't backed by any formal caving group so some coin to cover costs would be appreciated. Say \$2.00 for a year's subscription. Sorry, but we can't produce a newsletter and send to you otherwise.

.....AND THIS ISSUE

The Southern Hemisphere cave depth record has been held by the Kiwis for a while now. When a party of four bottomed Bibima Cave near Kundiawa at 494m. last August, the record went to P.N.G., and it looks like staying here for a while. The report on the cave and the first descent is given by Kevan Wilde and Van Watson.

Probably the wildest karst area around is the border country between Papua and the N.G. Trust Territory in the West Sepik and Western Districts. Malcolm Robb had a first hand look at the Hindenburg Wall at Kennecott's expense and he gives a graphic description of the country.

We have some caving news from all over also ("The Caving Scene"). Like the man said earlier - "cavers do not know what is happening elsewhere" - and that includes the editor. So let us know your news.

Very little has been published on caves in the Manus District (only papers still in press by P.W. Williams come to mind). Harold Gallasch describes Loru Cave on Los Negros Island.

Despite the fact that the New Britain karst is extensive, it has received very little attention. Michael Bourke reviews the limited literature and summarizes information on 'known' caves on the island. This paper is a reprint with some alterations from ASF Newsletter No. 57. It is reprinted here because most P.N.G. cavers are not associated with any caving club and do not have access to Australian speleo news letters.

BIBIMA CAVE, POROL ESCARPMENT, CHIMBU DISTRICT

Kevan Wilde * and Van Watson **

History The first European to record the existence of the Bibima system was Fred Parker in December 1964, who noted that there was a drop of at least 200 feet but was unable to descend due to the lack of equipment (Parker 1967). The first tentative exploration was made by K. Wilde, V. Watson and Dr. Julia James in May 1972. When Wilde and Watson descended to minus 180 meters, the descent was not continued because of a lack of bods. It was observed that the cave was still developing and had potential. The main survey and exploration was carried out on the 5th and 6th of August, 1972.

Location Bibima is situated on the Porol Escarpment in the Sikuri Pass approximately 20 kilometers north east of Kundiawa on the Kundiawa-Mai loop road in the Kundiawa Sub. District of the Highlands of Papua New Guinea. The entrance is approximately 2,100 meters A.S.L. (Estimated).

Geology Eocene and Oligocene limestone - with an east west fault in the region of the Sikuri Pass. (Rickwood 1955) Area is an uplifted escarpment that travels from Kerowagi to Chuave.

Trip: Members: K.A. Wilde, V. Watson, T. Maddern & B. Sanders.

Surface Party: B. Wilde.

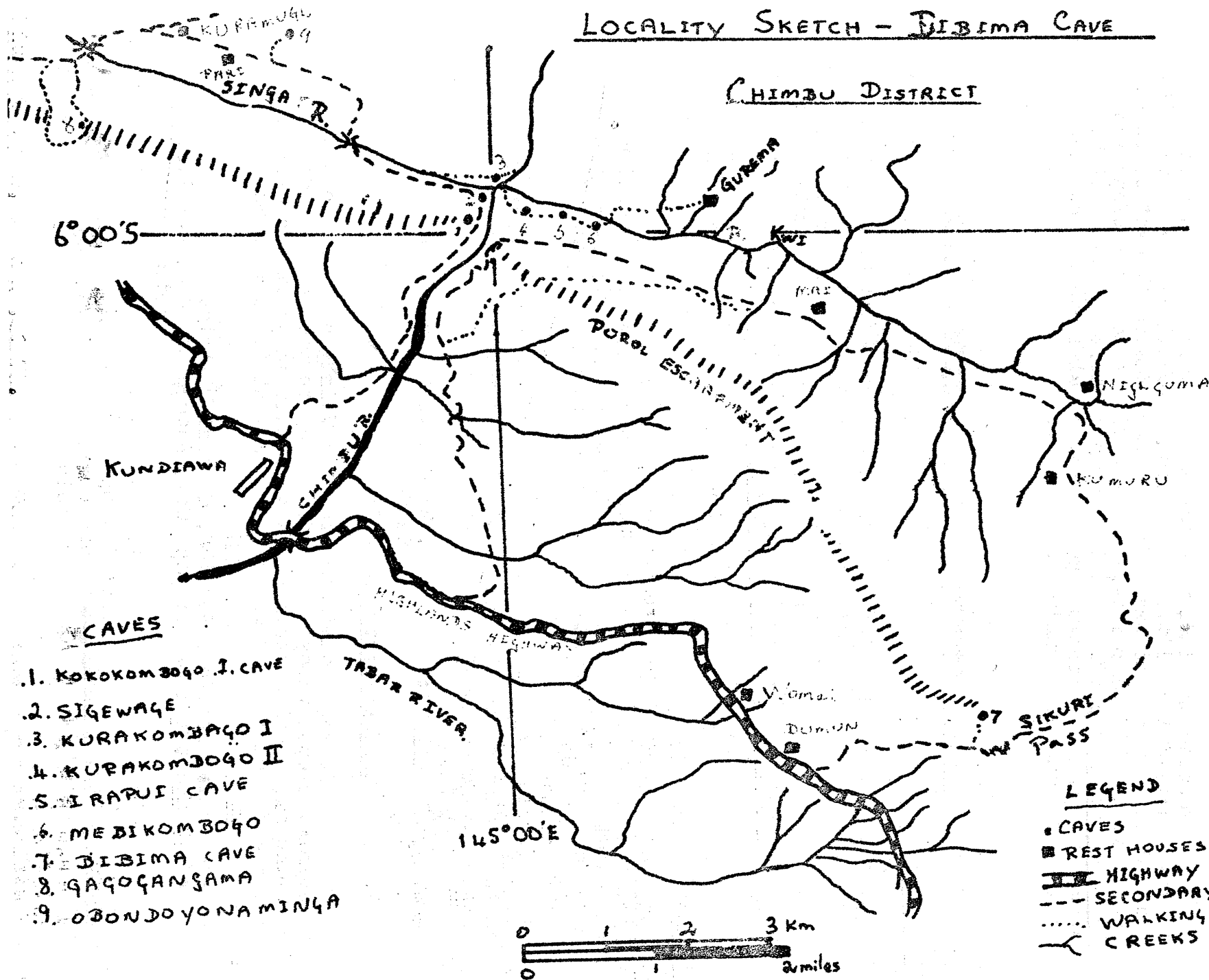
It was anticipated to be a fairly hard and long trip, therefore, preparations were made for up to two complete days underground. High protein foods were carried as it was decided that cooking gear would be excessive weight for a four man party.

* ~~Police~~ Police Station, Bereina, Central District.

** ~~Carpentaria~~ Carpentaria Exploration Co., Ramu Buse, P.O. Box 113, Madang.

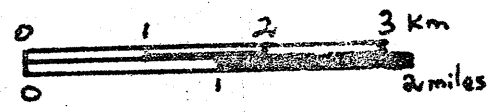
LOCALITY SKETCH - BIBIMA CAVE

CHIMBU DISTRICT



- CAVES
1. KOKOKOMBOGO I. CAVE
 2. SIGEWAGE
 3. KURAKOMBAQO I
 4. KURAKOMBOGO II
 5. IRAPUI CAVE
 6. MEBIKOMBOGO
 7. BIBIMA CAVE
 8. GAGOGANAMA
 9. OBONJOYONAMINQA

- LEGEND
- CAVES
 - REST HOUSES
 - == HIGHWAY
 - - - SECONDARY ROADS
 - WALKING TRACKS
 - ~ CREEKS



The following tackle was carried as it was felt that there would be a number of pitches:- 170 meters of 11 mm. terylene rope (single core with two sheaths, BS 230 kg.) 110 meters of No. 4 nylon climbing rope and 20 meters of electron ladder. Lighting consisted of four lead acid mining lamps and four carbide lamps with a supply of 40 hrs. of carbide. Personal equipment consisted of "Abseil Rack" or "Break-bars", "Jumars", and nylon tape webbing for slings and seats. Standard cave clothing was worn with parkas.

The night before the descent was spent at Bill Sander's place in Kundiawa, with a 4.00 a.m. rise and a drive up to the pass. A short walk up a gulley from the Kundiawa-Mai loop road brought us to the entrance pitch when is situated in a depression with a permanent stream entering the system. The entrance is a series of three shafts, the driest of which we rigged with a 50 meter terylene rope. Access to the rope pitch was gained by a 6 meter ladder which was retrieved by the last man down. The 50 meter rope was belayed to two substantial boulders on the lip of the shaft. The actual descent is an overhung drop of 39 meters of which about 35 meters is free.

We abseiled the pitch, striking bottom at about 8.00 a.m. There is a waterfall adjacent to the pitch but luckily it was low water and it did not interfere with the descent. We then thundered down to the limit of the previous exploration which is a standard stream passage with high rifts at the start closing down to about 3m. by 3m. The passage slopes at about 30°.

We were then at the 180 meter level which left us at the top of 9 meter pitch which was later named "Jumarlube". We rigged the pitch with terylene rope for abseiling which hindered us on the return journey. At this level was the first indication of formation and development as a cave and not a drain. At the top of the pitch, to the left, we saw a passage with flowstone, straws and things which we did not explore for fear of destroying. It was possible now to walk a level section after which we arrived at a chamber where Bill took some photographs. One of the formations was an eccentric stalagmite (Heligmite) and there were other fairly impressive formations, however, the urge for further depth pressed us downwards and at this stage further photography was abandoned owing to the limited time available.

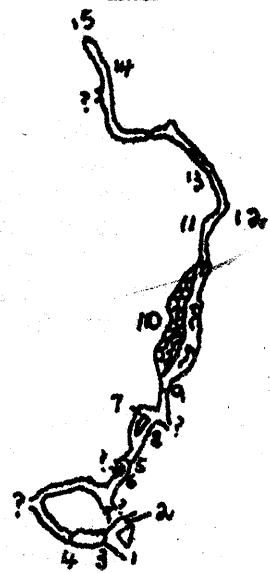
We then negotiated a 6 meter ladder pitch, followed by a crawl in the stream to a level area where we took a short rest and ate 'kai'. We then scrambled a steep slope of loose rock to a 9 meter pitch which we rigged with No. 4 nylon for abseiling, at the bottom was a traverse on a large slab.

We used webbing sling on the traverse for balance and named it 'The Swingletree'. This was followed by a short stretch of chimneying along a rift which was about 15 meters high and brought us into a large chamber of fallen debris sloping at approximately 30°

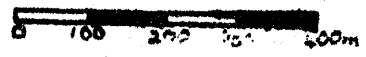
BIBIMA CAVE, CHIMBU DIST.



PLAN

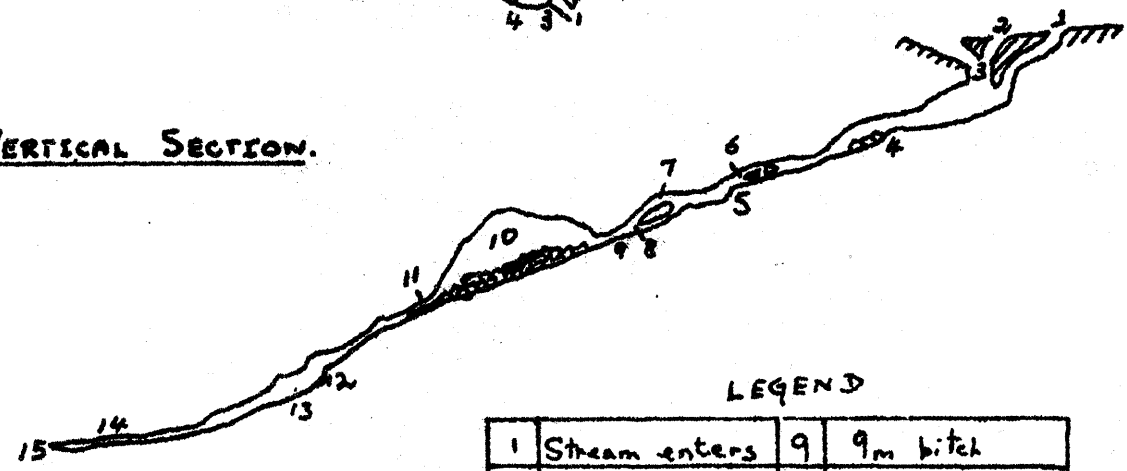


Total depth: 494m
1620'
Surv. length: 1222m



C.R.G. Grade 5.

VERTICAL SECTION.



LEGEND

1	Stream enters	9	9m pitch
2	6m ladder	10	Lucifers quarry
3	39m rope pitch	11	Distinctive feature
4	2m hand line	12	Passion cooler 6m ladder (west)
5	Jumar tube 9m pitch	13	Cockroach falls
6	Crawl in stream	14	Disappointment cave
7	Formation	15	Sum p
8	9m ladder		

for a distance of 150 meters. The chamber had a high roof and we were overawed by the immensity as our headlamps were incapable of highlighting the walls or ceiling. We scrambled down the debris with caution due to the looseness, at some points the floor was quite treacherous. We named the chamber 'Lucifer's Quarry'. We picked up the stream and found an exit point in the floor.

The next stage was conventional stream passage sloping at about 45° which led us to a waterfall and a pitch of 6 meters which was wet and aptly named as the 'Passion Cooler'. The stream continued on a 45° slope to a small waterfall, 'Cockroach Falls'. The slope of the passage then dramatically decreased to about 15° and after a distance of about 250 meters terminated in a squeeze and a sump which Van reckoned was undiveable due to the constricted nature and silting. The total descent time was 8 hours.

After a short rest we began the ascent and the survey out which took 11½ hours. All the rope pitches were ascended with the use of 'Jumars', with the exception of 'Jumarlube', which Kevan had to re-rig with a ladder owing to the presence of mud which caused the Jumars' to slip. The ascent was fatiguing due to the terraced nature of the passages which were nearly all scrambles and minor climbs. At about 3.00 a.m. on the Sunday we arrived at the entrance pitch which was again climbed with the use of 'Jumars'. We were all out by 4.00 a.m.

Summary: As we were pushing for depth we did not explore three stream passages which entered the system. Two of these enter at the minus 100 meter level and it is likely that these link with other sink holes which are known to be nearby. The outstanding point about the cave was that as we rounded each corner the cave would be continually plunging downwards at minus 30° for 8 hours. With judicious use the wet cells lasted the 20 hour trip. The final depth from the survey figures was minus 494 meters (-1,620 feet) and in August, 1972, was a Southern Hemisphere depth record.

As the cave is about 6° south of the Equator, the air temp° is not as cold as most countries where deep caving is carried out and long trousers, shirt, one jersey and a parka were found to be sufficient. Being on the move for 26 hours tends to be fatiguing. During the wet weather the increase in water flow may make passage difficult but it is unlikely that any section would be completely flooded.

Reference: Parker, F. (1967). The Caves of the Poral Ranges between the Chimbu River and Chuave, in the Chimbu District of the Eastern Central Highlands of New Guinea. Communications Occas. Paper No. 2. December, 1967. Sydney Spel. Soc.

THE HINDENBURG WALL

Malcolm Robb *

To the west of Telefomin in the West Sepik District lies a vast area of karst country including the imposing Hindenburg Wall towering 12,000 feet above sea level. The wall effectively isolates the Tifalmin and Telefomen valleys from the low country to the south as well as forming the border between Papua and New Guinea.

Composed of tremendous thicknesses of marine limestones, the Wall presents a spectacle of limestone formations that boggle the mind. Flying west along the Tifalmin valley to Mount Aiyung then turning south to the Alice River and the Ok Tedi, one flies over an area so remote, so isolated and weird that it is hard to believe you are still on the same planet. Far below you is spread a large plateau covered by a stunted, moss enshrouded vegetation, large blocks hundreds of feet high rise above the plateau in weird shapes, often with silver rivers of water cascading out of them; ragged cliffs point dramatically at the sky, deep ravines threaten to take your breath away and then, relief when you are over.

The south side of the Wall drops about 8,000 feet to the plains of the Fly River.

The vegetation is typical of limestone outcrops at this altitude; huge trees, numerous varieties of stinging and barbed vines grading into high altitude moss forest on the tops. We found the only sensible way to observe this side was by helicopter, and in this way numerous openings were investigated. We were often amazed by the huge rivers that poured out of the wall, often exiting half way up and cascading thousands of feet into the jungle below. Into one of these entrances we were able to fly the helicopter for about 200 feet, and here we estimated the water volume at about 1,000 cusecs.

Cavable entrances have been reported around Bolivip by the mission there. The Wall stands sentinel over the mysteries of the valleys beyond and whether leaving or approaching its massiveness, its spectacular formations and its vegetation leave one with a sense of awe.

* c/- Geology Dept., University of Queensland, St. Lucia,
Queensland, 4067.

Further north up the Elam River valley numerous limestone ridges above 9,000 feet form a jagged horizon leading right into the Star Mountains. Most of this area is typified by numerous sinkholes (often hundreds of feet deep with rivers entering at the bottom), some of the most frustrating vegetation to be found, jagged gorges and icy rivers. The area here is completely uninhabited, is bitterly cold, above 10,000 feet and perpetually shrouded in mist and cloud.

Due to the large amounts of water pouring out of the limestone and the almost continuous rain (in the dry season it rains every day) we felt that it would be incredibly dangerous to do any serious caving although exploration of these areas is both exciting and rewarding. We did investigate a few entrances but were literally flushed out.

The main feature of this area, apart from the primitiveness or lack of people is its isolation. Access is by aircraft only to Telefomin, to Bolivip or Tifalmin the only access is by foot, by helicopter or by mission plane.

It is important to note that many of the locals refuse to carry into the Star Mountains.

The Star Mountains represent one of the most rugged and spectacular areas in New Guinea but, due to their isolation, only expeditions with substantial financial backing and fairly extensive caving experience would be able to explore the incredible number of entrances in the area.

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THE CONTRIBUTORS

Michael Bourke (UQSS) started caving in Queensland in 1967 and has caved widely there and elsewhere in Eastern Australia, and for the last three years in P.N.G.

Harold Gallasch commenced caving in South Australia in 1960 and has been caving here for the last eight years.

Malcolm Robb was working in the West Sepik with Kennecott for a period and has now resumed full time studies.

Van Watson made a name for himself caving and climbing in N.Z. before he came here a few years ago. With Kevan Wilde he is the moving force in the Chimbu group.

Kevan Wilde has been caving very actively in the Highlands since 1971.

THE CAVING SCENE

The University of Queensland Speleological Society's New Britain expedition was the big event for the past few weeks. They managed to get to and explore the great doline with the cave at the bottom north of Pomio. No new Bibima to report, but a large cave with a huge river in it to provide the sport. The river eventually halted progress giving only 610m. of passage.

Les Lemon who developed a severely infected leg and had to be carried out has almost recovered. A full report will be published in Down Under (U.Q.S.S. Newsletter) with a briefer one in the A.S.F. Newsletter.

Plans are well under way for the August 1973 trip to the Puari-Koroba-Strickland area in the Southern Highlands to be led by Van Watson and Kevan Wilde. They plan to have twenty "single rope technique" men in the field for a month. The potential of the area in terms of area and depth of limestone is staggering. No caves yet, but Van, Kev and Bill Saunders go in for a look in April.

Viv and Bob Vincent and others in Moresby have been active up Javavere way lately and have surveyed two of the bigger caves there.

Not much news lately from the Chimbu or Mendi areas. Kevan Wilde, Bill Saunders, Bill Stott and Tony Maddern were making it all happen in the Chimbu with Van Watson bombing up from the Ramu. Kevan is at Bereina now and Van was in Sydney for the Australian Speleological Federation Convention. John van Amstal and his mob have been operating out of Mendi in the S.H.D., but no news from Mendi.

Hans Meier at Panguna reports that caving is at a standstill now. The main enthusiast, Peter Robinson, has returned to Melbourne.

Keravat, near Rabaul, is still the centre for trips around the N.G. islands. Hall Gallasch has recently been into caves North of Namatanai (N.I.) that contain very old wall markings, as well as to the Manus District (see this number). Michael Bourke has been surveying a few caves at the Kavieng end of N.I. as well as up in the Bainings and nearer Rabaul on the Gazelle. He contributed a paper, "Caving in Niugini" to the recent A.S.F. Convention.

Visitors to P.N.G. last year included Dr. Julia James of S.S.S. up from Sydney for a few weeks to look at the cave potential in the Highlands. The Hungarian geomorphologist, Dr. Dènes Balázs did a trip around collecting limestone water samples and information for a few books. Lex Brown, Les Lemon, Paulene McMahon and John Webb of the U.Q.S.S. came up from Brisbane for the New Britain expedition. Lex will be around sightseeing and caving until the end of March.

Niugini Caver, January, 1973.

LONIU CAVE, LOS NEGROS ISLAND, MANUS DISTRICT

H. Gallasch *

The Loniu Cave is well known in Lorengau and has had many visitors over the years. Recently, the owner of the land has started conducting parties through the cave at a fee of 50¢ a person. Although the easily accessible areas have been well traversed no party has yet made a thorough survey of all sections and a number of extensions are available for exploration.

Often the cave was visited by the Loniu people to catch bats and flying foxes for eating. Most probably it was also used as a source of shelter during periods of inter-village fighting. More recently in the last war both the Japanese and the native population of the adjacent villages sheltered in the large chambers from the merciless Allied bombing of the island, prior to re-occupation.

Formerly, the entrance had been well hidden by the growth of rainforest on and hanging down the cliff face. Recently, however, a path has been cleared to encourage visitors. Now the entrance can be seen from the road, some 200m. past Loniu No. 1 village. In its position on the cliff face looking out to the sea the cave can be reached by a climb of some 60m. from the road way.

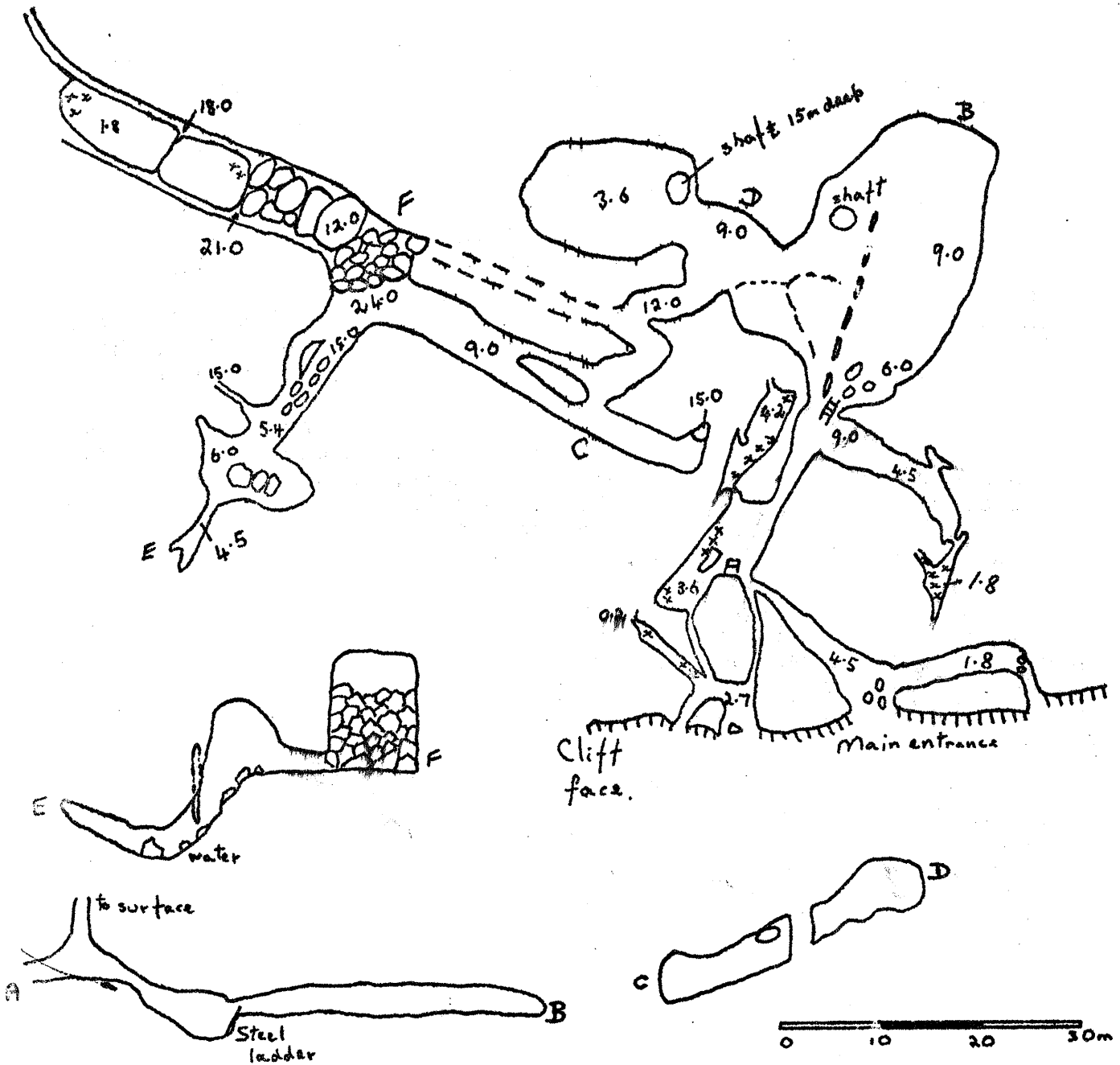
The entrance to the cave is partially blocked off by several large, old, weathered columns. Behind these columns a small chamber opens into two narrow tunnels, both of which later emerge in a larger chamber. A narrow crevasse from the surface opens in the roof of this chamber. Pythons sometimes fall down this shaft and on a second visit to the cave a large snake, was found coiled on a narrow ledge in the chamber wall.

Two passages lead off this chamber. One tunnel opens into a well-decorated parallel cavern while the other takes a steep plunge downwards. This passage opens into a large solution cavern running transversely to the other caverns. Unfortunately, even here there has been disfiguration of the walls, in the form of large letters and stenciled names.

At the extremity of this cavern a narrow vertical squeeze leads to a small solution passage well decorated with stalactites, stalagmites and small columns. In this section fine fibre roots of trees hang into the chamber. The floor is covered with a loose aggregate of leached, porous coronas.

* c/- D.A.S.F., Keravat, East New Britain.

LONIU CAVE, LOS NEGROS I. MANUS DIST.



- columns
- xx decoration
- 9.0 Estimated ceiling height in meters

C.R.G. Grade 2.
Surv. and drawn by
H. GALLASCH.
September, 1972.

Behind a series of columns a small solution hole leads down several meters to where a horizontal squeeze is blocked by stalagmite growth. Some of the best decoration in the cave occurs in the extension through this squeeze. The entrance hole itself is covered in a brilliant white crystalline flowstone and delicate stalactites, straws, helictites and other oddities adorn the passage.

The climb from the lower cavern up into the main chamber of the cave is facilitated by a steel ladder. Here a large domed chamber of some 70m. x 30m. is connected to several smaller but equally impressive voids. Near the entrance are several groups of large columns, but perhaps the most impressive feature is a curtain-like wall of stalactites and columns stretching the length of the chamber. Entry to the adjoining caverns is through holes which occur in this curtain. Apparently water penetration through a single fault in the limestone roof has resulted in this wall-like formation.

This and the adjoining two sections house a large bat population, mostly in small tunnels or shafts off the main chambers. The floor is liberally piled with a mixture of bat guano and mud and it is on this the varied animal life thrives. The rich insect fauna includes swarms of small flies and cave crickets with antennae up to 20cm. long. A species of grey crabs, with a body 4-5cm. across, is also commonly found scuttling around the loose coronas on the floor.

In this section of the cave several shafts appear to connect up with a lower level, but these were not descended.

3 From the central chamber a large winding tunnel slopes down to a lower level where there is a main solution passage. This passage forms a junction (see plan) with another section of the cave resulting primarily from collapse. This is in contrast to the former section where collapse was a very minor component in cave formation.

One very steep boulder slope leads down to a small collapse chamber, the lowest level in the cave. Over the slope the domed ceiling is at places 15m. high. From the side a narrow deep crevasse leads off. This was not pushed. At the lowest level several shallow pools of water occurred on gravel, an indication of either a stream bed or the water table. Sloping down from the opposite direction into this chamber was a much smaller tunnel, but this soon became pinched.

It is near the top of this slope that a series of rock falls has produced a hill of limestone blocks, some 18-20m. high. Following the main direction of the cave there is a large collapse chamber. It appears as though several large blocks, the largest being 23m. x 9m. x 18m., may have separated from the ceiling and

fallen into the former solution passage. This has left two large crevasses, one on either side of the blocks, leading into the distance. These crevasses appear 18-21m. deep and the extremities have not been explored. Some equipment would be needed. While the roof is about 9m. above the boulder slope this distance reduces to 2m. at the extent of the fallen blocks. Here also there is a fine group of stalactites and stalagmites.

Although I was obliged to have guides from Loriu village with me they preferred to stay in the well known sectors of the cave. The total length of passage way, as measured by pacing, was 660m., but it is considered that further major extensions are awaiting discovery.

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CAVES OF NEW BRITAIN

A Preliminary Report

R. Michael Bourke *

Cave exploration in Papua - New Guinea is in its infancy and has mostly been confined to areas readily accessible by road, the Javarere Caves near Port Moresby and the Chuave area in the highlands being the best known. New Britain is included amongst the areas with extensive karst areas, but about which little is known and even less documented, mainly because access to the limestone areas is difficult. New Britain karst is exceeded in area in Niugini only by the very extensive area in western Papua extending from the Gulf of Papua northwest through the Darai Hills to the headwaters of the Fly and into Irian Barat in a belt some 450km. long by 100km. wide. From the air, large areas of continuous dolines are visible, sometimes dissected by deep gorges, and the sides of some river valleys are characterized by limestone cliffs often over 300m. tall. A number of small to moderate sized caves, mostly stream caves of a simple structure, and a few very large dolines that lead into caves, are now known from New Britain.

The island is over 480km. long. Annual rainfall varies from 2286mm. at Rabaul to 6350mm. on the south coast. Geologically it consists of early tertiary rocks, predominantly volcanic pile of andesitic agglomerates and flows into which were intruded intermediate plutonic rocks of Oligocene age. Much of New Britain is covered by thick limestones of Miocene to Pliocene age, the bulk being of Middle Miocene age. Large areas of cream to white, compact limestone are present as cappings in the Whiteman ranges, the Nakanai Mountains and in the Northwest Gazelle Peninsula (Baining Mts.). On the Gazelle, smaller areas also occur on the east coast south of

* c/- D.A.S.F., Keravat, East New Britain.

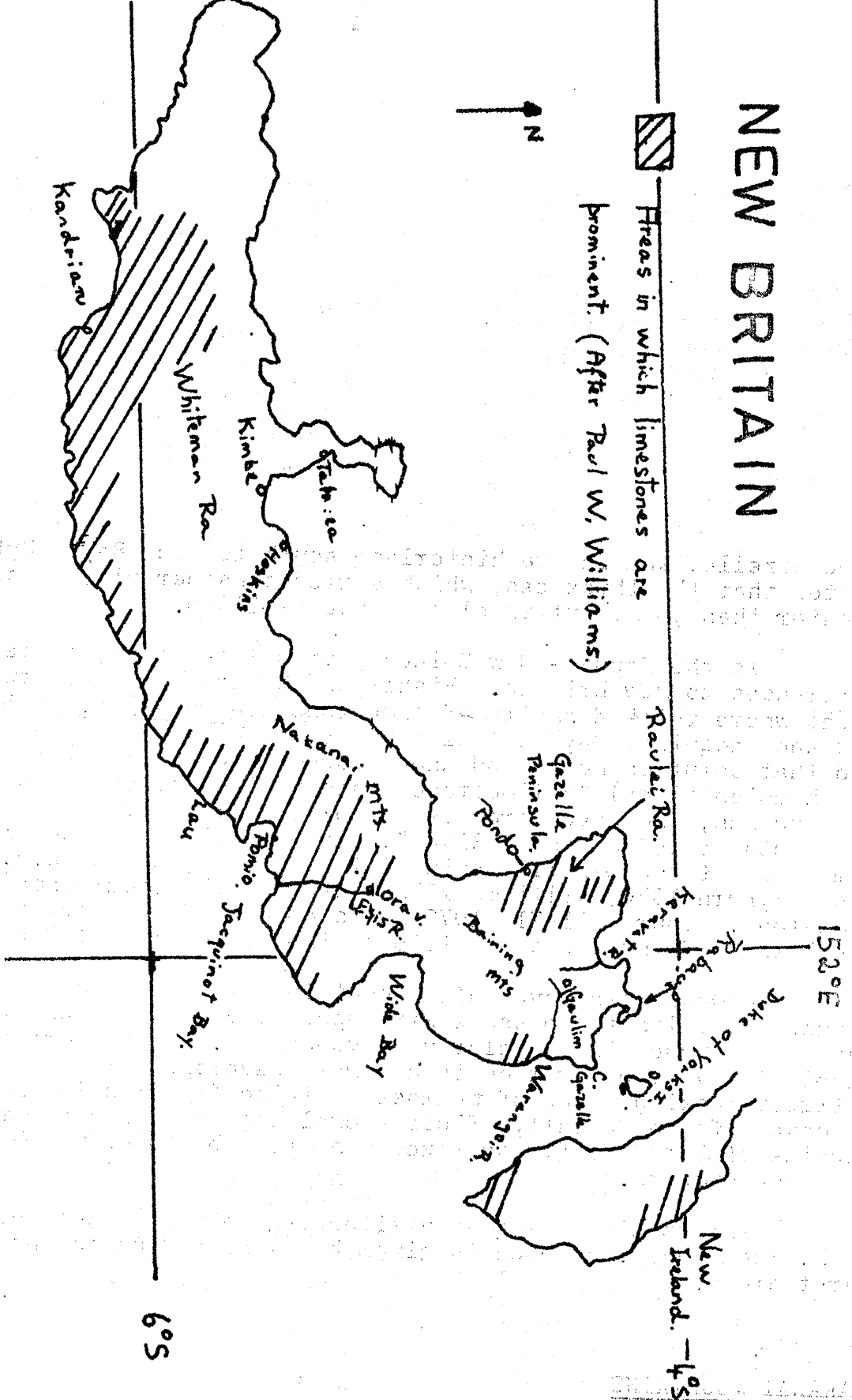
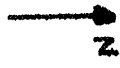
Niugini Caver, January, 1973.

Page 13

NEW BRITAIN



Areas in which limestones are prominent. (After Paul W. Williams.)



Cape Gazelle, and in the hinterland south to Wide Bay. Ryburn (1970) states that the thickness, which varies considerably, is commonly greater than 300m, but in places exceeds 1500m.

In the Papua - New Guinea caving literature, there are few references to New Britain. Fisher and Noakes (1942) state that in areas where thick deposits of limestone are involved, as inland from Lau and Jacquinot Bay, solution has been an active factor in erosion, and that solution holes and underground streams are common. According to Champion (1968) "a limestone plateau with caves is reported north of Kandrian, and caves are also reported inland from Pomio and Pondo and south of the Wanangai River". Macnab (1970) has described the limestone of the Gazelle Peninsula. Various authors (e.g. Hosking 1967, Ryburn 1970, Williams 1972) refer to the occurrence of the limestone. Bourke (1971, 1972a) has described two caving trips to the Baining Mountains and a trip to the Pomio area (1972b).

New Britain caves often contain streams and consist of a single uncomplicated passage with upper levels or extensive side passages, suggesting a relatively young age. As is common in many tropical caves, decoration is not well developed although not entirely lacking. One of the most striking features is the abundance of cave life, especially, floor-dwelling insects and bats. Several species of bats and flying foxes can often be found in the one cave in large numbers.

Information on caves visited by the author and one visited by K. Reed and C. Borough is given below according to the three major karst areas.

NAKANAI MOUNTAINS

Stories of great river effluxes and cave entrances are common for the area inland from Pomio. At the northern end of these mountains there are marked several dolines on the wartime army maps. One is described as "sinkhole approx. 1500' deep" and another as "sinkhole approx. 1250' deep". Chris Borough and Kevin Reed of the Port Moresby Speleological Society investigated the latter in 1968. The doline is almost circular and was estimated as 300-600m. deep. The sides are almost vertical. They descended to about 60m. above the bottom to where the sides became too steep to go further without more than a single line. On the floor of the doline a river emerges from one cave and disappears into another. Both entrances are about 25m. high. About 1600m. from the doline one branch of Pandi river emerges from a cave near Tuke village.

Niuqini Caver, January, 1973.

Page 15

The other large sinkhole marked on the maps was investigated by the author in April 1972 (Bourke 1972b) and by the University of Queensland Speleological Society's expedition in December 1972 - January 1973. The doline is approx. 1500m. long and is 260m. deep. There is a cave with a large river in it at the bottom which was explored for 610m. The river emerges about 1500m. away in a cliff face 55m. up and forms one branch of the Esis River (pron. Isso).

Seven kilometres north east of Pomio there is another huge sinkhole with a river - probably the Matali - flowing across the bottom. From near Nutuve mission yet another doline is reported by the villagers and was sighted from the air by Lex Brown of the UQSS expedition.

Smaller caves are reported from near Pomio.

THE GAZELLE PENINSULA

This consists of the Baining Mountains and a very fertile area of recent volcanics in the north-east portion separated from the mountains by the Warangoi and Keravat River valleys.

The Raulei Range in the North Baining Mountains in the north-west part of the Gazelle rises to 1830m. above sea level. Along the eastern edge of the range there are limestone cliffs 750m. high. The limestone is middle and possibly Upper Miocene in age and is more than 1000m. thick. It is mostly shallow dipping. Widely spaced horizontal and vertical jointing has been noted. It outcrops over 600 sq. km. (Macnab 1970). The surface topography is characterized by innumerable continuous dolines covered in tropical and some moss forest. As well as this karst, crevice karst occurs where the surface is dissected by fissures up to 15m. deep.

Only a fraction of the area has been explored for caves. Nine caves are known, none deeper than 24m. (Bourke 1972a). The caves are vertical in nature, and most dolines are soil filled or contain small caves that are blocked. Stream effluxes occur in the adjacent lowlands down to sea level. The depth of the limestone and altitude contrast suggest that nonblocked systems would be very deep.

Other caves are known at lower altitudes in the same area. An hour's walk from Yalum village (ca. 900m.) there is a small cave 100m. long (Oreat-Satadat). Two hour's walk from Alacasam village (520m.) is Oberungeram Cave, about 460m. long. A smaller one is reported nearby the village. In this area, many of the streams are dammed by impressive travertine deposits. Caves are reported in the vicinity of Wilumbinki village and, in fact, this area corresponds to Champion's "inland from Pondo".

Niugini Caver, January, 1973.

Page 16

The Yalum limestone series also forms steep rugged hills with karst topography immediately east of Lassaul Bay. Behind Matanakunei village in Open Bay, Pliocene limestone more than 200m. thick covers an area of 40 sq.km. and forms the highest point of the Lakit Range about 845m. above sea level. The topography is karst and steep slopes or cliffs bound the unit except on the north west side (Macnab 1970).

Three river caves are known in limestone in the Gaulin area on the edge of the Bainings. The area is relatively not so mountainous and is accessible by road, in contrast to the forementioned areas on the Gazelle where 1-3 days walking is necessary. One of the caves (Luminas) is 150m. long, another (Synnongoinga) is 150m. and a third (Durwy) is 75m. long. There are others in the area according to village people. Altitude would be less than 300m.

South of the Warangoi River, at least one cave is reported by village people 'klostu' Simbum village. The area is covered with Pleistocene reef-shoal limestone.

There are sea caves in the Pleistocene reef limestone on Mioko and Duke of York Islands in the Duke of York Group between Rabaul and New Ireland. Coralline Limestone is known in Niugini as coronas.

The Rembarr Range is composed of limestone with a thin veneer of volcanic ash. Peaks are up to 404m. A.S.L. Local political problems have prevented investigation of reported caves here.

Also on the Gazelle are caves formed in the pumice subsoil by stream action. They are from 6 to 15m. underground and boast passages and chambers. Near Malabunga High School, three caves are known, being 37m., 28m. and 25m. long respectively. The former two contain streams. Comunga Cave near Taulil village is another such cave and is about 18m. long. Another one has been formed by a line of weakness in consolidated sand and pumice of volcanic origin. An interesting feature of these caves is the presence of charcoal in the parent material, presumably timber burnt when the material was deposited. This charcoal should allow the deposits to be carbon dated.

Inside the crater of Matupit volcano at Rabaul there is a small cave beautifully decorated with a variety of minerals displaying orange, cream and green colours. Despite the number of visitors to the volcano, the minerals are well-preserved as access to the cave is fortunately not easy. At many locations near Rabaul there are tunnels dug for the wartime occupation of the Japanese army, in the soft pumice. Some are quite extensive and contained facilities for long occupation.

THE WHITEMAN RANGE

Few details are known, but the limestone is extensive (see map). Reports of caves are numerous. The Alimbit River emerges from a cave inland from Kandrian.

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