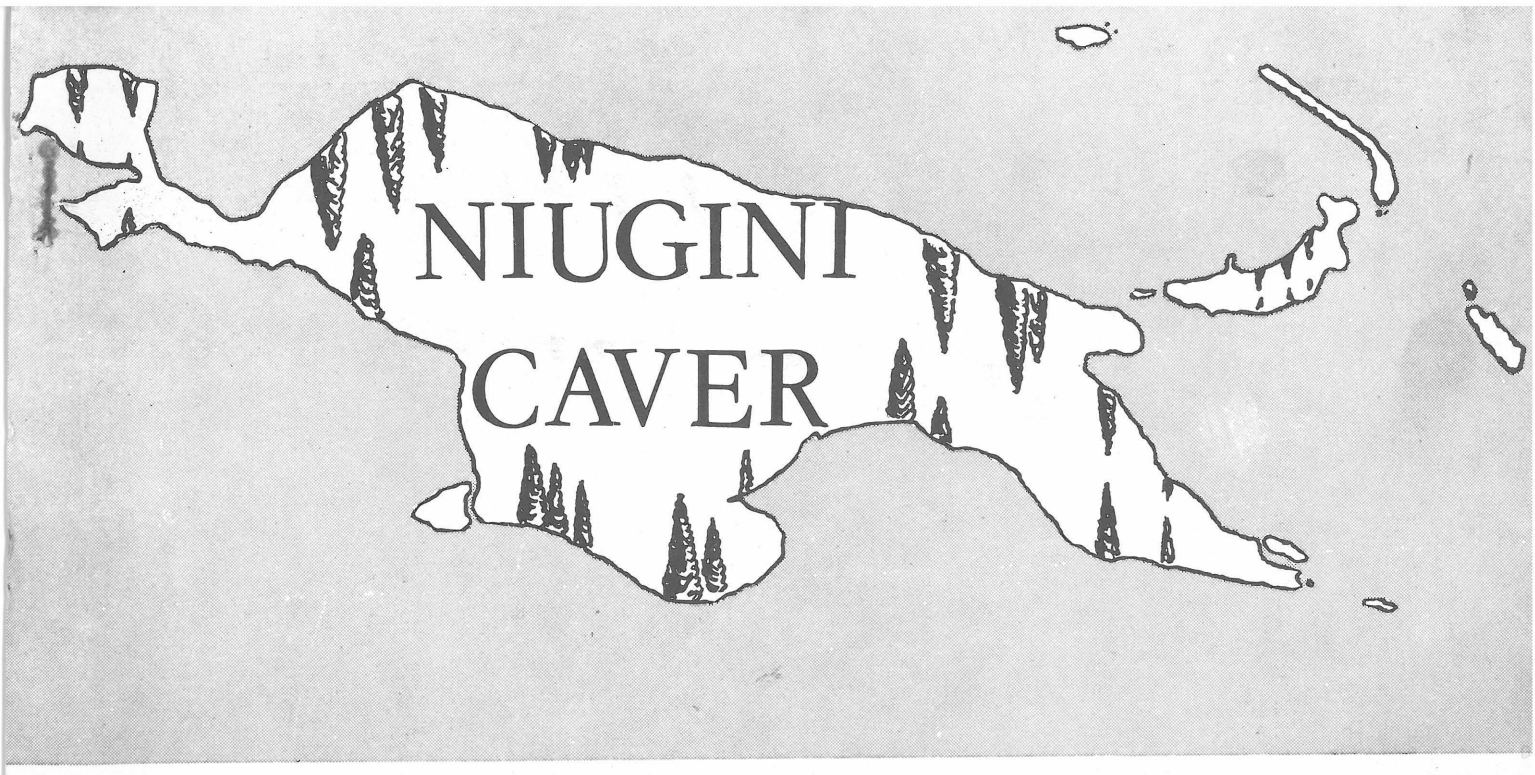
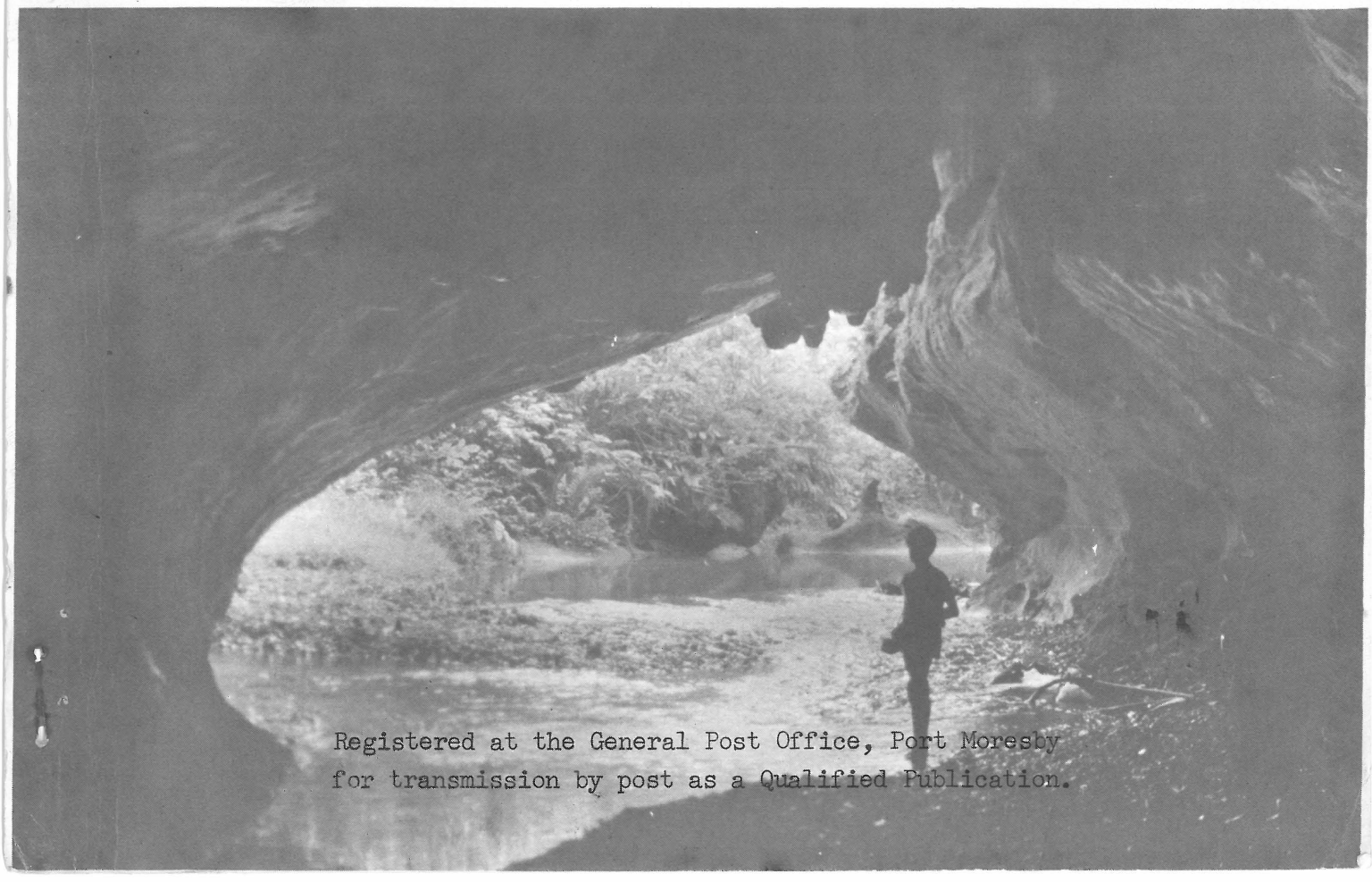


NEWSLETTER OF THE PAPUA NEW GUINEA CAVE EXPLORATION GROUP

Volume 3 Number 3 **October, 1975**



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Production of Last Number Michael and Jean Bourke, Jim Farnworth, Harold Gallasch, Colin Cranfield and Tim Sprod.

Contents

* * *

Cover Photograph. Looking out of the entrance of the Pokohol, Central Manus. This is the arch section which only takes stream flow after heavy rain. The vadose roof canyon partially filled with large stalactites can be seen. Bernard Pawih is the figure in the water with Julius Popoi in the right foreground.

Photo by Geoff Francis.

* * *

TOKTOK BILONG EDITA - FOCUS ON MANUS

Just south of the equator lie the Admiralty Islands of Manus, Los Negros, Rambutyo and numerous smaller islands. Together with the far flung Western Islands, they form the Manus Province (formerly District). Until recently Manus was a speleological unknown to outsiders. The geomorphologist Paul Williams had visited karst areas in central Manus and on Los Negros and reported briefly on the karst forms and caves. Hal Gallasch had described Loniu cave and David Holdsworth included two photographs from Loniu in a glossy pictorial.

The situation is quite different now. In the last two years Geoff Francis has explored numerous caves on Manus and Los Negros Islands. In this issue he gives brief descriptions of 53 caves from four karst areas as well as an outline of the geology and karst of Manus and Los Negros. He also mentions caves on Ndrova, Rambutyo and Nauna. As well as these, the geological map shows coral-line limestone on Pak and four of the Western Islands (Mal, Sumasuma, Aua and Wuvulu), so caves may occur on these as well.

As elsewhere the caves often feature in local legends. Inside four legends associated with Manus caves are given by three high school students. Other aspects of the caves are their use as places of refuge, especially during the heavy bombing the islands received during the last war, and the hunting of bats inside. Loniu is an undeveloped commercial tourist cave and pottery fragments have been found in it. To Pumpulyun must go some sort of a new record - it can be explored by canoe for 1250 m of passage upstream of the resurgence!

R.M.B.

* * *

P.N.G. SPELEOLOGICAL BIBLIOGRAPHY

I am compiling a comprehensive bibliography of P.N.G. speleology, and have some 600 entries so far. However it is difficult to locate all material, especially when it appears in popular books, newspaper articles, and specialist journals. It would be very much appreciated if anyone knowing obscure material could bring it to my attention. Some of the material that I am aware of has been published in this newsletter as follows:

New Britain	1(1): 18
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R. M. Bourke

* * *

CHRISTMAS MEET

The proposed PNGCEG meet in the Chimbu at Christmas looks like being on with a few starters from Rabaul and the highlands. Anyone interested please contact Jim Farnworth, Kevan Wilde or Michael Bourke.

* * *

KARST ON MANUS ISLAND

G. Francis *

I. GEOLOGY OF MANUS LIMESTONES

Manus Island is situated on the Outer Melanesian Island Arc, near latitude 2° and longitude 147°. It is elongated on an east-west axis, following the orientation of the island arc. Although Manus is composed mainly of volcanics and clastic sediments, limestones are represented to varying degrees in most geological formations.

Manus karst has received comparatively little scientific attention. Thompson (1952) carried out a geological reconnaissance of the island, traversing several karst areas. He suggested that the large closed depression at Kari was of tectonic origin, formed through collapse into an intrusive cavity. Thompson also believed that the limestone had been covered by a thin mantle of Pliocene volcanics, which failed to conceal the former karst topography. Kicinski and Belford (1956) studied the microfossils in rock samples collected by Thompson. On this evidence they postulated an unconformity between the limestone and the overlying clastic sediments.

Williams (1974) made a reconnaissance of the Los Negros and central karst areas, and gave brief descriptions of these areas in a broad survey of New Guinea karsts. Williams considered that limestone residuals in the central area were being exhumed from under a cover of Pliocene lavas. A recent geological survey of Manus has been carried out by Jaques and Robinson (in prep.) The following account is based partly on their work and employs the stratigraphic units proposed by Jaques (pers. comm.). Petrographic names for sedimentary rocks follow the classifications of Folk (1968).

Tinniwi Volcanics. Extrusive volcanics of middle Eocene to lower Miocene age form the geological basement of Manus. The extrusives include lavas, agglomerates and tuffs, predominantly of andesitic composition. Occasional lenses of limestone and tuffaceous lithic arenite are interbedded with the volcanics. In those limestone members where depositional structures have been preserved, the rocks are algal-foraminiferal biomicrites. But in the vicinity of intrusions the limestones have been heavily recrystallised and range from microsparites to coarse grained marble. The volcanic and clastic members of this formation have also been locally indurated and silicified. As the limestone lenses rarely exceed 30 m in thickness, karst development is very limited. No caves are known in the limestone members of this formation.

Dremsel and Yirri Intrusives. The Tinniwi Volcanics have been intruded by intermediate rocks of middle Miocene age. The intrusives range from quartz diorites and monzonites to dacite porphyries. There were several phases of emplacement (Kirwin, 1974).

Mundrau Limestone. This formation unconformably overlies the Tinniwi Volcanics. The limestones are compact cream to grey algal-foraminiferal

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biomicrites, with 10% to 65% allochem grains embedded in a matrix of lime mud. The allochem grains are mostly algal plates and foraminiferal tests of calcarenite size. Occasional biomicrudites with larger grains are present and there are some fossiliferous micrites with less than 10% allochem grains. In a few localities detrital intrasparudites may be found. Their intraclasts consist of broken biomicrite fragments, cemented by sparry calcite. There are also rare recrystallised limestones. The Mundrau limestones range from relatively pure carbonate rocks, to muddy biomicrites with a hydrochloric acid insoluble residue of 20%. In addition, occasional horizons of chert, calcareous lithic arenite and pebble conglomerate are interbedded with the limestones. Most limestone samples have an acid insoluble residue of less than 7%, consisting mainly of clay. Quartz, magnetite, pyrite and fragments of silicified volcanic rock are commonly present in the sand and silt fractions.

Bedding in the limestone is extremely variable. Some outcrops are massive and unbedded, while others are rhythmically bedded, with individual laminae only one or two centimetres thick. The bedding planes often contain concentrations of insoluble residues, and some stylolytes have developed. These appear to be secondary features, formed by pressure solution. Dips on the limestone usually vary between 15° and 45°, but in some southerly areas the beds dip very steeply. The directions of dip are normally away from the central intrusive complex. The stratigraphic thickness of the Mundrau Limestone is highly variable, but in places reaches 200 m.

Lauis Sandstone. This formation consists almost entirely of clastic sediments, ranging from middle Miocene to lower Pliocene age. The sediments include calcareous tuffaceous lithic arenites, siltstones, mudstones, pebble conglomerates and some poorly sorted cobble and boulder conglomerates. Bedding is well developed in the finer grained members which often contain foraminifera and marine molluscs. Generally the facies become more finely textured to the east.

Lorengau Basalt. Basalt and andesite lavas, tuffs and agglomerates are present in eastern Manus. The formation ranges from middle Miocene to Pliocene age. Its older members are unconformally overlain by Lauis Sandstone, but scattered outcrops of the more recent flows unconformally overlie the clastic sediments. The Lorengau basalts have in some cases been hydrothermally altered. There are occasional lenses of sandy foraminiferal biomicrite interbedded with the extrusives.

Naringel Limestone. Raised reefs of lower Pleistocene age unconformally overlie Lauis sandstone and Lorengau Basalt in easterly areas. The Naringel limestones are mainly algal-foraminiferal biomicrites and algal-coralline-foraminiferal biomicrudites, cream to orange in colour. There are some biomicrite-biosparite transitions, where the matrix consists of lime mud and sparry cement in equal proportions. Intrasparudites are also represented and there are occasional algal-coralline biolithites, with organisms preserved in growth positions.

The Naringel limestones are often highly porous, particularly the coralline materials. In some cases it proved impossible to etch specimens in the

field, since acid infiltrated the rock immediately. Large pods of sparry calcite have formed by the infilling of voids up to 40 cm in diameter. Vughs lined with coarse, pointed spar are well exposed in the quarry near Naringel. The limestones are generally pure carbonate rocks, with an insoluble residue of less than 6%. There are some local concentrations of terrigenous mud or manganiferous minerals in primary cavities. Many samples contain high magnesium calcite and some are dolomitic. The dolomite usually occurs as sparry cement, though in rare cases the matrix has been recrystallised to form fine grained replacement dolomites. The insoluble residue consists of clay, with skeletal grains of quartz, magnetite, marcasite, pyrite and pyrolusite. In some cases the ferruginous minerals have been weathered to limonite. The limestones are usually unbedded; in the few locations where bedding is evident, the dips are generally less than 15%. Both physically and chemically the Naringel Limestone varies considerably over comparatively short distances.

Quaternary Coral. Slightly raised fringing reefs of upper Pleistocene to Holocene age are well developed in easterly areas. They consist partly of reef rock and partly of unconsolidated coral sands and coarser detritus. The reef rock is largely coralline-algal biolithite and biomicrudite. There are also intrasparudites formed by the recementing of broken organic material. In addition to corals and Lithothamian algae the limestones contain bryozoa, molluscs and larger benthonic foraminifera (Jaques, pers. comm.). The late Quaternary limestones are extremely porous and permeable, even though there has been much precipitation of sparry calcite in primary voids.

Quaternary Alluvium. Sands, muddy sands, silts and muds, primarily of terrigenous origin, are widely distributed. They occur as estuarine, lagoonal, backswamp or floodplain deposits, with occasional higher level terrace remnants. Near Lorengau the coastal plain is underlain by more than 25 m of unconsolidated sediment (Weber, 1971). In areas with volcanic hinterlands, the sands are often rich in heavy minerals.

Regional Structure and Tectonic History. Manus originated as a strato-volcano in the lower Tertiary. The vulcanism was associated with crustal stresses created by plate movement. The island is situated on a small southerly moving platelet, which is interacting with a more rapidly westward moving Pacific plate, along a subduction zone just north of Manus. The resulting westerly drag has formed a series of very prominent tensional faults, NE-SW in orientation (Kirwin, 1973). There is also a set of compressional faults trending NW-SE, created by subduction. In the vicinity of faults, jointing is usually parallel to the fault lineaments. Where major faults are closely spaced, faulted blocks have been considerably tilted. The tectonic movements were initiated in the Oligocene or Miocene, and have continued through to the Pleistocene. The thickness of the Mundrau formation implies changes of relative sea level during deposition, but their nature is uncertain. The main area of deposition was in a tectonically controlled passage of NW-SE trend, situated east of the main volcanic island.

Kicinski and Belford (1956) have suggested that there was an interval of non-deposition and probable erosion, between the formation of the Lauis Limestone

and the Lauis Sandstone. This conjecture was based on foraminiferal dates for the respective formations, rather than field observations of the contact. But dated samples were obtained near the top of the younger formation, a considerable stratigraphic distance from the contact. The basal members of the Lauis Sandstone are usually unfossiliferous conglomerates. Foraminiferal dating of a sample collected from the base of this formation near Derimbat suggests that there is no real faunal break in the sequence (Jaques, pers. comm.). It seems likely that during the middle Miocene, volcanic-derived clastic sediments were deposited beyond the growing reef complexes. Sedimentation continued into the upper Miocene, in some cases on the reefs. The main uplift occurred during the Pliocene to lower Pleistocene.

Thompson (1952) believed that the Kari polje was too large to be adequately explained in terms of karst processes. He suggested that it had developed through collapse into an intrusive cavity. Drainage patterns south of Mundrupurio indicate a ring fracture about 1 km in diameter. But the fracture is largely outside the polje and much smaller than the latter feature. In the south, the depression is bounded by a series of NW-SE faults, but large vertical displacements are not evident. It thus appears that the polje is basically an erosional feature, though the erosive processes have been influenced by geological structure.

Williams (1974) considered that the central karst area was being exhumed from under a cover of younger volcanics. Field observations of the contacts indicate clearly that most of the adjacent volcanic rocks are older than the limestone. The Mundrau Limestone overlies a steep, irregular and eroded surface of Tinniwi Volcanics. There are only scattered outcrops of Lorengau basalts in the highest topographic positions. The basalts usually overlie Lauis Sandstone or Tinniwi Volcanics rather than the limestone. Consequently there is no evidence that karst forms have been inherited from a pre-volcanic phase of development.

II. KARST AREAS OF MANUS ISLAND

1. Los Negros Island. Los Negros is a smaller island at the eastern end of Manus. It consists of low volcanic and limestone ridges which trend ENE-WSW, following a fault system. The ridges are often separated by estuaries and alluvial lowlands. Steep sided raised reefs of Naringel Limestone are present at Lolak and Loniu (see figure). Much of the karst consists of rough, pitted limestone outcrops and large floaters. Filamentous algae play an important role in the development of these forms, which have been termed "phytokarst" by Folk et al. (1973). Where phytokarst is well developed the limestone is a deeply corroded skeleton with numerous sharp projections, which are treacherous underfoot. Solution pipes and wells penetrate the rock for considerable distances; tree roots often follow partings or solution pipes into the limestone. Small root grooves criss-cross the surface of some outcrops.

Areas of bare karst are dissected by soil floored corridors which follow fractures. The corridors are mantled with brown earths up to 1.5 m in depth, while elsewhere small pockets of dark shallow rendzinas separate rock outcrops. On the ridge above Loniu Cave, crevice karst with corridors up to 10 m deep has developed. There are a few closed depressions, usually elongated parallel to

the ridges. Occasional small springs issue from the base of the raised reefs, where Naringel Limestone is in contact with late Quaternary corals or sediment. As the Quaternary Coral displays similar solution sculpture, the contact is not very obvious in the field.

Along estuaries like Loniu Passage and Was Was Meri, the limestone forms vertical or overhanging cliffs which bear relict marine notches. The most prominent is a double notch with nips at 2 m and 4 m above mean high water level. The double notch is consistent in height, even where re-entrant coves extend back at right angles to the main shoreline.

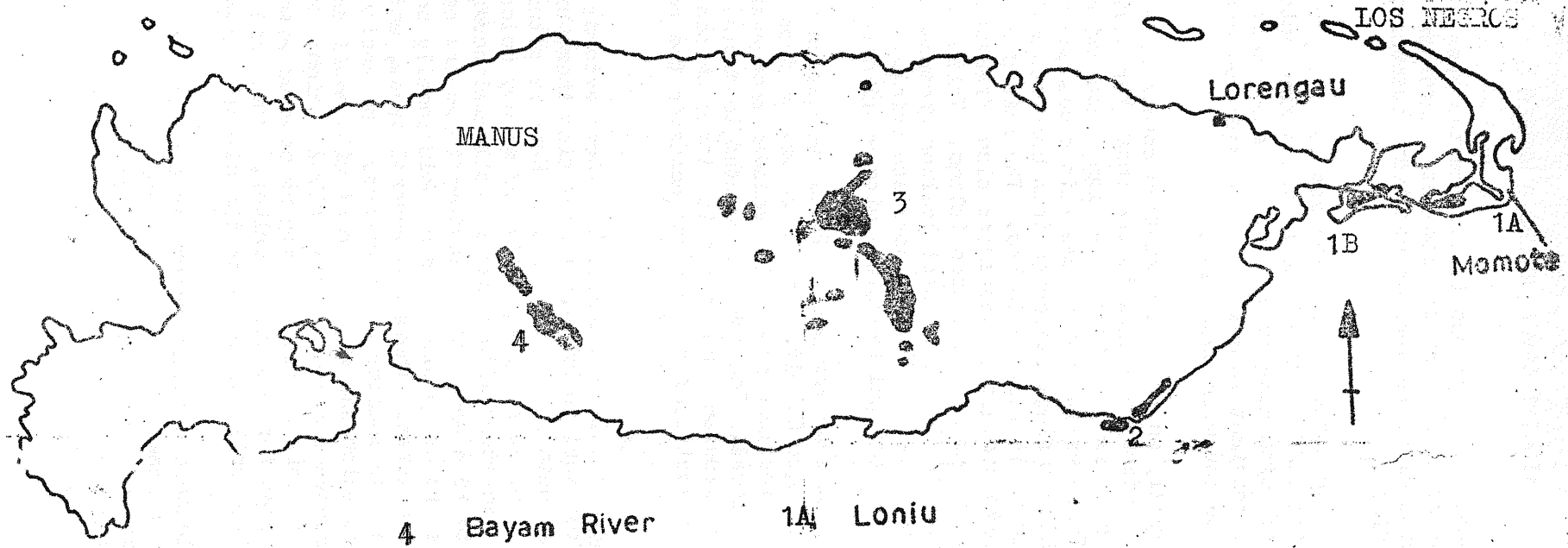
2. Bunai. At Bunai, on the south eastern corner of Manus, a raised reef of Naringel Limestone extends parallel to the shore for a distance of 3 km. Although much of the reef is less than 20 m high, each end rises to a hill about 50 m in elevation. These hills contain the main caves and a number of collapse dolines. Small brackish springs discharge into back swamps between the limestone and the volcanic hills further inland. The raised reef has been partially cleared and planted with coconuts. Corridors along fractures and pitted phytokarst are well developed, as on Los Negros Island. There are also isolated outcrops of Naringel Limestone in the coastal lowlands between Bunai and Loniu. Ndrova Island, 4 km south east of Bunai, consists mainly of Quaternary Coral, but has some outcrops of Naringel Limestone with small caves.

Inland from Bunai at Lake Yornam, a closed depression has formed on a limestone member of the Lorengau Basalt. Trees are absent from the lower parts of the depression and the limestone has well developed spongework, indicating periodic rises in lake level. The lake is reputed to drain occasionally but contains fine textured alluvium; thus there is little chance of finding a penetrable entrance. Other scattered depressions occur to the north and may be of similar origin.

3. Central Manus. A belt of Mundrau Limestone extends more or less continuously southward from Kari to Droia. In addition there are scattered outcrops to the north, west and south of the main belt. Kari is situated in a small polje, about 15 km^2 in area. The surrounding hills are mainly volcanics, while the polje is underlain by limestone with a partial alluvial cover. Steep sided pinnacles project up to 15 m above the alluvium; there are occasional larger towers. The pinnacles are often dissected by solutionally enlarged fractures, forming mazes of crevice karst. There are several types, which vary according to available relief and the spacing of fractures. One variant is characterised by deep narrow fissures which sometimes connect with small solution caves. Elsewhere broader corridors separate clints only 2 m high. Much of the crevice karst is difficult to traverse. Fissures may be covered with rotten logs and leaf litter, forming traps for the unwary walker. Penetrable corridors often terminate in blind walls, while progress on the clints is blocked by deep fissures.

Fine textured allogenic alluvium occurs as a series of terrace remnants 7-10 m above the present banks of the Kari River. Small shake holes have developed through subsidence of alluvium into limestone cavities. At Kari there are aligned subsidence dolines up to 7 m in depth. The crevice karst appears to have formed under an alluvial cover, through solution by laterally moving groundwater.

KARST AREAS OF MANUS ISLAND



South of the polje is an area of fluviokarst where the Worei River flows alternately through large caves and alluviated blind valleys. Smaller tributaries rising on the adjacent volcanic hills frequently sink at the limestone contacts. Lateral undercutting by the Worei has formed vertical or overhanging limestone cliffs which are encrusted with white lichens. There are several areas of cockpit karst with gullied closed depressions up to 150 m in depth. Although some cone hills are present, very few of the depressions have developed entirely on limestone. The terrain is an intricate mosaic of limestone and hydrothermally altered basement volcanics. After rain ephemeral surface flows are channelled down the gullies and disappear into sinks which vary from bedrock passages to shake holes and boulder piles. Each depression usually has multiple stream sinks, but only a small proportion are penetrable. In some cases a series of stream sinks is situated along the same drainage line. Their respective degrees of evolution suggest that there has been an upstream migration of sink sites over time. The lower sinks only receive surface flow after prolonged rain, when the capacity of the most recent sink is exceeded. On a larger scale this process may lead to the dismembering of cockpits; a number of cockpits have smaller depressions nesting within the main one.

Between Droia and Tawi is an area of "degraded" cockpit karst, with steep, gullied limestone hills and flat floored depressions mantled with allogenic alluvium. The orientation of these depressions is controlled by a fault system trending NE-SW. Small cliff foot caves occur at the base of the limestone slopes. In a few cases streams resurge in the cockpits and flow across the alluvium to sink on the other side. Alluvial terraces 7-10 m above the present ephemeral channels are represented in several depressions.

Most of the karst is covered with mid-height to tall closed forest, which has an irregular canopy. Alluviated cockpit floors often support sago swamp forests and there are some areas of regrowth. The dense and irregular forest cover makes air photo interpretation difficult. The U.S. Army 1:25 000 topographic maps contain a number of serious inaccuracies: major stream sinks are misplaced by up to 400 m, closed depressions are depicted as normal valleys, while other closed depressions are shown where none exist.

4. Western Manus. Mundrau Limestone outcrops in a narrow discontinuous belt near the Bayam River, south western Manus. There are occasional cone hills and cockpits, elongated along fractures; numerous large corridors give much of the topography a linear character. Major allogenic rivers have eroded the limestone down to basement rock and thus cross the belt without sinking.

Other Karst in the Admiralty Islands. On Rambutyo Island 75 km ESE of Manus, a raised reef similar to the one at Bunai extends for several kilometres along the east coast. It is reputed to contain small caves. Nauna Island, 100 km east of Manus, consists of limestone which has been raised up to 100 m above sea level. Pinnacles and solution wells are present (White and Warin, 1964). The pattern of intersecting fractures characteristic of Manus is also evident here. There are thus good possibilities for cave development.

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* * *

PAPUA NEW GUINEA KARST TYPES. 2. HONEYCOMB KARST

R. Michael Bourke *

The two plates opposite show honeycomb karst in the Raulei Range of New Britain. In the upper photograph the land surface is dissected by a deep ravine. The lower photo was taken from a lower altitude.

Honeycomb karst is the name applied by P. W. Williams to subdued cockpit karst on Mt. Kaijende. The surface can be considered as an undulating surface punctuated by innumerable rounded basins. The divides between the depressions form a network as does a honeycomb, hence the name. It occurs on the Lelet Plateau of New Ireland, in the Raulei Range, Nakanai Mountains and Whiteman Range of New Britain, on Mt. Kaijende in the Enga Province, in the Darai Hills of the Gulf Province, in the Hindenburg Ranges, and probably in many other areas such as on the Keriaka Plateau of Bougainville.

(Photographs by author).

* D.A.S.F., Keravat, E.N.B., P.N.G.

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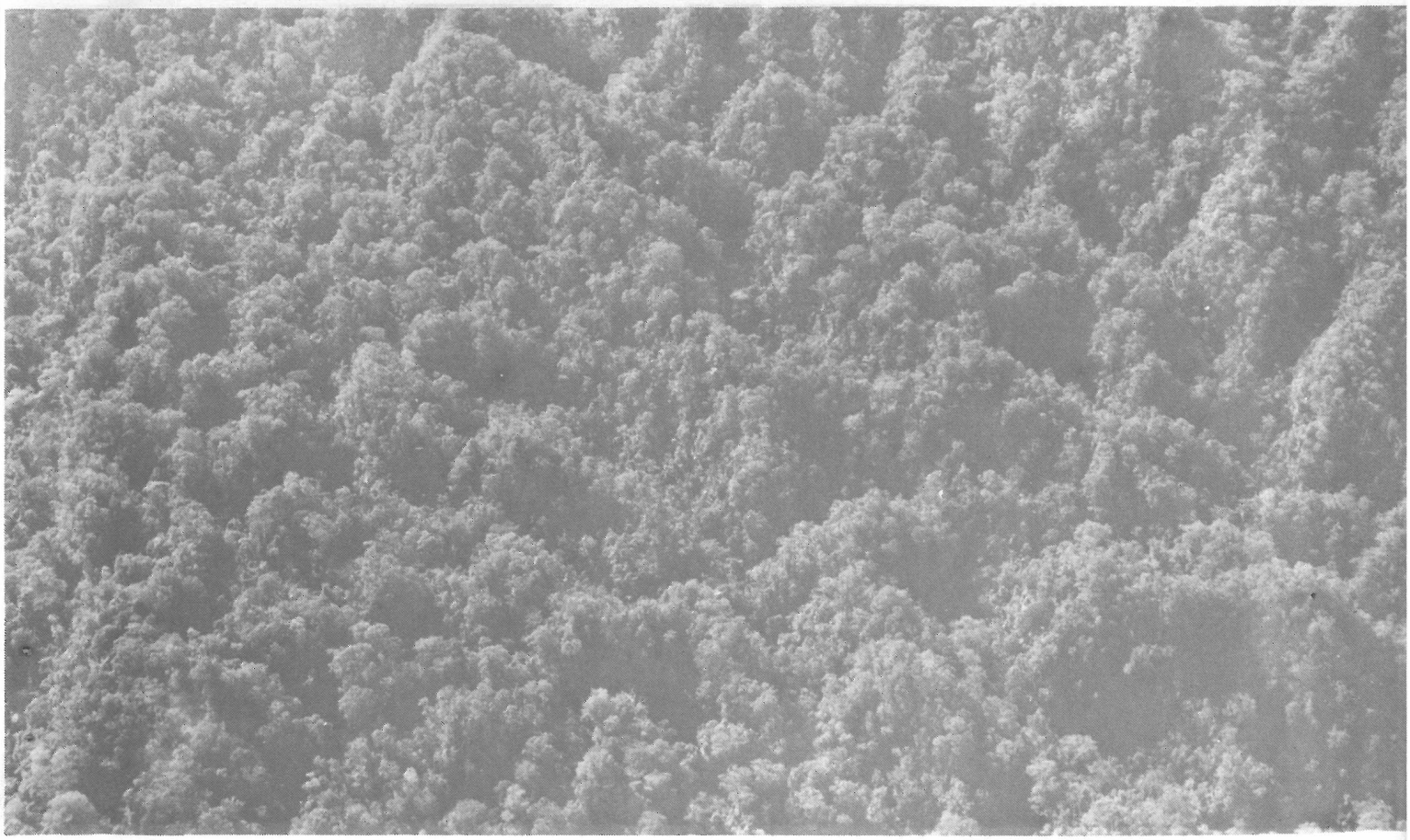

CAVES OF MANUS ISLAND

G. Francis *

The number of caves on Manus depends on the definition of cave which is employed. A complete list of all small cavities seen by the writer would run to several hundred items. In general the following list is confined to penetrable passages at least 15 m in length. A few exceptions have been made for rock overhangs and small cavities which have anthropological or prehistoric significance.

LOS NEGROS ISLAND

LN1. Loniu cave. A large phreatic system with four entrances and about 500 m of passage; used as a rough, undeveloped tourist cave by the owner. (Francis, 1974a; Gallasch, 1973). Holdsworth (1974) gives two photographs from Loniu.

LN2. Ngai-Loso No. 1 cave. About 20 m of passage blocked by a terminal rockfall; may formerly have been connected with Loniu cave (see map).

LN3. Ngai-Loso No. 2 cave. About 20 m long with sloping floor of mud and rubble; blocked at the end by formation (see map).

LN4. Ngai-Loso No. 3 cave. Similar in form but somewhat larger than No. 2 cave; has been walled off into chambers by the development of formation (see map).

LN5. Mau cave. A small cave with a pool near Loniu Passage.

LN6. Ahlu cave. A large phreatic system with one entrance near Loniu Passage and another higher up on the ridge.

LN7. Nge-Pelimat cave. A phreatic system with about 150 m of high narrow passages which terminates in a water filled rift; situated in a small collapse doline on the ridge opposite Lolak. Described by Francis (1974b).

LN8. Ndran Akohau cave. Has about 150 m of phreatic passages, generally narrow; contains flowstone cemented shells; situated near inner end of Was Was Meri (see map).

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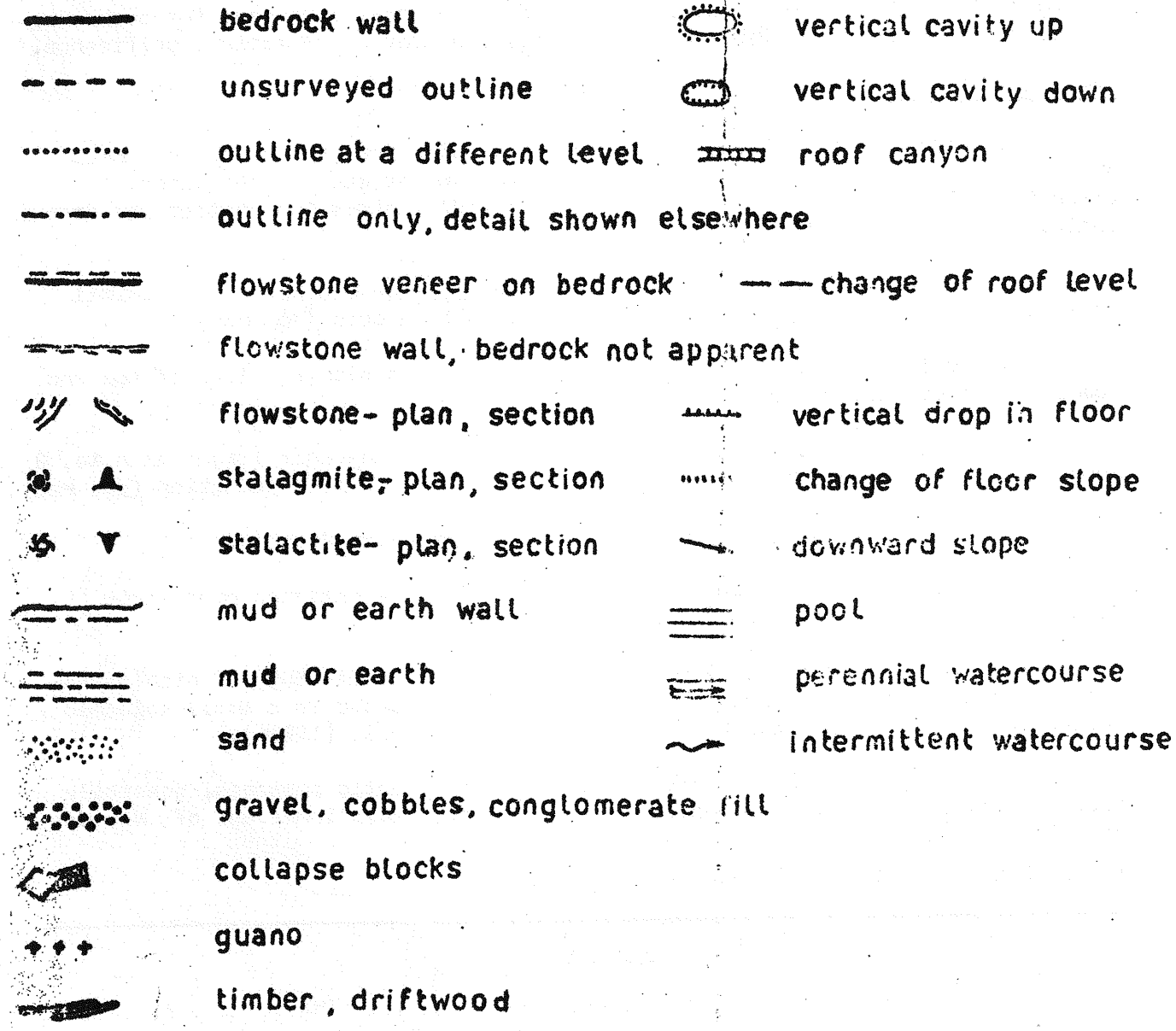
PLATES

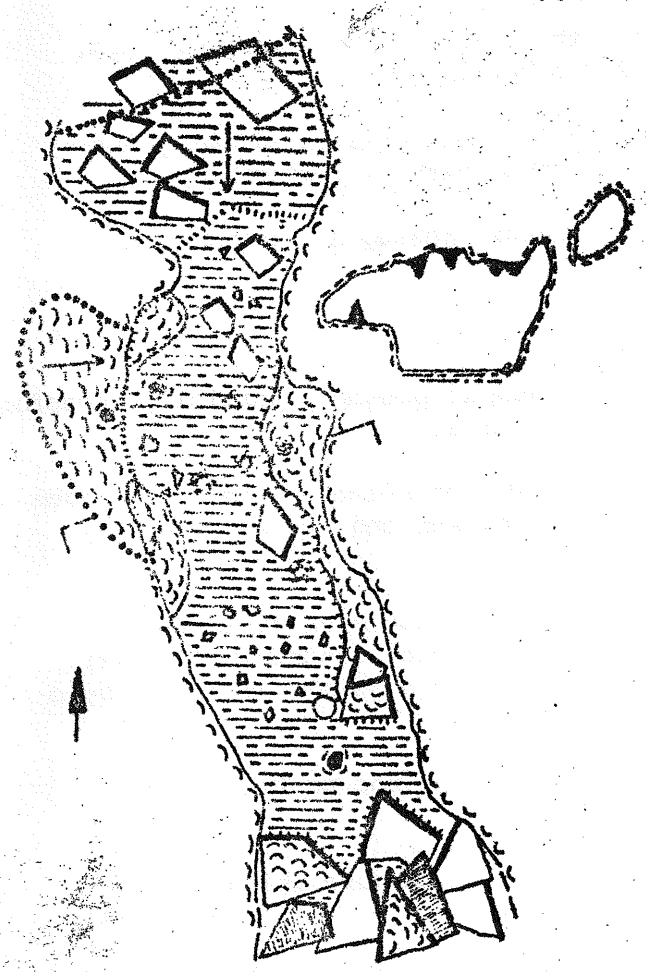
The upper one shows road construction, Manus style. The remains of a small cave at Bunai which was destroyed in May by the road construction can be seen on the right. The road passed within 20 m of Towan cave and 60 m of the Kohin doline. (Photograph by G. Francis).

Lower. Geoff Francis takes the temperature of a water sample collected from a dripping stalactite in Nge-Pelimat cave on Los Negros. The samples are being analysed as part of a geomorphological study. (Photo by R. M. Bourke).

MORPHOLOGICAL SYMBOLS FOR CAVE MAPS



NGAI-LOSO CAVES



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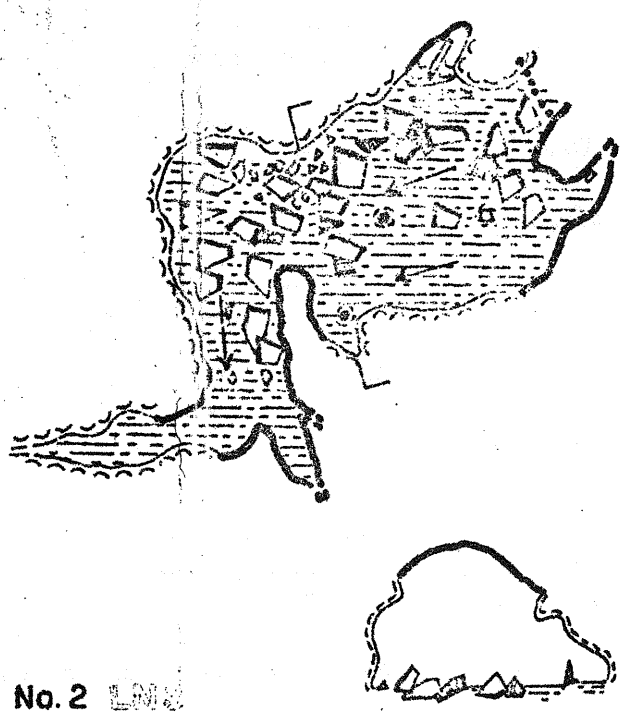

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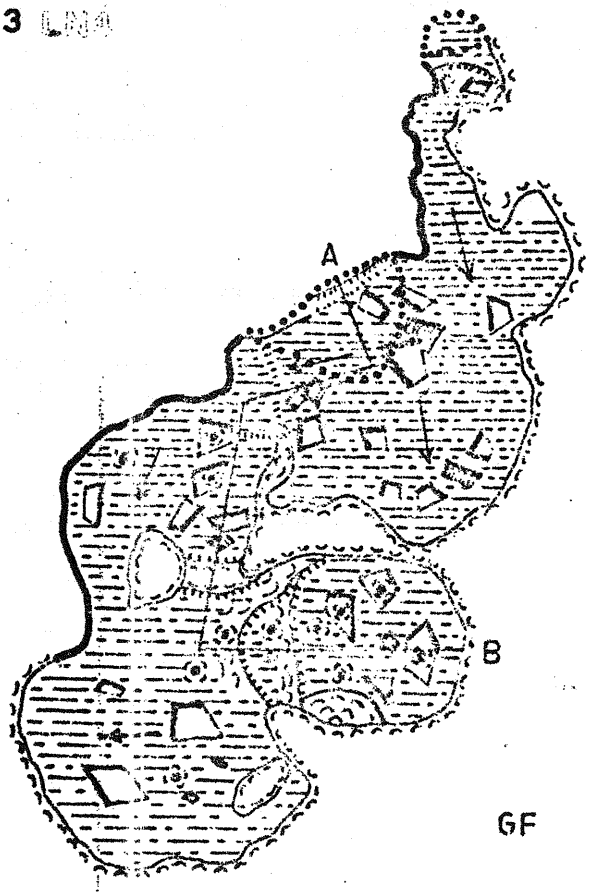

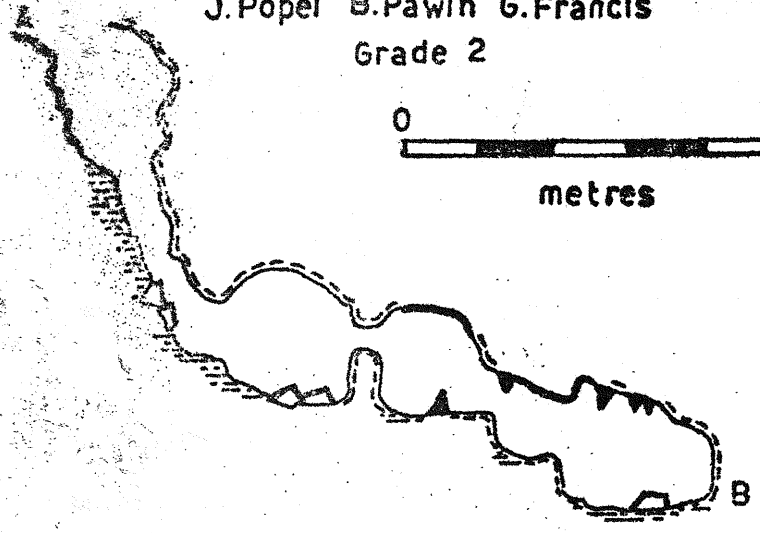

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LN9. Parakeipu cave. A small chamber with a squeeze entrance and rough, pitted limestone walls; near entrance to Was Was Meri.

LN10. Puke-eng cave. A large system with several vertical pitches; two Papitalai people have disappeared in there and thus entry is forbidden.

LN11. Degedilis cave. Has long narrow phreatic passages; situated on ridge above Was Was Meri.

BUNAI

BU1. Palang cave. About 70 m of narrow phreatic passage, partially unroofed by solution and collapse; situated in hill behind Bunai.

BU2. Kohin cave. A phreatic network with 130 m of passage leading off from a small collapse doline; one entrance is called Nambuakap and was not known by the locals to be part of the system.

BU3. Lower Kohin cave. A small solution passage extending at least 20 m into the limestone below Kohin; floored by clastic sediment containing shells; small flow of groundwater through irregular floor; could possibly be pushed by a micro-bod.

BU4. Towan cave. Two small bedding plane chambers, one on top of the other (see map).

BU5. Poywih cave. A medium-sized, well decorated chamber which slopes downwards (see map).

BU6. Nambwatap cave. An extensive phreatic system, situated in a hill at the northern end of the raised reef.

CENTRAL MANUS

CM1. Wakil cave. Stream sink which sometimes takes surface flow; a rock-pile collapse developed on fault, penetrable for 50 m

CM2. Marang Ngat cave. A stream passage about 50 m in length through which the Ti-i River enters the Kari Poljo; the middle sections are too deep to wade (see map).

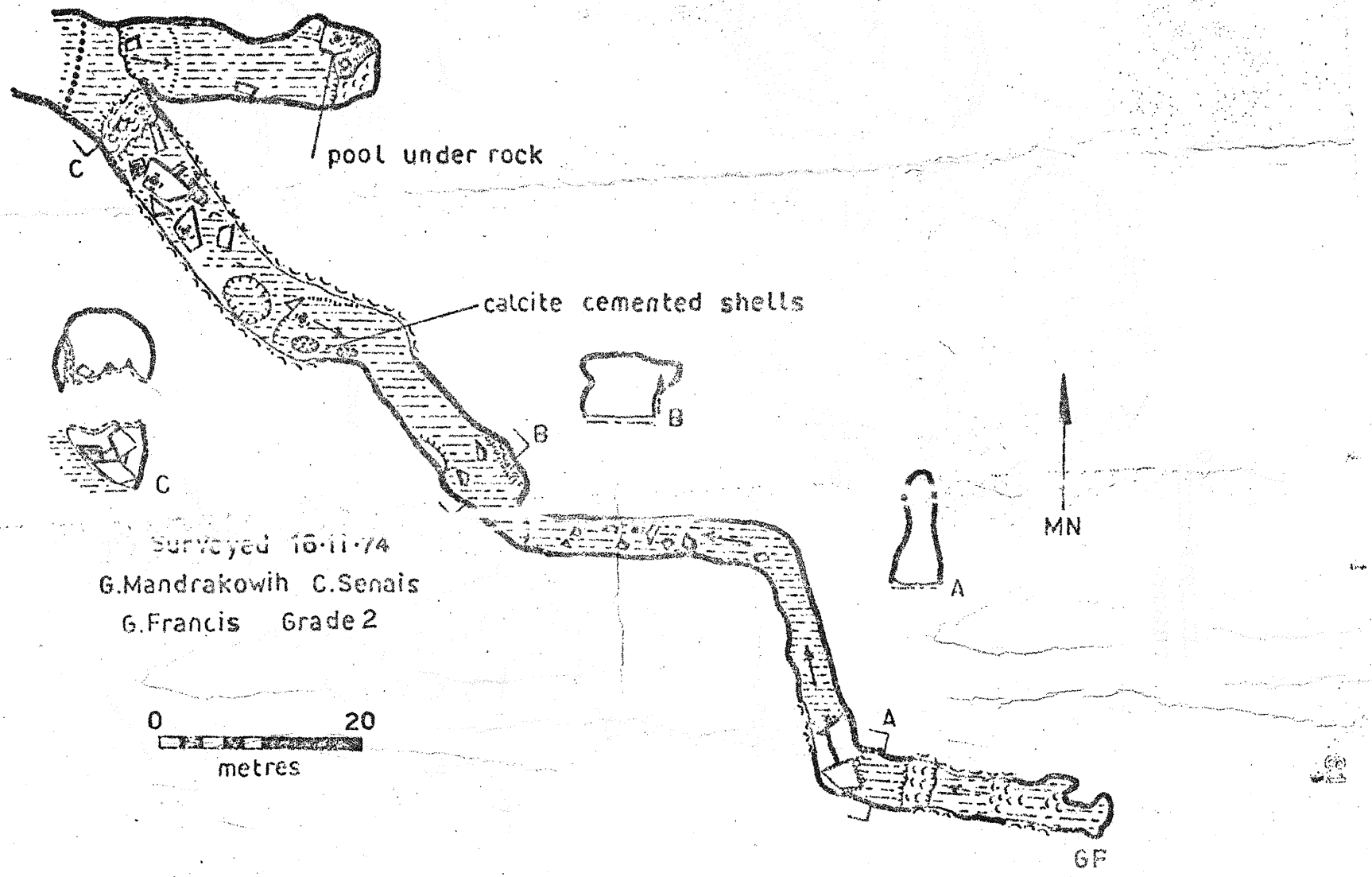
CM3. Wasuu cave. An intermittently active vadose cave with 50 m of small passages; situated beside Ti-i River downstream from Marang Ngat (see map).

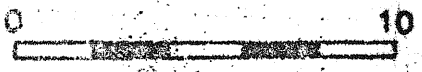
CM4. Wapuu. A small partially unroofed arch with entrance long jam; takes flow from Kari River during peak runoff (see map).

CM5. Ndrompilu cave. A vadose cave with 60 m of passage; stream flows through an incised canyon; on a small tributary of the Kari River (see map).

CM6. Lehlihia cave. A vadose cave with planed ceilings and channel grooved pillars; about 40 m long, just downstream from CM5 (see map).

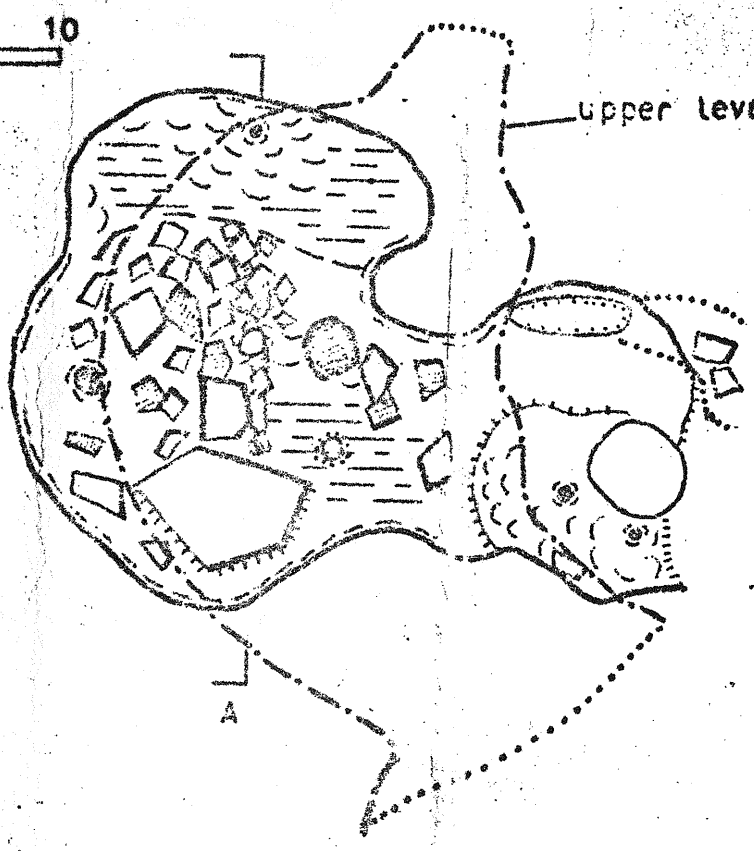
NDRAN AKOHAU CAVE

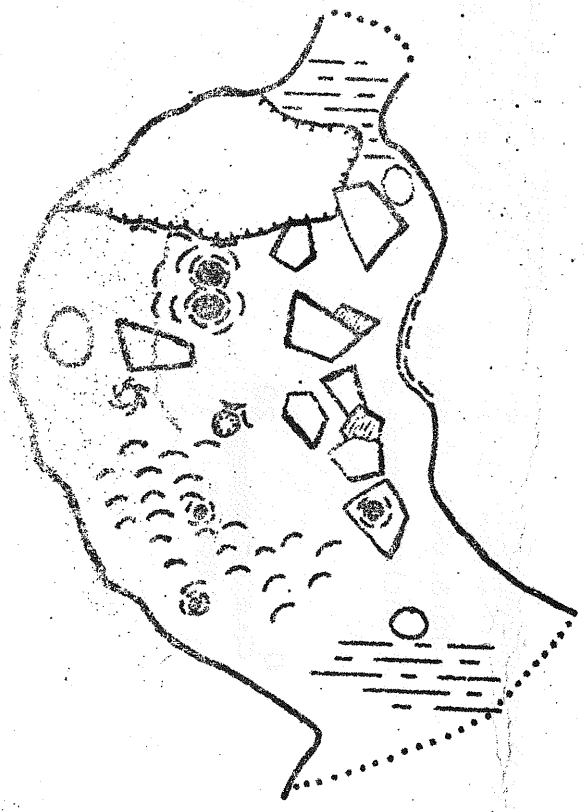


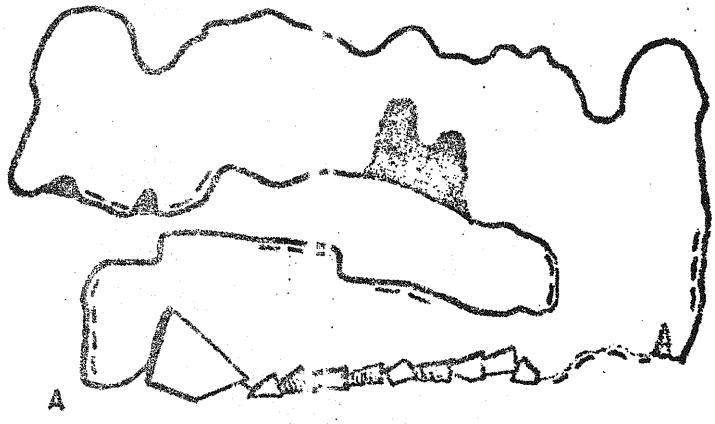


upper level

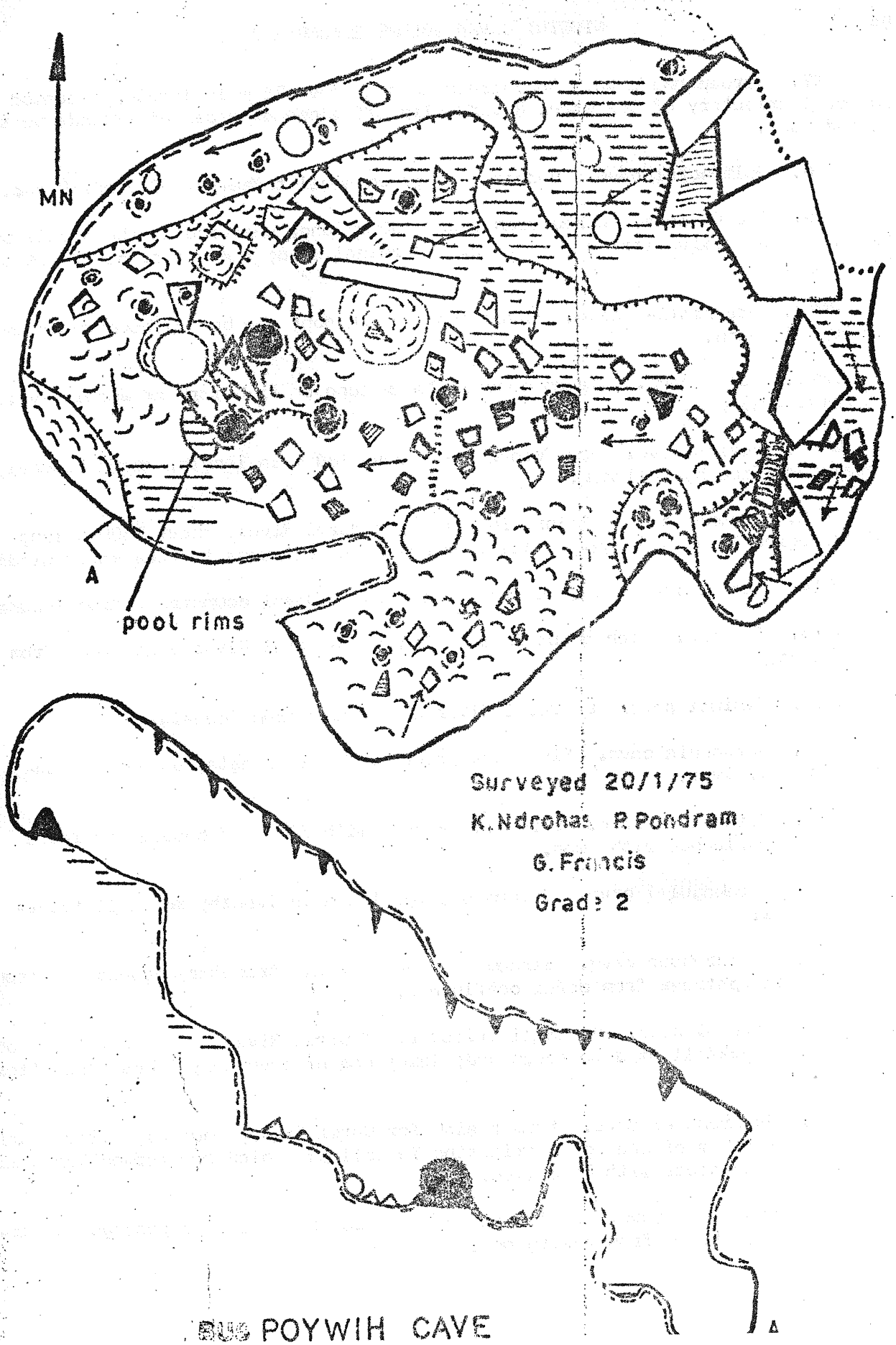
Surveyed 22/1/75
Pondram K. Ndrohas
G. Francis
Grade 2







TOWAN CAVE



BUG POYWIH CAVE

CM7. Ndrompahna cave. An ingrown meander cave 75 m in length, situated on small tributary of the Worei River, slip off slope of sediment extends up to planed roof.

CM8. Pulmondrol cave. Vadose passage on small tributary of Worei River.

CM9. The Pokohoh. Large arch about 180 m long, unroofed in the middle by collapse; one active stream passage with terminal sump; takes Kari River out of the polje.

CM10. Ndrehinti-i cave. Resurgence to Pokohoh; can be followed upstream for 50 m to sump.

CM11. Mukou cave. Stream passage 200 m long on tributary of Worei River; extensive collapse.

CM12. Ndrias cave. Dry former river cave 180 m in length, above Kopunei; largely modified by collapse.

CM13. Kopunei cave. Major sink of upper Worei River, about 1500 m long and averaging 50 m in height; locally unroofed by collapses to form karst windows.

CM14. Rahamusinen cave. Large river cave on Worei downstream from Kopunei.

CM15. Tewasiu. Arch about 60 m in length on Worei River downstream from Rahamusinen.

CM16. Tiniwai cave. On Worei River downstream from Tewasiu.

CM17. Motonenis cave. River cave about 200 m in length; on Worei downstream from Tiniwai.

CM18. Matndrumok cave. Large river cave with 300 m of passage on Worei River near confluence with Awah.

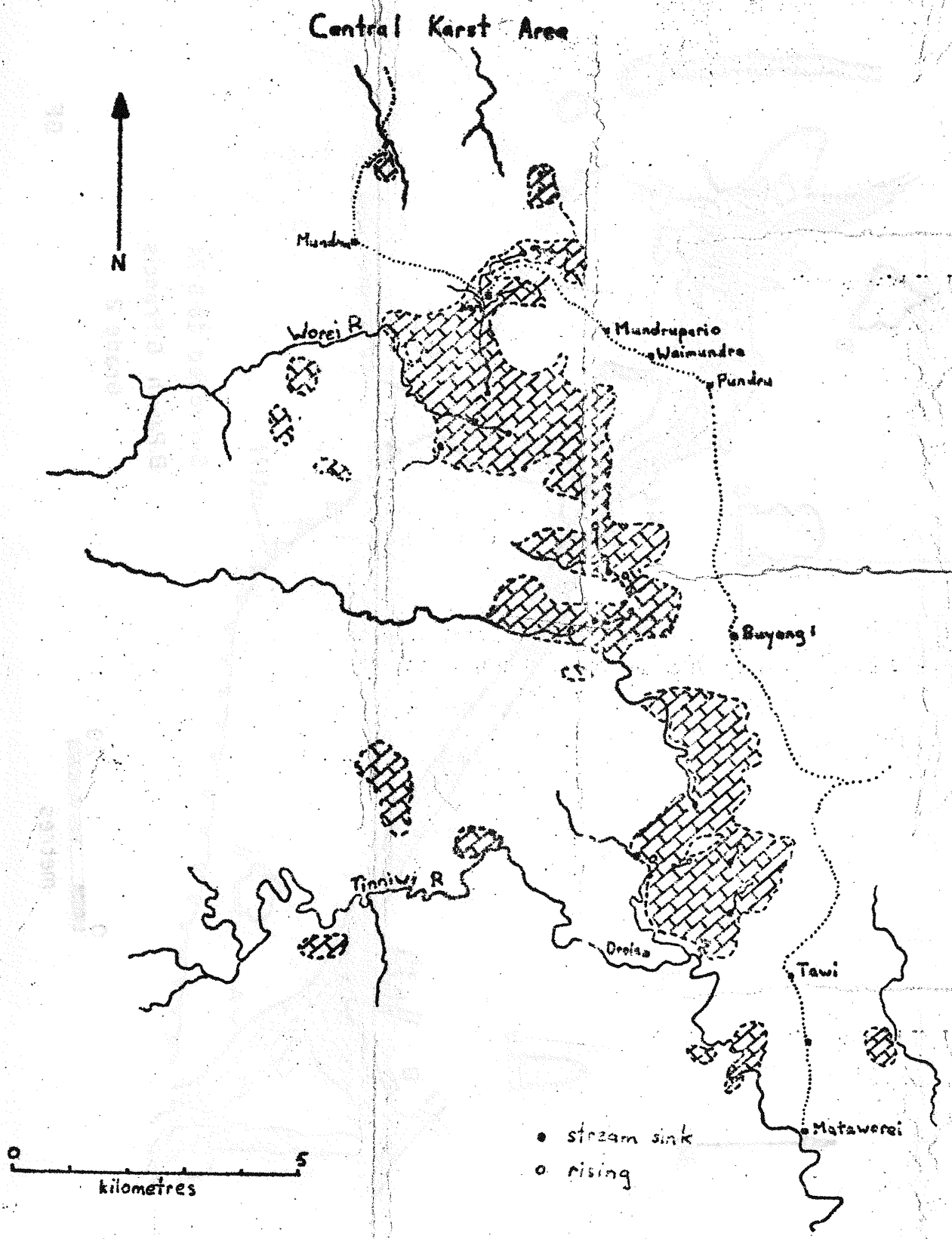
CM19. Ndrokapulal cave. Stream passage 150 m in length; on small tributary of Worei.

CM20. Matdrahuur cave. Stream passage on small tributary downstream from CM19 and just upstream from Worei confluence.

CM21. Ndrelei cave. On small tributary of Worei River; has about 150 m of passage with rockfall at downstream end; lower end of cave only takes flow after heavy rain.

CM22. Metdrohorki cave. Former sink for Worei River, now only active during floods; about 500 m of passage terminating in collapse which has formed karst window; probably connects with Pumpulyun.

CM23. Pumpulyun cave. Last river cave on Worei, 1250 m of passage negotiable by canoe upstream from resurgence.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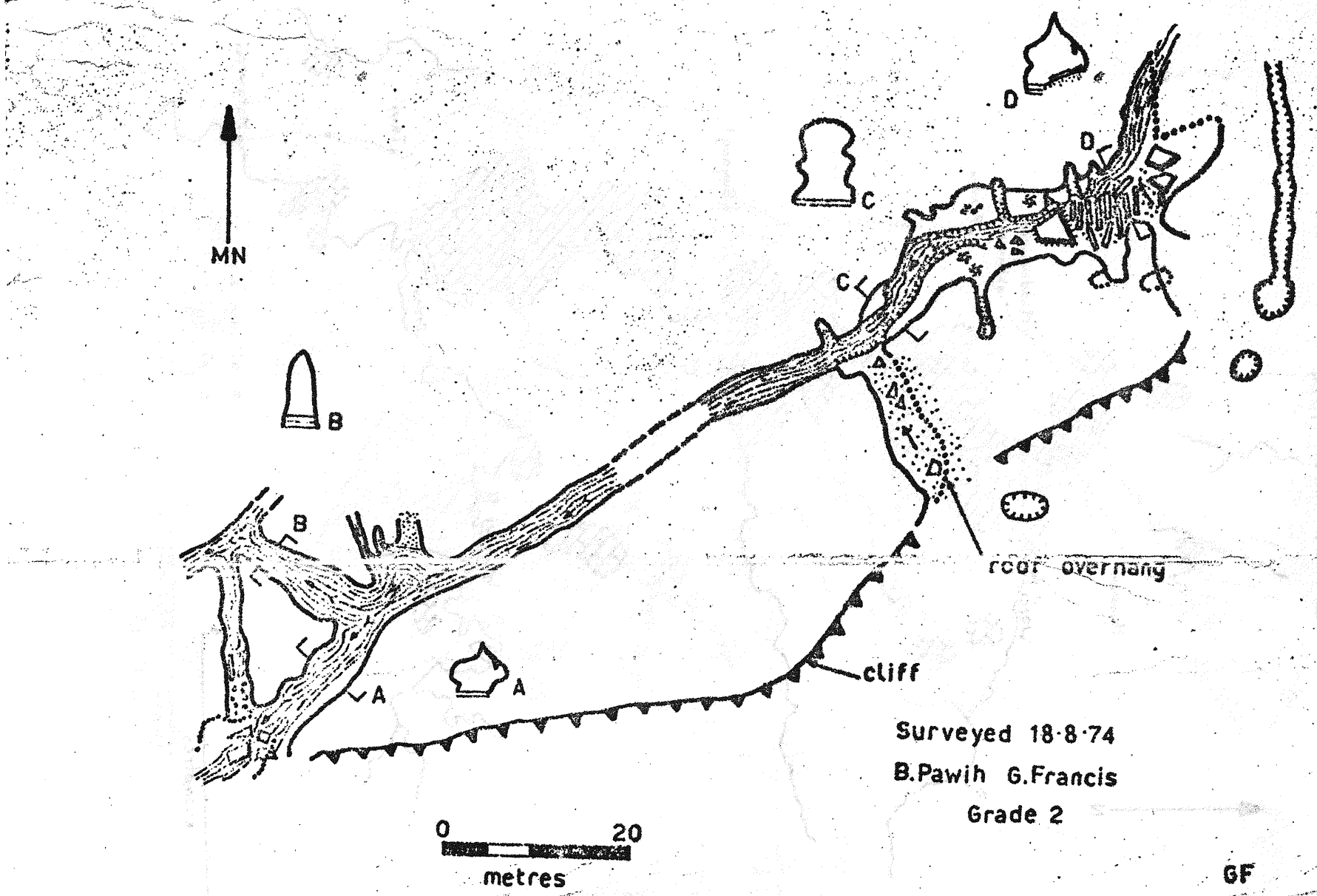
MARANG NGAT



Surveyed 18·8·74

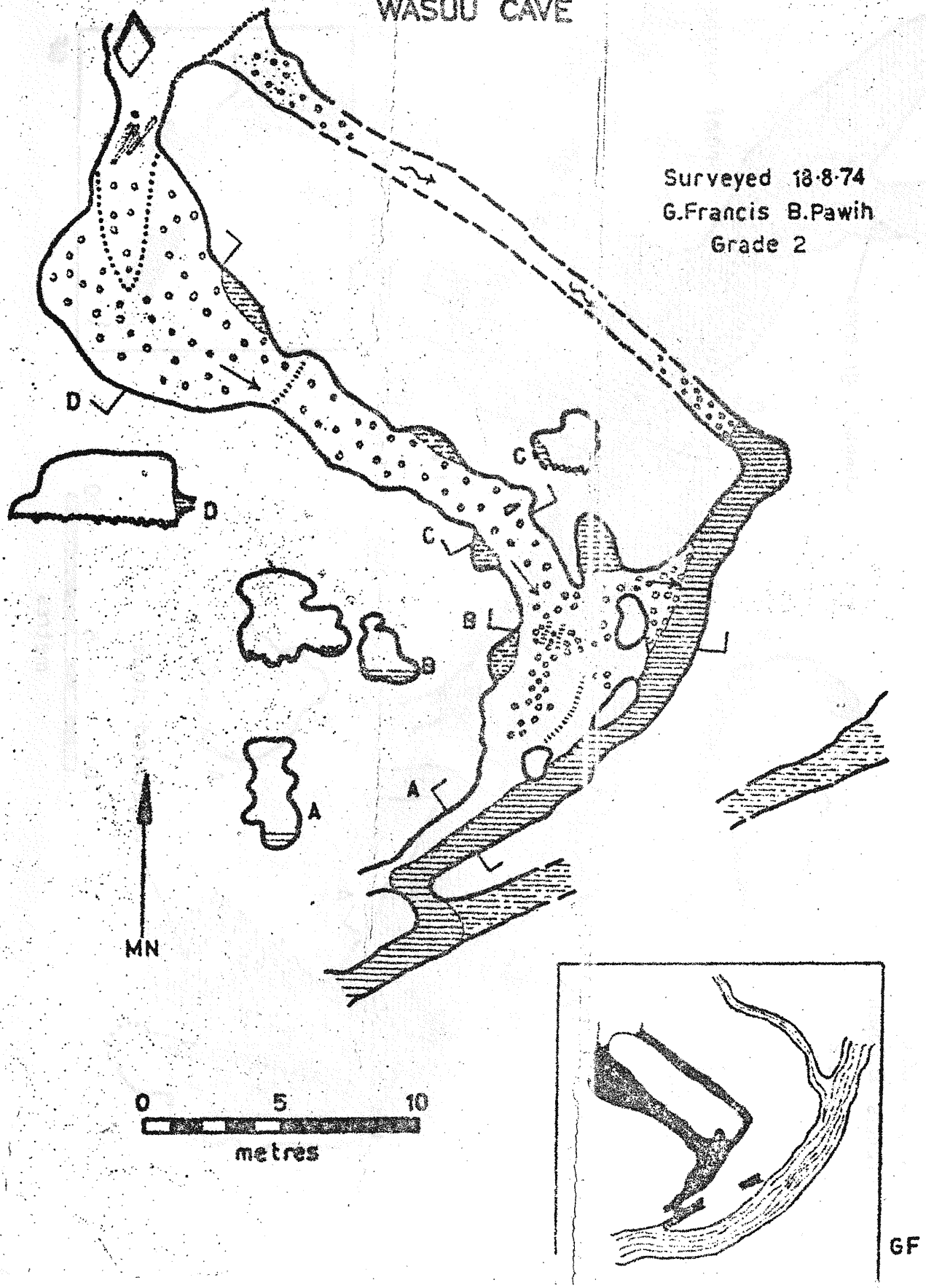
B.Pawih G.Francis

Grade 2

GF

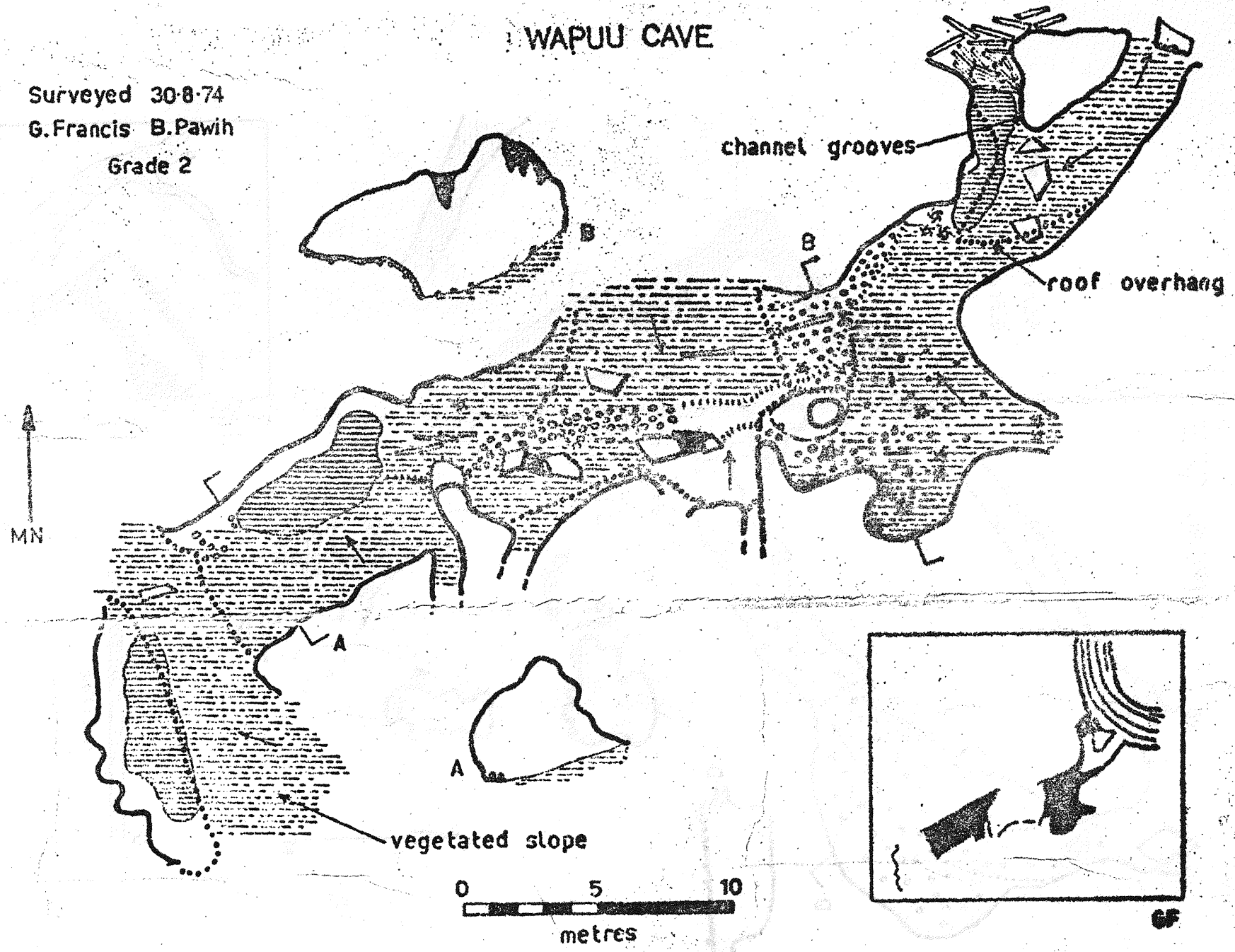
WASUU CAVE

Surveyed 18·8·74
G.Francis B.Pawih
Grade 2



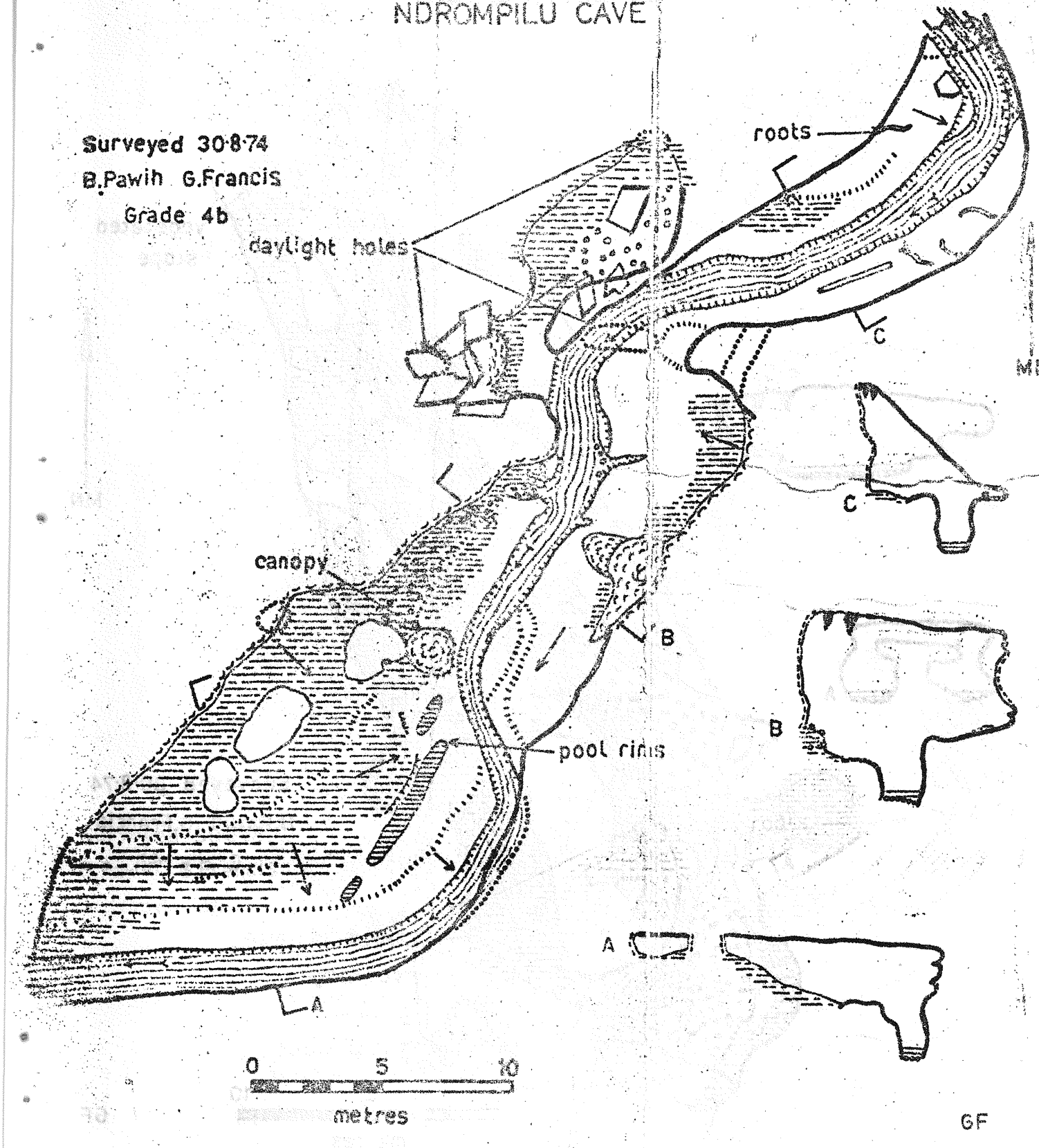
WAPUU CAVE

Surveyed 30·8·74
G. Francis B. Pawih
Grade 2

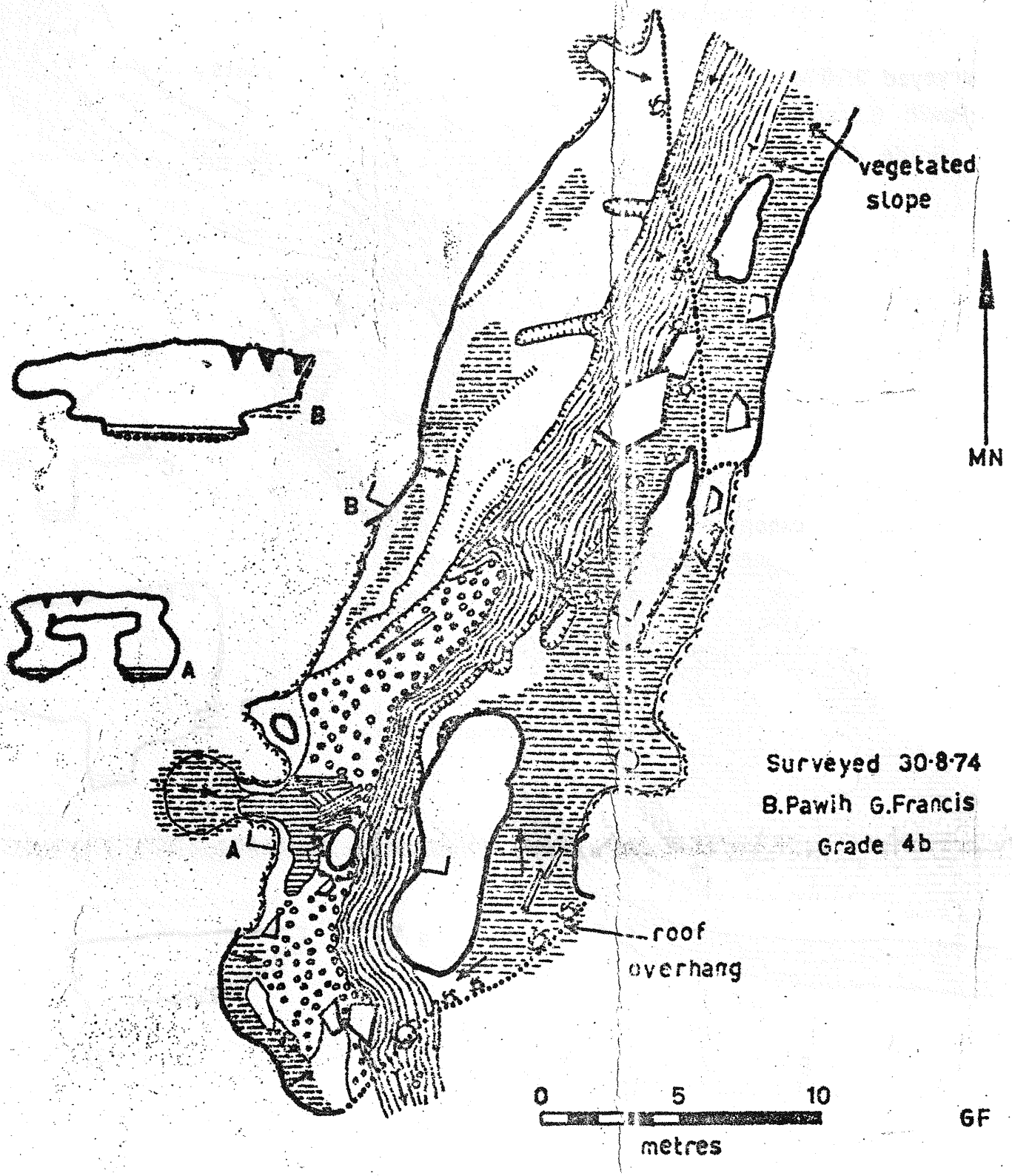


NDROMPILU CAVE

Surveyed 30·8·74
B.Pawih G.Francis
Grade 4b



LEHLIHIA CAVE



Surveyed 30·8·74
B.Pawih G.Francis
Grade 4b

CM24. Pukenkarahat. Fault controlled corridor with overhang on limestone capped ridge east of Pumpulyun; some small solution passages leading off; skulls on ledges and in solution well further downhill.

CM25. Pundroh. Cliff foot cave 15 m long with bedding plane roof; in cockpits SE of CM24.

CM26. Big Samsau cave. Resurgence in cockpit west of Pundroh; could be negotiated under low water conditions.

CM27. Little Samsau cave. Resurgence just south of CM26; at least 50 m of active stream passage with old, sediment choked resurgence.

CM28. Napirou. Overhang ledge near CM27, contains skulls.

CM29. Leptahun cave. Resurgence of small stream near Drapkapilal River; active stream passage and older passage which only takes flow after very heavy rain; about 80 m of cave, could be pushed further under low water conditions.

CM30. Matandru cave. Sink of Drapkapilal River; penetrable for a long distance under low water conditions.

CM31. Kumburun. Resurgence for Matandru near Worei River; two holes above resurgence appear to go; scaling pole or lasso would be needed.

CM32. Drangut cave. Resurgence in cockpit near Droia; penetrable for 20 m.

CM33. Drangut Sink cave. Sink for CM32, penetrable for fair distance under low water conditions.

CM34. Mata-ah cave. On south side of Worei River upstream from Mataworei; about 35 m of passage.

CM35. So-osah cave. A small chamber 6 m in length, with large stalagmite at entrance; in valley of Losa River east of Tawi.

CM36. Porsos cave. Narrow cave about 25 m in length, developed along fault near So-osah; former sink for small stream.

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* * *

SPELEO PERSONALITY - GEOFF FRANCIS

Geoffrey John Francis from Sydney; geomorphologist and speleologist; born 1947; scholarly in manner; quiet by nature.

Geoff did a B.A. at Sydney University, starting in 1965. After this he worked at Jenolan caves as a guide as he was not qualified for other field jobs. Later he worked at Mt. Kaputar National Park as a ranger. He studied geography externally from New England University, and in 1973 went full time holding casual jobs only. In March 1974 he came to Papitalai High School on Los Negros Island as a volunteer. He is currently doing a Masters degree externally from U.P.N.G. on the Manus karst. He plans to go finish at the end of '75 and finish off his M.A. Next year he may start on a Ph.D. in N.S.W.

He started caving about 15 years ago and six years ago joined the Sydney University Speleological Society. In N.S.W. he caved at Jenolan, Wee Jasper, Cooleman, Mole Creek, Wellington and Clifton. His interest in geomorphology started when people started asking him questions when he was a cave guide. The interest blossomed in 1972-73 when he did a study on the Wellington caves. A paper on this entitled "Evolution of the Wellington Caves Landscape" has been published in Helictite.

Geoff has really put Manus on the map cave wise. Before he started caving there, only a few caves had been reported. Geoff set about an active programme of finding, exploring and surveying caves. He has recorded some 53 caves from Manus and Los Negros Islands, identified the main caving regions and published his findings. Most of Geoff's caving on Manus has been done with his students as he has found difficulty in convincing anyone else to come out, apart from some of the nuns at the high school a few times. His main caving interest is now geomorphology, although he was once keen on exploration. Underground he spends his time surveying, collecting water samples, cave sediments and other specimens for his geomorphological studies. As well as working on karst geomorphology, he has been studying his local environment including soil profiles, the ocean and the botany of the forest.

Geoff had hoped to join the British expedition later this year as the P.N.G. scientific representative on the trip, but this appears impossible. R.M.B.

* * *

CLEO'S RIVAL

Your editor receives caving magazines of all types, but one received recently featured something one doesn't see too often - a nude caving centrefold. The model - unfortunately a male - had his private parts hidden by his wet cell. The magazine was the Metropolitan Speleological Society Journal, Dec. 1974.

* * *

CAVES AND THE PEOPLE IN CENTRAL MANUS

B. Pawih *

The Legend of Wasu-u Cave. This story comes from the village of Kari, Central Manus, which is surrounded by mountains. Around the village you will find caves, and in them are underground streams.

Long, long ago there lived in the village a rich gardener by the name of Onglourou. He had in his gardens many yams and taros; he worked the garden by himself, from morning to evening for several months. One day while working in the garden, he found that some of his big fat yams were missing. He didn't worry much about it that day, but was surprised to find more of this happening on later days. He decided to catch the person who was doing it.

On the following night he took his war weapons and waited in the bushes behind the garden. Late in the moonlight night came a devil who looked almost like a man. The reflection of his body in the moonlight was like a mirror. He jumped up and down singing as he went in search of yams. When he was very close the gardener stood up and shot the creature with one of his stone-head spears. It gave the devil a great blow, and with a loud cry of pain he jumped up and ran towards the mountains. His body was later found changed into a snake, lying at the entrance of the Wasu-u Cave. This cave was then believed to be the house of the devil.

The Story of Kopunei. During prehistoric times a tribe settled on the mountainside which is now called Ndrias. A man named Kopunei was in the Worei River catching "kindams" (large shrimps) for food. He was catching them by putting a bait on one end of a line and letting it down into the pool at the entrance of the cave which is now called Kopunei. Suddenly he was pulled down by a mighty force. He was taken by surprise and pulled down into the pool by a giant eel. Once in there the eel held the man, but his dog ran back home and tried to tell the people what had happened.

The people understood what the dog was saying and followed it down to the river. They found the kindams and knew what had happened. Many of the best swimmers tried to get the man back up but did not succeed. Then they sent messages to all villages that a reward would be given to anyone who could do this task. A few days later a man from a far away village volunteered, and got Kopunei up. This was done by fastening one end of a long string to the body. When they were given the signal they pulled up the bodies of Kopunei and the dead eel. They buried Kopunei, and had a big feast in honour of the man who got him out of the river. That is why the cave was named after the dead man Kopunei.

Caves such as Kopunei and Mukou are very useful to people in the village, because they catch bats for meat in them. Most known caves in the area were used during the war: the people used them to hide from enemies. This makes it difficult to allow Europeans to visit or explore the caves, because the people still believe that if war comes they would need to hide in the caves again. If Europeans come to know these caves, in a future war they might come back and destroy them, killing the people.

Kuruti Language: ngat = cave; pehlie = cave used as a dwelling; so-ou = limestone; loso-ou = crevice karst; muling = shake hole, subsidence doline.

* P.O. Box 146, Lorengau, Manus Province, P.N.G.

* * *

THE LEGEND OF SO-OSAH CAVE

P. Pius *

A very rich man once lived with his son at Mataworei. One day he decided to count his dogs' teeth. When he went into his store room he found that his dogs' teeth were all falling off because the fibre string which bound them was rotting. He wanted to find something to store his dogs' teeth on. He decided that the pitcher plant was suitable for this purpose. Leaving his son at home, he took his stone axe and headed off into the bush.

After walking and searching for hours he found a small pitcher plant, but was amazed to see that the pitcher plant had ashes on its leaves. He thought it must have come from a house or village nearby. Forcing his way through the undergrowth he came to a house which was alone in the bush. As he approached the house a girl called Aluh stood at a distance and called out "Are you a human being or a masalai?" "I am a human being," he replied. "Then come in and have something to eat with me and my old grandmother," she said. The man went in and ate. After eating he took the remaining food home in a pallet (wooden dish).

When he came home he took the food and gave it to his son to eat. After the son had eaten he asked his father where the food had come from. His father told him everything, and went on filling the pitcher plants with dogs' teeth. The son left, saying that he wanted to return the pallet, and returned along the way that his father had told him. As soon as the young man and Aluh met for the first time they fell in love with each other. After returning the pallet the son went back to his father. Aluh however followed secretly and saw the young man's house. A few days later she stole away from her grandmother and came to live in the young man's home, which means in custom that they are married.

After their marriage feast they lived happily until Aluh got pregnant. Then the young man decided to look for other girls to have sex with. One day he met some girls who lived on a misty hilltop above Mataworei. Every morning he stayed with them, returning in the afternoon. Aluh got curious so she secretly followed him one morning and found out all. She came home angry and after working out a plan she slept.

One day her husband woke up late. While he was still sleeping Aluh took a canoe paddle and went up the hill to where these maidens lived. When she got there they were still asleep. She took the paddle and pushed it into each girl's anus, killing them. However she forgot to wipe the blood off the tip of the paddle and brought it back to its place under the house.

When the husband awoke he ate and then he went up the hill. When he got there he saw that his friends were all dead. So he came back and saw blood on the tip of the paddle. He realised what had happened and went in and beat Aluh up so badly that she made up her mind to run away. After packing her belongings in a small sago strainer (basket), she went into the bush. She was ashamed to go back to her grandmother so she headed in another direction, walking and weeping. She came to a small cliff at So-osah. She called her forefather's name, wishing to be a stone and her home a cave. She changed into a woman shaped stone and still remains in the cave. When the young man found the stone, he felt very sad.

* P.O. Box 146, Lorengau, Manus Province, P.N.G.

* * *

THE LEGEND OF WAS WAS MERI

A. Pokolou *

The story is about two girls and their grandmother. They lived in a cave by the lagoon which is now called Was Was Meri. The girls' names were Hinipong and Hinimei. As a custom these girls were dressed in traditional clothes and taken into a hut in the cave. Their ears were cut and they had to stay in the cave until the ears were cured.

One day they were tired of sleeping and told their grandmother that they wanted to come out and wash. So their grandmother took them out and shook the ashes out. They sat under the big limestone rocks. The two girls jumped into the lagoon and washed; each time they went into the water their legs began to turn into the tail of a whale. Every time they came up they called out to their grandmother, "Look at us!" and their grandmother was very proud of them. Slowly their whole bodies were changing. The next time they jumped in they changed into whales and swam away. They swam around Los Negros Island and south to the place called Pere. At that time the head of the village and his men went out to throw their net. They left it in the sea and the girls who were whales swam into it and got stuck. The next day the fishermen found the whales and took them home.

They cut up the bigger one and shared it among the village people. The people sent the little boys and girls to fetch water; when they arrived at the place where the smaller whale was, they found a girl. She was weeping and told them to go away. They ran back and told the headman. He went there to see if the little ones were tricking him and saw the girl who was young and beautiful. He took her to his house and married her. Later she gave birth to a son. The boy grew up and used to play with other little boys. Once they called him "son of a fish" and he ran crying to his mother. Then one day everyone went to the gardens except the headman's wife and son and one old woman. They went to ask for help from the old woman. She gave the son some spears and told him to throw a spear in front of them and there would be land. They thanked her and walked to the beach; he threw a spear and there was land. They started to walk and behind them was sea. He did this many times over until they reached Naringel. They came up and started walking to Was Was Meri. When they reached the lagoon the woman hid her son among the flowers and went into the cave. The grandmother asked who it was. Hinimei called out her own name but the grandmother could not believe it. She went closer and let the grandmother touch her. Then granny knew that it was Hinimei, and heard the child outside. She sent her granddaughter to bring the child in. The old woman was very happy.

When the boy grew up the grandmother said that they would have to make a feast for him. Villagers who were invited were told that after they had eaten they should excrete into leaves and wrap them up. Later on the boy's father and his people came and joined the others who were still enjoying themselves. When the boy's father and his people went, they were given the leaf parcels which they thought would be food. When they saw the excrement, they realised why they had been given this rubbish. These people are now dead and the cave is covered with water. At Was Was Meri you can still see the rocks where the girls jumped off.

* P.O. Box 146, Lorengau, Manus Province, P.N.G.

* * *

THE CAVING SCENE

British Expedition. Howard Beck and Kevan Wilde completed their two month reconnaissance trip in June having gathered a lot of information on the area for the main trip.

By mid-September the deepest cave explored by the 26 man party was Agim Tem at 180 m deep. The main chamber in this one is about 60 m all round. The longest is Selminum Tem in which 13 km of passage had been surveyed with more to go. Much of the passage is very large, old and phreatic with recent vadose invasion. There is artwork inside - an engraving of a bird, some abstract patterns, and two human figures in a white mineral. The system also boasts a possible archaeological site and a large marine vertebrate fossil in limestone.

In the Finim Tel area the party explored a number of sinks and shafts, but nothing went deeper than 80 m. They have collected a lot of cultural material and consider that the expedition is already a success from a biological point of view. In the remaining few months of the expedition, it is planned to visit the fault controlled valley area and Wam Tigiin, and possibly the Star Mountains. The expedition forms the cover story for the May/June number of Descent.

Central Province. Several trips to Javavere were made in May-June and a group of seven people is quite active. A resurvey of the Old cave has been commenced by Malcolm Pound to train cave surveyors. A trip to a reported limestone outcrop at Kwikila 50 km down the coast from Port Moresby was unproductive.

East New Britain. Over the June long weekend Colin Cranfield, Jim Farnworth and Tim Sprod headed into the Bainings to revisit Obungeram cave. The cave was pushed to end and Jim did a rough survey. Cave depth is a respectable 102 m, making it the deepest explored cave on New Britain.

Leigh Gleeson visited a small cave near Nagail village on Makada Island in the Duke of York Group in September. Over the Independence period, Jim and Leigh went into the Galavit-Wilambimki area in the Bainings. They entered a number of shafts and saw others on the range above Galavit. However lack of drinking water hindered exploration and forced them over the range to Wilambimki. From here they walked to the west coast at Pondo and flew back to Rabaul from Open Bay.

Eastern Highlands. Things are pretty quiet in the highlands now that the Wilde has joined the Brits. However in September Michael Bourke, Gary Higgens and Dick Knight had a look at the art at Kafiavana near Goroka and took a few photographs. There are some access problems at Kafiavana now.

Manus. In the May holidays Geoff Francis went to Droia in Central Manus, and got washed out again. However he did manage to push Metdrohorki cave for 500 m to a rockpile which could possibly be negotiated with a rope. Geoff feels that the cave almost certainly connects with Pumpulyn which would make the total system nearly 2000 m in length.

Since May Geoff has made one trip to Ndran Akonau and two to Loniu. He writes: "I'm beginning to regret the choice of Loniu for a long term solution study. The public transport system here is worse than ever and I often end up walking there. Also the yob tourists keep knocking over my drip collectors!"

New Ireland. Over July-August an 8 man party spent a month exploring caves on the Lelet Plateau. Over 100 were explored, the deepest of which was 102 m. The longest pitch was 81 m. A number of river caves were explored for a respectable distance. In the village area (800-1000 m a.s.l.) caves were scattered between the cones. On the higher part of the plateau (above 1200 m), numerous caves were found in every karst depression but they usually chocked off after a pitch or two. Despite the failure to explore really deep ones, the party remained convinced they were there. Only a tiny fraction of the karst plateau was explored. One of the highlights of the trip was to stand on the edge of the plateau and look at the large resurgence at Dalum only a few kilometres away and over 1200 m below.

A number of interesting legends were heard. One of the more unusual finds was some human bones deep inside a tight horizontal cave. How they got there is a mystery. On the way out some of the party had a look at the caves that the Dalum River comes out of. They were not pushed. Another interesting cave visited on the coast contains human bones and art, and is used for rain-making magic. Overall, it was a hassle free trip thanks to the assistance given the party by Dave Larken and the Lelet people.

In July Hal Gallasch had a look at a "new" burial cave just south of Namatanai. It contains complete skeletons. At Silom he visited the big bat cave previously visited and another one just near the road. Following the Lelet expedition Leigh Gleeson visited New Hanover and got into a number of small but interesting caves near Meteran village.

Planned expeditions. Yet another expedition! A Tasmania-Queensland based trip is planned for July-August next year. The target area is still being decided but a return to the Lelet is possible or it may go to the Lavani Valley. A 6 to 8 man team is envisaged. The leader, Dave Gillieson, says that any PNGCEG cavers would be most welcome. The '76 Muller trip is definitely on although the leaders, Julia James and Neil Montgomery, are in North America somewhere. I heard that the proposed American trip is progressing O.K., so we may see them out here before too long.

Southern Highlands. In May Gerry Jacobson from Canberra and a Yugoslav karst engineering expert, Boris Parlin, visited the lower Waga River area. They found a possible resurgence for the river sink that drains the Waga. It is about 12 km south east of the sink. In the hydro dam site area, Gerry found another series of caves which appeared to be extensive. In the "beehive" area (tower karst) near Mendi he found a 30 m sink.

New Caledonia. Very little caving is done in, or at least described from, the rest of the south Pacific. However, in January-February a 7 man party from Australia spent about 6 weeks exploring and documenting caves in New Caledonia. They managed to "do" most of the major caves and will be publishing a comprehensive report shortly. The trip was marred by an accident in which the leader, Dave Gillieson, broke his leg badly.

R.M.E.

* * *

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Knife Fork Spoon
3-piece combination set. Aluminium Alloy non-rusing
65c set
used condition

Army Steel Dixie
Good/used condition
95c

Khaki Webbing Haversack
13" x 13" x 4"
New $5.50

Convas Type as above
Plus 2 Front Pockets
'D' Rings for Tying on
$5.50 new

J /Green Basic Pouch
New 65c

J/Green Cotton Trousers
Thigh Pockets for extra item storing
Size 26" - 34"
$1.50 - $2.50

Army Slouch Hat
Good condition Puggaree
$6.50 - $1.50

Cotton Drill Shorts
Used and New
Sizes 24" - 42"
Khaki, Navy, J/Green, White

Australian Giggle Hat
$1.75

Black Leather Ex-Army Boots
Repaired as Necessary
$6.50 - $8.50

Vinyl Poncho
New $5.50

303 Bayonette
As new with Scabbard $13.95
Without Scabbard $11.95

5' x 7' Vinyl Groundsheets or Sun Covers
$2.50 only

Webbing Straps
Large Assortment Blanket Straps, Padded Harness, Spiders, All Complete
50c to $1.50
Good used and some new condition

Webbing Belts
Australian Army $1.80
U.S. Pistol Type $1.50
Good/used condition

Nylon Mosquito Nets
Ex Army 72" x 36" x 36"
As New $7.50 Drop

Nylon Mosquito Net
36" x 72" x 72" Drop
New $5.00

WE MANUFACTURE TARPAULINS AND HAVE A REPAIR SERVICE

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* * *

A BRIEF LOOK AT CAVES AND CAVING IN THE COMMONWEALTH OF VIRGINIA, U.S.A.

C. W. Bennett *

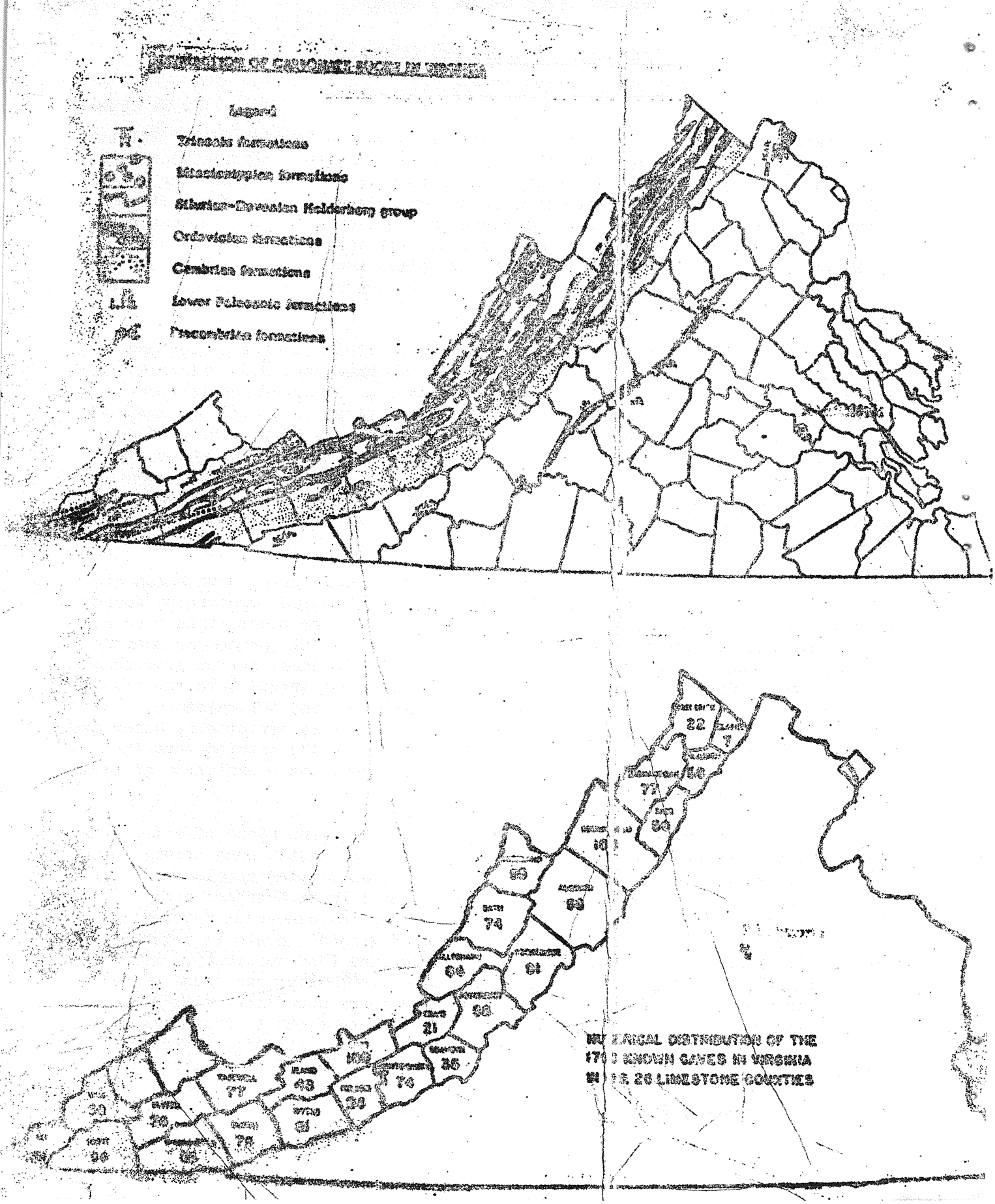
Virginia was one of the original thirteen colonies founded by the British and with the westward expansion from the eastern coastline into the Blue Ridge Mountains (a very old mountain chain running roughly north to south for approximately 1600 km and located approximately 300 km inland from the coast of the Atlantic), settlers began discovering caves in the carbonate rocks making up those mountains. As early as 1630 Virginians were leaching saltpetre from cave earth and exploring the numerous caves that dotted the western quarter of the state. These caves were further explored and exploited during the War of 1812 and our Civil War in 1861.

Virginia has approximately 1800 known caves within its boundaries and that number is growing slowly every year. These caves have developed primarily in limestone, which in some areas is over 150 m thick. Other carbonate rock is also present but not as extensive. Butler Cave, the largest in the state, has over 21 km of mapped passageway and reaches a depth of nearly 90 m. The cave was discovered in 1958 when several cavers dug open a small hole from which strong wind currents flowed. Butler boasts a subway-sized tunnel some 900 m long with one area having a perfectly level, smooth, white calcite floor. Unique rimstone pools, calcite crystal growth, cave coral, and tricky siphons prone to flooding also can be found.

Close by Butler Cave is the second largest Virginia cave, once known as Burnsville Saltpetre but now called Breathing Cave. Besides containing approximately 7600 m of passageway and areas of interesting formations, this cave also has an unusual quality in that it appears to breathe. This phenomena appears to happen throughout the cave but is most evident in a long, narrow passage near the entrance. Cigarette smoke, when exhaled will first travel into the cave, then stop and hang suspended, then travel back out towards the entrance. This action will continue day and night, but does appear to be affected by barometric conditions. Spence Cave in southwest Virginia is really nothing more than a 125 m deep pit. One small room at the 15 m level contains a profusion of stalactites and draperies.

Cave fauna is extensive in some caves, including nine kinds of bats: Big Brown, Little Brown, Gray, Silver-haired, Long eared, Little Long eared, Social, Least, and Pygmy. An occasional pack rat will trade a shiny pebble for your flash bulb. A nest of phoebes may hang from a wall in an entrance room, and an occasional snake, including the harmless black and the dangerous rattler, may also be found there. Because the temperature of Virginia caves is between 10 ^{o}C and 12 ^{o}C, snakes never venture very far underground (and survive!). Salamanders, cave crickets, spiders, and beetles, along with stone flies are found even far within our caves. Unfortunately, the increased human cave traffic is taking its toll on these creatures. Several species of bats are close to extinction, and pollution of ground water is destroying much of the insect life. Efforts are being made to stem this fatal tide and in some areas are meeting with success.

* 4620 Hanover Ave., Richmond, Va 23226, U.S.A.



GEOLOGICAL DISTRIBUTION OF THE
[7]3 KNOWN CAVES IN VIRGINIA
IN [6, 26 LIMESTONE COUNTIES

RASS, or the Richmond Area Speleological Society, is an affiliate of the National Speleological Society and was chartered by National in 1948. It now has approximately 80 members and provides services to its members and to caving in general, along with fellowship and information to and for all interested cavers. The NSS has more than 100 local chapters or "grottos" throughout the U.S.A.

Richmond, Virginia, the home of RASS and our magazine 'The Brass Light', is approximately 240 km east of the Blue Ridge Mountains. Most caving in this area is done through organized groups who are usually affiliated with the NSS. Most trips are taken on weekends and involve driving to the cave areas, fortunately a majority of which is done on Interstate roads, about 2½ hours away.

Because the Virginia caving area is close to several populous cities, organized caving is now facing its greatest challenge ever in this country. Many people are now caving who know nothing of conservation, equipment, safety, or caving courtesy. Unfortunately, many well-known and easily reached caves are now virtually destroyed by these careless, unknowing mobs. One Virginia cave was recently cleaned out by RASS volunteers and over 2 tonne of trash (mostly beer cans) were removed. Another weekend saw a popular cave with less than 1500 m of passageway containing over 50 people at the same time! Organized caving is now attempting to depopularize caving by maintaining a low profile, limit news and magazine coverage of caving and cavers, and discourage recruitment of new cavers. We also are trying to educate those people now interested in caving. Only this can save what caves we have left.

RASS also organizes caving trips and scientific exploration and evaluation of caves in our area. A meeting is held once monthly where Society business along with (hopefully) an informative program is presented. We will qualify members in such areas as vertical and underwater caving, providing training sessions for those purposes, and we also maintain a Fieldhouse within the caving region as a base of operations and meeting place.

Normally, a RASS caver is equipped with a fibreglass helmet, brass carbide lamp, coveralls, boots, and a possibles bag. In the bag are his secondary and tertiary light sources, water, food, first aid supplies, lamp repair kit and spare parts, and reserve carbide. Most of our cavers now carry spare carbide in prefilled lamp bottoms with screw-on lids. Electric lighting is increasing in popularity. Vertical caving is also in vogue and the vertical caver uses a rapple rack fastened to his swiss seat. Ascension is accomplished with either jumars or Gibb's ascenders. Women are active and make up a large percentage of both the membership, governing bodies, and caving participants.

Richmond area cavers follow the activities of the Papua New Guinea, New Zealand and Australian cavers with interest and, I must admit, a great deal of envy. Exploring virgin caves and making substantial contributions to the expansion of caving is becoming rarer and rarer here; and removing trash and spent carbide, along with erasing graffiti from the walls, is becoming all too common. Hopefully cavers in areas with newly developing and developing systems will learn from our mistakes and protect and preserve the natural resources that they have.

This is an open invitation to our fellow cavers. If and when you ever come to our part of the world, please don't hesitate to call. Although we're thousands of kilometres from the caving areas you know, you'll find Virginia caves wet, muddy, cold, dark, dirty, and beautiful.

* * *

AUSTRALIAN SPELEOLOGICAL FEDERATION CODE OF ETHICS

The Federations expects that the following rules will guide the actions of members of A.S.F. Societies.

1. (1) They will, in reporting their work, avoid and discourage sensationalism, exaggeration and unwarranted statements.

   (2) They will in publishing their work take particular care to acknowledge other peoples' contributions to the work involved, either as clubs or individuals, published work, personal communication or whatever.

   (3) They will be discreet in disseminating information that might endanger caves. In particular they should not broadcast their knowledge of entrance locations or routes.

2. (1) They will treat guides and other officials of tourist caves courteously and respectfully.

   (2) They will endeavour to be courteous to the general public, but will defend caves from the attentions of the uninstructed where this is deemed necessary for the protection of the cave.

3. (1) They will carefully observe the established rules of good camping conduct especially in the removal and proper disposal of rubbish.

   (2) They will bury their faeces when camping in bush conditions, but should avoid the catchment areas of caves.

4. (1) They will have specific or tacit approval from the owner or guardian before entering private property or caves reserves.

   (2) They will follow normal local practices regarding gates on properties or reserves.

   (3) They will not, except in cases of emergency, presume on the goodwill of owners in dry areas for supplies of water. Prior arrangements must be made.

   (4) They will take care to avoid interference with stock or crops.

   (5) They will, where a cave entrance has been blocked by the owner to prevent injury to livestock, reblock the entrance after use and liaise with the owner to erect some fence or other less offensive means to protect the integrity of the entrance.

5. (1) They will not leave rubbish in caves - their own or other peoples'. Spent carbide, flash bulbs, wrappings and other refuse must be brought out of the cave.

   (2) They will not disfigure caves by any unnecessary markings. Survey marks should be small and inconspicuous.

(3) They will take care to avoid disfiguration or destruction of cave decoration or any other natural features of the cave. Disturbance should be confined to tracks. In areas of clean flowstone floor, muddy clothing or boots must be removed and only clean clothing worn. Tracks should be rigidly adhered to. Helmets should not be worn in the vicinity of stalactite clusters.

(4) They will not under any circumstances leave faeces in caves. They will prepare themselves beforehand or, when underground, make provision for the removal of faeces.

(5) They will take stringent precautions to isolate all artifidally introduced organic wastes from the cave.

6. (1) They will, when visiting an area frequently visited by another club, do all in their power to co-operate with that club.

(2) They will conduct disputes in a restrained and gentlemanly manner.

7. (1) They will behave responsibly in environmental matters.

(2) They will endeavour to protect the caves of Australia.

* * *

CORRECTIONS NIUGINI CAVER 3(2)

The article by "Kakata" (not "Karata") referred to on p29 and p52 was written by Rick Giddings, not Bob Bates as stated. Another article on the Sonofi caves in the E.H.P. was received after this issue went to press. It is:

Anon. (1971) (Lynn Giddings). Sinofi Cave gives a look at splendor. Papua New Guinea Post-Courier. April 19, 1971 p3.

* * *

CAVE STAMPS

Collecting stamps that feature caves or karst features is a hobby some cavers indulge in. In the P.N.G. district series issued last year, the 15 cent stamp is from the Chimbu and shows Mt. Elimbari with a typical round house in the foreground. Mt. Elimbari has a sheer limestone cliff hundreds of metres high on the western aspect and is quite a spectacular peak. Caves found there have been disappointingly small however. This stamp appears on the front of the 1975 telephone directory along with the other 18 stamps in the district series.

* * *

FREE MAPS

According to a note in The Drum in the Post-Courier recently, the Defence Force is giving away lots of old World War II maps. They can be obtained from Captain Peter Bates-Brownsword, Post Office, Wards Strip, Waigani.

* * *

STOP PRESS - NEW WORLD CAVE DEPTH RECORDS

M. Martyn *

News from Neil Montgomery in England:

The French have connected Pierre St. Martin with a higher entrance adding approximately 100 m, depth now 1270 m. But PSM beaten by Gouffre Jean Bernard, which was connected to its resurgence cave. Depth about 1300 m. But PSM regains title when Bristol cavers connect it to Pereau d'Arphidia to give a depth of about 1400 m.

(Reprinted from J. Sydney Speleological Society 19(9): 216.)

* 2/101 Clovelly Road, Randwick, N.S.W. 2031.

* * *

THE NEW CONTRIBUTORS

Chuck Bennett is the secretary of the Richmond Area Speleological Society in Virginia, U.S.A. He is the editor of their magazine, The Brass Light.

Mike Martyn is the Journal representative for the Sydney Speleological Society.

Bernard Pawih is from Kari village in Central Manus. He is currently studying Form 4 at Papitalai High School and has caved on Manus and Los Negros Islands.

Anna Pokolou is from Lolak village on Los Negros. She is a Form 4 student and Head Prefect at Papitalai. She is also the first female to write for Niugini Caver!

Paul Pius is from Mataworei village on Manus and is currently a Form 3 student at Papitalai.

* * *

DISTRIBUTION OF NIUGINI CAVER BY COUNTRY

For a spacefiller here is a list of countries where Niugini Caver is sent together with the number per country:

Papua New Guinea	55
Australia	54
New Zealand	9
U.S.A.	8
United Kingdom	5
France	2
Hungary	1
Kenya	1
Switzerland	1
	136

* * *