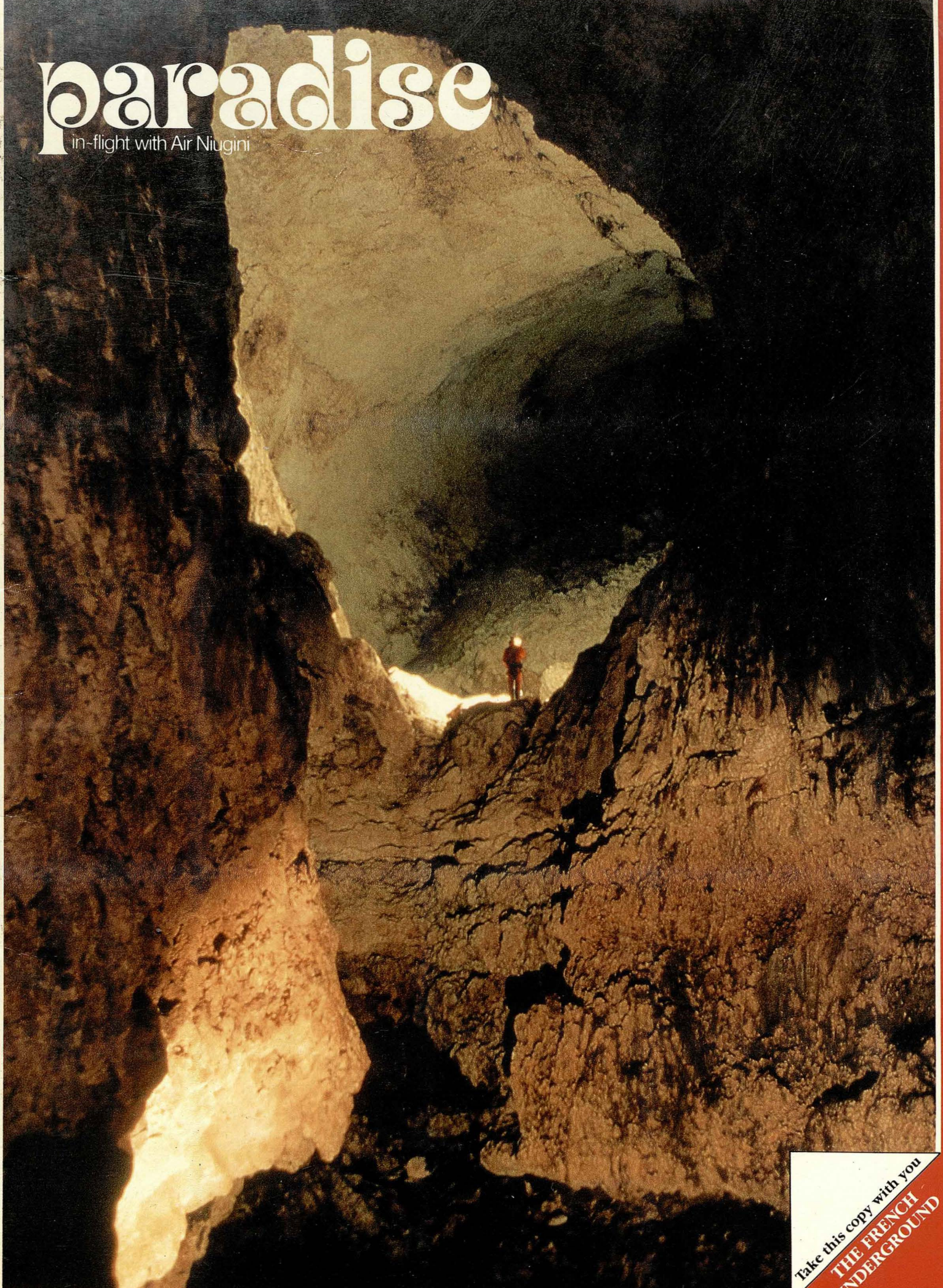


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No 64 Sept-Oct 1987
Paradise is published bi-monthly
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For thousands of years the remarkable sago palm has been the staff of life, provider of an important dietary staple, in Papua New Guinea. Overseas visitors unfamiliar with the traditional methods of extracting and preparing sago can learn about them in this issue.

Also in this issue share the astonishment of the French caving expedition which descended into PNG's huge caves and explored one described as "the Everest of the depths".

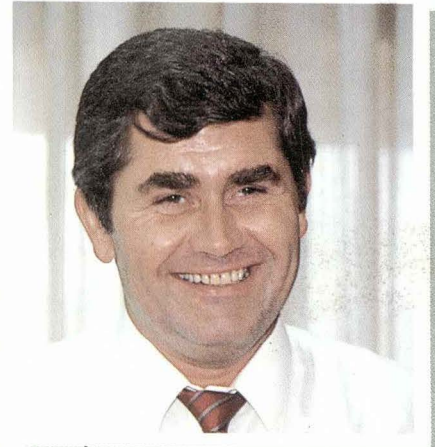
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Cover: A huge chamber, part of Tolana cave, New Britain.



Dieter Seefeld
General Manager

Editor - Geoff McLaughlin MBE
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Papua New Guinea - Advertising Department, Air Niugini, PO Box 7186, Boroko
Australia - Press Media Services Pty. Ltd.
300 Bridge Road, Camperdown NSW 2050
(telephone Sydney 692 0222)
Hong Kong - Progressive Advertising Agency, 11 Kam Ping Street, Kam Ming Yuen, Rm C, 2nd Fl., North Point
(telephone 5-630145-6
telex HX 65474PPAAE)
United Kingdom - Intergroup Communications Inc., 31 Lyncroft Avenue, Pinner, Middlesex
(telephone 01-868 9289;
cables Pacom Pinner)

Subscriptions

Annual subscription rates for six airmail issues are: USA, Europe, UK and Africa Kina 23 (US\$28)
Australia, New Zealand, Asia and South Pacific K19 (US\$24, A\$25)
Papua New Guinea K13 payment by international bank draft.

Printed in Singapore by Times Publishing Group.

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UNDERGROUND

So, this is it? The Everest of the depths! Instead of long pitches, we are limiting ourselves to abseiling small lengths, from one tree to the next, the only possible belays for our ropes. This is the technical, high-level tropical caving. Astonishments

and surprises at all moments. In a word, adventure.

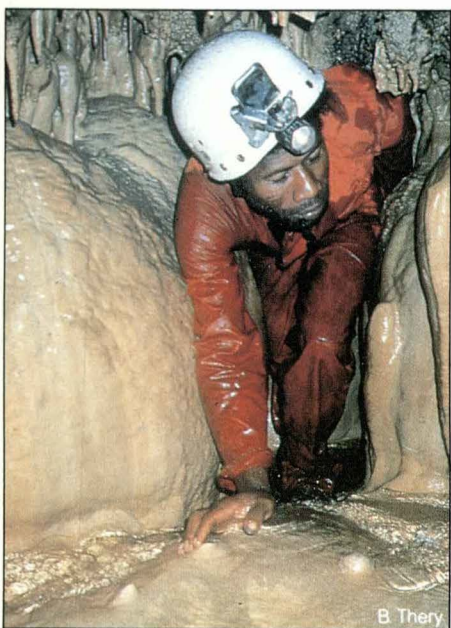
It is not every day that we abseil such a shaft! Circular walls from 400 to 520 metres deep, according to the side chosen, and 600 metres diameter at the top, 300 metres at the bottom. Under our

feet, a void of about 30 million cubic metres. Minye is the biggest explored cave entrance in the world; four to five Eiffel Towers would easily find room inside.

In front of me is Laure, the only woman in the group. She gets entangled in a creeper at the top of a vertical step. The jungle is everywhere, even in the steep section. We have to cut through this Gordian knot but our machete is like a pocket knife in this lush green growth.

Jacques is ecstatic. He goes from one belay to the next and does not stop saying: "Here we are, it is fantastic!"

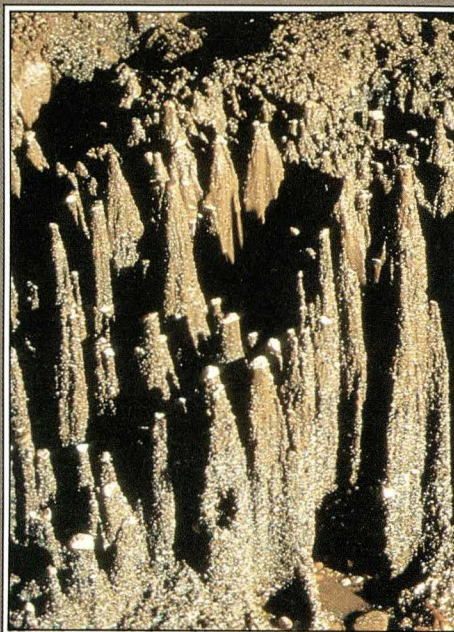
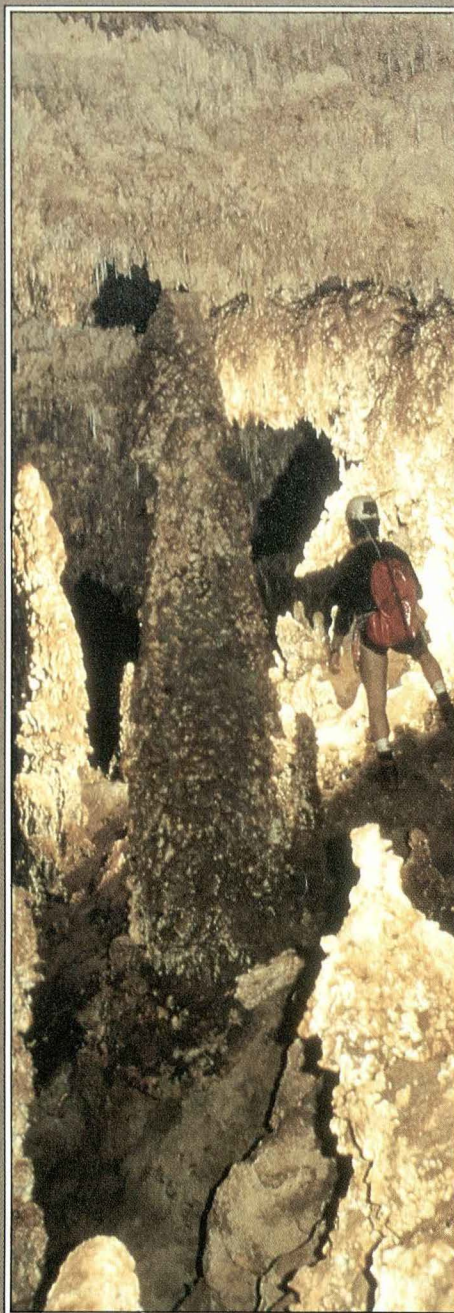
Halfway down, due to a clearance in the vegetation, we discover at last the river of Minye. It is like a white snake, gushing out from a sump. Then the line of white foam crosses the bottom of the shaft and disappears on the other side under a huge porch. Lost in the luxuriant jungle and the thick mist, we could not see it until now. The roaring of the river, coming up from the bowels of the mountain, was till now the only proof of its being there at the bottom of the



First page Underground waterfall in Guimbe cave.

This page, above Galowe villager explores Guimbe. **top right** Stalagmites in Guimbe. **below right** Stalagmites in Tolana.

Opposite page, top Cavers dwarfed inside Muruk cave. **below** A daring traverse over Minye's underground river.



extraordinary shaft.

"Do you see it?" Jacques asks me. I think of our efforts, of our year of getting ready, of our search for sponsorship, so many times to no avail. Our expedition, organised officially by the French Federation of Caving, gathered together cavers from all over France — not necessarily the best. Nevertheless the chosen ones are among the top fringe of the exploration cavers, those who were lucky enough to get holidays for the three month expedition and were able to put away K2500 for the individual contribution.

Our budget of K60,000 enables us to book the necessary supply helicopters for a few hours.

Jacques wakes me from my reverie. He is carrying on his back the water sledge. This cumbersome instrument, an obscene yellow color against the green surrounding, gets continually entangled in the creepers. Jacques swears and tries to break through. The grip gives and he can carry on towards the bottom of the shaft.

It rains, of course. As the cave, a sort of natural funnel, offers a gaping mouth to the rain, we are soaked in next to no time. At last, after an hour's abseiling, we set foot on the bottom scree.

A short walk between the wild banana trees, which grow all over the bottom of the shaft, leads us to the foaming flow of the fabulous river. "What a feeling of power!" shouts Jacques to overcome the deafening noise. It is hard to estimate the flow rate, maybe 15 cubic metres a second.

Such underground rivers are found only in Papua New Guinea or, more accurately, in the Nakanai mountains of New Britain where our expedition takes place. Nowhere else is there such a combination of awe-inspiring giant shafts and huge underground rivers.

The entire team tackled Minye. Now, three of us are here under the downstream porch. In the darkness, the vegetation has stopped. The gallery is huge, with a vault such as that of a cathedral, 70 metres above.

Bats fly in and out. Below the



C. Rigaldie





scree, the river flows into the darkness. Our downstream progress soon stops at our first obstacle: the gallery turns and the river goes from one side to the other, cutting our way.

The following day, the next party tackles the problem. It is the right moment to check out the operation of the water sledge. Swim across the river? No! Rapids follow and a poor swimmer would be carried along by the current. Before setting out with the sledge, we have to cast a hook to the other shore. We then firmly tie a rope going across the river. It is going to be the guideline for the caver on the sledge.

Bruno, dressed in a wet suit, a helmet on his head, a life jacket and a pair of flippers, rigs up a pulley on the rope and attaches it to the sledge. Then he goes with a splash, grasping the two-sided handle, his chest resting on this boat made of foam polyester. Like a cork, the caver courageously braves the wild waters and gets to the opposite shore. Hurrah, he did it! Now, it is easy to rig up a rope across the fast flow.

The rest of the team can follow without danger. But again, a new difficulty emerges. After 80 metres of easy progress on a wide bank, the gallery gets smaller. It is only eight metres wide and the bank disappears, giving way to the river. From the water surface to the roof, there is a space of only one metre. Is this the end? How disappointing it is! There is only one way to get through: to climb across the roof using a piton or an expansion bolt every metre! If a piton gives in, you are lost!

The team is divided about whether to go ahead or to consider the cave finished. The former solution wins. After three attempts, we have progressed only about 15 metres. The gallery turns. It is not possible to see around. Is it improving or not? Finally four of us, eager to get over, name this passage the "Roaring Forties", and decide to bivouac at the bottom of the shaft and continue to try to cross no matter how long it takes. At the twentieth expansion bolt, a caver,



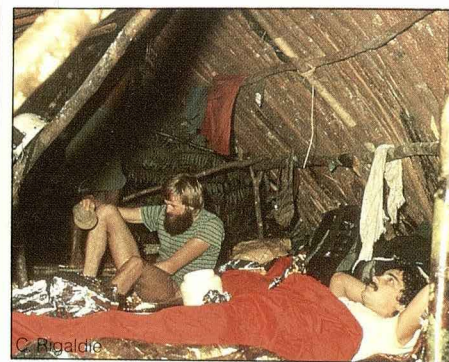
leaning over the water, discovers the gallery widens after the change of direction. The moral is obvious; 35 pitons and expansion bolts are necessary to overcome this giant roof above the infernal river.

The following part of the cave is easy as pie. A second crossing of the river confirms the efficiency of the sledge. After an easy walk on the narrow bank of a 20 metres-wide gallery, the bank narrows and we have to climb along the wall. Alas, a few metres downstream, the cave ends in a sump, the eternal enemy of the caver. Even with a diving suit, it would be suicidal to attempt a dive. So, that is the end for Minye!

A survey, photography and film-making trip ends this first stage of our program.

Minye camp is dismantled. The team rushes happily to the sea, the coconuts, the sun, coral reefs and the water at 30 degrees Celsius. We later set up other camps to explore two other isolated areas. A big 200-metre deep shaft is discovered and explored and a 70 cubic-metre per second spring is found on the right flank of the Galowe canyon. This is the largest spring known in the world.

A few days before the end of the expedition, our last exploration desire is fulfilled. A vertical cave is discovered at an altitude of 1300 metres, 1000 metres above the huge spring which gives birth to the Galowe River. Muruk cave reveals itself to be a succession of beautiful



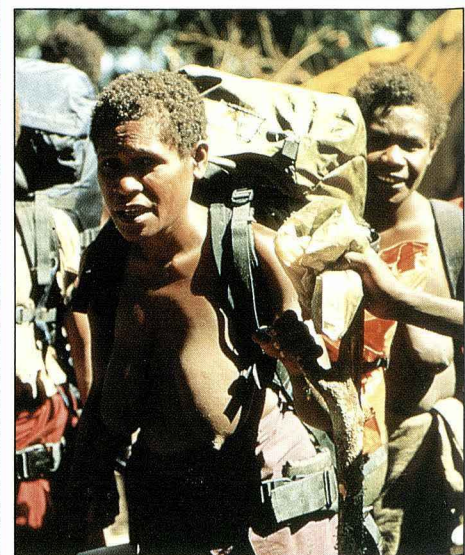
Opposite page Entrance to Kururu.
This page, top left Abseiling down into Minye.
below left The camp near Minye. **above** Resting in Kapkena village.



but physically testing passages. A stream runs from pitches to giant potholes then after 4500 metres of passages, at a depth of 637 metres, a sump stops our progress. No matter! This has been enough to improve the PNG depth record by 117 metres, and it becomes the second deepest cave of the Southern Hemisphere. (It has now dropped back to third place.)

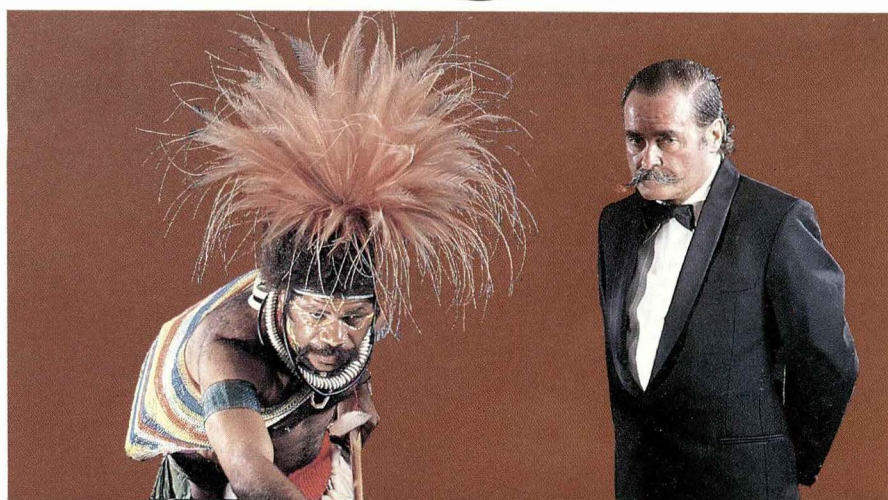
To sum up, the French expedition explored 32 new caves, totalling 18,500 metres of gallery. A superb success! The kind of success we realise only once in a caving lifetime. Already a large number of our group are thinking of coming back. The Himalayas of the cavers has just started to be explored.

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Top left *Readying the water sledge for its first test.* **below left** *Walking upriver to avoid the tangled junge.* **above** *Women carriers.*

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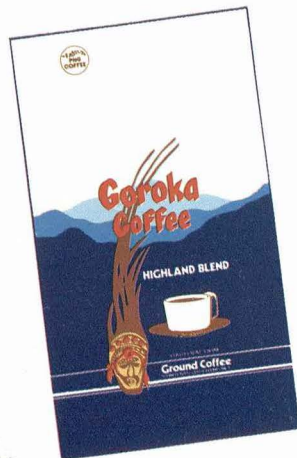
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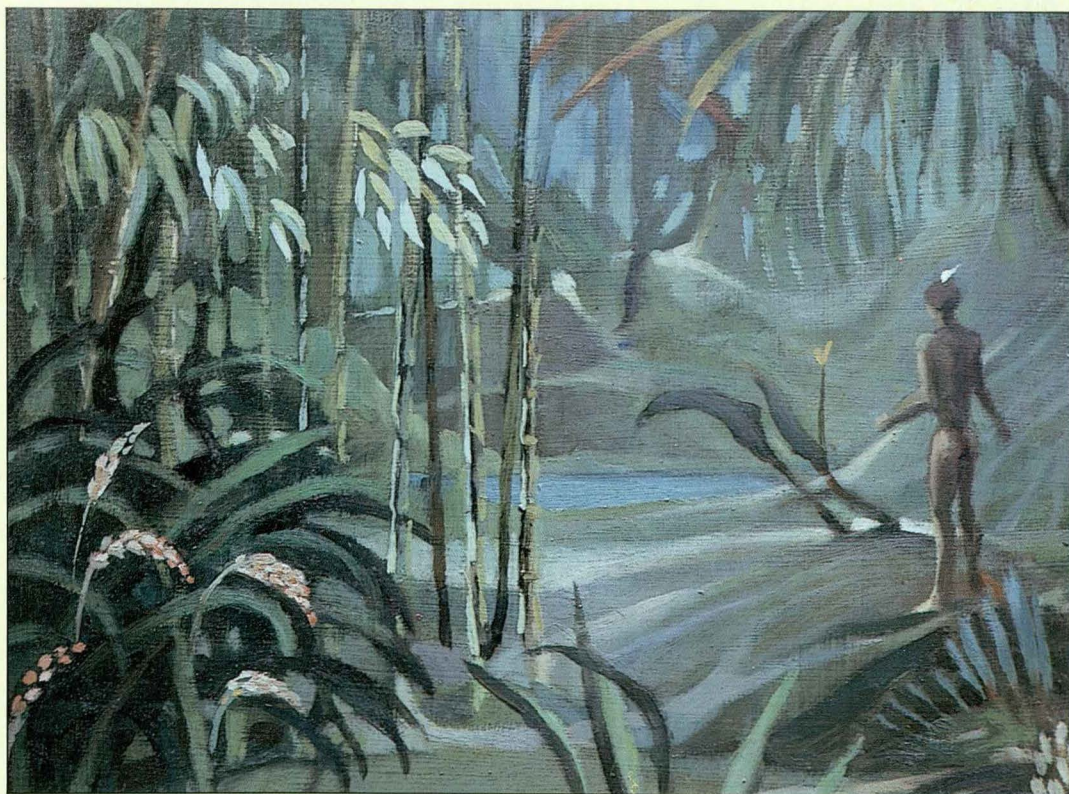
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DANKAN



Story and photographs by John Wilson

Visitors travelling to the Kulau Lodge in North Rabaul pass a cement brick wall with the image of a Tubuan and the word *Dankan* painted on it, unaware that behind that wall is the home of painter Ron Duncan, an Australian who has been living in this part of Papua New Guinea for 25 years.

Like other artists who have come to the South Pacific, Ron has found many subjects for his painting but, like the famous Gauguin, he has found his themes not popular with the buying public. This resistance can be attributed not to Ron's work but to the general lack of understanding and apprecia-

tion of his themes, most of which centre on the Tolai culture and his interpretation of this tradition.

When I first visited Ron I was fascinated by the simplicity of his lifestyle; his one-roomed house overlooking the sea at Kabakada Village. My fascination stemmed from curiosity. I wanted to know why he had chosen to live here in the midst of the Tolais, without most of the material comforts which we take for granted, when perhaps he could have been a successful commercial artist in Sydney.

Ron arrived in PNG in 1961 as a teacher, working for many years in primary schools around Rabaul. It was during this time he decided to make his home at Kabakada and was made welcome by the local Tolai people.

He was interested in the Tolai culture, especially with the Tubuan society, a secret society which originally was a force of law and order and today exercises great power, despite the rapid changes that have taken place among Tolais since Independence. Ron has not become a member of the Tubuan society even though he has felt a certain pressure to join. He regards the society as something specifically Tolai and

too far removed in essence from the understanding of expatriates. Often people have asked him to divulge the secrets of the Tubuans but, even if he did know, he would never reveal them. He values his relationship with the Tolais far too highly.

To support himself, Ron creates paintings of Rabaul harbor which appeal to tourists and buyers who are residents in the country, but he is personally drawn to in-depth studies of the Tolais and his interpretation of their cultural mystique. He is not merely dabbling but living an experience built on his involvement with the Tolais and his feeling for their culture and their land.

The old Tolai men are his greatest critics, advising him on the cultural correctness of his works, but also giving him content for future works by the way of stories and explanations. There is a genuine interest and appreciation by the local Tolais and his work is the subject of much discussion and criticism. Sometimes he has had to make certain changes to a painting lest he breach a traditional taboo. These are the paintings

Top Eerie jungle scene by Ron Duncan. **below** The artist at work.





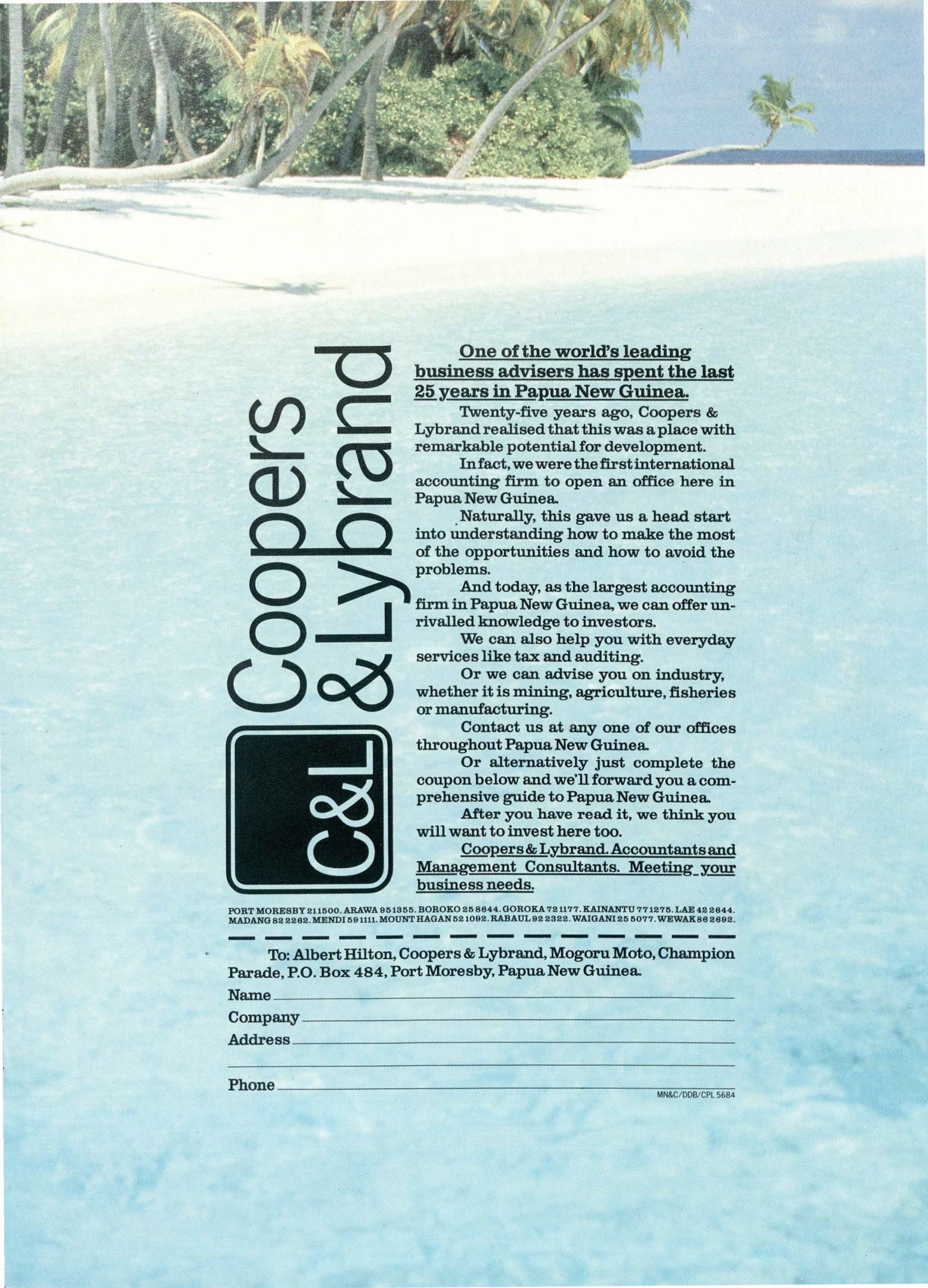
Top Closeup of Tubuan painting from previous page. **below** Tolais as seen through the eyes of artist Ron Duncan.

which generally do not sell. Most buyers want moonlight-over-the-harbor scenes and these Ron does in his individual style, but without interest because he feels they lack vitality and depth. It is in his treatment of traditional themes where he excels, where light, rhythm and the mystique of the Tolai culture is captured.


Ron Duncan is in a unique position in that he is able to live quite compatibly with the Tolais and paint without pressure. He has given up material comforts for an existence which has been a valuable source of learning for him both as an artist and as a person. It is the Tolai people who anchor and encourage him. It is this rapport with the Tolai culture which he has experienced for these many years that has given his paintings life and meaning.

John Wilson lectured at Gaulin Teachers' College Rabaul for seven years, and is now living in New South Wales.

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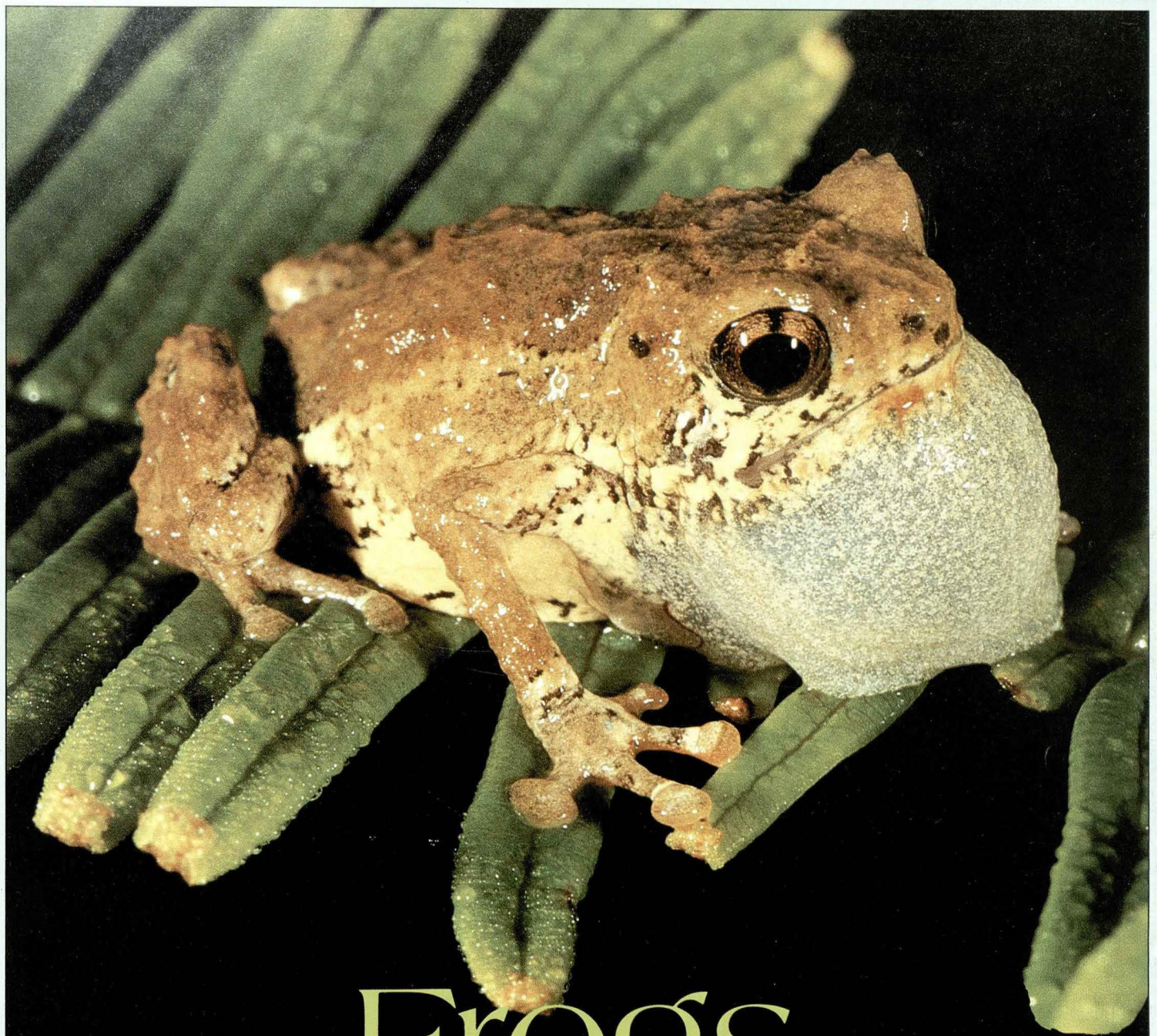


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Frogs — in — Paradise

Story by Rupert Stocks. Photographs by Mike McCoy

Most of us would agree that one of the distinguishing features of frogs is that they lay eggs in water; these eggs hatch into tadpoles, which then grow legs, lose their tails and develop into adult frogs. However a group of

frogs, the microhylids, which lives in Papua New Guinea, has dispensed with the tadpole stage. They lay eggs on land which hatch directly into baby frogs.

This evolutionary development is doubly interesting in that PNG is not a country lack-

ing rivers and creeks in which tadpoles could live. On the other hand the rainfall is high and sufficiently consistent during the wet season to keep the soil, and the eggs on the soil, moist — thereby preventing their death through dessication. It seems probable that due to the extremely mountainous terrain in many parts of PNG, the streams are so swift and subject to flooding that tadpoles in streams could be swept away. This has led to the development in one group of frogs of tadpoles with extremely powerful muscular tails and large sucker mouths to hang on the rocks, as well as the microhylids which lay eggs on land.

The name microhylid is not well known to non-herpetologists but microhylid frogs have evolved many different species in PNG with differing lifestyles.

Some of these frogs are extremely abundant. For example *Oreophryne* sp., which can be found in shrubs and trees at night, is common in suburban gardens in Lae as well as the tropical rainforest. It is more often heard than seen and when I first heard the call, I described it as like a creaking hinge. It frequently calls from banana leaves and lays its eggs inside the stalk of a banana leaf near the main stem. The photograph (1) was obtained by prising the stalk from the main stem to reveal the frog and his eggs inside.

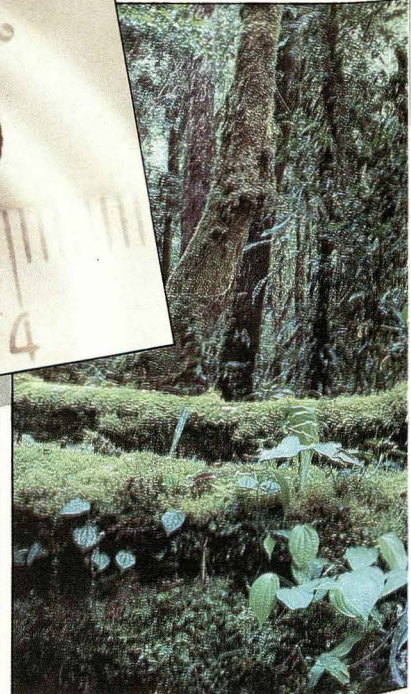
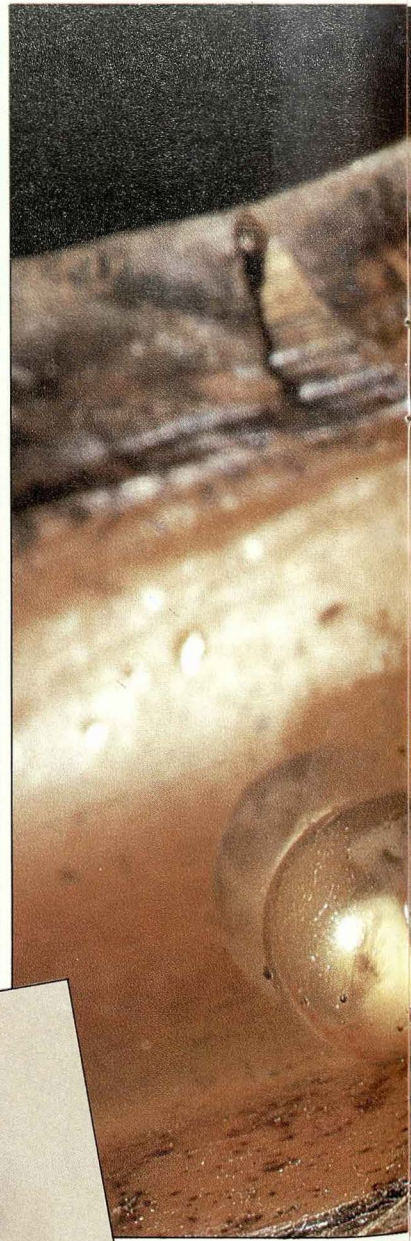
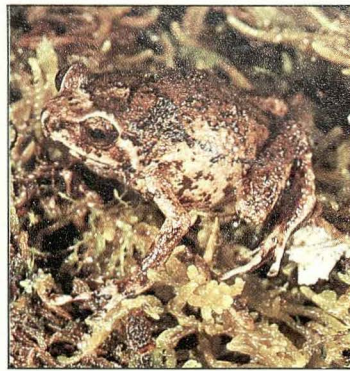
I have observed the courtship of this frog in an aquarium. Like most frogs courtship commences with the male calling to attract the female. The female approaches the male on his banana leaf and follows him as he then retreats down the leaf stalk. The male then pushes his way inside the stalk and continues calling. The female joins him in his cosy nook, which makes further prying into their nuptials almost impossible — even in an aquarium! The resulting eggs are laid in a sticky string which adheres to the stem of the banana leaf. The male remains with the eggs, mainly to drive off insects

which might like eggs for breakfast, however he continues calling and often can be found with two strings of eggs at different stages of development. It appears that, having found a suitable site, a second female may be enticed into his boudoir.

Other microhylid frogs live on the ground or in burrows. The photograph (2) of *Phrynomantis robusta* shows the male sitting on his eggs in a burrow which was shown to me by local villagers. The burrow was in an earth bank in the middle of the village and the frog and eggs were visible from outside the burrow.

Most of these frogs lay their eggs in rather more concealed places which can only be seen by lifting leaves, as in the case of *Barygenys* photographed (3) near Wau, or even digging in the soil.

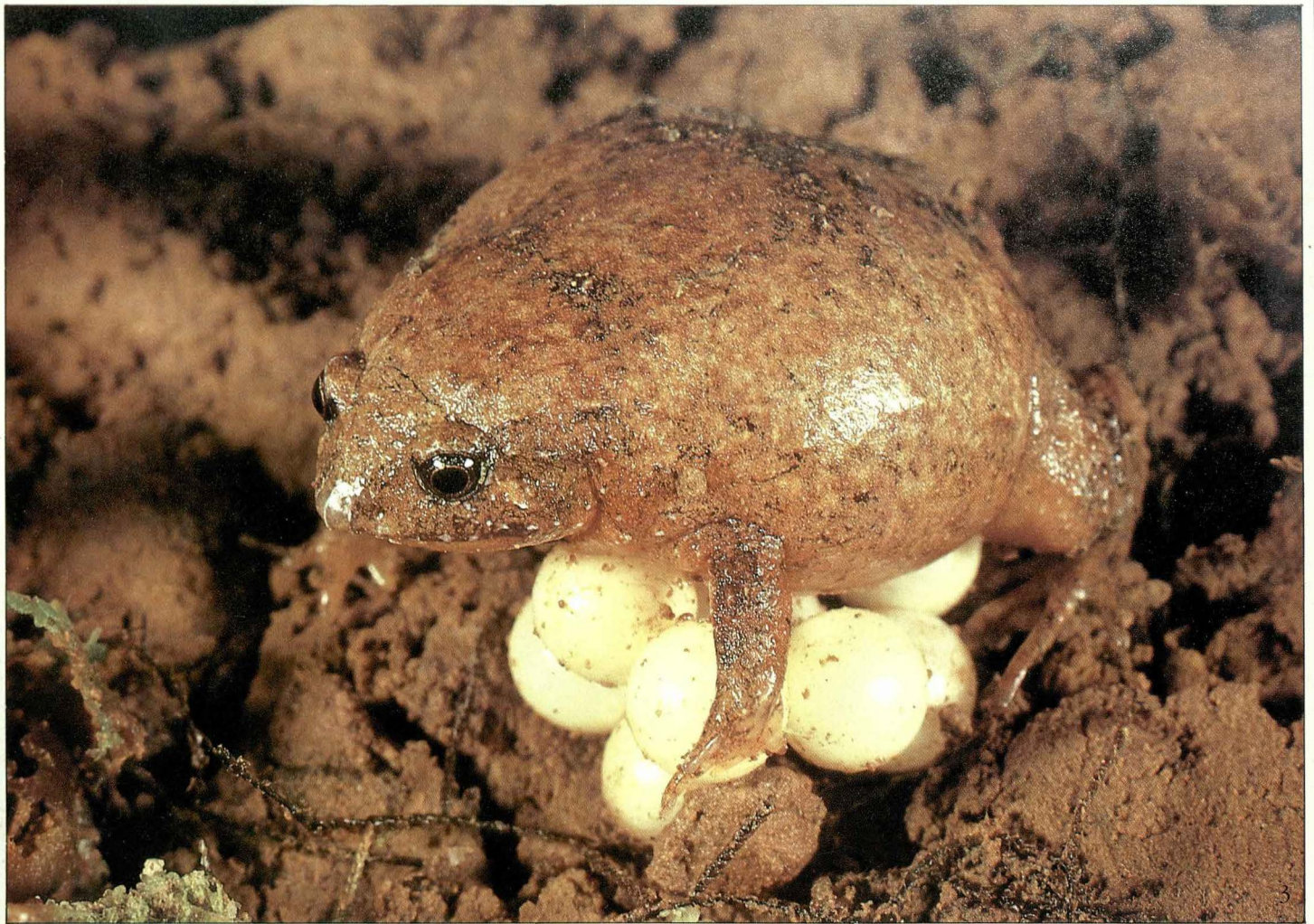
The eggs are usually laid in a string, like beads on a necklace, and are few in number, only 10 to 50. They are larger than frogs' eggs laid in water; the shell is tough but transparent and the baby frog can be seen developing inside. The legs,



Front page Male calling for a mate (*Cophixalus variegatus*).
This page Some of PNG's unique ground dwelling frogs, from top *Cophixalus kairiensis*; *Cophixalus cryptotympanum*; *Phrynomantis lateralis*; and a hatchling and eggs of *Phrynomantis robusta*.



Top Male guarding eggs inside a banana stalk (*Oreophryne* sp.)
below left Typical ground frog habitat. **below right** Male guarding eggs in a burrow (*Phrynomantis robusta*).



Top Male on guard duty (*Barygenys flavigularis*). **below** Blending in with its forest floor habitat (*Copiula fistulans*).

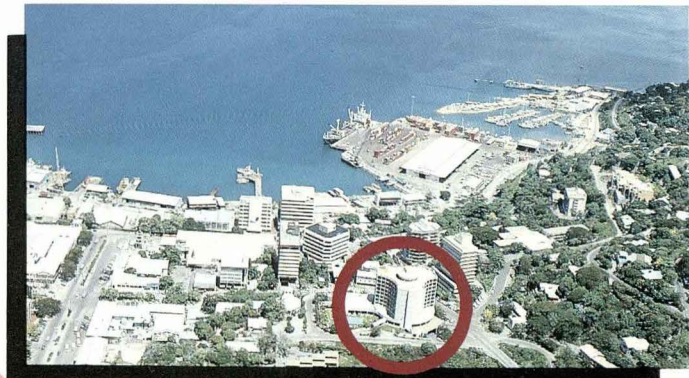
head and eyes can be distinguished after only a few days, and a large tail also appears. This is not used for swimming although the froglets often whirl around inside the egg if exposed to light. The tail is the gill through which the froglet obtains oxygen — it breathes through its tail! The tail is usually still present when the baby frog hatches but within one or two days it disappears.

Even today very little is known about the life of these small and rather inconspicuous frogs so I will continue to drive into the tropical night in my faithful Toyota Landcruiser to rendezvous with my Papua New Guinean friends so that we can toil through the mud and thickets of the jungle to *painim rok-rok* (look for frogs).

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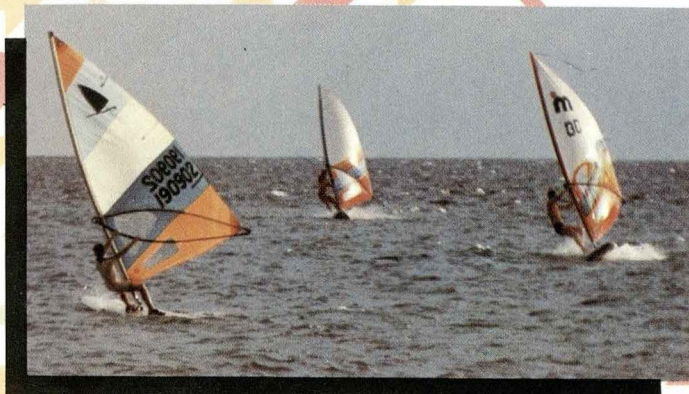
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The Okuk Highway, to the west and east of the coffee town of Kainantu in Eastern Highlands Province, must be part of the most exhilarating driving in the country. From the east, after a hot, straight run across the Markham Valley, a gentle incline starts the winding stretches of road, up to the Kassam Pass. With that engineering feat, an amazing twisting road in the very edge of the mountains looking over the valley floor, you rise up from the heat to the 1,600-metres-high temperate zone with its cooler, fresher atmosphere, and you have come to the Highlands.

The crest of the pass is marked with the mythical figure of Nokondi holding a coffee branch, a sign which is seen on the roadsides throughout the province.

From the top of the pass, it's another country. The Gadsup people belong here, and at the crest they sell their bows and arrows to passing visitors. These traditional weapons are still made for fighting and hunting, with long, strong and totally functional bows from pliant black palm. Alongside these is a selection of the surprising range of vegetables grown all over the Highlands region.

Another 30 minutes' drive and you come to Kainantu. Along the way you see the

Photographs by Lesley Oakley and Richard Phethean
Story by Lesley Oakley.



typical groups of bush material houses, amid clumps of trees, ranged up and down the mountain, interspersed with vegetable gardens, with the ubiquitous staples of sweet potato, "kau kau", and taro. This life-style seems not to have changed for centuries.

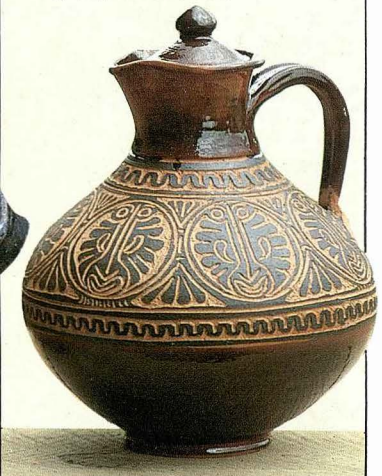
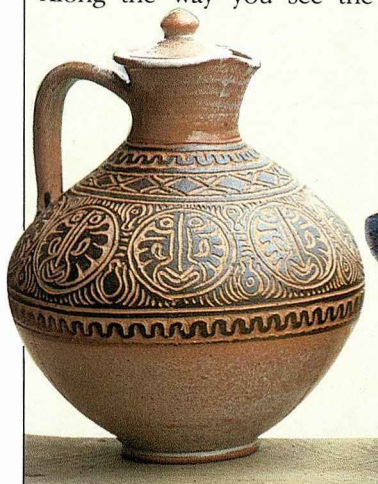
Kainantu is known as the "gateway to the Highlands". It is really the first town of the Highlands, coming from the east, although the highway skirts the Electricity Commission's Yonki township, built for staffing the Yonki Hydro projects.

Kainantu is split by the road which forms its main street, and central axis of the town, next to the green swathe of the now disused airstrip. The typical selection of shops that make up small Highlands towns are laid out along the highway — the supermarkets, trade stores, takeaway food bars, banks and so on.

There is one remarkable building. If Kainantu is the gateway to the Highlands, then the Eastern Highlands Cultural Centre is the gateway to Kainantu.

The building sits back unostentatiously from the road,

Top Nokondi country. **below** Urns with 'Tayas' decoration, by Tayas Mavin, flank casserole with 'Koreve' design, by Abake John.



NOKONDI'S CRAFTS

partially screened by small coffee plantations, indicative of the cash crop that can be seen everywhere in the province. Here the coffee creeps up to the boundary of the centre, the staff houses and their food gardens.

The centre, formally established in 1981 in its present building, now has a staff of 30. They live mostly around the large, architect-designed main building, an impressive place that is looked on by the whole community as a town asset. Coming over a last creek bridge on the highway, look for the cultural centre sign on the left, and the centre's carpark, surrounded by lush garden areas.

Most of the young workforce here has been in the craft workshops for some years, because the centre's first function was as a training and employment project for grade six school leavers. They are quite prepared to "story" about the centre for as long as they have an audience; a casual visit can take up to a couple of hours, with coffee breaks.

The first section of the main building is used for pottery and the work made here is possibly the best known contemporary pottery in Papua New Guinea. Pottery has been produced in the town since the early 1970s and Kainantu pottery has an easily distinguishable style, now seen in gift and craft shops all over the country.

Traditionally there were no potters in this area of the Eastern Highlands, as cooking

pots were traded up from the Ramu Valley. But the land around Kainantu is rich in deposits of a semi-stoneware clay. Having such a good supply of local raw material (thoroughly investigated and mapped by the late Harry Davis, the New Zealand potter), it made sense to consider ceramics as a field for skills training and associated employment programs. Muriel Larner, MBE, a well-known coffee grower in the Kainantu area started to develop this potential early in the 1970s, and the first workshop was in her own home.

The hardest physical work is the digging of clay. The cultural centre's utility can be seen every few months, taking the road-going south, towards Arau plantation, for the three hours of off-road driving to the source of one of clays used. Where rough single tracks have been cut, pushing out into the bush of the Eastern Highlands, the earthbanks along the roadsides reveal strata of grey clay. The only method of extraction available is a shovel and muscle power.

This clay is taken back in hard masses to the centre, where it will be mixed with clay taken in a similar way from the site of goldmine workings to the north of the town. The time consuming processes of preparing for use then begins:

drying, grinding, soaking in tubs of water and then left to dry again until a workable consistency. Finally it's possible to think about making pots from this material.

The Kainantu potters are almost all local Eastern Highlanders. From those first trainees who worked with Muriel Larner, sharing her enthusiasm for clay, the skills have been passed from the experienced men to the younger students, much in the way of a traditional apprenticeship. Technical assistance has been provided in recent years by foreign volunteers, notably British under the Voluntary Service Overseas (VSO) scheme, Australian and German.

While the forms of the pottery are of western functional ceramics, the pieces are all individually hand-decorated, designs being definitely from PNG. It is this surface design that has made Kainantu pottery unique and well known.

Using roughly-fashioned engraving tools, the designs are literally carved into the sides of the pot, through a layer of stain, to show through the clay color. The process requires a steady hand and a good eye. These colored and carved designs are complemented by the three glaze colours: brown, blue and green. These are made from recipes that have been designed

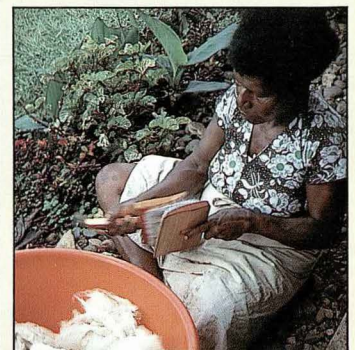
using mostly local materials in combinations of clay and wood ash, mostly from the coffee sticks that are burned nightly in the lounge hearth of Kainantu Lodge.

All the work made here is on a "one-off" basis, no two pieces are identical. Incoming orders are given to those potters who would be practised in throwing a particular shape on the wheel, or carving a special design. About half of the finished work finds its way to the central shop area here; the other 50 per cent is sent around PNG, to individuals or other shops. The pottery can be seen in places as far afield as Tabubil in Western Province and Wabag in Enga Province, along with the gift shops in the towns of Madang, Lae and Port Moresby.

The same applies to the handweaving work in the centre's other main workshop. There is always at least one special order being worked for a rug — a complicated design of birds or crocodiles next to the popular geometric designs.

The six looms are kept busy using the piles of wool heaped around the walls. This seemingly never-ending supply of wool from the sheep station near Goroka means that these rugs now can be considered as true crafts of the country. Local sheep farmers come in with their small bags of wool to sell — the by-product of the sheep projects springing up all over the Highlands.

The dirty, greasy, just cut wool is brought in, offered in



an assortment of bales and sacks to be checked for quality, length and natural oiliness and assessed for its usefulness for weaving and spinning. Just as with the pottery, the lengthy process of preparing the raw material is carried out within the centre's workshops — and there is a constant hum of activity.

Before going near a loom, the wool is picked over, washed, sorted, carded with fine metal combs and finally twisted into hanks ready for weaving. Piles of these soft twists are divided up for each weaver's requirements. A large chequer-board design will use the same quantities of the very dark-brown wool and white, whereas a more complicated Masalai man or Kundu drum design uses less of the colored wool. The floor rugs made in Kainantu are also bought as decorative wall hangings, as the beautiful, striking designs are well suited to this. With the increasing number of sheep projects at village level in PNG, there is a reserve of expertise in

this workshop that can be well utilised. Other items made include baby blankets and quilts, horse rugs and an assortment of cushions and mats.

A short walk from the main building takes you to where all these activities originally came together. The large shed now houses the preparation area for the pottery where the clay goes through the grinding, soaking and drying stages. There are mounds of the sticky grey clay drying on plaster slabs, supplying the potters with material of the right consistency to throw on the wheels.

The home of the screen-printing studio, with three long print tables, occupies adjacent space. Displayed around the walls are brightly colored examples of the prints produced here for dressmaking fabrics or curtains and exciting T-shirts. The mixing of dye concentrates also is done here; the range of colors is endless. While one table is being used for six metres of fabric for curtains, the other may be covered with lines of shirts drying, following the printing of mask or bird designs, or maybe something special for a sports club or community group. Complete sets of uniforms have been printed here, such as for the Gallery Restaurant in Port Moresby, and the Probation Service in Goroka. The souvenir T-shirts for the

Highland Shows in 1984 and 1986 came from the Eastern Highlands Cultural Centre.

Smaller items from the screen printers are found in the centre's shop: placemats, tablecloths, serviettes and souvenir PNG flags, along with a selection of shirts, dresses and children's wear.

In the shop, there is also much more to see than the work of the centre's staff. Every Monday a craft market is held in the centre's garden to buy stock for the shop and for visitors to buy from the local craftsmen themselves.

From the Kamano area outside Kainantu comes basketware, trays, placemats and market baskets, made from split cane in the characteristic colors of light and dark brown, green and gold, woven into delicate designs unique to the area.

From the Tairora area, south of Kainantu, comes bamboo, which has been smoked then designs etched into the darkened surface to make wall hangings and planters peculiar to the district. The designs are based on birds, flowers and scenes from village life.

Body decorations known as bilas can be found throughout the Highlands, and the centre's shop has pieces typical of bride price presentation and sing-sing dress, with pig tusks, shell headbands and necklaces. Also in the shop are bows and arrows, very much belonging to the Highlands; the arrows with different tips for birds, or fish, or pig hunting.

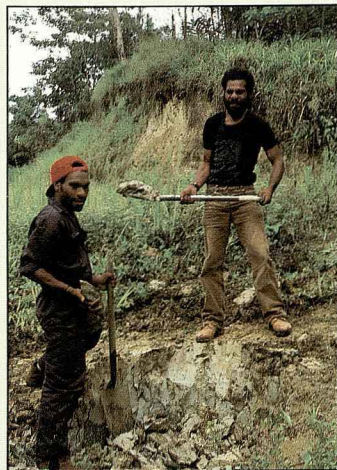
This is all "samting bilong

Hilans" but the cultural centre, while concentrating on this work, also has collections of artefacts from other areas to show the range of handcrafts that are produced in all provinces of PNG, with pieces from Milne Bay, Manus, Rabaul and the Gogodala region.

A small museum adjacent to the shop displays items particularly from the Kainantu and Okapa areas of the Eastern Highlands — bilas, fighting and digging tools and a good collection of stone pestles and mortars found by local people. Some well-preserved clay-cooking pots provide an interesting comparison to the newly made pottery available in the shop.

But for many visitors, with the long highway ahead to Goroka and other Highlands towns such as Kundiawa, Mount Hagen, Mendi, Tari and North to Wabag, there is just not enough time to fully explore the workshops and museum. Perhaps though, time enough for a cup of Highlands coffee and a little shopping before resuming the journey.

Lesley Oakley and Richard Phebean are British VSO volunteers currently working with the Milne Bay Development Program and previously with the Eastern Highlands Cultural Centre.



From left Decorating a "Tayas" mug; hand woven rugs; combining wool before spinning; centre shop interior; digging clay near Aru; Tairoran bamboo and Kamano baskets.

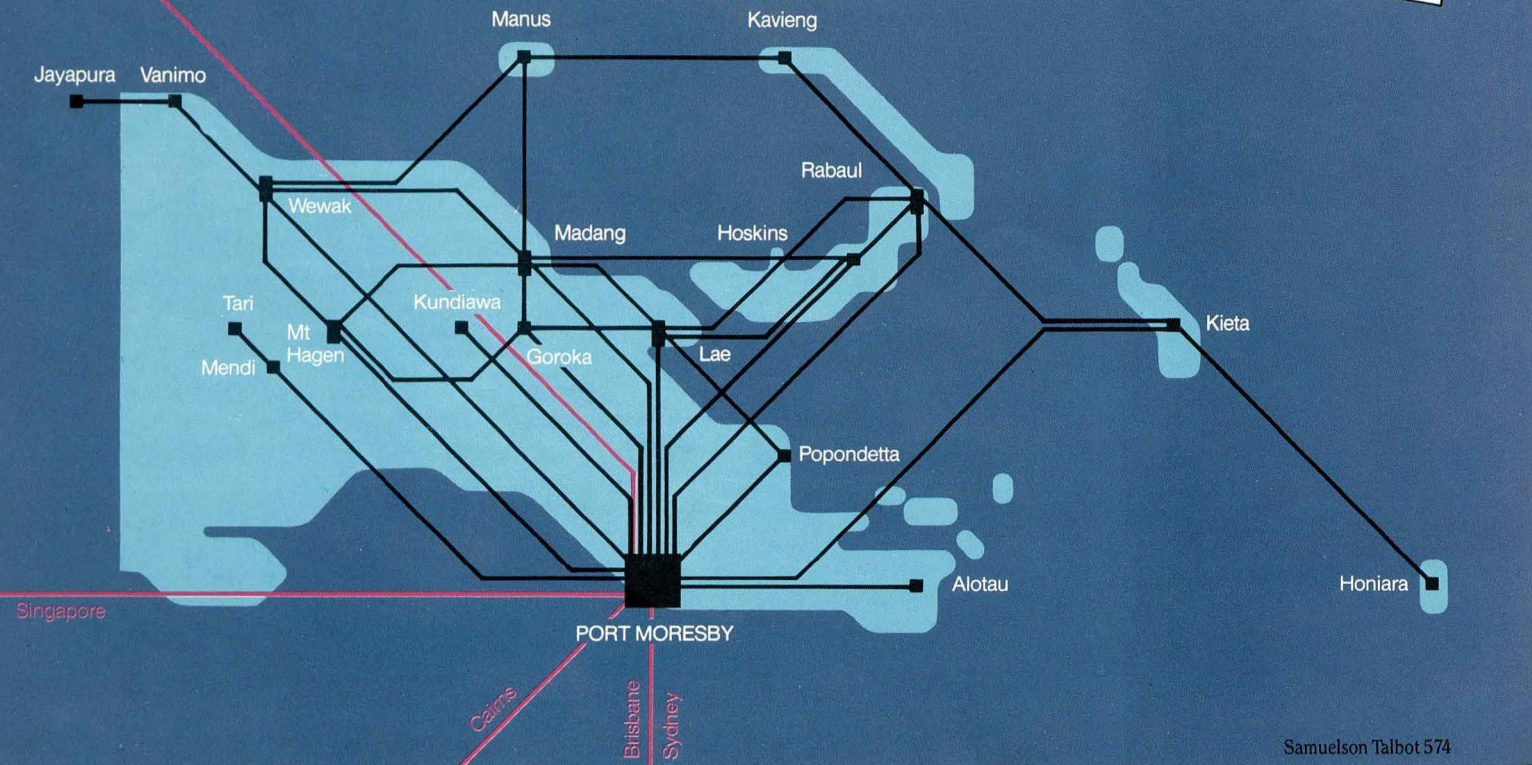
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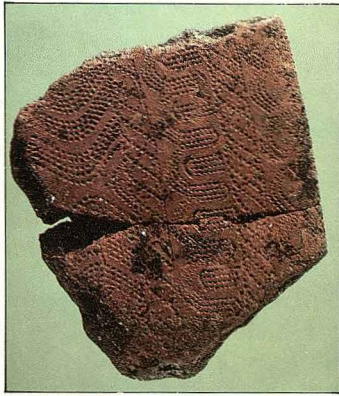
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Old New Britain

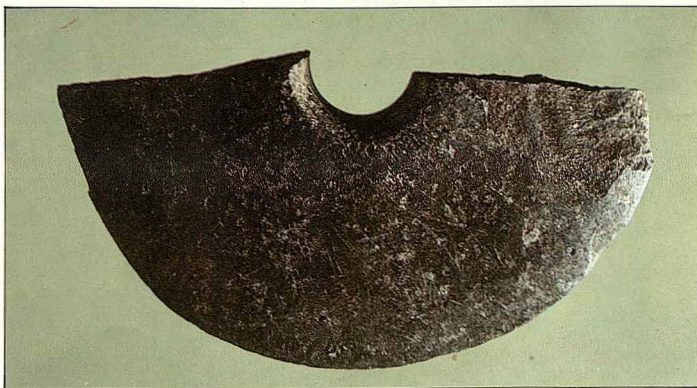
Story and Photographs by Dr Chris Gosden



In April, 1985 a schooner, the Dick Smith Explorer, left Sydney bound for the Bismarck Archipelago. Its task was to support teams of archeologists through six months of survey and excavation. The 12 teams scattered throughout New Britain, New Ireland and Manus were investigating one main question: were these island provinces of Papua New Guinea the home of the first colonists of the Pacific?

The islands of the Pacific, from Fiji eastwards, were once empty of people. Around 3,500 years ago the Western Pacific was occupied by people carrying a particular type of pottery known as lapita. Sites with highly decorated lapita pots are found from Manus to Samoa, providing an archeological clue to the track of the Pacific colonisers.

The 1985 expedition established the broad outlines of the prehistory of the Bismarck Archipelago. Some of the facts uncovered were surprising. A cave site on New

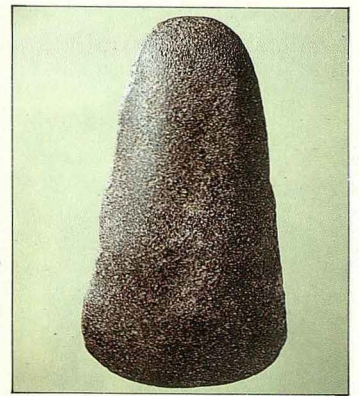


Clockwise from top left Lapita pottery shards about 3,000 years old; wild pork for ceremonial feast; traditional axe head; old power stone (mokmok) for bride price. Photographs from Pillo Island.

Ireland showed that people have been in the region for more than 30,000 years, ten times as long as they have been in the smaller islands of the Western Pacific. Indications of trade by land and sea were provided by obsidian, a volcanic glass used for making tools.

Obsidian from Talasea, on the north coast of New Britain, was found in New Ireland caves from 12,000 years ago, showing that people were regularly crossing the water gap between New Britain and New Ireland carrying items for trade.

We are beginning to under-



stand the degree to which people have altered their environment over the last 30,000 years, introducing plants and animals from outside the area and modifying the landscape to suit the new introductions. The broad picture of change within the Bismarck Archipelago needed to be supplemented by more detailed studies of individual regions.

At first sight it might seem unlikely that the Arawe islands played a part in the peopling of the Pacific. The Arawe group is one of the most isolated in coastal Papua New Guinea today. Yet 3,500 years ago the situation might have been different, with the Arawes being part of a large network of lapita communities which stretched over thousands of kilometres.

I first saw the Arawe islands from the deck of the Dick Smith Explorer in 1985. We reached the group at first light. The rising sun revealed a mass of islands covered with luxuriant green vegetation, cleared in places for gardens. Some islands are formed of raised

coral, their tops some 40 metres above the sea, with wave-cut notches in the cliffs on their seaward side. Others were low lying and surrounded by mangroves. As we moved closer it was possible to see villages located on beaches sheltered from the open sea, close to the main island of New Britain. Soon after we anchored, the research vessel and a local boat delivered Dr Jim Specht of the Australian Museum, who had arrived in the area a few days previously. Jim had already located one large lapita site on the island of Pililo, visible as a scatter of pottery, obsidian and shell on the beach. It was already obvious that the area had considerable archeological potential.

The boat departed the next day to set up a team in East New Britain. By the time it returned

two weeks later we had found a large number of sites of lapita and later periods. Laboratory analysis of the finds back in Australia confirmed that here was a region which could give us a detailed picture of life over the last 3,000 years.

In November, 1986 I returned for a three-month field season, together with three students from La Trobe University. We were aided throughout our stay by the Kimbe Cultural Centre and given enthusiastic help by the

people of the Arawe area. We were to live for three months on Pililo Island, in the house of the village leader, Leo Sapu.

Archeology has been described as the science of rubbish. Archeologists attempted to work back from what people threw away or lost, plus traces of houses, fires and pits, to how life was in the past. Bones and shell show what food was eaten; stone and shell, as well as pots, indicate the range of technology available and marks left by house posts,

pits and fires indicate how settlements were laid out.

Excavation is the time-consuming process through which the basic archeological information is recovered. Archeologists attempt to recognise different layers of earth and sand, together with the particular pots, bones and stone tools in each layer. Layers of earth are the basic units for understanding the sequence of changes in a site. When these can be dated they can show links between sites and how settlements were distributed within the area at different times.

Our main excavation was a lapita site on Pililo Island. This was a large site, stretching 400 metres along the beach and obviously the remains of a substantial settlement in prehistoric times. The site was made up of layers of clay and sand. The clay was particularly interesting, as it had probably been washed down from the high part of the island when the vegetation was cleared for gardens. The clay thus gives an indication that intensive gardening was taking place on the island 3,500 years ago. The site produced a rich array of lapita pottery, one of the largest collections from anywhere in the Pacific, making it possible to study the range of decorations and their similarities with other sites in the Pacific. With the pots were plentiful amounts of obsidian and other stone tools,



Clockwise from above Oyster-shell adze; 3,000-year-old human jaw bone; pottery fragments decorated with fingerprints and ancient designs; the Pililo excavation site.



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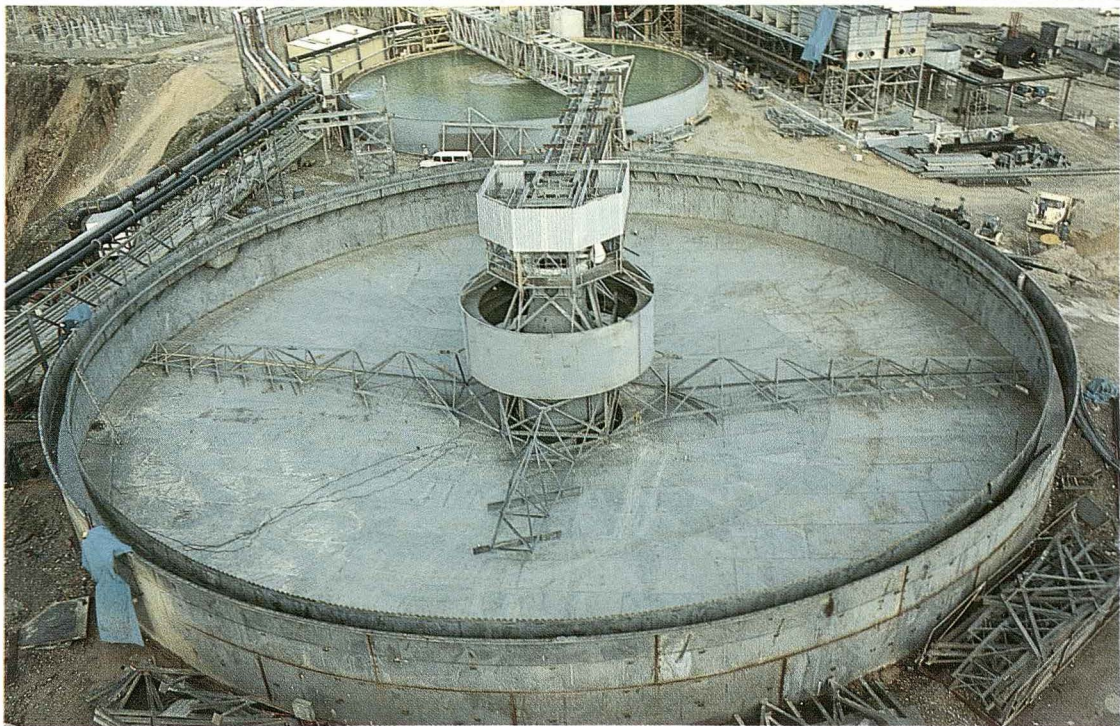
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animal bones and, importantly, a number of human remains. The human skeletal evidence makes it possible to compare people in the lapita period with those in Melanesia and Polynesia today, throwing light on the ancestry of different groups.

In the Arawes one obvious change we noted was where settlements were located in different periods. During the lapita times, settlements were on the beach with immediate access to the sea and no sign of defence. However in later times, all settlements were on the high parts of the islands, sometimes surrounded by palisades as protection against the constant warfare and raiding in the area. The exact reasons for the change from peace to war are unknown, but may have to do with rising population and greater pressure on resources.

As well as lapita period finds, there was material from the last few hundred years, rubbish thrown down on to the beach from the defended hilltop settlement. These included many artefacts known to the older people in the village, such as shell adzes once used for making canoes and now replaced by metal. There were also finds such as fish hooks made from shells, which no-one could recall. As our excavation progressed local people became increasingly excited about the new light being thrown on their past.

At the end of three months we had found far more than we had hoped, including a type of pottery previously undiscovered. Our homeward trip took us via the delightful Walindi guest house, just outside Kimbe. There Max Benjamin, an enthusiastic amateur archeologist, showed



us a nearby lapita site with quite different styles of pottery decoration from those found in the Arawes. Comparing the two sets of pots it was obvious that, although lapita pots are broadly similar over a huge area, there are also marked regional variations.

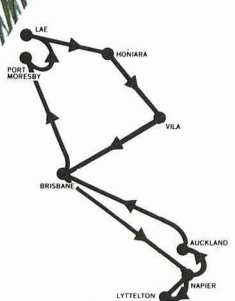
The most striking feature of PNG today is the diversity of its cultures and peoples. It is an exciting prospect to be able to trace the roots of the diversity back 3,500 years to the lapita period and perhaps beyond. Archeology is only just beginning in PNG and huge areas remain to be investigated. The Arawe project is one more step towards understanding the enormous depth of human occupation and the sequence of changes which have made PNG what it is today.

Dr Chris Gosden is lecturer in Archeology at La Trobe University, Victoria. Air Niugini assisted his archeological field season to Arawe area in November, 1986.



Top West New Britain rock shelter contains archaeological deposits for future expedition. **centre** Nearby burial cave. **below** Ancient lapita pottery unique to the Arawe islands.

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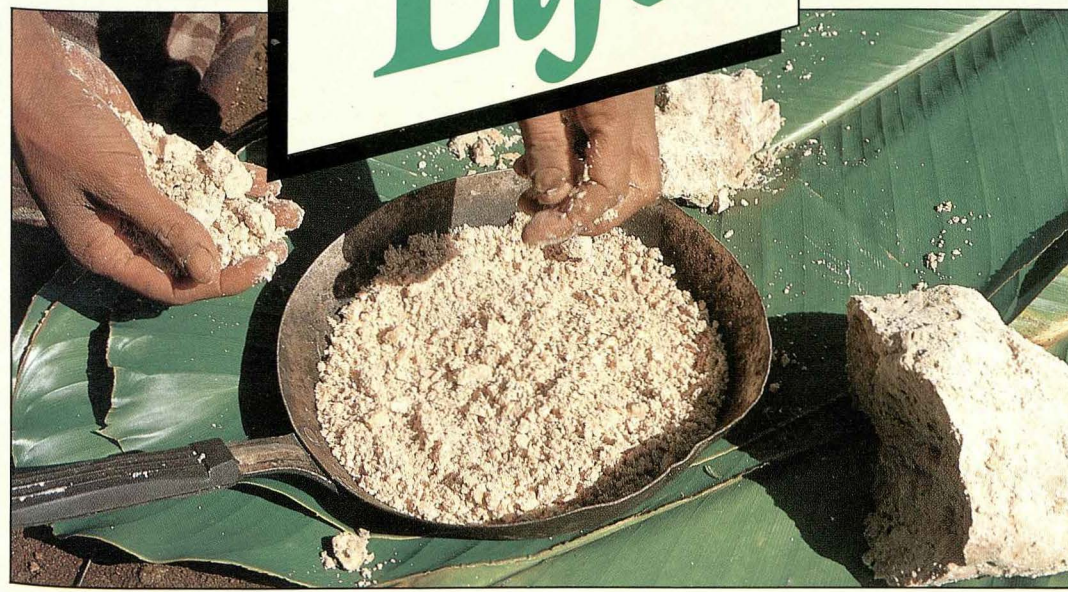


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Top Sago thorns. **below** Crumbling raw sago into the frying pan.

Story and photographs by Keith Briggs



The Staff of Life

In the dim, damp rain-forests a loud whack, whack, whack is a common sound as women beat the crumbly pith of the sago palm to separate and extract pure sago, the staple diet of most Papua New Guineans living at altitudes lower than about 650 metres.

Sago is a member of the palm family, *Palmae*; the genus *Metroxylon*, species *Sagu*. The trees take from 15 to 20 years to mature, depending on altitude, and attain a height of up to 16 metres. Just before flowering the selected tree is cut down by the men. Traditionally the hard skin was fractured with a cigar-



shaped stone mounted in a handle, and the job completed with a stone axe. Nowadays steel axes are used and a tree is felled in a short time. The men also prepare the fallen palm for the women by cutting and laying back the bark or skin on either side of the log to form a flat, clean area on which to sit and chip the pith.

The smaller trees in a sago

swamp bristle with needle-like thorns up to 15 centimetres long. Avoiding these, the men also pry off the large limbs, the butts of which wrap halfway around the trunk. These are trimmed and joined butt to butt to form a trough, fastened by wooden nails, and caulked watertight with special soft reeds. This trough is mounted on a frame of forks driven into

the ground, with one chute-like limb lower than the body of the trough, forming a channel down which the sago-laden water can flow. Women work in groups of two to four and each woman has her own trough.

The adzes for pulverizing the pith are like picks with a flat-ended, sharp-cornered "bit" of stone or black palm. These days short lengths of steel tubing

Insets above Mt Bosavi women mixing water with the sago pith, beating it to release the starch and using adzes to chip the pith from a log.



Above Typical sago-making scene with women beating pith in two troughs at a worksite in the bush.

mounted on the adze are popular. Some people cut the pith off the end grain in fine shaves and some work at the side and pare it off that way with strong accurate swings. The resultant product is like coarse sawdust. It is carried in bilums and emptied into the troughs, always set up beside a water supply.

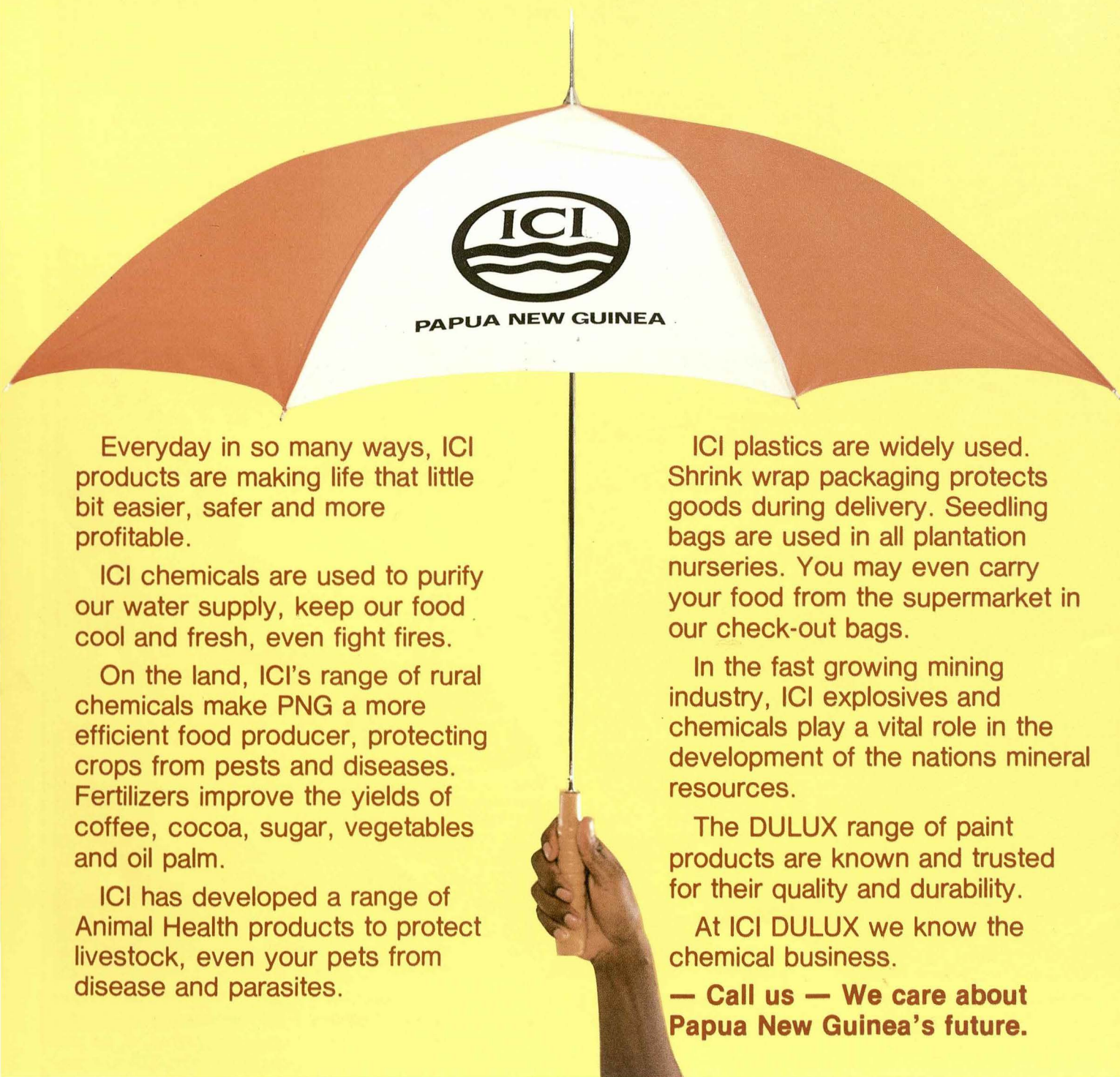
Bark dishes are used to ladle

water onto the pith which is beaten with a long, flexible palm stick about as thick as an adult finger. This beating of the damp pith makes the loud whacking sound that travels so far through the jungle.

The body of pith is turned, mixed and beaten for about 40 minutes, after which a very finely woven, open-mouthed bag is pegged in the lower

chute with special spring tension pegs made from sago-frond skin. Water is poured onto the beaten pith and a portion of the mixture is scooped down the chute into the bag to be squeezed and wrung. The starch, actually a fine powder, is carried in the water through the weave of the bag down the chute and into one of the large bark tubs where the heavy

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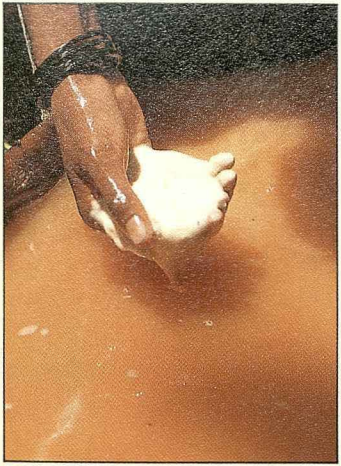
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starch settles. The pith just wrung is placed in the back of the trough and a new portion is squeezed, and so on, until the contents of the trough have been processed. The whole mass is then smoothed back into the trough and the beating begins over again. After repeating the cycle twice the water runs fairly clear so the exhausted pith is scooped out and discarded.

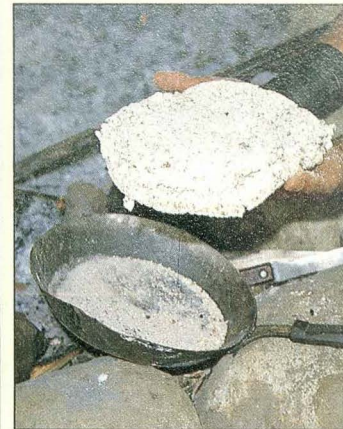
By way of a rest, the women prepare woven tubes from sago leaves, ready to hold the product of their day's work. Water is drained off the settled starch which is scooped into the tubes or into tightly woven sago bags, where the excess water seeps away. Sago at this stage is like wet putty in consistency, weight and even color, usually white or pink. A large tree will keep three or four women working for up to a week, and yield over 200 kilograms of flour.

This method of obtaining the staple diet is practised in all parts of PNG except the Gogodala area between the Fly and Aramia Rivers in the Western Province. The Gogodala women place shredded pith in a tightly woven bag and, balancing on two horizontal supports over the bark tub, squeeze, pummel and wash the sago out with their feet.

Most sago is carried back to the village and hung or stored away from the pigs. It keeps quite well and the daily needs are taken from the container. Sago is preserved by wrapping it in layers of leaves and burying it in swamp mud or in the bed



Insets A handful of sago from the settling trough; dried sago in a cooking leaf. **above** Wringing water from the pith.



of a small creek that will not run dry. It will keep for up to a year in this way but is easily distinguished by its sour taste and smell.

The damp flour is cooked in numerous ways depending on the custom. For example, it can be wrapped in long leaves and cooked over embers to form sticks with a pleasant crust. Almost any type of food can be added or mixed before cooking. Sago grubs, tree grubs, leaves, fruits, pitpit buds, nuts, seeds, fish, chopped meat, fat or bananas make for tasty variety. When cooked in bamboo the result is a long rubbery meal. The moist flour is also pressed into frying pans and cooked over a low fire producing a flat crumbly pancake with a thin crust on each side.

In the lowlands, grated coconut is blended in before cooking which results in probably the tastiest of all sago dishes.

As one flies over the vast sago swamps or the small stands along the creeks at higher altitudes, the scene below can be pictured. The women beating and washing, the pet pig foraging through the discarded pith, the skinny dogs dozing in the warm ashes of the fire under the sago frond shelter where granny looks after the children and cooks the Chef's Special of the day for the whole group ... you guessed it — sago.

Insets Tubes of new sago ready for transport; a cooked sago pancake. **above** Filling the carrying tubes made with sago leaves.

The New Islander Hotel

papua new guinea's first truly international hotel

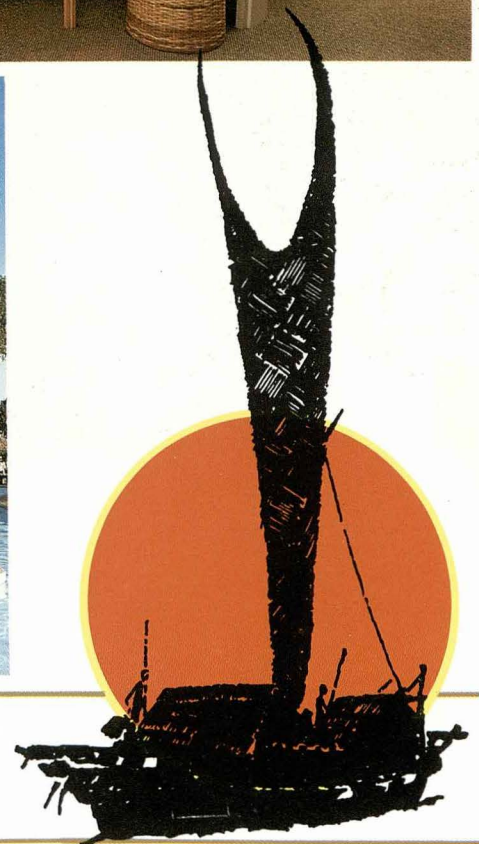
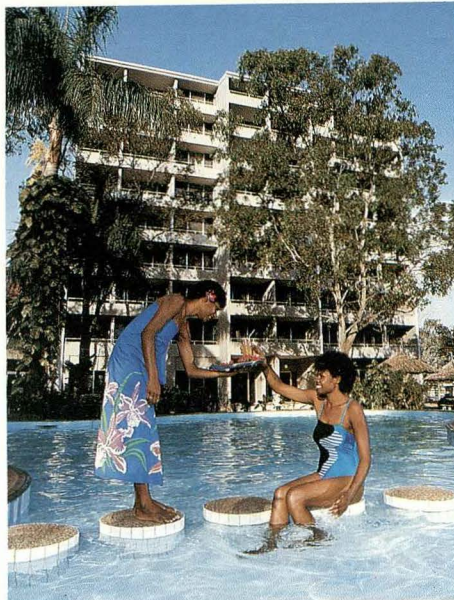
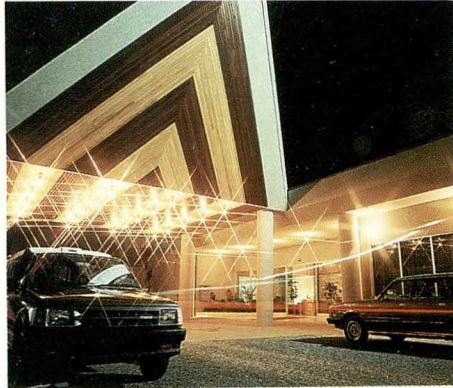
Set in ten acres of tropical gardens, the Islander is located midway between the airport and the city centre, within 5 minutes drive of Central Government Offices, Parliament House and the National Museum.

Facilities include:

- 186 deluxe rooms and suites
- Direct-dial telephones with computer modems
- Colour TV and in-house video
- Complete secretarial services
- Conference and banquetting facilities for up to 500 people
- Travel agency
- Florist
- Hire car service
- Hairdressing salon
- Boutique
- News agency
- Coffee shop
- Restaurant
- Cocktail bar
- Night club
- 4 glass backed squash courts
- 2 synthetic grass tennis courts
- Fully equipped gymnasium
- Swimming pool
- Complimentary airport transfers

The location is only one reason you will choose the Islander. The luxurious accommodations together with the superb cuisine, whether it be from our Kofi Haus Coffee Shop, from the elegant Sanamarie A'La Carte restaurant, or from our 24 hour room service, and the professional service from our courteous staff are all reasons why the Islander is Papua New Guinea's only truly International Hotel.

The Pacific has great hotels... the Islander is the great hotel of the Pacific.



The Islander Hotel

PO Box 1981, Boroko, Papua New Guinea.
Telephone: 25 5955, Telex: NE22288, Cables: Islander

A member of the Davara group of hotels.

New

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