

# The New Guinea Tropical Ecology and Biodiversity Digest



March 1997

Issue 3

(please send all contributions and corrections to: Deb Wright, P.O. Box 15, Weikert PA, 17885-0015, USA; fax: (1) 717-922-1152; email: "ddwright@ptd.net"-- thanks!)

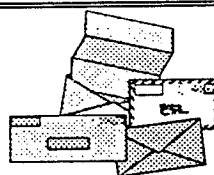
This issue we want to thank the Wildlife Conservation Society of the New York Zoological Society, Conservation International, and the MacArthur Foundation through a grant to Christensen Research Institute for providing xeroxing and mailing support -- this is much appreciated!

If you want to receive this newsletter on e-mail instead of in the mail (you could print out a hard copy and it would save us xeroxing and postage) (it is formatted in Word for Windows 6.0), please send us a note saying that this is alright and include your current e-mail address. Thanks!

If you need back issues of the Digest, please let us know and we will mail them to you.

From now on we are going to try to get a new issue out every six months so the information stays up-to-date. We apologize for the delay in this issue!

## Editorials and Letters



Anybody want to expound on their thoughts or solicit opinions about something? Please send in anything you would like to see appear here!

### The Risk to the Irian Tortoise: Utilization and Population Degradation

by Benja Victor Mambai

Lorentz Nature Reserve (proposed National Park), is an indispensable habitat for the Irian Tortoise (*Cartochelys insculpta*) and for the New Guinean Snake-Necked Turtle (*Chelodina novaeguineae*). Available habitat for these reptiles consists of the rug-like swampy area that stretches from the east on Asmut to the west very close to the concession area of the PT Freeport Indonesia Company.

The Irian Tortoise is protected by the Wildlife Protection Ordinance 1931, and the Government of the Republic of Indonesia c.q. Agriculture Minister's decree No. 327/Kpts/UM/5/1978. The New Guinean Snake-Necked Turtle is protected under the Agriculture Minister's decree No. 716/Kpts/UM/10/1980. However, they are still being

hunted. The Snake-Necked Turtle is somewhat better off than the Irian Tortoise because it is harder for people to find and thus harder to hunt.

The local people in the Lorentz area, especially the tribal people of Asmat, Sempan and Kamoro, are fond of hunting these species as a source of nutrition. They use the eggs and the meat. They have hunted these species for generations.

Hunting for the Irian Tortoise reaches its peak from September until the end of October. This is the nesting season when tortoises come up on the delta to lay their eggs. There are an average of 3-6 Irian Tortoise nests on each 50-100m stretch of delta. During this period people set up

bivouacs along the river banks. When the female tortoises lay their eggs at night, the people kill the tortoises and collect the eggs. If they missed the tortoises at night, they will find the tortoises' footprints on the delta (which lead to the nests) and dig up the eggs. Hunting is on the increase because now wildlife merchants give hunters tobacco and money in exchange for tortoises and eggs. Now the hunting is not only for local consumption, but for trade as well.

Because of this situation, the fate of the Irian Tortoise is becoming worse and worse. This area is very

isolated and thus it is hard to control these hunting practices. We need to have education and awareness training for the local people so that they can have personal sustainable use of the tortoises and can stop the tortoise trade to outsiders. This is needed if we are to stop the decline of both the Irian Tortoise and the NG Snake-Necked Turtle.

For more information, please contact: Benja Victor Mambai, WWF Indonesia Programme-Lorentz, JL Angkasa Indah II No. 6, Jayapura, Irian Jaya, Indonesia, phone: (62) 96-742-528, fax: (62) 96-742-529, email: lorentz@maf.org



## New Guinea Conservation Projects



### Conservation Priority-Setting Conference for Irian Jaya held in Biak

from Andrew Mack

From 7-12 January 1997, eighty-eight scientists, conservationists, and development planners met in Biak for a conference to determine conservation priorities in Irian Jaya. The conference was jointly sponsored and organized by BAPPEDA-Irian Jaya, Cenderawasih University, PHPA, LIPI and Conservation International. Financial support was provided by USAID, The World Bank, The Government of Japan, BAPPEDA-Irian Jaya, and the Kehati Foundation. Participants spanned a wide array of the biological and human sciences and included several NGO and government officials concerned with development and conservation.

The meeting was similar to the priority-setting conference held in 1992 in Madang PNG, but with an expanded and improved format. The conference was preceded by a year of data collection by participants and CI offices in Jayapura, Jakarta and Washington. Using a variety of base maps and GIS databases the participants mapped out areas of high conservation priority based on endemism, diversity, threat, and other criteria such as scenic and cultural value. Participants first met in groups focusing on taxonomic, social and economic specialties. The participants then re-grouped according to geographic areas and refined the priorities established by the first working groups. Finally, the maps and priorities were synthesized by collective meetings of all participants. The process proved very useful in combining the expertise of top Irian experts worldwide to form several maps showing areas of high conservation need in terms of biodiversity in Irian Jaya.

The unanimous conclusion of everyone at the conference was that our state of knowledge is inadequate. More field research and basic biological survey of Irian Jaya is urgently needed. Strategies to address this shortcoming were discussed and several exciting propositions are being initiated. The conference documented that biodiversity and endemism in Irian Jaya are extremely high, making this province of Indonesia not only a conservation priority for the country, but a high priority on a global level. Because many areas of Irian have not been developed or logged and are sparsely populated, there exists an opportunity to involve conservation considerations in planning that is unparalleled in most parts of the world.

The conference results are now being assimilated and finalized. A document and maps will be published shortly. These assets will be presented to the appropriate agencies in Indonesia where they can be used in development planning for the Province. CI staff will be involved in follow-up to the conference for at least another year, working closely with government officials in Irian Jaya and Jakarta. Thus, although the conference itself was an intensive 5-day session in January, the entire priority-setting process is a two-year endeavor. Thoughts and suggestions from readers concerned with conservation in Irian Jaya are always welcome and can be forwarded through Dr. Andrew Mack, CI's New Guinea ecologist, P.O. Box 15, Weikert PA 17885, phone: (1) 717-922-1177, fax: (1) 717-922-1152, email: a.mack@conservation.org

### Tonda Wildlife Management Area

from Garrick Hitchcock

Garrick Hitchcock is currently engaged in PhD research examining the way of life of the Waratha people of the Bensbach River area, Western Province, Papua New Guinea. The Waratha homeland lies within the Tonda Wildlife Management Area. The Tonda WMA was nominated as a Wetland of International Importance under the Ramsar Convention in February 1993, and is the only

Ramsar site among the Pacific Island states. The biodiversity of the area is currently threatened by pest species introduced from the adjacent Wasur National Park in Irian Jaya; poachers operating from Irian Jaya also regularly cross the international border into Tonda. A key concern of Garrick's research project is the response of the Waratha to these problems.

On the positive side, AusAID (the Australian Agency for International Development) has recently provided funding for a feasibility study of a coastal zone management plan for the Western and Gulf Provinces of PNG. Tonda WMA has been identified by this project as a key centre for future conservation and development planning. In addition, the World Wide Fund for Nature has

recently commenced a project entitled the Tri National Wetlands Conservation Programme. Its aim is to help transfer lessons learnt from managing wetlands with indigenous people between three protected wetland areas in the region: Tonda WMA, Wasur National Park, and Kakadu National Park in Australia.

## Wetlands International

from Roger Jaensch

Wetlands International has a program in Indonesia, including Irian Jaya, and in Oceania, including Papua New Guinea. Wetlands International has been working in PNG since August 1994 and their main areas of work include:

- a regional (Pacific) workshop on wetland conservation and sustainable use held in Pt. Moresby in June 1994
- capacity building for PNG Department of Environment and Conservation, especially for the Wetlands Officer, the Resource Inventory team, and the National Crocodile Monitoring Unit

- inventories of waterbirds and wetland plant communities in the Middle Fly floodplain and Mid-Upper Sepik floodplain
- support to PNG DEC in implementing obligations under the Ramsar Convention on Wetlands, including developing nominations for new Ramsar sites

For further information on the Oceania program please contact: Roger Jaensch, Manager of Wetlands International-Oceania, GPO Box 636, Canberra ACT 2601, Australia, phone: 61-6-250-0779, fax: 61-6-250-0799, email: roger.jaensch@dest.gov.au

## UNEP Biodiversity Database Management Project in PNG

from Michael Hedemark

PNG was one of the first nations to sign the Convention on Biodiversity at the United Nations Conference on Environment and Development in Rio de Janeiro. Article 7 of the Convention is concerned with the identification and monitoring activities to support Articles 8 to 10 (*in situ* conservation, *ex situ* conservation and sustainable use of components of biological diversity). Contracting Parties are required to:

- Identify components of biological diversity important for its conservation and sustainable use (Article 7a)
- Identify activities likely to have adverse impacts (Article 7c)
- Monitor the status of both biodiversity components and threats (Articles 7b and 7c)
- Maintain and organise data derived from identification and monitoring activities (Article 7d)

In response to the last requirement, UNEP in collaboration with WCMC, designed and submitted to the Global Environment Facility (GEF) the project proposal entitled Biodiversity Database Management Capacitation and Developing Countries and Networking Biodiversity Information (BDM). Ten countries have been selected to participate in the programme. PNG is one of them. Under the guidelines set forth by UNEP, the Biodiversity Database Management Project is to do four things:

- Conduct a national and international institutional survey which will report on the existing national capacity for data management.

- Prepare a national plan for the management and application of biodiversity in support of the Convention on Biological Diversity.
- Develop a series of basic guidelines to support efficient information management
- Compile a resource inventory as a "tool box" of available methods and technologies

At this date the PNG BDM programme is engaged in the following activities:

- The national and international survey of institutions holding biodiversity data are nearing completion and a catalogue is to be produced
- Two workshops have been held to identify guidelines to guide the establishment of datasets and to coordinate data capture and generation of information
- One workshop to identify the policy environment that will expedite the collection of data, processing of information and inclusion of this information into the landuse decision making process

Formal documentation describing the results of the above activities have yet to be produced.

Anyone wishing more information on this program should contact John Genolagani, BDM Program Manager, or Michael Hedemark, Project Coordinator, fax (675) 325-9192 or email 100357.2406@compuserve.com

## BioRAP: PNG Pilot Study

from Micheal Hedemark

Planning where priority conservation sites should be located is an essential and continuing part of a nation's overall strategy for conservation and sustainable use of biodiversity. On 25 February, Mr. Pius Pundi, DEC

Secretary for Department of Environment and Conservation, signed a memorandum of agreement with an Australian Consortium<sup>1</sup> and the World Bank /GEF and the Australian

Agency for International Development (AusAID) to initiate Biodiversity Rapid Assessment Programme (BioRAP).

The BioRAP is a "tool kit" which uses measures of biodiversity, and climatic and environmental data, and current land use to identify alternative sets of biodiversity priority areas. Unlike the Conservation Needs Assessment Project which identified large undifferentiated areas of high biodiversity, the BioRAP will take into account costs, degrees of threat, feasibility of intervention and management, and any other trade-offs that users might nominate. The methodology is rapid (approximately 12 months) and can be used to demonstrate different land use options at different scales.

The application of the BioRAP methodology in PNG will assist the nation in assessing priority areas of biodiversity and will aid in strategic planning for conservation and sustainable use of biodiversity. This type of planning is needed to augment land use plans developed by other sectors of the economy and to fulfill obligations to

international conventions (eg., Convention of Biological Diversity).

The BioRAP project will utilize full GIS capabilities and will also provide many spin-off products, such as a relational database for survey/patrol collections and a predictive model for species distribution based on geo-climatic variables.

For further information on this new DEC programme, contact John Genolagani, Assistant Director for the Biodiversity Assessment Branch (formerly known as the Resource Inventory Branch), fax (675) 325-9192 or email 100357.2406@compuserve.com

<sup>1</sup> The Australian consortium consists of the Commonwealth Scientific and Industrial Research Organisation (CSIRO), the Centre for Resource and Environmental Studies (CRES) at the Australian National University, the Environmental Resources Information Network (ERIN), and the Great Barrier Reef Marine Park Authority (GBRMPA).

## Looking for a Policy that Works for Forests and for People

from James Mayers

**Organizations:** National Research Institute with ICRAF, UNDP, WWF. Coordination of overall project: IIED, London.

**Summary:** The Forestry and Land Use Programme of IIED embarked on this project in January 1995, supported by the British Overseas Development Administration and the Netherlands Ministry of Foreign Affairs. The project is centered on case studies within a wide geographical spread of countries with differing forest problems; policy environments; and degrees of stakeholder participation in policy processes. One of the case studies is currently underway in PNG, in collaboration with the organizations above.

The main focus of the study in PNG is to:

- understand different stakeholder contributions to negotiation, operation and impact of logging projects
- examine the design and implementation of local and national "alternatives" to destructive logging

- examine actual and potential relevance to forest management of national policy processes
- This emphasis stems from the study team's view that current national policy in PNG is a contradictory balancing act between the politics of the Melanesian village and the politics of the global economy. The team will be interviewing a number of key national policy actors and involving a wide range of people in analysis of local action and its articulation, or current lack of articulation, with national policy. Outputs of the study will include country-specific conclusions on what elements of policies and policy processes contribute to sustainable forest management.

**Contact for more information:** Dr. Colin Filer, The National Research Institute, P.O. Box 5854, Boroko, NCD, PNG, phone: (675) 326-0300, fax: (675) 326-0213. Or James Mayers, Forestry and Land Use Programme, IIED, 3 Endsleigh Street, London WC1H 0DD, UK, fax: (44) 171-388-2826, email: iiedforestry@gn.apc.org

## Papua New Guinea Environmental Research and Management Center

from Rick Bein

The Papua New Guinea Environmental Research and Management Center (ERMC) at The Papua New Guinea University of Technology (UniTech) has recently contracted its first director, Dr. F. L. (Rick) Bein. Dr. Bein is on leave of absence from Indiana University/Purdue University at Indianapolis (IUPUI) and is in charge of developing the center. He has studied and worked with environmental issues for many years in the United States and where he worked previously, in Brazil and Sudan.

The ERMC was initiated at UniTech in 1994 to promote the discussion of the environment within the academic community and within PNG. As a "center" it answers to the Vice Chancellor and works with the academic departments that demonstrate environmental interests. Some of the goals of the ERMC are to develop the teaching of environmental concepts both at the post graduate and under

graduate levels, and to expand knowledge of the environment through interdisciplinary research and consulting. A new journal has been approved for the ERMC called "*Habitat: The Journal of Environmental Issues in Papua New Guinea*." This will help to provide a forum for environmental research in PNG. With respect to community service, the ERMC is developing out-reach to non-government organizations (NGO's) and to schools and is offering short courses and seminars in a variety of settings in PNG. The Center is also coordinating environmental assessment teams to study the effect of development projects on the physical and human environments. Currently it is sponsoring the short course, "Preparing the Environmental Impact Assessment."

Director Rick Bein promotes the approach to the environment as the "interaction of the natural and cultural

conditions that affect life." He takes the "conservationist" perspective that the natural environment is to be used but not abused rather than the "preservationist" approach that wants to isolate and not use the natural environment, or the "exploitationist" approach that wants to take everything from the environment with no regard for tomorrow. Bein sees a great need for the conservationist ethic in PNG as there are

great pressures to develop the country while at the same time PNG is one of the few places in the world where most of the country is still forested.

The ERMIC can be contacted at Box 39, Private Mail Bag, UniTech, Lae, PNG, phone: (675) 473-4686, fax: (675) 475-7534.

## Village Development Trust

from Sasa Zibe Kokino (summary of the VDT newsletter)

In response to villagers' requests, the 69,000 hectare site of VDT's Kamiali ICAD Project (60 km south of Lae) has been recommended for gazetting as a Wildlife Management Area. This decision is especially important because neighboring villages have chosen more conventional routes that have led to long-term environmental damage; the WMA will allow this village to protect its natural resources. Some initial biodiversity studies have already been carried out and more are planned for the coming year. Efforts are being made to create hiking tracks for access to remote areas and to initiate ranger training for villagers in the WMA.

In early 1996 VDT focused on development aspects of the Kamiali ICAD. A village fishing project now buys fish from family canoes and sells the fish to the government fisheries wharf in Lae. In its first quarter the project sold K2,500 worth of fish which translated to K1000 in income for 50 village families. In 1996 the Village Commercial Portable Sawmill was also established and presently provides income for 18 village operators on a rotating basis. The timber is sold at market prices and is also being used to build the VDT Training Centre which employs another 20 villagers. Courses in small sawmill operation and environmental awareness have already been held at the centre. The centre can also be used by visiting researchers and eco-travelers. The Training Centre has a roof of split shakes instead of corrugated metal to conform to the idea of using entirely sustainably harvested materials. VDT employs three villages near Lae to produce shakes from milky pine and bass wood (which are fine for shakes but would bring a low price as sawn timber). These operations employ mostly men, however, the VDT's Women's Training Program is now operational. Three women from Kamiali are employed at the Lababia Bakery (a drum oven project) and their profits are put into a bank account to be used for women's projects. The Kamiali Conservation Committee (elected representatives from the village) oversee all projects to make sure they operate within the guidelines for the WMA.

VDT has a representative involved in the drafting of a regional strategic management plan for marine turtle conservation from 1997 to 2001 (other members of this

committee are from countries throughout the Pacific). The Kamiali ICAD Project has established a turtle buffer zone where leatherback turtles can nest without the risk of their eggs being taken. VDT also participated in meetings to develop strategy for the International Coral Reef Initiative activities for 1997.

The Village Eco-Timber Project (VETP) is a cooperative effort between VDT, Morobe Village Ecotimber Association, the Timber Industry Training College, and Adventist Relief and Development Agency. The project assists village sawmill operators to obtain business loans for commercial eco-timber companies and it has established a revolving fund for financing sawmill equipment. To insure that loans are repaid, VDT is providing training and field support. A lumber yard has been established where operators can sell their timber. VDT staff assist villagers in completing the application for VETP. To do this, VDT carries out surveys of the timber on the land in question, learns about the social climate, and draws up a landuse management and logging plan to ensure that the project will be environmentally, economically and socially sustainable. VDT has thus far helped five villages with their applications and over fifteen other villages have expressed interest in the project.

VDT has begun an experimental program using water buffalo to move timber from the sawmill site to the nearest road. This is the first project to use water buffalo in this fashion (they have been used for agricultural purposes in PNG). Using water buffalo saves manpower and is less destructive environmentally than heavy machinery. Three rural sawmills are currently using water buffalo and three more will be in the near future. Before buffalo can be placed at a site, two handlers meet their buffalo at a four week training course where both the buffalo and the handlers are trained. The buffalo pull either a trailer, in good terrain, or a sled designed for swampy areas.

For more information about any of the above projects, please contact: Sasa Zibe Kokino, Village Development Trust, P.O. Box 2397, Lae, PNG; phone: (675) 472-1666; fax: (675) 472-4824



## Current Research Updates

If you have recently finished work or are currently doing a project, please send a summary for inclusion in the next newsletter-- thanks! Remember that research articles should still be submitted to journals for publication-- we just want to print a summary of your work to let people know what is going on without having to wait for the lag-time involved in regular journal publications and so that summaries of all current work can be found in one location. We want to make it easy for everyone to keep informed about all of the current research in New Guinea, so please send your information!

### Floral Phenology of Motupore Island

from Cecile Lumer

A team from the Biology Department of the University of Papua New Guinea (Cecile Lumer and several of her botany students) will be visiting Motupore Island every two weeks for a one-year period to document the flowering phenology of the plants found there. They walk along a trail system recording the amount of flowering for each plant on a 0-5 scale. They expect to collect data for 85-

90% of all the plant species on the island. This information can then be used to facilitate future studies on plant reproduction.

For more information contact Cecile Lumer: Biology Department, University of PNG, P.O. Box 320, Univ PO, PNG.

### Rapid Assessment Program Survey in the Lakekamu Basin, PNG

from Andrew Mack

Conservation International, through a grant from USAID, sponsored a RAP biological survey in the Lakekamu Basin, Gulf Province, Papua New Guinea. Fieldwork was conducted in forest in the vicinity of the new Ivimka Research Station. The research station is part of a conservation initiative sponsored by the Biodiversity Conservation Network (BCN) and administered by CI and the Foundation for the People of the South Pacific (FSP).

The survey was conducted 15 October to 15 November 1996. The following personnel formed the RAP team: Dr. Gerald Allen, Dr. Allen Allison, David Bickford, Paul Igag, Joel Kulang, Dr. Andrew Mack, Kurt Merg, Alexandra Reich, Dr. Roy Snelling, Dr. Wayne Takeuchi, Debra Wright.

**Birds**-- Approximately 128 species were observed during the field session of which about 6 had not been previously recorded in the basin. The avifauna of the basin is one of the richest forest assemblages documented anywhere in New Guinea. Quantitative data was collected by means of point counts and mist netting. Three hundred minutes of point counts were made. Mist net captures numbered over 700 with 650 birds banded for future research.

**Fish**--Twenty-two species representing 14 families of fish were identified and collected in the vicinity. One or two of these might represent undescribed species. A good series of voucher specimens was collected.

**Herpetofauna**--Approximately 72 species of reptiles and amphibians were recorded. This represents one of the most diverse, or at least the better-documented sites in New Guinea. Several represent previously undescribed species. Quantitative data was collected on transects and plots. Many

species were tape recorded and a good series of voucher specimens was prepared.

**Insects**--About 128 species of ants belonging to 57 genera in all 7 of the ant subfamilies known to occur in Papua New Guinea were recorded. This is undoubtedly the best surveyed site for ants on the entire island. Many interesting range extensions were made, including first time records for the island. At least one specimen represents an undescribed species and other species collected are only known from a few specimens. An additional 24 species of social wasps and bees were collected.

**Mammals**--Trap capture rate was relatively high for NG with roughly 128 individuals captured and 80 recaptures in 3100 trap nights (1/15 trap nights). Additionally, bats were censused using mist nets and two harp traps. Twelve mammal species were trapped, 9 bat species were captured, and 3 additional mammal species were sighted, for a total of 24 mammal species (8 families) recorded.

**Plants**--Fortunately the RAP occurred during a time of elevated flowering activity, so many extremely valuable collections were made: about 313 species collected with fertile vouchers and another 135 species recorded by sight records; for a total of about 450 plant species from about 123 plant families. Two permanent 1-ha plots were censused. There were roughly 650 stems on the alluvial plot and 840 stems on the hill plot.

The RAP survey results are now being compiled by Andrew Mack and will be published later this year in a thorough RAP report.

## Rapid Assessment Program Field Training Course Successfully Completed in PNG

from Andrew Mack

A training course for students of UPNG was conducted 15 November to 11 December 1996 in the Lakekamu basin of Gulf Province, Papua New Guinea. The course was conducted in the vicinity of the new Ivimka Research Station. The course was funded by USAID and conducted by Conservation International. The station is part of a conservation initiative funded by the Biodiversity Conservation Network and administered by CI and the Foundation for the People of the South Pacific.

The course was taught by: David Bickford, Kurt Merg, Andrew Mack, Alex Reich and Debra Wright with guest lectures by visiting scientists Jerry Allen, Geordie Torre, Stephen Richards and Roy Snelling. There were seventeen students from the University of Papua New Guinea and one trainee from the Cenderawasih University/Manokwari, Irian Jaya.

The course utilized the CI RAP-PNG training manual edited by Andrew Mack and a bound selection of supplemental readings. The first week of the course was occupied with general lectures, field exercises, and orientation walks. Students were introduced to topics such as what surveys are, field safety, data collection and

organization, use of maps and compass, basic note-taking, etc.

The remainder of the course the students divided into groups based upon their taxonomic interests: birds, insects, mammals and plants. During the second and third weeks, students spent most of their time with field work and data collection. Late afternoons were occupied with lectures or paper discussions. Lectures included topics such as data analysis, making graphs and tables, statistical tests, etc. During paper discussions, students were organized into different groups. Each group led the class-wide discussion of 1-2 scientific papers (from the supplemental readings) much as occurs in graduate seminars at USA universities. Papers covered taxonomic and conservation themes in PNG.

The last four days of the course were occupied with data analysis. The taxonomic groups organized and analyzed the data they had collected much as they would for any survey. On the final day, a mini-symposium was held in which each taxa group presented the results of its work and fielded questions from the other students.

## Plant Diversity and Spatial Patterns along Altitudinal Gradients in Tropical Rain Forest Communities in Papua New Guinea

from Lawong Balun

This study was carried out in closed tropical rain forest communities in the Sulka area of New Britain Island and in the Kikori Basin on the New Guinea mainland between January and August 1995. The study sites were stratified along an altitudinal gradient ranging from 0-2000m above sea level (a.s.l.).

All vascular plant species including epiphytes up to 10m above the ground were enumerated from plots (belt transects 333m X 6m) established at fixed aneroid datum point at different altitudes. A total of seven and nine plots were established at stratified altitudes in the New Britain Island and Kikori Basin respectively to provide a snapshot pattern of species diversity with varying altitudes and landscape.

The peak species diversity S (153 species/0.2 ha) for New Britain Island was recorded between 400-600m and the peak S (190 species/0.2 ha) for Kikori Basin was recorded at 170m a.s.l. Species diversity based on individual life forms indicated that epiphytic diversity reached its peak at elevations higher than that of the total S and subsequently showed gradual decline at altitudes higher than those recorded in the overall S. A total of 110 and 133 plant families were recorded from *circa* 500 and 800 voucher

specimens collected for the New Britain and Kikori study area respectively.

Forest communities between 80-800m were floristically over 50% similar for both study areas. Comparison between 800m and 1100m showed 24% similarity. The change in species composition along the altitudinal gradient is gradual hence there is no well defined zonation. 17% of the plant species occurred throughout the entire altitudinal range and the rest (83%) have a restricted altitudinal distributional limit. Individuals showed a clumped distribution pattern.

Cumulative number of species for both Kikori Basin and Sulka showed no leveling off at lower altitudes but started leveling off after 1100m a.s.l.

Tree species predominated the species richness measure in the lower altitudinal range, contributing an 80% proportion at 200m a.s.l. and 63% at 800m a.s.l., but showed marked decline with increase in altitude with the lowest proportion of 45% at 1600m.

For more information contact: Lawong Balun at Bulolo University College, P.O. Box 92, Bulolo, Morobe Province, PNG.

## A Study on the Floral Diversity of the Hagahai Area in the Madang Province, Papua New Guinea

from Joel Kulang, Olo Gebia, and Lawong Balun

This study was carried out in a closed tropical rain forest community in the Hagahai area in Madang Province on the New Guinea mainland between August and

September 1996. The study sites were stratified along an altitudinal gradient ranging from 250-1250m above sea level (a.s.l.).

All vascular plant species including epiphytes up to 10m above the ground were enumerated from plots (belt transects 333m X 6m) established at fixed aneroid datum point at different altitudes. A total of six plots were established at stratified altitudes to provide a snapshot pattern of species diversity with varying altitudes and landscape.

The peak species diversity S (281 species/0.2 ha in 151 genera and 81 families) for Hagahai was recorded between 800-1000m a.s.l. and declined gradually going both up and down altitudinally from there. The 281 species/0.2

ha is by far the highest measure of species richness for Papua New Guinea yet recorded.

The forest is under constant death and recruitment in all size classes and is a typical late secondary forest.

Cumulative number of species for all altitudinal plots showed no leveling off although different rates of species accumulation was noticeable.

For more information contact: **Joel Kulang** or **Olo Gebia** at Christensen Research Institute, P.O. Box 305, Madang, Madang Province, PNG, or **Lawong Balun** at Bulolo University College, P.O. Box 92, Bulolo, Morobe Province, PNG.

## Research Updates from the Crater Mountain Wildlife Management Area

from Arlyne Johnson, Scientific Coordinator of the Research and Conservation Foundation of PNG

The following researchers have worked at stations and field sites in the Crater Mountain Wildlife Management Area over the last six months:

- **David Ellis** (University of Kent, UK). A study on use, perception and representations of environment by Pawaiians in a rural community in the Crater Mountain WMA. This is a doctoral study which began in the community of Haia in December 1995 to continue through the end of 1998.
  - **David Bickford** (University of Miami, USA). A study of the phylogeny of the NG Microhylidae frogs and their reproductive strategies with a special emphasis on a herpetological monitoring program for tracking amphibian declines in NG. This doctoral study began at the Wara Sera Research Station in November 1995 and will continue through March 1998.
  - **Dr. Gary Dodson** (Ball State University, USA). An ongoing study of the effects of habitat disturbance on antlered flies (*Phytalmia*) of New Guinea. A brief visit in July 1996 with National Geographic staff to photograph the *Phytalmia* population near the village of Haia. Article to be published later this year.
  - **Steve Hamilton** (National Museum, PNG). Ongoing survey of the bats of the family Pteropodidae at bat caves outside the village of Herowana. Assessing the feasibility of long-term monitoring of bare-backed fruit bats (*Dobsonia magna*) to measure impact of hunting and establish levels of sustainable use. Collecting data on population demography of *D. magna*.
  - **Debra Wright** (Wildlife Conservation Society-NYCS, USA). Coordinating scientific team and student and landowner trainees in five months of biological surveys of five taxa along an altitudinal gradient within the WMA. Taxa include birds, mammals, herps, moths and plants. Three surveys complete at 120, 550 and 1450 meters with two more surveys scheduled at higher elevations in the WMA for early 1998.
  - **Dr. Andrew Mack** (Conservation International, USA). Coordinated Rapid Biological Assessment two-week training course for seventeen PNG national biologists/students near the village of Wabo in June 1996.
  - **Beno Erepan** (University of Papua New Guinea, PNG). A one month survey in July 1996 of community-based natural resource management in the community of Haia in the Crater Mountain WMA. Conducted as part of his requirements for his post-graduate honors degree in Environmental Sciences.
  - **Will Betz** (IUCN Tree Kangaroo Species Survival Plan Project). Conducted two-week feasibility study in December 1996 to assess establishment of long-term monitoring of tree kangaroos in the Crater Mountain WMA. Survey conducted in Maimafu village at 1800-2100 meters.
  - **Dr. Todd Capson** (University of Utah, USA). Currently conducting six-week feasibility study for initiations of a long-term ethnobotanical study in the Crater Mountain WMA. Working with residents in Herowana and Maimafu villages to assess methods for documentation of the use of medicinal plants with a goal of providing a permanent, written record of their ethnobotanical traditions.
  - **Dr. Wayne Takeuchi** (Forest Research Institute, PNG). Presently collecting botanical specimens and verifying identifications on permanent 1-hectare plots within the WMA to assess plant diversity of vegetation along an altitudinal gradient in the Crater Mountain WMA. The intent of the long-term project is to identify and quantify floristic patterns within the WMA, conduct ethnobotanical polling, prepare an annotated species checklist for the area, and provide national botanist training.
- The following scientists have applied for funding to begin conducting studies in the WMA sometime in 1997:
- **Dr. Stephen Garnett**. A study on the conservation biology of the Palm Cockatoo (*Probosciger aterrimus*) at the Wara Sera Research Station from 1997-1999. To examine reproductive biology, habitat use, diet and genetic variation of the species.
  - **Marianna Ellingson** (University of Ohio, USA). To conduct a case study of the Crater Mountain Integrated Conservation and Development Project and the linkages between ecotourism and biodiversity conservation.
  - **Greg Pryor** (University of Florida, USA). A 6-month pilot study in 1997 on the biology of the Vulturine Parrot (*Psitttrichas fulgidus*), to be followed by dissertation research beginning in 1999.



- **Tamatha Barbeau** (University of Florida, USA). A 6-month pilot study in 1997 on the biology of frogs that live in the forest canopy, to be followed by dissertation research beginning in 1999.

The Crater Mountain ICAD Project team is currently implementing a long-term interdisciplinary monitoring plan in the WMA to measure the effectiveness of community-based conservation initiatives in the long-term conservation of biodiversity at the site. This year the team, together with members of the WMA communities, will begin collecting biological data on:

- Bird species richness through point and flyover counts at three elevations. Wildlife use at three villages in the WMA through a study of diet and through school, market and captive animal surveys.
- Megafauna richness through transect surveys of animal signs at three elevations in disturbed and undisturbed habitats.
- Plant use in house construction and artifact production for sale in village handicraft businesses at three villages in the WMA.
- Preliminary conservation area and land use mapping to identify change in land use over time.

In addition, business and community development staff, with the help of community representatives, will monitor socio-economic indicators such as income, employment, sales, level of training, community institutional development, management and decision-making.

The biologists on the Crater Mountain ICAD Project team include:

- **Robert Bino**-- Village Coordinator for Miamafu
- **Peter Minimulu**-- Village Coordinator for Herowana
- **Paul Igag**-- Village Coordinator for Haia
- **John Ericho**-- Crater Project Coordinator
- **David Bickford**-- Resident Scientist
- **Arlyne Johnson**-- Scientific Coordinator for RCF

The community development and business staff on the Crater Mountain ICAD Project team include:

- **Josh and Robin Alpers**-- Community Development Volunteers for Miamafu
- **Zachariah Moro**-- Field Enterprise Coordinator for Herowana
- **Cat and John Hiller**-- Community Development Volunteers for Herowana
- **Paul Hakahu**-- Field Enterprise Coordinator for Haia
- **Doug and Rochelle Zanini**-- Community Development Volunteers for Haia

For more information about research possibilities and conservation activities in the Crater Mountain Wildlife Management Area, contact:

The Research and Conservation Foundation of Papua New Guinea

Crater Mountain ICAD Project

PO Box 1261, Goroka, EHP

Phone and Fax: (675) 732-3211

email: 10355.2621@compuserve.com

## Announcements and Requests

This section is for anyone to use. You can send in announcements (for example, to advertise an upcoming meeting). You can also send in any requests for information that you think other newsletter recipients could help with (for example, if you are writing a paper about forest structure and want to find out who is currently working in this area or who you could collaborate with or exchange info with). Please send any announcements or information requests to Deb.

### Wanted: Environmental Coordinator (Job!)

World Wildlife Fund (WWF), an international organization working worldwide for the conservation of nature, seeks an **Environmental Coordinator** to work on location in Gulf and Southern Highlands Provinces, Papua New Guinea. The job entails working with local communities to develop and implement strategies for conservation and sustainable resource use. It involves biological survey work, establishment of protected areas, development and monitoring of forest management and land use plans, training, and monitoring conservation performance. This position requires a Masters degree or equivalent experience in conservation and natural resource

management and at least five years field experience in natural resource management, land use planning, biological assessment, or a related field. Experience in Papua New Guinea and/or the South Pacific, with customary landowners, is preferred, as is experience of working in multi-disciplinary teams and in training. Excellent communication skills required. Tok Pisin and/or Matu language skills are an advantage.

Please send your resume and cover letter by mail to: Scott Atkinson, WWF, Human Resources Department 564, 1250 24th Street, NW, Washington D.C. 20037. No fax or telephone inquiries, Please!

### **Wanted: Info on your interests**

For the next directory (we will be sending an updated version once a year) we would like to include a short description of the research/conservation interests of each

recipient of the Digest. Please send one or two lines describing what you work on in NG to Deb Wright at the address or email listed at the top of this newsletter. Thanks!

### **Wanted: DNA samples from *Nyctimene* or *Paranyctimene* Bats**

Nancy Irwin will be creating an up-to-date phylogeny for the *Nyctimene* group at the Hall/Moritz lab at the University of Queensland. To do this, she needs samples from all *Nyctimene*/*Paranyctimene* species from all over New Guinea. If you know of anyone who has collected tissue or membrane punches from these species, please let Nancy know. If you are planning to mist-net bats in New Guinea, or know of anyone who is intending to net bats, please let Nancy know. When bats are netted it takes about 1 minute to collect membrane punches which are 4mm diameter holes

in the patagium. These punches do not harm the bats and they grow over completely. Nancy can provide all the materials and instructions needed to collect these punches. Help us sort out this confusing group!

To contact Nancy: email: "omissa@kbinirsnb.be"  
phone: 00 32 2 627 4354 fax: 00 32 2 619 4825 address:  
Nancy Irwin, Institut Royal des Sciences Naturelles de Belgique, Conservation Section, Vautier Rue 29, B 1000 Bruxelles, Belgium.

### **Incorporating Sustainable Development in the Curriculum**

The National Department of Education wishes to incorporate knowledge and skills related to sustainable development and care of the environment into the school curriculum at all levels. This is currently being done in the subject Ecology. However, there is a need to broaden the incorporation and a new subject is being created on resource development.

This subject is aimed at providing information and some skills for small scale resource development to assist students in making a living and to improve their standard of living in a sustainable way. The course will also help students understand their rights as landowners and will try to help them avoid being exploited.

The course will include the following areas: small businesses, forestry, agriculture, aquaculture, wildlife management, home environment (housing, care of machines, sources of energy, etc.), village industry and crafts, appropriate technology, ecotourism, nutrition, etc.

The Department also wishes to promote the messages of community development workers and organizations and would welcome comments, suggestions and sources of information and or materials to make this a valuable course for our students, especially the majority who will not enter the formal world of work.

The Habitat UniTech in Lae and the National Museum in Pt. Moresby would like to be involved with educational programmes for teachers and school children and initial discussions have already been held between these groups and the Department of Education. Perhaps there are other organizations that are also interested?

For more information please contact: Guy Mascord, Curriculum Reform Officer, Department of Education, P.O. Box 446, Waigani NCD, Papua New Guinea, phone: (675) 324-6432, fax: (675) 325-5902.

### **NG on the Internet**

The Bishop Museum has added a New Guinea biodiversity section to the Bishop Museum Internet WWW site. The address is:  
[www.bishop.hawaii.org/bishop/natsci/ng](http://www.bishop.hawaii.org/bishop/natsci/ng)

At present the site focuses on the collaborative insect ecology work underway in PNG by Bishop Museum, Christensen Research Institute, International Institute of Entomology, Czech Academy of Sciences, and Wau Ecology Institute (including Yves Basset, Vojtech Novotny, Scott Miller, Allen Allison, Al Samuelson, Larry Orsak, George Weinblen and others). The WWW site includes preliminary analyses, data and images of insects from our current insect

herbivore work funded by the US National Science Foundation, as well as our approach to parataxonomist training.

In the near future, we will be adding the text of the recently published "Papua New Guinea Country Study on Biological Diversity" as well as comprehensive bibliographies on entomology and herpetology.

For more information contact: Scott Miller, Bishop Museum, 1525 Bernice Street, Honolulu Hawaii 96817-0916, phone: 051-808-847-3511, fax: 051-808-841-8968, email: [scottm@bishop.bishop.hawaii.org](mailto:scottm@bishop.bishop.hawaii.org)

### **Needed: Info on Biodiversity Resources in Museums outside PNG**

The PNG Department of Environment and Conservation is involved in a project to assess the scope of biodiversity information currently available. This is an obligation under the Convention on Biological Diversity and is needed for environmental management. DEC has engaged the help of Bishop Museum to assess biodiversity

information, both specimen holdings and electronic data records, in museums outside of PNG. We are assembling this information from many sources and will soon be circulating our preliminary compilation to the museums concerned for verification. If you have specimen collections, or other data on the occurrence and/or status of species in

PNG, that we might otherwise miss, please contact us. We probably have good coverage of the major collections in the United States, Australia, and Europe already, but we welcome further input.

Please contact: Scott Miller and Allen Allison at Bishop Museum, 1525 Bernice Street, Honolulu Hawaii 96817, USA, email: [scottm@bishop.bishop.hawaii.org](mailto:scottm@bishop.bishop.hawaii.org)

## Directory of Anthropological Scholars Wishing to Help Conservation Efforts

The Committee of Concerned Pacific Scholars (CCPS) was formed in 1993 to promote collaboration between anthropologists and other scholars working in the Pacific Islands and organizations seeking sustainable alternatives to industrial logging and other socially and environmentally destructive forms of development in the Pacific.

CCPS has published a directory of scholars and scientists from North America, Europe, and the Pacific Islands who have accumulated extensive knowledge of the societies and cultures of the Pacific. Many of these scholars have already put their knowledge to use on behalf of conservation and sustainable development. All of them, however, wish to make their experience more readily available to those engaged in the important work of conserving the Pacific's natural resources for use by Pacific peoples.

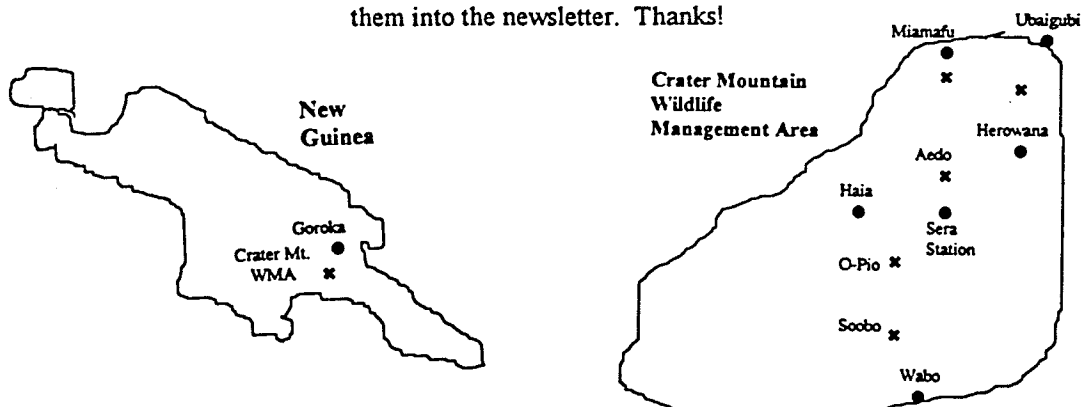
Conservation activists can use the directory to locate scholars who have conducted research in particular countries, provinces or local areas in the Pacific and are familiar with their societies and cultures. The directory also indicates topics on which individuals have special expertise, such as land issues, kinship or exchange systems. Those listed in the directory are willing to contribute their knowledge to legitimate conservation efforts, to the extent that their circumstances permit. They also can help activists locate other experts in relevant fields.

To obtain a copy of this directory, or for more information, please contact: Dr. Kathleen Barlow, Dept. of Anthropology, University of Minnesota, 215 Ford Hall, 220 Church St., SE, Minneapolis MN 55455, USA; fax: (1) 612-625-3095; email: "barlo001@maroon.tc.umn.edu"

## Research Stations



This section is for contributions describing research facilities in New Guinea. If you have information about a place where researchers are welcome to come and work, please send a summary. Include the location, altitude, available facilities, logistics of getting there, and a contact name, address and fax number. If you want to send some pictures too, we can scan them into the newsletter. Thanks!



### Crater Mountain Biological Research Station

from Deb Wright

The 26,000 ha Crater Mountain Wildlife Management Area (CMWMA) ranges in elevation from 100m to 3000m a.s.l. It encompasses parts of Simbu, Eastern Highlands, and Gulf Provinces. There are four villages near the outer boundaries of the WMA, all with grass airstrips for small planes (see maps above). Researchers could work in any of these villages (Miamafu--2000m, Herowana--1400m, Haia--700m, or Wabo--100m). Currently there are village houses that researchers can rent

for a small fee and local landowners that you can hire as guides/field assistants.

Additionally, the Sera Station was built in 1989, with funds from the Wildlife Conservation Society, between the villages of Haia and Herowana and is in relatively undisturbed rain forest (6.5 meters of rain annually). The 15 km marked trail system allows you to go from 800m to 1350m in elevation within a two hours walk from the station. Baseline work has been done on plants, birds, mammals, and

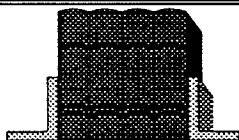
frogs at Sera and people are welcome to tap into this database. Within the next year we will have long-term bird and mammal marking projects up and running (there are already over 800 birds banded). Additionally, we should have a preliminary plant field guide for the CMWMA within a year with information on leaves, fruits, seeds, and flowers as well as phenology patterns and fruit nutrient analyses for many species (overstory and understory) (over 12,000 plants have been marked at Sera for phenology studies). There are 5 ha of plant plots at Sera with all plants  $\geq 10$  cm DBH marked, measured, and identified. There are additional permanent 1 ha plots at Aedo (1450m), O-Pio (550m), and Soobo (120m) (see map above). In Feb and March of 1998 we will be doing two more ha plots, one at 2000m and one at 2800m (see additional X markings on map).

The Sera Station (at 1000m) is a 16X12 meter building on 2.4 meter stilts with a large verandah overlooking a wooded gorge. Over half of the recorded 170 bird species at Sera have been seen from this verandah (Emu 92:246-247 and Emu 96:89-101). It has two bedrooms, a large workroom and kitchen area and another work area that has desk counters along three walls. It also has a storeroom for supplies and a dry box for drying specimens and electronic gear. The station has lots of field gear (triple-beam balance, telemetry equipment, mist-nets and traps, dissecting scope, etc.). This year we hope to purchase a moisture-proof computer and printer for research visitors to use. The station currently has a petrol generator that we should be replacing this year. It also has 5 solar panels for energy. There is a helipad for quick evacuation in case of

emergencies. There is a radio for communication with the helicopter company; the peacecorp workers and village coordinators at Miamafu, Herowana and Haia; MAF (the small plane operator); and the Research and Conservation Foundation of PNG offices at Pt. Moresby and Goroka. Pay rates for house rentals, field assistants, supply carriers, and land fees are set by the management committee each year (with representatives from all land-owning groups in the WMA) and are not allowed to change within the year. There is a researcher booklet that includes these pay rates and other needed information about working in the WMA. In addition to the main building, there is a 6X4 meter cottage with bed and counters and a large building to house local assistants.

To get to the villages you simply fly on MAF from Goroka (roughly K60 with 16 kg of cargo, K300 to charter a plane with 400 kg). To get to the Sera Station you fly to Haia on MAF from Goroka, then you hike 8-15 hours (depending on your condition, and you can overnight half way if you wish) to the Station. If you hire porters for your cargo to get it from Haia to Sera, it will cost about K14 for each 20 kg (this includes food for the carriers). Or you can helicopter directly to the station from Goroka (about K1000 with 400 kg).

There are research opportunities galore here. If you are interested in coming to work at Crater, please contact the Crater Mountain ICAD Project at P.O. Box 1261, Goroka EHP, Papua New Guinea, email "10355.2621@compuserve.com", phone and fax (675) 732-3211.



## Available Publications

If you know about any books we should know about, please send the details!

### From the Division of Botany, Office of Forests, Lae, PNG:

Womersley, J. S. 1976. Plant Collecting for Anthropologists, Geographers, and Ecologists in Papua New Guinea. Botany Bulletin No. 2. Office of Forests, Lae.

### From the Papua New Guinea National Museum, P.O. Box 5560, Boroko NCD, Papua New Guinea or Robert Brown and Associates (Qld) Pty Ltd, P.O. Box 1299, Coorparoo DC, Queensland 4151, Australia:

Swadling, P., R. Wagner, and B. Laba. 1996. Plumes from Paradise: Trade cycles in outer Southeast Asia and their impact on New Guinea and nearby islands until 1920. PNG National Museum, PNG and Robert Brown & Associates (Qld) Pty Ltd, Australia.

### From the Bishop Museum Press, P.O. Box 19000-A, Honolulu Hawaii 96817, USA:

Parsons, Michael. 1992. Butterflies of the Bulolo-Wau Valley. Handbook No. 12 of the Wau Ecology Institute. US\$24.95 plus US\$2 for shipping and handling.

### From AID/WATCH:

A new AID/WATCH publication entitled "People and Power in Papua New Guinea" is available.

It covers:

- the World Bank/IMF structural adjustment program
- impact of overseas development agencies on health, education, and poverty alleviation
- forestry issues, mining, and Australian investments
- land registration, corruption and big men

To order a copy, send AUS\$12.50 plus \$2.50 shipping (extra \$5 for outside Australia), via credit card or check to AID/WATCH to: AID/WATCH, P.O. Box 652, Woollahra, NSW 2025, Australia, phone: (61) 2-264-6090, fax: (61) 2-264-6092, email: lee@peg.apc.org

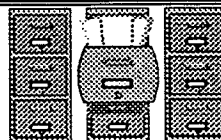
From IIED, 3 Endsleigh Street, London WC1H 0DD, UK, fax: (44) 171-388-2826:

NGOs in the Forest: participation of NGOs in National Forestry Action Programmes: new experience in Papua New Guinea. by James Mayers and Basil Peutalo

IIED Forestry and Land Use series No. 8. 1995. Price £5.00.

**Summary:** This publication reviews the current context of national forestry planning and NGO participation, and describes how the latter may be facilitated. It draws particularly on experience of NGO participation in the PNG National Forestry and Conservation Action Programme, looking at the potential and actual roles of NGOs in the NFCAP process.

## Scientific Literature



This issue we are including additional references sent in by contributors (thank you!). If you haven't sent your publication list in yet, please send all your citations to Deb as soon as possible so we can cite your work! It doesn't matter if you have one paper, or 30 papers-- the rest of us want to know about it! We would really like to know what you have found out about New Guinea. If you have more than one page of citations, please send your list on disk (preferably Word) if possible-- thanks! In addition, don't forget that we offer a reference-finding service for those of us without inter-library loan. If you need a particular reference and cannot find it or do not have access to it, please write and we will see if we can't find it for you and send it to you. (Not just the citations in the newsletter, you can request any citation).

### Pat Woolley-- Publications on New Guinea mammals:

- Woolley, P.A., and A. Allison. 1982. Observations on the feeding and reproductive status of captive Feather-tailed possums, *Distoechurus pennatus* (Marsupialia: Burramyidae). *Australian Mammalogy* 5:285-287.
- Westerman, M., A.H. Sinclair, and P.A. Woolley. 1984. Cytology of the Feather-tailed Possum, *Distoechurus pennatus*. Pp. 423-425 in A. Smith and I. Hume (eds.), *Possums and Gliders*. Australian Mammal Society, Sydney.
- Woolley, P.A. 1989. Nest location by spool-and-line tracking of dasyurid marsupials in New Guinea. *Journal of Zoology, London* 218:689-700.
- Westerman, M., and P.A. Woolley. 1990. Cytogenetics of some New Guinean dasyurids and genome evolution in the Dasyuridae (Marsupialia). *Australian Journal of Zoology* 37:521-531.
- Woolley, P.A., S.A. Raftopoulos, G.J. Coleman, and S.M. Armstrong. 1991. A comparative study of the circadian activity patterns of two New Guinean dasyurid marsupials, *Phascosorex dorsalis* and *Antechinus habbema*. *Australian Journal of Zoology* 39:661-671.
- Woolley, P.A., and A. Valente. 1992. Hair structure of the dasyurid marsupials of New Guinea. *Science in New Guinea* 18:29-49.
- Jackson, K.L., and P.A. Woolley. 1993. The diet of five species of New Guinean rodents. *Science in New Guinea* 19:100-108.
- Alpin, K.P., and P.A. Woolley. 1993. Notes on the distribution and reproduction of the Papuan Bandicoot *Microperoryctes papuensis* (Peroryctidae, Peramelomorpha). *Science in New Guinea* 19:109-112.
- Woolley, P.A. 1993. Collection and laboratory maintenance of New Guinean dasyurid marsupials. Pp. 91-97 in M. Roberts, J. Carnio, G. Crawshaw, and M. Hutchins (eds.), *The Biology and Management of Australasian Carnivorous Marsupials*. American Association of Zoological Parks and Aquariums Monotreme and Marsupial Taxon Advisory Group, Washington D. C.
- Westerman, M., and P.A. Woolley. 1993. Chromosomes and the evolution of dasyurid marsupials: an overview. *Science in New Guinea* 19:123-130.
- Woolley, P.A. 1994. The dasyurid marsupials of New Guinea: use of museum specimens to assess seasonality of breeding. *Science in New Guinea* 20:49-55.
- Woolley, P.A., and A. Allison. 1995. Reproduction in *Pipistrellus papuanus* (Chiroptera: Vespertilionidae) in Wau, Papua New Guinea. *Science in New Guinea* 21:131-138.
- Woolley, P.A., and C.B. Furby. 1995. Laboratory observations on the reproductive biology of *Rattus (Stenomys) verecundus* and *Pogonomys sylvestris*, murid rodents from New Guinea. *Science in New Guinea* 21:115-122.
- Krajewski, C., L. Buckley, P.A. Woolley, and M. Westerman. 1996. Phylogenetic analysis of cytochrome b sequences in the dasyurid marsupial subfamily Phascogalinae: systematics and the evolution of reproductive strategies. *Journal of Mammalian Evolution* 3:81-91.

### Popular magazine articles:

- Feather-tailed possums. 1984. Paradise no. 47, Air Niugini.
- Life at Bensbach. 1986. Paradise no. 56, Air Niugini.
- Animals from Agaun. 1987. Paradise no. 63, Air Niugini.
- Wildlife over the border. 1990. Paradise no. 78, Air Niugini.

**Clifford B. Frith and Dawn W. Frith— Publications on New Guinea birds**

**(Our apologies if authors are in mixed order)**

- Frith, C.B. 1968. Some displays of Queen Carola's Parotia. *Avicultural Magazine* 74:85-90.
- Frith, C.B. 1970. Sympatry of *Amblyornis subalaris* and *A. macgregoriae* in New Guinea. *Emu* 70:196-197.
- Frith, C.B. 1970. The nest and nesting of the Short-tailed Paradigalla *Paradigalla brevicauda* (Paradisaeidae). *Bulletin of the British Ornithologists' Club* 90:122-124.
- Frith, C.B., and C.J.O. Harrison. 1970. Nests and eggs of some New Guinea birds. *Emu* 70:173-178.
- Frith, C.B. 1971. Some undescribed nests and eggs of some New Guinea birds. *Bulletin of the British Ornithologists' Club* 91:46-49.
- Frith, C.B. 1971. Nidification of some New Guinea birds. *Bulletin of the British Ornithologists' Club* 91:164-165.
- Frith, C.B. 1974. Observations on Wilson's Bird of Paradise. *Avicultural Magazine* 80:207-212.
- Frith, C.B. 1976. Displays of the Red Bird of Paradise *Paradisaea rubra* and their significance, with discussion on displays and systematics of other Paradisaeidae. *Emu* 76:69-78.
- Frith, C.B., and D. Coles. 1976. Additional notes and displays of Queen Carola's Bird of Paradise. *Avicultural Magazine* 82:52-53.
- Frith, C.B. 1977. Some birds of paradise skins in a Singapore collection. *New Guinea Bird Society Newsletter* 128:8-9.
- Frith, C.B. 1979. An annotated bibliography to the ornithological literature of the Papuan Subregion 1915-1976. *Bulletin of the American Museum of Natural History* 164:379-465.
- Frith, C.B., and K.D. Bishop. 1979. A small collection of bird of paradise eggs (Paradisaeidae) at Baiyer River Sanctuary, Papua New Guinea. *Emu* 79:140-141.
- Frith, C.B., and D.W. Frith. 1979. Leaf eating by birds of paradise and bowerbirds. *Sunbird* 10:21-23.
- Frith, C.B. 1981. The displays of Count Raggi's Bird of Paradise, *Paradisaea raggiana*, with observations on those of congeneric species. *Emu* 81:193-201.
- Frith, C.B., and D.W. Frith. 1981. Displays of Lawes' Six-wired Bird of Paradise, *Parotia lawesi*, with reference to those of congeneric species. *Emu* 81:227-238.
- Frith, C.B., R. Donaghey, and A. Lill. 1985. Bowerbirds. In B. Campbell and E. Lack (eds.), *A New Dictionary of Birds*. T.&A.D. Poyser, Calton.
- Frith, C.B. 1987. An undescribed plumage of Loria's Bird of Paradise *Loria loria*. *Bulletin of the British Ornithologists' Club* 107:177-180.
- Frith, C.B. 1987. Fawn-breasted Bowerbird *Chlamydera cerviniventris* on the Lai River, Jimi Valley, Western Highlands Province, Papua New Guinea. *Muruk* 2:63.
- Frith, C.B., and D.W. Frith. 1987. The Logrunner, *Orthonyx temminckii* (Orthonychidae), at Tari Gap, Southern Highlands Province, Papua New Guinea. *Muruk* 2:61-62.
- Frith, C.B., and D.W. Frith. 1988. Nests and eggs of the Papuan Scrub-wren, *Sericornis papuensis*, (Acanthizidae) and the Grey-streaked Honeyeater, *Ptiloprora perstriata*, (Meliphagidae). *Australian Bird Watcher* 12:168-170.
- Frith, C.B., and D.W. Frith. 1988. Courtship and mating of the Superb Bird of Paradise *Lophorina superba*. *Emu* 88:183-188.
- Frith, C.B., and D.W. Frith. 1988. The Chestnut Forest-rail, *Rallina rubra* (Rallidae), at Tari Gap, Southern Highlands Province, Papua New Guinea, and its vocalizations. *Muruk* 3:48-50.
- Frith, C.B., and D.W. Frith. 1989. Discovery of the nests and eggs of Archbold's Bowerbird *Archboldia papuensis* (Ptilonorhynchidae). *Australian Bird Watcher* 12:251-257.
- Frith, C.B., and C.J.O. Harrison. 1989. An undescribed plumage in the Crested Bird of Paradise *Cnemophilus macgregoriae*. *Bulletin of the British Ornithologists' Club* 109:137-140.
- Frith, C.B., and D.W. Frith. 1989. Miscellaneous notes on the bowerbirds *Chlamydera cerviniventris* and *C. lauterbachii* (Ptilonorhynchidae) in Papua New Guinea. *Australian Bird Watcher* 13:6-19.
- Frith, C.B., and D.W. Frith. 1990. Nesting biology and relationships of the Lesser Melampitta *Melampitta lugubris* (Paradisaeidae). *Emu* 90:65-73.
- Frith, C.B., and D.W. Frith. 1990. Archbold's Bowerbird *Archboldia papuensis* (Ptilonorhynchidae) uses plumes from King of Saxony Bird of Paradise *Pteridophora alberti* (Paradisaeidae) as bower decoration. *Emu* 90:136-137.
- Frith, C.B., and D.W. Frith. 1990. The nest of the Mountain Firetail *Oreostruthus fuliginosus* (Estrildidae) in Papua New Guinea. *Bulletin of the British Ornithologists' Club* 110:35-38.
- Frith, C.B., and D.W. Frith. 1990. Discovery of the King of Saxony Bird of Paradise *Pteridophora alberti* nest, egg and nestling with notes on parental care. *Bulletin of the British Ornithologists' Club* 110:160-164.
- Frith, C.B., and D.W. Frith. 1990. Nidification of the Chestnut Forest-rail *Rallina rubra* in Papua New Guinea. *Emu* 90:254-259.
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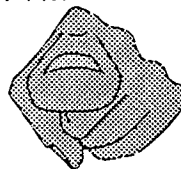
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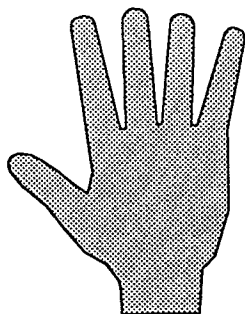


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## Our Current Mailing List

Included with this issue of the Digest, you will find a directory of all of the people we are mailing it to. We hope it will facilitate communication between all of us. Please help us by sending the names and addresses of anyone else who would like to get a copy of the Digest. Also, please check your address, phone, fax, and e-mail. If anything is wrong, please drop us a line so we can correct it. If you would rather not receive the newsletter, please let us know so we can save the paper and postage. Thanks!



**Goodbye until next time!**  
**Lukim yu bihain!**  
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