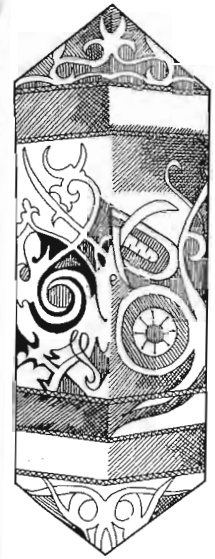
BORNEO RESEARCH BULLETIN

Vol. 15, No. 1 April, 198



The Borneo Research Bulletin is published twice yearly (April a September) by the Borneo Research Council. Please address inquiries and contributions for publication to Vinson H. Sutlive, J Editor, Borneo Research Bulletin, Department of Anthropolog College of William and Mary, Williamsburg, Virginia 23185, U.S. Single issues are available at US$2.50.

NOTES FROM THE EDITOR

Meetings organized by the Borneo Research Council during the recent Annual Meeting of the American Anthropological Association were unusually productive. The papers presented in the session on "Recent Research in Borneo" were of high quality and were well received. Four are printed in this issue, and the other three will be published in September. At the Council's business meeting, held later the same day, several interesting and important proposals were approved for circulation to other fellows and subscribers.

First, we agreed to poll all readers about alternating our meetings between the annual meetings of the American Anthropological Association and the Association for Asian Studies. Alternating meetings would permit participation by persons interested in Borneo other than those who attend the AAA meetings. A form for registration of your opinion is enclosed.

Second, we approved inauguration of a series of Working (Occasional) Papers for publication of articles longer than 10 pages. This would provide for dissemination of research materials upon demand and establish a maximum length for articles to be included in the Bulletin. By agreement of authors and the Editor, working papers will be edited and processed but reproduced (xeroxed) only by special order. Working papers will be announced in the Bulletin as they are accepted and available.

Third, a suggestion was made that persons interested in agricultural systems of Borneo contribute to a comparative volume of case studies. This suggestion was made after the Organized Session during which the obvious diversity of such systems was made even more apparent. Persons interested in contributing to such a volume are encouraged to write to the Editor.

Beyond the meetings, a suggestion has been received that we devote a special issue of the Bulletin to the work and contributions of Borneo's indigenous scholars. To this end, we invite submission of names, addresses, and activities for preparation and eventual publication.

We are sincerely grateful to the following persons for their contributions to the work of the Council: J. B. Avé, Stanley Bedlington, D. E. Brown, Michael Dove, Richard Allen Drake and Doris Drake, Wayne T. Frank, Mary Beth Fulcher, Philip Goldman, Sin Fong Han, John L. Landgraf, Virginia Matheson, Peter Metcalf, Rodney Needham, Robert Nicholl, Roger D. Peranio, Ifor B. Powell, Raymond Rudes, William M. Schneider, Richard Shutler, Jr., John O. Sutter, Joseph A. Weinstock, Herbert L. Whittier, and Patricia R. Whittier.

RESEARCH NOTES

Change and Indigenous Agroforestry in East Kalimantan

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East Kalimantan, a part of Indonesian Borneo, is a frontier province undergoing rapid change. Multinational timber and oil companies are actively involved in extracting the province's wealth; one of three government resettlement programs in conjunction with the military is attempting to influence the settlement patterns of the province's hinterland peoples; plans have been made (and are currently being negotiated) to move thousands of Government Transmigrant families from Java and Bali to the province.

This research was motivated by an interest in documenting the interaction between the people and the forest of East Kalimantan, in light of all these changes. A concern for the impact of these changes on women specifically, emerged as another important and heretofore neglected consideration. Dayak agroforestry practices--usually referred to as "shifting cultivation"--form a focus by which both of these changes can be analyzed.

In recent literature there has been a recognition that shifting cultivation takes many forms and that those forms can have different impacts on the forst (e.g., Grandstaff 1978; Kunstadter, Chapman and Sabhasri 1978; Pelzer 1978; and others). The following analysis focuses on the important differences in the Kenyah agroforestry system (or, shifting cultivation) as it is practiced in the remote Apo Kayan (Long Ampung; see figure A, small triangles) and in the more accessible lowland region of the Telen River (Long Segar). The most significant differences--discussed below--fall into three categories: environmental, technological, and commercial.

In many ways, assessment of the human impact on the forests of Kalimantan is reminiscent of a dilemma identified by Solzhenitsyn:

> If only there were evil people somewhere insidiously committing evil deeds, and it were necessary only to separate them from the rest of us and destroy them. But the line dividing good and evil cuts through the heart of every human being. And who is willing to destroy a piece of his own heart.

The creativity that allows people to improve their quality of life, the responsiveness to changing circumstances that allows people to make adjustments necessary to survival, are the flip-side of the coin that results in widespread destruction of the forests (as well as other portions of the environment).

In the following discussion I hope to use the changes that the people of Long Segar (the primary study village) have made in their way of life, in response to their changed circumstances[1] --particularly environmental, technological, and commercial--to demonstrate how the destructive and the creative are welded together in the human capacity to think, invent, react in ways that are perceived as beneficial to those who comprise the significant members of one's world. In development and environmental circles rural peoples in general are often seen as hidebound traditionalists, and shifting cultivators in particular are believed to engage in rampant, uncaring destruction of their environment. I hope, in the following analysis, to show the creativity and opportunism that result both in demonstrable environmental damage, and in real improvement in their current quality of life.

The Research Sites

Most of the research on which this analysis is based was conducted in Long Segar, East Kalimantan, where I lived and worked from October 1979 thru August 1980. The comparative data from Long Ampung were collected in May and June 1980. Long Segar is a Christian, Uma' Jalan Kenyah (Dayak) village, located approximately 142 air kilometers from the provincial capital, Samarinda. The village was gradually settled by the present inhabitants who moved on their own initiative from Long Ampung between 1963 and 1972. In 1972, Long Segar, Kernyanyan and Long Noran (neighboring Kutai and Uma' Kulit Kenyah villages, respectively) became a formal government-sponsored Resettlement Project; and since that time they have received a variety of kinds of assistance (e.g., housebuilding and agricultural tools, seeds and seedlings, extension efforts, and agricultural machinery).

Long Segar had a de facto population of 1,052 inhabitants in June 1980, almost all of whom gain their livelihoods by means of shifting cultivation. This is supplemented in some cases by wage labor, sale of agroforestry products, and cottage industry. The village is situated within an American-based, multi-national timber concession, near a German aid-sponsored plantation pilot project, and is accessible by plane (one-half hour), speedboat (nine hours,), and longboat (36-48 hours) from Samarinda.

Long Ampung (the home village of Long Segar's residents), with a de facto population of 486 (census: June, 1980) is located near the Malaysian border. At present it is not accessible by air or water, and requires a day's fast walk from the nearest airstrip. Consumer goods, particularly salt, cloth, tobacco, sugar, beads, kerosene and cooking pots, are carried in on men's backs for the most part; though occasionally supplies are dropped by the Government from low-flying planes. Kenyah men have a long tradition of undertaking expeditions to Malaysia and other more distant places to procure such goods (Colfer 1982a). With the above exception the community is self sufficient. As in Long Segar, shifting cultivation forms the economic base, with rice as the staple food, supplemented by vegetables from gardens and forest produce.

On Situational Analysis

This research was undertaken within a conceptual framework[2] derived from the expanding body of literature substantiating the notion that people's behavior and beliefs are mutable and responsive to changing external conditions. We considered this perspective to be particularly appropriate in a frontier environment like East Kalimantan, where human creativity and adaptability were so much in evidence.

Within our overall concern to address "problems" or policy-relevant issues, we selected specific human actions as our focal point for research. We then investigated all factors (insofar as possible) that had an impact on or were affected by that action. In this way, with the problematic human action at the center, we were able to trace the significant components or factors outward, and develop an understanding of the complex, intertwining, mutually affecting influences and impacts that comprised the context for that action. This approach is consistent with the study of situations advocated by the philosopher, Karl Popper (1972). Our approach provides a useful technique whereby the holistic advantages of ethnographic research, with its recognition and description of the complexities of interacting causes and effects characterizing social behavior, can be maintained at the same time that the focus required by policymakers can be achieved.

One problematic human action that served as a core for this study was cutting down the forest. An important divergence from traditional anthropological methods must be reiterated here: The community of Long Segar was not the boundary for the unit of study in this research. It was, rather, an entry point from which the action of cutting down the forest could be viewed and better understood. People, including those who cut down forests, live in communities, and identification of the factors that influence these actors requires a thorough understanding of the social context in which they operate. Participant observation was therefore my most basic research tool.

The situational approach required that I pursue factors and influences outside the community whenever these seemed relevant. In an effort to understand why people cut ironwood to make lumber, for instance, I had to investigate the Indonesian Government's rulings on such harvesting, the customary actions of timber companies from whose concessions such timber was cut, and the price paid for such products in Samarinda, as well as the more typical kinds of information that might be collected in a standard ethnographic study (e.g., the feasibility of such endeavors given time allocation requirements of traditional agricultural practices; values and beliefs about the forest and its products; local availability of chainsaws, gasoline, and other technological aids; and so on).

As my understanding of the critical factors relating to forest cutting activity improved, I was able to devise more specific studies to quantify behavior and beliefs that had impacts on this action. Specifically I

completed a study of land use since resettlement, a time allocation study (Colfer 1981a), a study of female decisionmaking and male migration in the two communities (Colfer 1982a), a demographic study of the two communities, and a study of inter-generational change in forest-related cognitive mapping and attitudes (Colfer 1981b; 1982b). The results reported in this paper are based on participant observation, the time allocation study, the study of cognition (Galileo), and some preliminary analysis of the other studies mentioned.

The Kenyah as Agroforesters

The forest cutting activities of Uma' Jalan Kenyah in Long Segar are related principally to their dependence on agroforestry[3] as an economic base. The following discussion of agroforestry as it is practiced in the two Kenyah communities, Long Ampung and Long Segar, focuses on change,[4] in an attempt to shed light on the important factors that are relevant to policymakers.

The most obvious reason that Kenyah consistently cut down the forest is to make dry rice fields. Rice forms the basis of their subsistence, and other economic activities are seen as supplementary. Kenyah call themselves farmers (petani), considering this important in distinguishing themselves from those forest dwelling peoples such as the Punan who do not cultivate rice (gaining subsistence by hunting and gathering) and whom the Kenyah consider inferior. Rice cultivation has also traditionally been an important symbol of women's roles. Where boys are desired because they go on expeditions, girls are preferred because they diligently make ricefields. The comparatively high status of Kenyah women implied by their responsibility for a sphere of life deemed so important (i.e., rice) is obvious in daily life (Colfer 1982).

But the facts that the Kenyah cut down the forests to make ricefields and attribute primary importance to those ricefields have obscured the importance of Kenyah use of those fields after the rice has been harvested. Kenyah dependence on the forest, at varying stages of regeneration, for both animal and plant food, for other minor forest products, and for timber, has been underestimated; and justifies considering their economic system to be based on agroforestry rather than agriculture alone. This perspective will be amplified in the following pages.

Environmental Differences

Flying northwest from the lowland Long Segar region to the Apo Kayan, environmental differences are striking. The flat landscape with occasional communities visible along the rivers, and the patchwork effect of fields, secondary and primary forest areas, give way to mountainous terrain, covered by primary forests with few indications of human habitation.

Long Ampung (1°42'N, 114°51'E) is located on the Kayan River, between Long Sungai Barang (25 km east, upriver) and Long Nawang (25 km north, downriver), both of which have airstrips which are served at irregular and unpredictable intervals by Mission Aviation Fellowship (MAF) planes. The downstream canoe trip to Long Nawang is a mere three hours; but the journey is dangerous due to rapids, and returning is an arduous eight hours, mostly poling. Between Long Ampung and Long Sungai Barang, the Kayan River is impassible because of the rapids; but Kenyah can make the trip on foot in one day.

The people of Long Ampung have lived in their current site since approximately 1918, moving from a site about half-an-hour downstream (Long Anye) where people still go to harvest fruit trees and collect minor forest products such as bamboo. This comparatively stable residence is contrary to prevalent stereotypes about shifting cultivators, but is congruent with the patterns of other groups in the region. Before people began moving away in the early 1960s, in search of trade goods, schooling and medical care, Long Ampung supported a sizable population.[5] Related to the length of residence and the recent population size, all the forest in the area around Long Ampung is owned secondary growth. The one exception is a small plot of primary forest in soil that is considered inferior, and which is preserved to provide timbers for house construction and other such uses (see Jessup 1980b:1, on a similar plot in Long Sungai Barang).

Although detailed soil analyses are not yet available for the area, we do have indications that soil in Long Ampung is better than in Long Segar. The people of Long Segar habitually remark on this when comparing their agricultural endeavors in the two locations. This opinion was substantiated by the field observations of Kuswata Kartawinata and Herwasono Soedjito (Director and researcher, respectively, Herbarium Bogoriense). Kartawinata, in describing the Long Sungai Barang situation, notes "...a variety of soils, ranging from 'black', brownish yellow, yellow to 'white' soils." (1980:2). He elaborated that the Apo Kayan is characterized by small pockets of many different kinds of soil, including volcanic (personal communication, June 25, 1980). Probably related to the greater fertility of the soil, the forest regeneration process is speedier in the Apo Kayan area, taking five to ten years, rather than 10-15 years as in Long Segar, before a field is reusable for dry rice cultivation, in spite of the altitudinal differences (Table 1) that would lead one to expect the reverse.

Topographically, the Long Ampung area is characterized by steep hills and narrow valleys, with many rushing rivers and streams. The land is fragmented by these rivers, precluding the large expanses of field that are so detrimental to forest regeneration; and the presence of rocks, boulders, and small cliffs further interferes with the clearing of wide expanses. The rivers are fast, clear, and full of small rapids and waterfalls.

The main hazards to crops in Long Ampung are the animals that inhabit the surrounding forests: monkeys, bears, deer, birds, and mice.

Because of the quantity and persistence of these pests, fencing fields is usually necessary. The presence of animal pests and the resulting necessity to fence are two factors that encourage people to locate their fields in close proximity to one another. One person can guard a group of fields as easily as one field; and the mere presence of more people inhibits the animals to some degree. Additionally the amount of fence construction per family is reduced when fields are clustered together. Fencing, like the felling of large trees, is one of the agricultural tasks customarily performed by men.

With regard to fence construction, it is worth noting that people from different villages cooperate to minimize the amount of fencing necessary. One of the most distant field groupings (Sungai Lesong, 2 hours upriver from Long Ampung) included 17 fields within one fence. Within that fenced area were three distinct sub-areas, separated by small patches of forest, and belonging respectively to two longhouses from Long Ampung[6] and one from Long Uro' (a Lepo' Tau Kenyah village half a day's journey upriver from Long Ampung). Individual fields tend to include mixed topography, with areas of steep slope as well as flatland. There are frequently small patches of trees here and there in a field--along small streams, in stony areas unsuitable for cultivation, or near prized fruit trees. The small size of field groupings combined with the frequent presence of stands of trees within the field proper are helpful in the forest regeneration process.

In the move to Long Segar, a variety of adjustments was made in response to environmental differences. Long Segar is located on a major river, the Telen, which offers only one significant and occasional barrier (the rapids one hour downstream) to access to Samarinda. The Uma' Jalan moved to Long Segar from Long Ampung in a gradual procession beginning in 1963, and terminating in 1972 when Long Segar became the center of a government Resettlement Project (Respen).

Prior to the Uma' Jalan arrival, there had been a small settlement of a few Kutai people (the nucleus of a Muslim community now called Kernyanyan directly adjacent to Long Segar) in the immediate vicinity; and land histories of all Long Segar households provide only occasional reference to prior use of land by Bahau people. The availability of land was one of the reasons the Uma' Jalan chose this site. Uma' Jalan men and women, scouting for a village site closer to commercial centers, originally heard of this area from the current village headman's son who was married to a Kayan woman from upriver (Kayan Melah), near the confluence of the Marah and the Telen Rivers. The scouts were welcomed by neighboring villages and encouraged to settle in the area. This, combined with the prevalence of primary forest, attests to the lack of population pressure on the land in the recent past.

Since 1969, this area has been part of an American timber concession. But, because the region near Long Segar has been determined to be forested with "nonmerchantable timber" i.e., insufficient quantities

of the export species, notably meranti and kapur), the people of Long Segar have had a relatively free hand in their use of the forest.

The people of Long Segar, in contrast to some other shifting cultivators of Kalimantan (Vayda 1961; Dove 1978; Jessup 1980a; as well as many members of the neighboring Kutai community), prefer making their fields in primary forest if at all possible. Indeed, the people of Long Ampung expressed this preference too, but could not act on it because of lack of primary forest available to them. In line with this expressed preference, almost all fields made by Long Segar residents since resettlement have been in primary forest[7] (totalling an estimated 11,600 ha between 1963 and 1980, Azier 1980). Of the 1979-80 fields, 82 percent were in primary forest. Long Segar residents who make fields in secondary forest or who reuse a field a second year, usually do so because of a shortage of men during the felling season (due to absence or illness), or in recent years, to minimize traveling distances to their fields.

An analysis of the soils and other climatic factors 30 kilometers upriver from Long Segar has recently been completed (LEAP 1980), supporting the less formal observations of botanists and soils specialists who have visited Long Segar. Typical soils in the area (an area not marked by soil diversity) are deep loams, of low fertility. The areas along the rivers are somewhat more fertile, due to alluvial deposits; but no soils in the region were rated as more than "marginally suitable for continuous dryland arable farming, due to the inherently low soil fertility" (1980:25).

Topographically the area is flat compared to Long Ampung. Slopes of 0-8° are "common," with slopes of 15-25° "more rare" (LEAP 1980:27). The gently undulating nature of much of the land in the area means that large groups of families can make their fields adjacent to one another. The 1980 harvest included one grouping of 67 adjacent families (an estimated 160 ha), with none of the clusters of trees within the fields so often observed in the Long Ampung area. Forest regeneration under such circumstances should require much longer than in the smaller, tree-studded clusters of fields.

Annual rainfall in the area is 2,345 ± 629 mm, with no months with mean average rainfall less than 125 mm (records from 1929-80, Muara Wahau). The combination of flatland along the rivers and high rainfall are contributing factors in the frequency of flooding in the area.[8]

The Telen River, on which Long Segar is located, is a broad, winding river, full of silt. The resulting brown muddy appearance contrasts sharply with the crystal clear waters of the Kayan and other rivers near Long Ampung. Richard Bower, soils specialist and regional planner with Transmigration Area Development, a German-Indonesian development project in East Kalimantan, has observed that the rivers whose headwaters included heavily logged regions (like the Telen at Long Segar) were markedly muddier in appearance than rivers coming from unlogged areas (personal communication, July, 1980). Loss of soil due to runoff and

erosion are legitimate concerns because 1) the rains fall on denuded[9] forest land with high intensity, washing away the fragile topsoil, and 2) the rivers' flooding periodically removes soil from along its banks in huge landslides. With the increasing human activity planned in this region--continued logging activity and increasing local populations (through spontaneous and Government Resettlement and Transmigration efforts) that will inevitably further disturb the forest--loss of soil may become an important problem.

The frequency of flooding in the river valleys combined with the greater fertility of land there have persuaded many Long Segar residents to make one field in a lowland area subject to possible flooding and another in a hilly region some distance from the river. Of the 1979-80 fields, only three percent included mixed topography, compared to 29 percent of Long Ampung's 1979-80 ricefields. The fact that droughts have greater negative impacts on harvests in the hilly regions further encourages people to adopt this two-pronged approach if their human resources permit it. In Long Ampung many households have two fields, but their fields include a large one some distance from the village and a small one close by for easy access. Droughts and floods are not significant problems in the Apo Kayan, and need not enter into agroforestry decisionmaking.

The comparative scarcity of bothersome forest animals in the Long Segar area also obviates the necessity to fence fields. The presence of the numerous people who populate large clusters of ricefields is sufficient to keep the animal nuisances (and food source) to a minimum.

A summary of the major environmental differences is presented in Table I below.

Adoption of New Technology

Numerous changes, of course, have occurred with the people's move from Long Ampung to Long Segar (see Table II for a partial listing), but the adoption of three technological innovations has had profound impact, both on the people's forest-clearing activity and, in the case of two of those innovations, on the relative autonomy of women. The three important technological innovations are the outboard motor (or ces), the rice huller, and the chainsaw.

Technology, in Long Ampung is simple. Because of transportation difficulties, it is essentially impossible to utilize any kind of machine that is powered by an internal combusion engine. In 1980, gasoline cost Rp. 750/liter[10] and was rarely available, even if the money had been. Transportation, in most cases, consists of walking. Canoes are used where feasible, by both sexes, but the many rapids prevent their use in many instances. When things must be transported, men, women, and children use large back-baskets, woven from forest products.

Table I

A Summary of Environmental Differences

Long Ampung and Long Segar

Environmental Feature	Long Ampung	Long Segar
Soil	more fertile	less fertile
Topography	hilly, segmented	flat, rolling
Floods	rare	frequent
Forest	secondary	primary
Altitude	800 m a.s.l.*	40 m a.s.l.*
Temperatures	cool**	hot**
Agricultural hazards	animal pests	floods, droughts

*Long Sungai Barang is 800 (meters above sea level); Muara Wahau is 40 m a.s.l.

**Monthly mean temperatures at Samarinda are 25-26°C with mean maxima of 30-32°C and mean minima of 18-20°C. Temperatures at Long Segar are likely to be a bit warmer as it is farther inland (LEAP 1980:8). Temperatures at Long Ampung are definitely cooler: fires are lit for warmth in early morning.

Table II

ACCESS TO SELECTED FOREST PRODUCTS
Long Ampung and Long Segar

Product	Long Ampung	Long Segar
sang (Licuala) - sunhats	-	+
bamboo - construction, baskets	++	+
Tepo (?) - mats, food	++	+
pandanus - mats	++	+
rattan (seka) - baskets, tying	-	++
nanga (Eugeissona - roofs, walls)	+	--
tika (Cyperus haspans) - mats	+	--
pineapple	++	+
ironwood - construction, papper poles	-	++
meranti - construction, sale	-	++
firewood	++	++
tat (CRA Toxylon clandestimum) - shingles, house construction	++	++
sip (Stachyphrynium jagorianum) - roofing	+	--
damar - lighting, caulking	-	-
edible ferns (e.g., Stenochlaena palustris, Diplazium)	++	+

Key: --: none, -: far, +: exists, ++: abundant

A very time-consuming activity in Long Ampung is the hulling of rice, which is done with a large wooden mortar and pestle every afternoon on the verandah of the longhouses. The rhythmic sound of the pounding marks a time of day (3-5 P.M.) in Long Ampung conservation. Everyone pounds rice, though women tend to spend more time at it than men.

The felling of trees, which must be done every year in the preparation of a ricefield and also whenever lumber is needed for other purposes, is done with an axe or the large knife that Kenyah men and women carry everywhere, slung at the hip. Everyone participates in forest clearing, but the large trees are felled by men. In general, the work of the Long Ampung Kenyah is arduous, with human energy providing for most human needs.

In Long Segar, access to the three technological innovations mentioned above--the ces, the rice huller, and the chainsaw--has made an important difference in the return on human labor expended. Life is easier.

The outboard motor, or ces, is an unusual variety: a glorified lawnmower motor with a 2-1/2 m shaft which extends horizontally out behind the canoe. The driver can control the depth of the propeller and shaft and the direction of the craft, by manipulating a handle which extends forward from the body of the engine. It is an ideal craft for river travel, as the rivers are strewn with floating wood and other litter which are a constant menace with more conventional engines. In July 1980, the cost of gasoline in Long Segar was Rp 250/liter. A generous estimate of the total cost of operating a ces (including cost of engine (Rp. 150,000 - Rp. 195,000), gasoline, oil, replacement parts) was Rp. 600/hour.[11]

The ces came to Long Segar in 1977, and apparently "caught on like wildfire." By February 1980 only 26 percent of Long Segar's households were without a ces. Primarily used for going to ricefields, it also facilitates visiting friends and relatives in other villages, seeking medical care, and marketing produce in the nearby timber camps. Elders are already complaining that the younger generation does not understand the "theory" of paddling canoes.

That the ces has made Long Segar life easier can hardly be denied; paddling (or worse yet, poling) upstream is no joyride, if it must be done as a regular part of life. The ces' widespread use in the area is too new to assess its direct influence on the environment--most notably the river. It may, in the long run, adversely affect the fish supply, which as yet is still abundant.

The indirect effects, in the form of releasing human energy for more extensive utilization of the forest, are more obvious. The ces grants people access to much wider territories than they could effectively use before. So they can go farther, and they have more time once they get there. The impact of these facts on the forest will become clearer when the commercial factors are discussed below.

Though all people in Long Segar appreciate access to the ces and the time it saves them, the advantages to the women must be weighed against a potentially very important loss: their comparative autonomy. Kenyah women, long used to managing without their men from time to time, customarily decide how they will spend their days. They are active in agroforestry decision-making, and other people rarely tell them what to do. Without the ces women and men were equally mobile, within the vicinity of the village and the ricefields. But one trait of the ces--its weight--represents a serious constraint for women when they would like to go forth alone. A seemingly inconsequential characteristic of a machine has the potential for seriously eroding one aspect of female autonomy (which is generally considered to be an important component of high female status overall).

The gasoline engine-driven rice huller is another innovation that was eagerly seized by Long Segar's people. Where in the past they had to spend perhaps two person-hours per day per household pounding rice, now enough for a week can be hulled in a very short time. The cost is one kilo of hulled rice from every kaleng[12] of machine-hulled rice. One kilo of hulled rice cost Rp. 200 in July 1980, three months after the end of harvest. The blistered hands and aching backs that characterize the hand hulling process in the minds of Long Segar residents are attested to by observations in Long Ampung where the gruelling work is still a daily necessity. The people recognize that machine hulling wastes more rice, and in times of shortage a few people reported hand hulling their rice. There is no general awareness yet that the nutritional contents of machine-hulled rice are less than in hand-hulled rice.[13] There are four rice hullers in Long Segar, two of which were operating regularly in 1979-80. All rice is hulled by machine. The impact of this most welcome technological innovation on the forest again is indirect, in the form of freed human energy. The time spent hulling rice can now be spent in other activities. The Kenyah value hard work and industry; and are most likely to utilize their free time in other economic pursuits. Further harvesting of the forest around Long Segar is an extremely probable direction for this added human energy to take.

The severe labor displacement that resulted from the introduction of rice hullers on Java, specifically for women, (Collier and Soentoro 1978; Safilios-Rothschild 1980, Cain 1981) has not occurred among the Kenyah. Displacement of women from sources of cash income is the problem in Java; in Kalimantan these women were never dependent on a cash income, both men and women traditionally hulled rice, and surplus labor is not a problem.

The chainsaw, with its obvious and direct impacts on the forest, came to Long Segar in 1975. It is among the most valued of potential belongings, costing Rp. 400,000. In 1980, 28 percent of the households in Long Segar had a chainsaw, and the percentage has been increasing. The chainsaw can be used both in the traditional forest-clearing activities connected with the dry rice cycle (making a considerable difference in the

amount of time required to clear a field[14]) and to make money. The fact that Long Segar ricefields are almost all in primary forest (distinguishable primarily by the presence of very large trees) makes the chainsaw even more desirable in Long Segar than it would be in Long Ampung where secondary forest predominates.

A man--and NOT a woman--can hire himself and his chainsaw out to his neighbors and family to clear land for ricefields at Rp. 5,000-7,000 per day (fieldowner buying fuel and food); during slack periods in the agricultural cycle,he can clear forest at the nearby plantation for Rp. 5,000 per day; or he can go to work as a logger for one of the timber camps that dot the East Kalimantan map. Such companies, in the Long Segar area, now hire loggers and their chainsaws, rather than supplying the chainsaw as was previously common practice. There, if he is strong and industrious, he can earn as much as Rp. 150,000 per month, though a more usual figure would be Rp. 100,000 per month. The local American timber company pays such loggers Rp. 150 per cubic meter of timber cut.

A third use to which a chainsaw can be put is to make boards and beams. Beams, for instance, are cut in the forest and sold in the forest (Rp. 15,00 per cubic), in the village (Rp. 25,000 per cubic), or in Samarinda (Rp. 45,000 per cubic). Two men with one chainsaw can expect to cut one to two cubic meters of lumber per day. From the above discussion, it is clear that from a "standard of living" perspective, acquiring a chainsaw and using it are rational actions which result in clear benefits for the particular family in question.

What then are the impacts of this innovation on the forest? If people can fell ten times as many trees in one day with a chainsaw as they can by traditional means, this is a substantial change in the "balance of power" between people and forests in East Kalimantan. The availability of the chainsaw has meant that one family can potentially clear a much larger ricefield (a factor that is particularly significant taken in conjunction with the increased time available to the people from adoption of the ces and the rice-huller). Field sizes are measured by kalengs of rice planted. In Long Ampung, the average field size for 1979-80 was 5.1 kalengs; for Long Segar 5.8. This discrepancy reflects an even greater real difference in size of fields: 1) the hillier topography of Long Ampung results in more wastage of seeds (as noted by the Kenyah); and 2) seeds are customarily planted approximately 0.5 meters apart in secondary forest fields (Long Ampung), but almost a full meter apart in primary forest fields (Long Segar). Seventeen Long Segar fields, randomly selected, were measured in February 1980, with an average size of 2.38 ha (Massing 1980:8). No comparable data for Long Ampung are available.

The more thorough clearing of fields that is now possible likewise has adverse impacts on the forest. A large tree which might well have been left standing in the past, and which could have provided seed in the forest regeneration process, is now felled without hesitation.

The impact of the chainsaw on the forest is intimately tied up with the role of timber companies in the area. Adicondro (1979:312) reports that "due to the increasing anti-logging sentiments in Kalimantan, the provincial parliament of East Kalimantan even asked the government to ban the use of chainsaws." This seems an improbable outcome, but testifies to the widespread awareness of the significant impacts of the chainsaw on the forest.

The chainsaw, like the ces, has a potentially negative impact on women. Although some women use the ces (banding together to carry it), none use the chainsaw. It is simply not suited to the physical strengths of women. In the agricultural cycle, the men can now do the main tasks for which they have traditionally had responsibility (the felling of large trees) in one-tenth the time they used to require. There is no comparable technological innovation that cuts the remainder of the agricultural labor (the majority of which is female[15]) required. Women's labor thus becomes less efficient, relative to men's.

Obviously all the possibilities for supplementing cash income with a chainsaw are likewise unavailable to women. So women are further disadvantaged in terms of their access to cash--at the same time that money is consistently increasing in importance in the daily life of Long Segar. Indeed, the ces and the chainsaw themselves, as generally desired economic assets, are available only for cash. The importance for women of the inexorable forces pulling the Kenyah into the money economy will be explored from another perspective in the next section.

The presence of these three important technological innovations--the ces, the rice huller, and the chainsaw--have contributed significantly to an alteration in the interactions among men, women and forests in the Long Segar region, as compared to the Long Ampung area. These changes, freely chosen by the people themselves, have resulted in a physically easier lifestyle and a higher standard of living in Long Segar. But they promise to have negative impacts on the forest ecosystem (see Peluso 1980, for similar findings) and on the position of women in the community, in the long run. Of course, as Dr. Ray Smith, Chair of Agricultural Engineering at the University of Hawaii, points out a

> ...new emphasis on proper technical innovation and design could possibly lead to improvements to remove the negative impacts of this recently introduced equipment on women. Simple, lighter weight designs with improved technical features to permit equipment to be safely used by all, men, women, and older children is a possibility. (HITAHR "departmental" review, January 8, 1982).

However, in the absence of such improvements, the current trends can be expected to result in an eventual lowering of the standard of living and of the general quality of life in the area. (To be continued in Bulletin, September 1983)

Notes

1. Remembering that they chose a path that required their adapting to changed circumstances when they decided to move to Long Segar.

2. We were influenced by such works as Hoben's (1979) and Miracle's (1970) work on the decision-making capabilities of rural peoples; Moore's (1975) treatise on "situational adjustment;" and Castillo's (1969), Hutton and Cohen's (1975) and Helleiner's (1975) presentations of data on the rationality of rejection of some externally advocated innovations. The perspectives provided by Eckaus (1977), Hoben (1979), and Hill (1970) on the great range of variation in the condtions under which rationality is exercised, as well as the views of Barker et al. (1977), Chambers (1974) and Vayda (1979) on the practical knowledge that people gain through experience about the varying conditions under which they must make decisions and act, have helped to shape our approach to this research project.

3. In Jessup's (1980b) paper on shifting cultivation in Sungai Barang, he identifies their system as a form of agroforestry, rather than agriculture, with the people utilizing the areas that have formerly been considered "fallow" for products other than rice. This interpretation is much more reflective of the actual situation, both in the Apo Kayan and in Long Segar. See "Production, Consumption and Commerce" in the next issue for an elaboration of the Uma' Jalan agroforestry systems.

4. I recognize the danger in considering the differences between these two communities as representative of "change", with Long Ampung considered stagnant and Long Segar changing. One important change in Long Ampung itself is the population. In 1978, only 4,896 of the 1970 population of 8,551 people, remained in the kecamatan Kayan Hulu, where Long Ampung is located (Vayda and Colfer 1979:3). But there is general agreement among the Kenyah that life in Long Ampung is not radically different now from the life Long Segar's inhabitants lived when they were there.

5. Long Segar residents can name twelve longhouses in Long Ampung in 1965 (conflicting with Whittier's data 1978:99), with the largest having 67 doors. The current four longhouses range in size from 8-28 doors, averaging 17.25 doors per longhouse. One "door" averages about 7 inhabitants. The 1965 population was probably around 2,000, according to my best guess.

6. The 12 fields belonging to Long Ampung residents comprised an estimated 22.5 ha.

7. This may technically include some very old secondary forest, as well.

8. Some maintain the timber companies' logging activities have increased the flooding of both the Telen and other Kalimantan rivers in recent years (e.g., Adicondro 1979; Pak Jamari 1979 (personal communication); and others).

9. The forest lands are denuded by shifting cultivation and by logging activity. Timber company personnel near Long Segar estimate that they disturb 30 percent of the soil wherever they log, and their extensive road networks require clearcutting along roads for necessary sun hardening of road surfaces (to maintain access to logging areas).

10. The 1979-80 exchange rate was approximately Rp. 620 to US$1.

11. The value of labor in Long Segar is discussed below.

12. A kaleng holds 18 liters or 11 kilos of unhulled, field dried rice.

13. It is possible that reduced nutritional level (which is further substantiated by a reduced amount of wild foods to supplement the diet in Long Segar) may result in more illness. This in turn could reduce people's time and energy available for forest harvesting and other activities affecting the forest. Preliminary findings, indeed, suggest that the health status in Long Segar is inferior to that in Long Ampung (see Colfer 1981c). But my general impression is that this one factor is more than compensated for by the time available due to technological innovations.

14. Local people estimate that one man with a chainsaw can equal ten men with axes and knives.

15. Of the total agricultural labor, 54 percent is done by females, and 46 percent by males.

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Kadayans in the Shair Ken Tambuhan??

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The usage of proper names in traditional Malay literature often raises interesting questions. For instance, the term kadayan occurs frequently in the Shair Ken Tambuhan (Teeuw 1966) although the tale is neither set in Borneo, nor does it stress a contrast between landsmen and those more oriented toward the water. The meaning of this kadayan appears problematical.

The Shair Ken Tambuhan is one of the so-called "Panji Tales." That is, it is one in the series of Javanese-Malay tradition legends centered about the person of Panji, the Raja of Koripan. The tale cycle is found in Java, Bali, Sunda, and Sasak on Lombok, as well as amongst Malays who have originated from Java (Teeuw 1966:xv).

As with most shair (or sha'er, legends composed in a set quatrain verse form), the wealth and depth of interest lies in the language and imagery. The plot itself follows a fairly straightforward line; and may be summarized briefly as follows.

Among the princesses in the land of Koripan was one from Tanjungpura. She had originally been Puspakenchana, a princess of Daha who was expelled by Batara Kala.

The Raja of Koripan had an only son, Raden Inu Kertapati, also known as Raden Menteri. The plan was to marry him to a princess of Banjarkulon. But one day while Raden Inu was out sporting with his companions near the secluded garden of the women, he saw and fell in love with Ken Tambuhan.

This angered his mother who ordered him to go out hunting. While he was away she ordered her huntsman to take Ken Tambuhan out and murder her, which he did.

But in accord with Ken Tambuhan's last request, the huntsman placed her on a flower-covered raft and floated the raft downstream. There Raden Inu saw the raft with his beloved, and died of grief beside her.

When the Raja of Koripan heard of the death of his only son he drove his wife out of the palace to become the keeper of the hunting dogs. Then the Raja went into transcendential meditation for forty days.

The gods of Keinderaan[1] saw this and were moved. Batara Guru, the leader, commanded Batara Kala to rectify matters. Before leaving, Batara Kala sought out the Gandapurawangi, or Wijayamala flower, which the Bidadari Sugarba gave him at his request. Batara Kala then descended to earth, and with the Gandapurawangi flower restored the two lovers to life.

Grand ceremonies marked their wedding. The news even reached the land of Daha; and the Raja of Daha came to Koripan with his queen.

Raden Inu and his wife were chosen rulers of Koripan and Daha, and other grand ceremonies took place. Then the ruler of Daha returned to his home. All was well.

The precis given here uses past tense, in accord with English language tradition. But the original sha'er[2] uses no marking of time, other than indicating the relative sequence of events occurring after a particular beginning. It thus conveys to the listener a sense of immediacy, of reality, which is lacking in the English. The traditional hearer knows that the legend occurred in another time and another place, yet one not so different from the here and now. The most important motif is the disruption of the social order and its subsequent restoration. Being a good member of society, and maintaining the social order, were and are fundamental traditional Malay values. Nor is the involvement of non-human personae unusual. For the social order includes both human and non-human entities. (As one respected Hajiah pointed out, "After all, Allah made all of them.")

Teeuw romanized the Shair Ken Tambuhan carefully on the basis of several manuscripts; and provides a detailed aparatus criticus. But anyone who has worked with Jawi (Malay written in Arabic script) manuscripts knows well that the absence of most vowels and the existence of frequent consonantal errors provide abundant challenges to the reader.

Traditional sha'er reading differs considerably from the process called "reading" in the West. The traditional oral reading is done in a specific semi-chant mode. The test of a good sha'er is that it will sound

well, and can easily be read, in this mode. In Brunei this often involves a conscious altering of certain vowels for effect, as well as considerable sound-play on certain consonants, particularly the nasals. A group of people listens eagerly to the reader, sometimes carrying on conversations amongst themselves, interjecting comments, or joining in on certain passages. The traditional manuscript is one written in Jawi. Not uncommonly, a reader will be busily doing the besa'er (sha'er reading) and suddenly come to a stop. Conference then may ensue with all present who can read Jawi until the difficult word or line is figured out. Non-readers may suggest words or phrases which they think might belong. The presence of standard vocabulary and commonly occurring figures and patterns of sha'er language help. But sometimes the error in what is written is sufficiently large that the person doing the reading must in essence compose a line that fits the context. Obviously, in order to do the besa'er in the first place, an individual must have a good grasp of the traditional literature.

Furthermore, the listeners have often heard the same sha'er over and over again. What they have heard, of course, are interpretations done in the oral tradition of the local dialect. Because of this, and because the charm and interest lies in the language used, rather then in novelty of plot, many listeners, even though they cannot read, will know basically what words belong where. And herein lies the tale.

While in Brunei on holiday during summer, 1980, I read the Shair Ken Tambuhan aloud to an interested audience.[3] Part way through occurred the line, didapatinya hadhir segala kadayan.[4] "It then occurred that all the Kadayans came to be present." (Teeuw, 1966, p. 81, verse 117) The word, kadayan, occurs also in subsequent lines. About the third time that I read this word the leading sha'er expert in the audience spoke up and said, "That is not 'kadayan;' it is 'kaudthian!'"

The interlocuter was correct. The word Kadyan, "landsman," or "Kadayan," (the name of a particular cultural group in Brunei) does not fit well into the context. But kaudthian, "companions, associates," does, and makes perfect sense.

The manner in which the interpretive difference may have arisen is not far to seek. Most likely, the scribes neglected to put over the Arabic d the dot which would have converted it to dth, a voiced th. It would have been assumed that the reader, thoroughly familiar with the word that ought to be there, regardless of what was actually written, would provide the correct pronunciation. Similar occurrences are common in the case of k (no dot) and g (k plus a dot over it) which in modern printed sha'er are often in rather free variation. The g's sometimes have no dot, or the k's do have one. Three versus one dot over p and f also varies widely. It must be understood that what is here referred to is the works printed or written in traditional style (which involves complex ligatures, interesting letter shapes, and variant orthographies), not the ones put out under modern spelling rules.

The reading of the traditional style Jawi hinges upon identification of the basic consonatal pattern of the word as related to sound, and the filling in vowels and so forth later. The variation of two styles of s, for example, causes no difficulty to the traditional reader. Ironically, school children who have learned to read Jawi written according to standard orthography find it difficult or impossible to read the traditional; they are looking for distinctive word-shape or orthographic form, rather than working from the sound skeleton to the word. By the same token, those accustomed to the traditional orthography often find the new difficult. All in all, then, the transcription of kedayan in Teeuw's work is fully understandable, though probably incorrect.

There are no kedayan in the Shair Ken Tembuhan.[5] The word transcribed as kedayan (landsman, or a member of the Kadayan cultural group in Brunei) should in fact be, kaudthian (companion, associate). The reading of kaudthian given by Brunei Malay sha'er experts, fully accords with the context and meaning of the work as a whole.

Many Jawi works have never been transcribed and translated. It is important for these transcriptions and translations to be done while there still live that older generation who know the traditional literature well, and who can provide the insight needed for its accurate transcription and understanding. This is a major challenge facing anthropologists and linguists working in the Island Southeast Asian realm.

Notes

1. In Brunei Malay this is rendered, kayinderahan, the Land of Indra. Kainderahan together with Kayangan (also mentioned in the Shair Ken Tambuhan) comprise the "Kingdoms at the very edge of the clouds," between earth and heaven, but being of the sky.

2. The older romanization, sha'er, is used here because it is the standard form which has been borrowed into English. The Teeuw volume is in the new orthography which uses the spelling shair.

3. I have been taught to do the traditional female besa'er. (The traditional male besa'er differs from the female.)

4. Read in the Brunei style this comes out as didapatinya hadzir sagala kadayan.

5. Even modern printed versions are important in this regard; they are the source from which many have read in recent years. One of my more instructive experiences in traditional sha'er reading occurred at a wedding. With a respected older women I was reading from a printed version of the Sha'er Putri Chendawan, "Oh, that is one of

the most beautiful of all." Some lines of it were quite garbled, and a major discussion ensued until each was interpreted. There is no reason to expect that hand-copied manuscripts were any less prone to difficulties. Indeed, some have handwriting which is extremely hard to interpret. The important thing is not a polished and finished performance. Rather, it is the doing of a traditional activity which links one in time and reality to the traditional culture. The reality is the social occurrence here and now, a part of the long continuity of existence reaching beyond the memory of the oldest living people. This connection is broken with the younger generation, reared on radio, television, and formal school education. They view traditional literature as a boring set piece to be memorized for exams and soon forgotten. They lack interest, understanding, and empathy for the traditional literature.

The older generation makes little direct comment upon this modern state of affairs. But their almost passionate interest in teaching me to besa'er well, and to understand the inner meaning of both what I am reciting and of the act of recitation itself, constitutes a powerful statement.

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RECENT RESEARCH IN BORNEO

The following four papers were presented in the session on "Recent Research in Borneo" held during the Annual Meetings of the American Anthropological Association in Washington, D.C. Three other papers presented in the session will be published in the next issue of the Bulletin.

WARFARE AND COMMUNITY SIZE IN NINETEENTH CENTURY BORNEO

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A very obvious feature of the societies of central northern Borneo is longhouse residence. Unlike anthropologists who work in many other parts of the world, students of these societies have no difficulty in delineating specific communities. Hundreds of people are gathered under one roof, and the nearest similar structure may lie many miles away through dense jungle. Given the impressiveness of the structure, and the relative briefness of our fieldwork, it is very easy to see the longhouse community as timeless. Often there are dialect differences between one community and its neighbor, and this reinforces the impression of the immutable nature of the institution. Religion varies in the same way also, providing yet another force, it would seem, for community integration and identification. So we fall readily into a structural-functionalist view of ritual as one among many adhesives holding together those singular residential groups.

Among the Berawan, whom I studied in 1972-3, communal ritual is a prominent feature of longhouse life. For example, there is a major ritual that is held soon after the harvest every year called papi' lameng, simply "prayers of, or for, the house." It involves the preparation of shrines at which pigs and chickens are sacrificed and prayers made to the ancestors. But papi' lameng is most obviously a rite of commensality. One wanders from apartment to apartment along the verandah, arm in arm with a companion or two, and at each stop one samples the new rice, and the wine prepared from it. As the day wears on, the party warms up, and the gemeinschaft that is generated amid the hubbub of socializing is almost palpable. At funerals, which gather many people together and involve nightly parties, socializing, and drinking, the atmosphere is no less convivial. The integrative function is even more in evidence because there is a powerful collective representation that requires the attendance of all community members at least for the final night of the wake. To consistently fail to attend funerals is to abandon membership of the longhouse. Moreover, the mortuary rituals have a central place in Berawan society, because the staging of them has a lot to do with the legitimization of rank and leadership.

In view of all these conservative forces, it comes as a surprise to learn that Berawan longhouse communities are not as immutable as they

appear. They too have life histories, careers of growth and decline that reflect historical circumstances. These careers provide us with a window onto the dynamics of Berawan sociality, and Berawan religion. Using it, we may perhaps be able to break out of the circularity of structural-functionalist argument. As Durkheim saw, and Radcliffe-Brown failed to see, ritual is an active agent in social processes, and not a mere adjunct to them.

In the early 1970's, most of the Berawan lived in one of four longhouses, located in two tributaries of the Baram, the Tinjar and the Tutoh. These communities numbered about 400 each. At the time of my fieldwork, I virtually ignored the fact that there were in addition some hundreds of Berawan living as minorities in houses of other ethnic groups, or in dispersed settlement. This fact now seems more significant to me, in light of recent historical research. This research began with migration stories collected higgledy-piggledy during fieldwork, and only later collated carefully. Most ethnographers in the area have found themselves jotting down such stories, and the pages of the Sarawak Museum Journal contain many of them. They have a tedious Old Testament quality about them that repels the casual reader: Chief so-and-so begat chief such-and-such, who moved to some place that you cannot find the name of on any map, and so on. In addition there are accounts of early travellers in the area, who occasionally provide key pieces of information that corroborate and date the indigenous account.

Using these sources, I have been able to reconstruct population movements in the lower Baram area for the last century with some confidence. What I discover is this: The four Berawan communities of the 1970's were six communities in the 1910's, and just two in the 1880's. The fission and fusion of Berawan populations were a response to unstable political conditions. The general picture is as follows:

In the early nineteenth century, warfare was endemic throughout the Baram watershed. People from the far interior, Kayan and Kenyah, were pushing down the Baram towards the centers of trade on the coast, from which came prestige goods of many kinds. Some of these groups were numerous and powerful, by the standards of central northern Borneo, and they defeated or displaced less powerful ones. In 1857, a Kayan war party, said to number 5000 warriors, arrived before the gates of Brunei itself. The ancient Sultanate, fabulous in its power and wealth, was obliged to pay them off in order to get rid of them.

Potential victims removed themselves to safer locations, and the resulting volkerwanderung gave rise to those tortuous migration stories that we now collect. Some small groups fled almost to the coast, and placed themselves under the protection of Moslem potentates there. Others, such as the Tring, were virtually annihilated by warfare, enslavement, and headhunting. The Berawan neither fled nor perished. Instead they formed themselves into alliances larger than any that had previously existed, and strong enough that Kayan warparties would paddle on by in search of easier game.

One of these alliances was headquartered at Lubok Bendera in the lower Tutoh river. It consisted of at least four longhouses grouped together, accomodating two varieties of Berawan, the Bitokala and the Kapita, their close cousins the Lakipo, and a remnant of the much abused Tring. The houses were surrounded by a stockade, and there was a resident community of Malay traders -- a veritable jungle metropolis. The Sultan of Brunei maintained a "fort" nearby, and the town was in touch with Brunei via a walking trail. Spencer St. John visited the place in the 1860's and left us an account of it. In the Tinjar, the Berawan were gathered into a similar defensive structure at Long Batan, together with an element of the first wave of Kenyah migrants into the area, the Long Tabballau Sebop. This alliance was the power base of the famous Aban Jau, who styled himself Rajah Ulu -- the upriver king.

Even at this distance in time, it is possible to pick up echoes of the societal strains involved in these unprecendented alliances. All the gemeinschaft that Berawan ritual was able to muster was not sufficient to prevent fighting breaking out within the community at Lubok Bendera, and it is clear that only the external threat enabled the leaders to hold things together. Nevertheless, there was much experimentation with new ritual forms, particularly in the death rituals, in order to provide legitimacy for a new order of leadership. One example will illustrate this: Normally, a graveyard is located away from the longhouse, and often across the river from it. Graveyards are sacred places, usually avoided by the living. The presence of the ancestors there makes them both powerful and dangerous. The Lubok Bendera community is the only one that I ever heard of where the massive, elaborately carved tomb posts of important leaders were erected directly outside their longhouses, as if to diffuse the authority of the ancestors over the entire site. The posts were carved out of durable hardwoods, and it is still possible to see the remains of them, though all trace of the longhouses themselves have been obliterated by the jungle.

At Long Batan, things were in many ways even more tricky. The allies there were of more disparate ethnic origins, and had many differences of custom and ritual. In particular, the all-important mortuary rituals were at odds. The Berawan practiced secondary treatment of the dead, performed at a great feast held a year or more after the initial funeral, in the manner described by Robert Hertz in his classic essay: "A contribution to the study of the collective representation of death" (1907). The Sebop had no such practice, and in fact expressed disgust at it. This is a major contretemps, as is shown by an event at Lubok Bendera, the other confederacy. There, a near massacre occurred when a Malay trader from the coast was so unwise as to laugh at a Berawan corpse, which was displayed in a seated position on the longhouse verandah as custom required. The trader lost his head, his fellow Malays left in great haste, and relations with the Sultanate were strained beyond repair. (This incident actually contributed to the cession of the Baram watershed to Sarawak, because the "back door" to the Sultanate, previously closed by the Berawan alliance, was now left open to Kayan attack.)

Faced with the threat of a similar explosion at Long Batan, an interesting ritual compromise was worked out. The Berawan contingent modified their practices so as to eliminate the phases that most offended the Sebop, principally the opening of the container used for primary storage of the corpse, and the cleaning of the bones. For their part, the Long Taballau Sebop lengthened out their funerals enormously, much beyond the normal ten-day limit usually observed by other Sebop and Kenyah. The rites of the allies were made to look superficially similar, and these transformed rites persisted in the descendent communities until recent times. Meanwhile, the construction of mortuary edifices was elaborated, much as at Lubok Bendera. We cannot know what part Aban Jau, the assertive leader of the alliance, played in these modifications. But certainly they tended to support his power.

However, even his influence was limited. Berawan oral history recalls that he waxed too proud for their tastes, and that he took too many liberties with other peoples' property and wives. The Sebop, Berawan say, are used to having chiefs that behave that way, but the Berawan are more egalitarian and independent of temperment. So even before pacification occurred, Aban Jau's Berawan following began to melt away. While agents of the regime of Rajah Brooke of Sarawak were still establishing themselves in the lower Baram area, a Berawan sub-chief offered to co-operate with the new English rulers. He and his followers moved far downriver, beyond Aban Jau's reach, into the lower Tinjar. Thus defied, the old chief's power began to crumble. Another group left, moving onto their farmlands a little less far downriver. And finally, the last remnants of the Berawan decamped. One of these groups immediately built a solid longhouse for itself, and once again the funeral edifices not only show where it was located, but also substantiate that there was a man secure enough in his influence to muster community resources for the construction of lofty hardwood tombs. The other splinter groups were less settled, both geographically and politically. During this epoch, each of the daughter communities made further small ritual innovations, creating a nascent identity that can still be detected. But the process was reversed in the second decade of this century, when a new leader emerged who was able to reassemble under one roof all the Berawan of Tinjar. But the great longhouse of this revived community, which I visited in the early 1970's, still bore traces of the diasphora. On close inspection, it turns out to be three houses, all in a line end to end, and with short bridges between them. In preferred farm areas, in kinship links, and in ritual, the distinctiveness of the three former communities can still be made out.

Meanwhile, at Lubok Bendera, a similar process of fission was going on. The Kapita Berawan and Lakipo went their separate ways, although the remnant of the Tring had become so intermarried with the former as to become absorbed. The Bitokala Berawan stayed put, and are there still, except that an offshoot community moved to Long Teru and amalgamated themselves with the Lelak people there. . .

But enough said: I have made my point. When viewed over an historical time frame, rather than the year or two that fieldwork usually lasts, it is the fragility of the longhouse community that is striking. Now it will no longer do to think of ritual as merely the glue that holds these small-scale and clearly bounded societies together, for sometimes the glue holds, and sometimes it does not. Conversely, in the process of fission and fusion of longhouse communities, there is the opportunity to see what part ritual actually has played, and to assess without circular argumentation its role in the every-mysterious conjuring of sociality.

AN ESSAY ON PUNAN RELIGION

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Introduction

In the latter 1870's, naturalist and adventurer Carl Bock ventured into the forests of what is now the Muara Wahau district of East Kalimantan. "...I was intending to penetrate into the forest," he said, "and endeavour if possible to solve for myself the mystery of the Orang Poonan, or Wild People of the Woods" (Bock, 1882:69). He encountered a small handful of people, about seven individuals in all, with whom he spent a single afternoon. And yet in that one afternoon, Bock managed to formulate a notion that has persisted in the minds of many right down to the present day.

> I believe these savages to be the true aborigines of Borneo. They live in utter wildness in the central forests of Borneo, almost entirely isolated from all communication with the rest of the world (op. cit. 75-76).

I am presently preparing for publication a book that will attempt to demonstrate, in somewhat tedious detail, the hypothesis that the Punan of Borneo are not what they seem at first glance. I shall try to show that, rather than being the aborigines of the island -- autochthonous, pristine remnants of some earlier, hunting and gathering phase of the island's history--the "Punan" are in fact the descendents of erstwhile sedentary, agricultural Dayak peoples who opted to specialize in the collection of primary forest resources for trade. It is not possible to summarize in five or six pages any of the arguments I have marshalled to support this view. I would merely like to take the opportunity this morning to focus upon one specific aspect of Punan culture, namely religion, in order to provide a bit of illustration -- not proof -- of my hypothesis that the Punan derive from a generalized Dayak cultural base.

By way of provenience, let me note first that between August 1980 and November 1981 I conducted a comprehensive ethnographic survey on groups of present and former nomadic hunters and gatherers, known generally as "Punan." My search for these people took me to several widely scattered areas of Indonesian Borneo, or Kalimantan as it is now called. The following remarks derive from my encounters with Punan groups in the districts of Tanjung Palas, Peso, Malinau, and Kayan Hulu in the Bulungan Regency; the Kelai district of the Berau Regency; and the Tabang district of the Kutai Regency, all of which are located in the Province of East Kalimantan. In the Province of Central Kalimantan I visited and studied Punan groups of the Sumber Barito district in the Barito Utara Regency. While profound differences and variation were found to exist among the many scattered groups known as Punan, it is possible to make certain baseline generalizations with respect to the Punan and their way of life on an island-wide basis.

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As is well known, the traditional "adat" religions of the settled Dayak peoples of Borneo are elaborate and complex. They contain well-developed cosmologies, profuse mythologies, imaginative theories of creation and ideas about the natural order. Each of these religions features a pantheon of deities, many of whom are conceived of anthropomorphically. There is often a supreme being, perhaps also a consort for the supreme being, and a long list of patron deities associated with a variety of day-to-day domestic activities. More often than not, there are in addition many complicated rituals and public ceremonies with specialized male and female practitioners. There is also an elaborate belief in omens.

The traditional religion of Punan groups is a sort of abridged, trimmed-down, or, if you will, 'portable' version of those adhered to and practiced by their settled Dayak neighbors. The Punan have, in effect, extracted from these complex and elaborate religious systems the bare utilitarian essence needed to provide a supportive ideology for their relatively simplified way of life. They have, as it were, left behind such cumbersome and unwieldy elements as agricultural rituals, feasts that go on for 9 days and nights, and cosmologies taking hours to properly recite, and have instead brought away with them one special aspect of Dayak religion that is perhaps uniquely suited to the rough exigencies of nomadic hunting and gathering, namely omenology.

Punan religious beliefs revolve mainly around omens gleaned from the flight patterns and calls of birds. Each and every Punan group possesses a small pantheon of certain birds that are believed to be able to communicate with human beings. They do this by flying overhead in a precise manner and by issuing various meaningful calls.

A Punan entering the deep forest to hunt game or seek jungle products watches and listens for advice. A certain bird flying overhead

toward the left is a bad sign, informing him that the path he is taking is either devoid of game or fraught with danger. If the bird, however, flies overhead toward the right, this is a good sign that indicates that the presently trod path is safe and will lead the man toward game and the jungle products he is seeking.

Most of the spirit birds within the pantheon of any Punan group issue two or more variant calls. A bird has what is described as a "good" call and a kasar or coarse, bad call. Good calls are interpreted as auspicious indications of imminent success; bad calls are warnings of impending danger or failure. The plethora of calls heard in the forest from the various spirit birds bear a variety of messages for those who know how to interpret them. A call from one bird tells a man to halt for a day or two and make camp at his present location. Another advises that pigs will be plentiful if he veers off towards the left. The call of another bird may warn him of danger at the spot where he is resting, while another forecasts a chance encounter with a seldom-met friend. Certain calls signify a crisis back at camp, directing the hunter to return home at once. Among the Punan Murung there is a certain bird which, when it is heard singing in the middle of the night, informs its hearer that a close relation has just died.

An elderly Punan Beketan from the upper Tuboq River in the Tabang district related to me the manner in which one of his ancestors became a legendary hunter of wild rhinoceros. The man, as I was told, was guided in his quest for rhino horns by a succession of spirit birds, each bird guiding him safely unto the care of the next. Their calls led him through the forest by many twists and turns, enabling him eventually to bring down a grant total of twenty wild rhinoceros--all of them tracked and taken with the birds' unflagging assistance.

As the Punan explain it, the calls and flight-signs of their spirit birds are simply a matter of friends helping friends. Punan regard these birds with fondness and respect. Most groups will not hunt or harm their 'special' birds under any circumstances. The birds are seen as invariably helpful and concerned for the well-being of their human friends. Punan Beketan say that the birds that speak to them are more than mere messengers; some are capable of issuing calls that render their hearers immune to danger and invincible against enemies.

In many districts and from many different groups I was to hear over and over again, "All Dayak people believe in these birds. It is not only Punan that believe in them." This is indeed true. Compare the religion of any one Punan band with that of its settled Dayak neighbors and you will find that the birds comprising the Punans' pantheon are also to be found in the religion of the settled group, but as somewhat minor characters. Thus, for example, while the Punan Oho of the Apo Kayan display reverence toward birds they call Shishit, Ki'ing, and Telajan, these birds similarly exist in the religion of the nearby Kenyah Lepo Tau, with somewhat diminished significance.

Many Punan groups, in addition to their belief in spirit birds, also profess a belief that the sound of a tree falling in the forest, called Kayu reba, and the cry of a small deer known as kijang are invariably portents of doom and impending disaster to whoever hears them. Again, casual inquiry among settled Dayaks reveals that these too are embedded deeply within their notions of the natural order.

But more importantly, there is the afore-noted mental equation of left with "bad omen" and right with "good omen." This deeply entrenched notion is shared not only by all Punan groups of my acquaintance but also by every other Dayak people with whom I came into contact.

As such, we are able to discern that what comprises Punan religion are in fact aspects derived from settled Dayak belief systems. Rather than being essentially different from Dayak religion generally, the religion of Punan groups is a scaled-down version of the latter, stripped to a bare utilitarian minimum in order to serve the somewhat specialized needs of nomadic hunters and gatherers. Indeed, if any one conclusion can be drawn from the full ethnographic overview I am now preparing for press, it is that the above statement might as well be applied to Punan culture in general. Those familiar with Borneo and with specific Dayak societies may already have gathered from the foregoing remarks that, rather than being in any way different or out of the ordinary as far as Borneo is concerned, 'Punan religion' is precisely what one would expect of nomadic Dayaks.

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AGRICULTURAL PRACTICES OF THE KERAYAN LUN DAYEH

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The agricultural practices of the Lun Dayeh of the kecamatan Kerayan, an upland region where the borders of East Kalimantan, Sarawak, and Sabah meet, have yet to be adequately described. This report, based on field work done in 1980, shows their agricultural patterns to be not only unusual for inland Borneo, but also to be surprisingly productive. Although some Lun Dayeh engage in shifting cultivation similar to that employed by other interior groups, the practice of irrigated rice agriculture is far more important in the area.

According to their orally transmitted histories, the Lun Dayeh have for centuries been transforming the valleys of the Kerayan into inundated

rice fields. These fields--some situated in what were naturally poorly-drained areas, some irrigated from nearby streams--have been producing surplus quantities of rice for many Lun Dayeh communities almost every year, from as far back as anyone can remember.

In making a new field, the Lun Dayeh farmer first selects an appropriate area and then slashes, fells, and burns the vegetation covering the site. The area is then levelled and water-retaining dykes are constructed using iron hoes and spades. In the far past, it is reported, the implements used for the tasks of levelling and dyking were similar in shape to the ones used now, but were of wood or bamboo. Since population density in the Kerayan district is quite low, areas that need little levelling continue to be available and are chosen as sites for fields. All necessary dykes, canals, and other earthworks are carefully planned, measured, and dug. In the dyking and levelling process the surface of the new field is loosened, and when all is ready it is flooded.

In fields that have been previously cultivated, all standing vegetation--largely rice straw and other grasses and sedges--is slashed or pulled out and in most cases is stacked on the dykes which separate the fields, thus reinforcing and building them up. Some of the cut vegetation may also be burned. However, in many fields, little vegetation needs to be cut, as free roaming water buffalo have in the several months since the last harvest, eaten and trampled most grasses. While these buffalo aid the farmer by ridding fields of vegetation, and trampling and loosening the soil, and in fertilizing the fields, they do considerable damage to dykes, fences, and canals. Thus, prior to planting, many earthworks must be patched and repaired. The water buffalo are not used for any further agricultural work; no plowing or other soil preparation is done.

While the repairs of earthworks are being made, particularly well-prepared sites are sown with seed to serve as sources of the rice seedlings that are later to be transplanted. Often these seedbeds are placed close to the farmers' houses so that refuse and human and animal (chicken, duck, pig) offal will fertilize the field.

When rice seedlings reach a height of about 30 cm., they are uprooted for transplanting. Some fields receiving the seedlings are partially drained while transplanting is underway; more frequently the standing water is not drained. The level of water is kept at a high level throughout the growing season. The level is raised as the seedlings mature, with about 30 cm. of water ideally standing in the field when the rice reaches its maximum height. Lun Dayeh farmers report that unless a drought occurs during the growing period, the high level of water that is maintained effectively suppresses weed growth. As droughts are uncommon, weeding is rarely done.

Harvesting is carefully done, with each panicle of rice cut separately with a small knife. Even after the harvest, water is only temporarily drained for ease in catching the small fish and snails that

inhabit the pond-fields. Apart from several episodes of fishing each year, and occasional draining due to the accidental breaching of dykes, the fields remain inundated throughout the year.

The Lun Dayeh lati' ba system differs significantly from the classic sawah and other "models" of rice agriculture. A more interesting question concerning their agricultural practices however, is not, "what kind of wet rice cultivators are the Lun Dayeh?" but rather, why are they intensive wet rice farmers at all?

A thesis now widely accepted by anthropologists (Barlett, 1980) and others is that the degree of intensity of land use (i.e., the number of times a plot of land is cropped within a specific period of time) reflects and is determined by the density of the human population per area of arable land. This hypothesis advanced by Boserup in her Conditions of Agricultural Growth (1965) rests on a previous notion that less land-intensive patterns of farming (e.g., long-fallow shifting cultivation) require less human labor per unit of crop harvested, than do more intensive modes (e.g., permanent field farming). Thus Boserup concludes that land-extensive forms of farming will not be replaced by land-intensive ones until populations are forced to do so by population pressure.

The human population density of the Kerayan sub-district is approximately 2.2. persons per square kilometer. The land available for swiddening or any other way of making a living in the Kerayan still appears near endless. The Kerayan's pond-fields and villages are surrounded--especially to the south and east--by many square kilometers of unfelled mature forest. The Lun Dayeh wet rice cultivators have not developed, nor do they continue to practice their particular system of cultivation because of population pressure. When questioned, most Lun Dayeh informants who engaged in wet rice cultivation stated that it was an easier, more reliable, and more productive form of farming than is swiddening.

Examination of the Kerayan environment -- physical, biotic, and social -- and of the lati' ba system shows that although the "Boserup thesis" does not apply in this case, the Kerayan population's reliance on intensive annual cultivation of inundated fields is nevertheless economically "rational".

Factors Discouraging Shifting Cultivation

There is considerable evidence that in the Kerayan, the annual dry season or seasons are considerably less marked or reliable than those characteristic of other interior parts of Borneo. This lack of a period when the farmer can be fairly certain of rainless weather may be one factor which detracts from the attractiveness or relative efficiency of shifting cultivation as a way of agriculture. Without a reliable dry season that is sufficient in length and intensity to dessicate the timbers felled by the shifting cultivator, the necessary burn will be inadequate and the soil

will not receive the nutritive ash a good burn would provide. A poor or inadequate burn usually also results in increased weed and pest problems.

The considerable isolation of the Kerayan area, distant from opportunities to engage in market trade, might also be cited as a possible reason why, historically, shifting cultivation may have been a difficult way to make a living in the area. Without access to steel or iron bush-knives and axes, the annual job of clearing the forest which usually includes the felling of large hardwood trees, would have been extremely onerous. Some populations of the Kerayan region have traded for iron as long as is remembered in their oral histories. But trade for market products was always difficult; it necessitated long trips through territories often occupied by hostile groups. And while most inland groups of Borneo had to trade for at least two items they considered necessities--salt and iron--the Lun Dayeh had no need to trade with coastal peoples for salt as their region is blessed with numerous salt springs. Therefore, only one item had to be obtained from non-local sources--iron. (However, many items of prestige and adornment--Chinese ceramics, gongs, beads, etc.,--also come into the area through trade). It is probable that during various periods, trade might have been especially difficult because of the existence of marauding parties or of intense warfare along the trade routes. (The 1850s and 1860s were apparently such a time, when Kayan war parties made travel through the area between the Kerayan uplands and the coast especially dangerous (St. John, 1862). During such particularly stressful times a type of cultivation which did not require the use of trade items might have been especially favored, and many of the necessary irrigation and earthworks may have then been extended and farming intnesified. The cultivation of wet rice in the Kerayan was previously done with tools fashioned of wood and bamboo, and many older residents of the Nan Ba region (a center of wet rice farming) can still remember when a village of twenty or so households would own among them only one bushknife.

Factors Favoring Permanent-Field Cultivation

Apart from considering factors which may have made shifting cultivation a relatively unattractive method of agriculture in the Kerayan, one can also identify conditions peculiar to the region which rendered wet rice farming less onerous than might be expected. The topography of the region is characterized by steep hills standing above broad valleys. These valleys are in many places poorly drained and are watered by several slow moving, silt-laden rivers. Indeed, the familiar contrast between upriver areas, where fast-flowing, clear streams cascade through steep valleys, and downriver regions, where slow, muddy rivers meander through wide floodplains, is, to a large degree, reversed in the Kerayan. The areas farthest inland are flat and broad, and as one travels downriver, the streams begin to flow faster, clearer, and through narrower valleys. The well-watered, often swampy areas found in the Kerayan district, particularly near the headwaters of the Bawan and Kerayan rivers, and in the Na Ba region, are excellent areas for wet rice production. The

creation of pond-fields in these areas requires relatively little labor as the need for levelling, irrigation, and dyking is minimal. Some terracing of slightly higher ground is done, but as rather flat sites are still available for exploitation, such more strenuous work is rarely necessary. So the making and maintenance of fields is perceived by the local farmers as a demanding but not prohibitively difficult task; indeed many areas of the Kerayan appear to be almost "natural sawah". Although watered by small streams, water supply is quite reliable and excessive flooding in the major wet rice producing areas such as Nan Ba and the Upper Bawan is very infrequent.

It must also be pointed out that much of the apparent ease and success of wet rice farming in the Kerayan may be attributed to the profound and detailed knowledge that Lun Dayeh have of their environments. Decisions to extend or make new pond-fields are made only after careful observation of vegetation, soils, water quality and availability, and a number of other factors. Fields are made gradually, with perhaps only a bit more terrain levelled and dyked each year whenever time permits.

Among other factors which might have both in the past and in the present shifted the balance from a greater ease and profit of making impermanent swiddens to making permanent pond-fields is the previously mentioned isolation of Kerayan communities. The Kerayan Lun Dayeh could "afford" to invest quite heavily in the construction of earthworks and canals, as they were little threatened by invaders such as the aforementioned Kayan, who forced many downriver swiddening Lun Dayeh to abandon their homes and migrate to other rivers (St. John, 1862). Feuding and headhunting did occur frequently in the Kerayan area, but especially in the richer wet rice settlements, apparently no permanent changes in land tenure were affected by warfare.

It is possible to continue to speculate at length about other reasons why Kerayan populations, apparently not pressed by high population densities both in the past and at present, choose to farm their lands in an intensive manner. Boserup bases her thesis largely on the argument that given a choice, farmers will tend to opt for the mode of cultivation that involves least effort for an adequate harvest. Therefore, reliable data on the relative labor efficiency of shifting cultivation is necessary to understand why the Lun Dayeh situation apparently runs counter to Boserup's expectations.

Estimates of Labor Expenditure

As I did not spend an entire agricultural year observing Kerayan lati' ba cultivators and swiddeners, I am not able to present a complete quantitative outline of the labor required for a year's cropping under the two farming regimes, nor can I give precise energy input-output ratios for these two methods of cultivation. It is especially difficult to gather accurate data on labor requirements for wet field cultivation, as much of the work done consists of maintenance of dykes and canals, tasks done throughout the year.

Despite these problems I was able to reasonably accurately estimate major labor expenditure in the lati' ba and swidden systems of the Kerayan. I found the total labor required to produce a crop of rice (excluding rice processing and livestock tending) in the pond-fields of the area varied from 178 to 192.5 man-days per hectare, which was significantly more than the 123.5 to 133 man-days needed per hectare of swidden farming (excluding rice processing). However, swidden fields tended to be more than twice as large as irrigated fields. Their large size in great measure reflected their lower productivity: the yield from dry-land fields in 1980 -- an exceptionally good year for swiddens -- averaged 947 kilos per hectare, while yields from irrigated farms averaged somewhat over two metric tons.

Summary and Conclusions

In view of currently widely-accepted generalizations concerning population density and intensity of land use in the tropics, the choice of Kerayan Lun Dayeh cultivators to engage in pemanent-field agriculture appears anomalous and economically irrational. However, investigation of the labor needed to produce a crop of rice in Borneo by both shifting cultivation techniques and by intensive pond-field farming, shows that the lati' ba method yields not only more per area but also more per man-day of labor than does swiddening. Specific environmental and historical circumstances prevailing in the Kerayan also serve to support the view that lati' ba cultivation is a rational choice. It is suggested here that many factors other than land availability may affect the choice of farming technique, and that the "Boserup thesis" might be applied far more successfully to the explanation of changes in dry-land farming than to rice production.

ETHNIC GROUPS IN THE NORTHEAST REGION OF INDONESIAN BORNEO AND THEIR SOCIAL ORGANIZATIONS

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INTRODUCTION

From December, 1980, through August, 1981, we undertook ethnographic field work in Kalimantan Timur.[1] We had earlier in the summer of 1980 attempted to continue our long-term study of Rungus society and Rungus oral literature. However, the Sabah Government, after initially encouraging us, refused to permit us to conduct research, as it has in the past. We were similarly discouraged from engaging in ethnographic field work in Brunei and Sarawak. Consequently, I, with my wife and three daughters as field assistants, applied to LIPI to undertake field work in Kalimantan Timur under the sponsorship of the Population

Studies Centre at Gadjah Mada University. This was approved, and we subsequently obtained local sponsorship of our research from the University of Mulawarman as well.

Our research goal in Kalimantan Timur was to find an ethnic group where we could initiate a long-term study of their social organization, language, and oral literature similar to that we had planned among the Rungus. To this end we conducted ethnographic surveys in the Sebuku River drainage basin and in the Sekatak, Batayau, and River basins of the northeast section of Kalimantan Timur.

PEOPLES OF THE SEBUKU RIVER BASIN

The Agabag Tinggalan

At the present time the main section of the Sebuku River up to Pembeliangan is occupied by Tidung people. At Pembeliangan the river divides into two branches, the Tulid and the Tikung. In these branches of the Sebuku River are found speakers of Idahan Murut isoglots (Appell 1968). We surveyed the Tulid branch.

The Idahan Murut in this region traditionally call themselves Agabag, which is derived from the lexeme for "loincloth." An exonym for these speakers and perhaps related speakers has been the term "Tinggalan" (alternatively rendered Tenggalan), which has been in use since the late 1800's. I have suggested that it might be productive for the ethnic terminology of Borneo to use a binominial system with the first term being the autonym, and italicized, while the second term would indicate the general linguistic family to which the group belongs, and would therefore be an exonym (Appell 1968). Consequently, I have called the Idahan Murut speakers in the upper reaches of the Sebuku River Agabag Tinggalan.

However, we should be cautious in this since the term "Agabag" may in fact be an earlier exonym which has been subsumed by these peoples.

I should also make clear that it was extraordinarily difficult to interview on the ethnic terminology of the region. Previously the exonym "Tinggalan" had become well established among the indigenous peoples. More recently, however, the term Orang Pedalaman, "people of the interior," has been the term the local Indonesian government has decreed appropriate to refer to these people. Therefore, in eliciting ethnic terminology we would frequently get either the term "Tinggalan" or "Orang Pedalaman."

The Tulid Agabag no longer live in their traditional villages. Several years ago the government brought them down from their traditional areas, many above difficult rapids, and have aggregated them into three resettlement areas. While the Agabag traditionally lived in longhouses,

the Indonesian government has decreed that they should live in individual houses, and they have been told to take up one of the approved world religions in place of their own.

The Tulid Agabag are swidden agriculturalists with a primary dependence on manioc rather than rice. Marriage involves a bride-price, and residence after marriage is virilocal.

I have previously argued that as far as we knew all the societies of Borneo were cognatic (Appell 1976a). However, I have also argued at various times (Appell 1973, 1976b) that the classification of societies into unilineal and cognatic in essence distorts ethnographic reality. The Tulid Agabag provide a good example of this argument.

All the male descendants of the purchaser of a large funerary jar have the right also to be buried in that jar. Bones are removed periodically. These are put in coffins and buried underground to make place for newer corpses. Also, the virilocally residing wives of men entitled to burial in these jars have the right to be interred in these large expensive funerary jars by reason of their marriage.

This in no sense can be considered a corporate descent group but is what I have termed previously a jural collectivity, in this case a funerary jar focused jural collectivity (Appell 1983, ms.). The rights lie with the individual members rather than the group as an entity of its own. Unfortunately there was not sufficient time to go into jural cases at length during our stay among the Agabag, and I assume it was a jural collectivity, although it may have been in fact a jural aggregate (see Appell 1976c, n.d.).

This traditional culture of the Agabag was disrupted by confrontation. Since then there have been extensive changes brought about by resettlement and Christianization. Therefore, after an inquiry of approximately two weeks, we decided not to continue our work among them but instead to work among the Bulusu'.

THE PEOPLES OF THE SEKATAK, BENGARA, AND BATAYAU RIVER BASINS: THE BULUSU', TIDUNG, BULUNGAN, AND PUNAN

In the lower reaches of these rivers are found Bulungan and Tidung settlements. The middle reaches are inhabited by an ethnic group called Bulusu'. And in the highlands are found Punan.

The Bulusu'

The Bulusu' are also known as "Berusu" or "Brusu." Their perferred autonym is, however, "Bulusu'." The Bulusu' inhabit primarily the Sekatak, Bengara, and Batayau Rivers. A few villages can also be found on the right bank of the Mentarang River as well as some of its southern tributaries.

It is difficult to assess the linguistic affiliation of the Bulusu' at the present time. It is clear that their language is most closely related to the Tidung language, and they themselves recognize this close affiliation while pointing out how divergent their language is from other neighboring languages.

Traditionally, the Bulusu' are longhouse dwellers and swidden agriculturalists. Post-nuptial residence is virilocal, and a bride-price is required of gongs, jars, cannons, and various other items.

Bride-price payment in Borneo may be divided into two types: corporate and redistributive. Corporate bride-price is found among the various Dusunic-speaking peoples. In this situation, the domestic family of the bridegroom pays a bride-price from its accumulated assets to the domestic family of the bride, which adds these assets to its accumulated earnings.

In the redistributive type of bride-price, the bride-price is constituted not only from the assets of the groom's domestic family. The father of the groom also borrows additional required items both from his network of kin as well as the network of kin of his wife, the groom's mother. The father of the bride receives the bride-price and redistributes it among his network of kin and the network of kin of the bride's mother in repayment for outstanding loans of brassware, jars, etc., as well as in repayment for contributing to the marriage feast.

The Bulusu' method of bride-price is the redistributive type.

The development cycle of the Bulusu' domestic family differs from that of the Iban or the Rungus. The longhouse compartment holds a patrilateral extended family. Typically it is composed of the parents and their sons, the sons' wives, and the sons' children. However, this unit is essentially a consumption rather than a production unit. There is one hearth, but each nuclear family has its own swidden and its own swidden house. Each nuclear family spends much of their time in their swidden house during the agricultural year. But when they are living together in the longhouse apartment each one contributes food from their own swidden to the domestic economy.

A son will remain in his father's apartment until his children have reached a marriageable age. He will then build his own longhouse apartment from which his children marry, and the three generational structure is created again. The eldest son remains in his parent's apartment to care for them in their old age.

I have drawn attention to the two basic types of land tenure systems in Borneo (Appell, 1971, Appell n.d.). These are, with of course various subtypes, as follows: the Rungus system or what I have termed the "circulating system" and the "contingent system," which occurs among the Iban, Kayan, and Kenyah. In both systems the village owns residual rights

over a territory in which the resident members cultivate their swiddens. In the circulating system, no individual or family can establish permanent use rights over an area by felling primary jungle. Instead each year after a family unit has removed all its agricultural produce from its swidden area, the area reverts to the area of disposal of the village. And any other farming unit in the village may use that swidden for its own new swidden when sufficient forest cover has grown up.

In the other system, permanent use rights may be established by a farming unit clearing primary jungle. I have termed this system the "contingent land tenure system" because these rights are contingent on residence. These use rights are held by the farming unit and its successors as long as they remain resident in the village. On leaving the village these rights revert to the village and its area of disposal.

The Bulusu' have a very interesting variation of the circulating land tenure system. The swidden area reverts to the village area of disposal unless it is planted in fruit trees. Fruit trees are significantly more important among the Bulusu' than other peoples in Borneo I have worked with. While the Rungus plant small groves of fruit trees, the Bulusu' during a fruiting season will plant a whole swidden with trees. And the rights to these trees belong to the cognatic descendants of the planter. However, this is only done after a major fruiting season, which only occurs irregularly, anywhere from three to seven years, after an unusually dry spell which permits the flowers to be fertilized and the fruit to set.

I should like to point out that this sytem of Bulusu' land tenure occurs in an area of extreme rainfall, contrary to my original hypothesis on the possible ecological determinants of land tenure. There appears to be no predictable dry season in the Bulusu' region, and so planting is timed only in terms of minimizing bird pests.

The Punan

At the headwaters of the various rivers in the Bulusu' territory and in the height of land between water sheds, in what I have referred to as "the Punan highlands," are found various Punan groups. They refer to themselves as Punan, but I believe that this was originally an exonym.

The language of these Punan groups is markedly different from the Bulusu'. In fact, in intermarriages between Punan and Bulusu' the use of the Punan language in the family has resulted in cause for divorce because of the inability of a Bulusu' woman to know what is being talked about.

From the Punan highlands down to the traditional Bulusu' villages, there is a steady cultural and genetic gradation from Punan to Bulusu' populations and Bulusu' culture. In the upper reaches of the rivers are found impermanent Punan settlements in which the economy is based on hunting and gathering and the planting of some cassava. Farther downstream are found settlements of Punan with some admixture of

Bulusu'. Rice is cultivated and longhouses are used, although it is my impression that these longhouses are smaller and less elaborate than in full Bulusu' villages. Even in these latter villages male Punan can be found. For when a Punan male wishes to learn rice agriculture and give up hunting and gathering, he will marry a Bulusu' female. Living with his father-in-law for a number of years he learns the techniques of longhouse building and swidden farming.

However, this is not to imply that the Punan settlements in the Punan highlands are composed solely of Punan. There you do find an occasional Bulusu' or a Bulusu'-Punan mixture and in one instance which I know of there has been a Tidung male who has married in and lives with a Punan- Bulusu' wife.

The Tidung-Bulungan

My remarks on the Tidung and Bulungan ethnic groups will be abbreviated here for lack of time.

There is considerable intermarriage between the Tidung and Bulungan so that a new ethnic category is developing: the Tidung-Bulungan.

We found Beech's work (1908), which has been one of the reference points in our understanding of the Tidung and Bulungan in the past, to be full of errors. We collected materials to correct this dictionary as well as some of the conclusions he reached. One of his conclusions was that the Tidung and Bulungan languages are fairly closely related, but this is certainly not true. As I mentioned, the Tidung are most closely related to the Bulusu'.

His conclusion that the Tidung did migrate from the interior to the coast has been substantiated by the data we gathered, but the evidence on which he drew his conclusion was false. The term "Tidung" does not mean "hill" or "mountain," as he indicated. From Nunukan south through Tarakan and into the Bulusu' area we were constantly corrected on this assumption. There is a minimal pair Tidung:tidong. The first refers to the ethnic group and the second refers to hills or mountains.

CONCLUDING REMARKS

Cline of Intermarriages

Punan males marry Bulusu' females. And Bulusu' females also marry into the Tidung-Bulungan category. Therefore, there should be on balance more males than females in Bulusu' society. This does not seem to be the case. The obvious conclusion that can be drawn is that the Bulusu' are producing significantly more females than males. But we have not yet had time to analyze all our genealogical data to verify this impressionistic conclusion. Intermarriages are only part of a complex series of exchanges that link these societies together.

Cultural Differences in Cognitive Processes

Our work in Indonesian Borneo resulted in one interesting discovery about differences between cultures in cognitive processes. I have found it useful to distinguish cultures whose cognitive organization is primarily based on digital information processing from cultures where the processing is analog.

The Rungus Dusun and American science primarily use digital processes for organizing information. That is, boundaries of phenomena are clearly distinguished and members of a category are defined by the presence or absence of particular characteristics. In the analog approach boundaries are indistinct and items may be considered in two different categories depending on the social environment. That is, categories are defined by the degree to which a characteristic is present, and this is, of course, always open to negotiation (see Dentan 1970, Appell 1973).

In contrast to the Rungus, we found in Indonesian Borneo that cognitive processes are largely analog. Boundaries are unclear, categories are organized in terms of degree of essential characteristics, and these are open to interpretation by anyone. This approach is represented in the comment made about Indonesia: "Everything can be negotiated."

I am not too sure the degree to which this observation pertains to the indigenous cultures of Indonesian Borneo rather than to the Indonesian national culture. However, we hope to explore this idea further and provide examples of its from our field data in the near future.

Note

1. I gratefully acknowledge support of this research from the National Science Foundation (Grant No. BNS-7915343) and the Fort Foundation. I want to thank my wife, Laura W. R. Appell, and my three daughters, Laura P., Amity C. P., and Charity R., for their help in this research. I also want to thank LIPI for their support and particularly Dr. Masri Singarimbun, Director, Population Study Center, Gadjah Mada University, for his valuable advise and sponsorship. I am indebted also to Dr. Soetrisno Hadi, Rektor, Universitas Mulawarman, and Bupati Soetadji of Bulungan for their many kindnesses and help.

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BRIEF COMMUNICATIONS

Remarks on Some Notes On The Origins of the "Punan" of Borneo

Wilhelm G. Solheim II

I found Carl Hoffman's research note (1981) on the origins of the "Punan" of particular interest because shortly before reading his article I had said much the same thing about similar ethnic groups over all of Southeast Asia. I do disagree on one point of no particular importance with Hoffman and that is how far back in time the "Punan" situation, as he hypothesizes it, started.

To save you the time in looking up his report I quote his final paragraph: "Thus the 'Punan' of the ethnographic present are nothing more or less than ahli hutan, 'forest specialists.' As such, they descend from groups who chose to concentrate upon what after all comprises most of Borneo's land area-- the tropical rain forest, unencumbered by ladang, gardens, longhouses, or fixed territories to defend against enemies."

In the article I had just written (Solheim n.d.) I had mentioned that in most countries of Southeast Asia you could find different economic and ethnic groups with very different economic and cultural organization including "...hunting and collecting groups in the remnant tropical forest areas..." living in close proximity. I went on to say:

> Until very recently these latter small ethnic groups were considered as either relic survivals of earlier cultural stages or peoples forced back into marginal zones by more advanced, newer arrivals. With recent archaeological research we see this pattern going back thousands of years into prehistory and we have come to realize that these are symbiotic societies utilizing distinct ecological niches and furnishing each other important products specific to their different niches.

This idea is not something new with this unpublished paper of mine but has been an hypothesis that some of my former students and I have held in common for some years and that has been expressed in varying ways by several of us before (Hutterer 1977, Kennedy 1977, Peterson 1973, Solheim 1980). I feel that such groups as the "Punan" have lived their economically viable lives in their tropical rain forest niche furnishing faunal and floral elements of the tropical forest ecological zone to neighbors not living in or well acquainted with that zone for at least 6,000 years. I further feel that culturally these groups have evolved directly out of the Hoabinhian cultures of Mainland Southeast Asia and similar cultures of Island Southeast Asia with constant small genetic interchange among the people of the different niches. Thus while culturally their origins are thousands of years back in the forest, genetically this is not so. Phenotypically they usually look different from their neighbors probably primarily due to constant selection of genetic combinations of value to their tropical rain forest home.

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Languages of Sabah

The 1981 Annual Report of the Summer Institute of Linguistics Malaysia Branch, includes the following language groups for Sabah. (The distinctness of the languages preceded by the "?" is not fully ascertained yet; they are strikingly similar to the language enumerated just above. Some languages consist of two or more distinct dialects; these languages are indicated by "(dial.)."

INDO-EUROPEAN

AUSTRONESIAN

1. Chabacano

Western Austronesian

2. Butung
3. Javanese (dial.)
4. Lundayeh
5. Banggi
6. Illanun
7. Suluk
8. Bugis (dial.)
9. Ida'an (dial.)

Malayic Family

10. Iban
11. Cocos
12. Brunei

Bajau Family

13. East Coast Bajau
14. West Coast Bajau

Bornean Stock

15. Tidung

Paitanic Family

16. Lingkabau
17. Makiang (including Sinabu, Sinarupa, Kolobuan, Rumanau)
18. ? Dusun Segama
19. ? Lobu
20. Tambanua
21. Dumpas

Murutic Family

22. Kolod
23. Kalabakan Murut
24. Selungai Murut
25. Serudung Murut
26. Sembakung Murut
27. Tagal (including Sumambu, Alumbis)
28. Timugon
29. ? Beaufort Murut
30. Baukan
31. ? Tengara
32. Nabay
33. ? Paluan (including Sook Murut Takapan)
34. ? Pandewan
35. ? Gana
36. ? Dusun-Murut

Dusunic Family

37. Rungus
38. Tatana
39. Klias River Kadazan

Dusunic Family (Cont'd.)

40. Papar
41. Bisaya
42. Kuijau
43. Eastern Kadazan
44. ? Mangkaak (including Sukang)
45. Coastal Kadazan
46. ? Sugut Kadazan
47. ? Minokok
48. Northern Dusun (including Kimaragang, Garo, Tebilung)
49. Central Kadazan-Dusun
50. ? Kuala Monsok Dusun
51. ? Lotud

Threats to the Proboscis Monkeys

Sonia Jeffrey

Proboscis monkeys Nasalis larvatus are endemic to the island of Borneo, where they are found along coastlines and rivers up to about 100km from the sea. Van der Zon reported them 200km inland on the Mentawai river but found this to be exceptional.[4] None have ever been reported from the strip of Sarawak coast between the Rejang river in the east and Brunei.[3] Elsewhere, especially in the more densely populated north Borneo, they have been eliminated from large areas of river and coast by hunting and farming. The species is given vulnerable status in the IUCN Red Data Book.

Proboscis have been recorded in areas of both wet and dry vegetation, but always on acidic soils and near rivers. Habitats vary from peat swamp forest, as in the Tanjung Puting nature reserve, and dry kerangus forest, as in the Samunsum wildlife sanctuary, to high forest of mixed dipterocarps growing on limestone, as in the Pengadan study area. Rivers are usually tidal and may be brackish or fresh, the former bordered by salt-water palms Nipa fructicans and pedada trees Sonneratia spp., the latter, further inland, by Pandanus spp., Ficus microcarpa and Octomeles sumatrana. Riverside vegetation is important because proboscis sleep in branches close to or overhanging rivers at night. Favorite trees include pedadas F. microcarpa and O. sumatrana because they also eat their leaves, and dipterocarps, e.g. Dryobalanops oocarpa. They may sleep on overhanging nipa palm fronds if the stands are extensive and there is nothing taller, although Kern reports that in Brunei Bay they showed no tendency to sleep on Nipa.[2] Where swamp forest trees such as Ganua motleyana and Heritiera spp. occur by the river, proboscis choose these because they are the tallest available. Where there are few if any trees, such as on farms or recently abandoned farms, there are no proboscis, and they have not been observed sleeping inland of rivers, although on one occasion following continual harassment at dusk they stayed hidden in trees a few metres back from the river until well after nightfall. They were rarely found in estuarine vegetation dominated by the mangrove Rhizophora apiculata, and never in pure stands of this species, although Kern reports that they eat its leaves.[2] At dusk when they settled in their sleeping trees, they could be counted fairly accurately from the river, and where the habitat was suitable there were at least 20.2 animals per sq. km.

Proboscis were not often seen more than 3km upstream of Pengadan, which approximately coincides with the end of the limestone. Occasionally they were seen in the seasonal swamp forest on smaller rivers (5-10m across) about 15km upstream of Pengadan. Sleeping groups varied from one or two animals, always adult males, to nearly 100 in several trees on both sides of the river, but groups of 10 to 18 were by far the most usual. Larger groups than this comprised more than one foraging unit, the units arriving at different times and from different directions; large groups split up again the following morning.

The highest proboscis densities were in the limestone area upstream of Pengadan, where they were twice as numerous as downstream. Pengadan itself covers about 4 sq km, extending for about 2km along both banks of the river at the end of the limestone karst, and is considered to be a fairly effective barrier to proboscis migration up and downstream. Numbers along the river Baai downstream were comparable to those of the large and medium rivers at Tanjung Puting - about 10 per sq km. Habitats here were generally low-lying, flat and seasonally swampy with some brackish water. Along the small river at Tanjung Puting, where abandoned farms and settlements had become large treeless grass areas, numbers were smaller. Forest on well drained soils immediately inland of the river Samunsam is classified as kerangas or heath forest.[1]

Since Kalimantan accounts for more than two-thirds of the island of Borneo, Indonesia has a major part in the protection of proboscis monkeys. They have been reported from four of Kalimantan's seven established nature reserves, including a sighting in Bukit Raya some 200km from the coast (UNDP/FAO 1977), but their status and distribution there is not known. Very little has been written on their habitat requirements and whether existing reserves provide adequate protection. Proboscis occur in a wider variety of riverine habitats than was originally thought but no detailed ecological study has been made; previous studies were made in mangrove and swamp forest, none in tropical forest.

Population pressure is not as yet a serious problem in Kalimantan, with some six million people in about 50,000 sq km. People tend to live on the coast and along rivers, especially those navigable by small craft. The Dayak settlers practised shifting cultivation with small plots scattered along the rivers, their only other disturbance of the riverine forest being the collection of rattan and housepoles. Deer and pig meat were preferred to monkey meat and were shot, using blow-pipes and poison darts or snared. In the last 12 years much larger settlements have spread

up the rivers due to the rapid increase in logging companies, most of which have their base camp on the river and raft logs down it to the coast. Recent regulations (1980) stipulate that 60 per cent of logs produced must be processed locally, with the result that numerous sawmills and plymills have been established in remote areas, with many people coming in from other more remote Indonesian islands. Indonesia hopes to become self-sufficient in pulp and paper by 1984, and there are major plans for the industry. The three major projects of Kalimantan rivers, two of which are just north of Pengadan, will use raw materials harvested from hardwood forests including swamp species such as Dacrydium spp. The Kayan river pulp and paper mill, with a proposed annual capacity of 135,000 tons from 600,000ha of forest, is one of the smaller projects, but will lead to large-scale destruction of habitat.

Locality	Total distance (km)	No. counts made	Maximum no. individuals/sq km
River Baai downstream of Pengadan	62	10	9.3
River Baai upstream of Pengadan	28	10	20.2
Tanjung Puting - large river	20	2	10.5
Tanjung Puting - medium river	5	1	10.6
Tanjung Puting - small river	17	2	5.1
River Samunsam	(estimated by K. Proud)		13.3

Besides the spontaneous migration to work in Kalimantan's growing wood-processing industries, Indonesia, aided by the World Bank, is moving 2.5 million people from crowded Java mostly to Kalimantan by 1984. These people will be expected to farm the poor Kalimantan soils, which, when the forest cover is removed, quickly become leached of their nutrients. As food supplies become scarcer, hunting as an alternative source of protein and income will increase.

Apart from man, predation pressure on proboscis seems slight. Only one eagle, the black eagle Ictinaetus malayensis, is large enough to eat adult primates, although the clouded leopard has been known to eat male proboscis. Crocodiles and pythons undoubtedly take the occasional small monkey.

It is unfortunate that the proboscis monkey's specialized habitat coincides with the very areas in Borneo that are to be colonized, farmed and industrialized by man. The need for more intensive studies of proboscis seems urgent in light of the increasingly gloomy reports on the chances of its survival. (ORYX, June 1982, pp. 337-339).

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OBITUARY

Benedict Sandin, 1918-1982

Benedict Sandin, the former Curator of the Sarawak Museum, noted folklorist and Iban ethnographer, died at his home on the Paku tributary of the Saribas River, on the 7th of August, 1982. He was buried, on August 12th, in the ancient Iban cemetery at Batu Anchau, a mile and a quarter downriver from his natal longhouse at Kerangan Pinggai.

Benedict Sandin was born, Sandin anak Attat, on the 18th of October, 1918, the eldest of four children of Attat anak Penghulu Garran and his wife Indu anak Nyanggau. His parental grandfather, Garran "Lembang Batu", was Native Chief of the Lower Paku Iban from 1875 until his death in 1900. He succeeded Benedict Sandin's great grandfather, the redoubtable Linggir "Mali Lebu," who led the Paku Iban during James Brooke's campaigns against the Saribas in the 1840's. Benedict's maternal grandfather, Nyanggau, was a well-known dukun, or traditional curer. His father was a public orator. By his own account, it was his father who first instructed him in the richly poetic language of Iban oration, traditional narrative and ritual of which Benedict later became an undisputed master. His father died in 1946; as a bachelor, he had fought with the Rajah's forces at Bukit Salong in the Ulu Rejang.

For part of his childhood, Benedict lived with his maternal grandparents at Sebemban in the lower Saribas. In 1928, he was sent by his father to St. Augustine's School, Betong. Here he was a student from 1928 until 1933. He continued his education at St. Thomas', Kuching, from 1933 to 1939. He entered the Brooke civil service, as a junior Native Officer, in 1941, and remained in government service throughout the Japanese occupation.

In 1941 Benedict married Evelyn Lemok of Bangkit, Paku. They had four children, a daughter and three sons. Evelyn died in 1951, and Benedict remarried Dindu anak Saga of Samu in 1953.

After the war, Benedict's talents as a writer were recognized and he was transferred first to the Education Department, then to the Sarawak

Information Office. As an Information Officer he served for two years as editor of Pembrita, the first Iban language news publication. Here his gifts came to the notice of Tom Harrisson, then Curator of the Sarawak Museum, and a special post was created for Benedict on the Museum staff in 1952.

Shortly after he joined the Museum, Benedict was sent to New Zealand for a year's training (1954-55) under an UNESCO fellowship. Here he studied museum techniques and attended courses of lectures in the Department of Anthropology, University of Auckland. Shortly after his return to Sarawak, he took up a newly established post as staff Research Assistant. Although largely self-taught, Benedict possessed both dedication and remarkably natural gifts as an ethnographer, and the years that followed were phenomenally productive. He sought out knowledgeable bards, genealogists and authorities on local history, and through assiduous recording developed an erudition and detailed knowledge of Iban traditional culture, history and religion unrivaled by that of any other single individual.

One of his major interests was the extraordinarily complex traditonal religion of the Iban. His approach to the subject was chiefly by way of the richly allegorical chants, known as timang, or pengap, sung by Iban bards (lemambang) during major cycles of longhouse ritual (gawai). Over the years he published a superbly detailed series of chant texts in Iban (1968a, 1969a, 1971, 1972, and 1976a). He also wrote more generally in Iban on religious cosmology, using both the pengap and spirit-hero sagas (ensera) as his main sources (1962a, 1964, and 1968b). These works include some of Benedict Sandin's finest ethnographic writings. Only one of the ritual chants that he recorded during these years, that of the Gawai Burong, was fully translated (1977), although others were presented in partial translation, together with annotational analysis, both by himself and with Tom Harrisson (cf. 1961, 1962c, 1967b; Harrisson and Sandin 1966). In addition to his writings on the Gawais and their cosmological background, Benedict also published important studies of augury (1980), death ritual (1966a, 1968c, and 1969b), and dream divination (1962b, 1966c).

Two other major interests were traditional history (1967a) and adat (1966b, 1976b, 1980). To appreciate Benedict Sandin's contribution to these areas, it must be noted that his lifetime bridged a crucial era. At the time of his birth there were still living in the Saribas elderly men and women who were born before the arrival of the Brookes. As a child, he was thus exposed to the values of a fully traditional way of life. In this respect, he belonged to the last generation in the Saribas with a first-hand link to the past. In earlier times the Paku Iban and others of the lower Saribas had been a major warring force. Following their pacification, former war leaders and their successors journeyed abroad, bringing back with them trading experience, cash crops, and an intense interest in education. Among these travelers was Benedict's own grandfather Nyanggau. The Saribas Iban thus launched themselves on an early course of rapid self-modernization, and by the time of Benedict's birth, the

region had entered upon a period of unprecedented economic prosperity, change and cultural florescence, the experience of which strongly shaped Benedict's concern with history and traditional adat.

His approach to history, as religion, was largely by way of oral tradition. In his most important historical study, The Sea Dayaks of Borneo Before White Rajah Rule (1967a), he reconstructed the proto-history of Iban migration and settlement in Sarawak primarily be means of oral genealogies (tusut) and traditional narrative histories. Using these same sources, he also made important additions to our knowledge of Iban society during the subsequent century of Brooke rule, particularly through his highly profitable collaboration with Robert Pringle (cf. Pringle 1970: xii-xv; Sandin 1966b). His concern with adat was mainly historical and in his writings he shed important light on the formative development of a number of significant Iban institutions, including slavery and coastal raiding.

Benedict Sandin became Curator of the Sarawak Museum and Government Ethnologist in 1966. He retired in October, 1973, and in recognition of service, was awarded in the same year the Kesatria Mangku Negara by the Yang Di-Pertuan Agong on behalf of the Malaysian Government.

Following his retirement, Benedict was appointed Senior Fellow at the Universiti Sains Malaysia, Penang. His appointment ran for a year and a half (1974-76). Upon his return to the Paku, he worked for the next year on a study of Iban shamanism aided by a small grant from the Smithsonian Institution (1978). In his final years, he returned to his life-long interest in genealogies. With the help of a small group of research assistants, he compiled a collection of over 300 genealogical transcripts with associated biographical data. These have since been deposited in the Sarawak Museum. He was deeply concerned with their preservation and personally saw in this collection a fitting conclusion to his own life's work. Regrettably they proved to be just that.

Benedict Sandin succumbed to lung cancer and related complications on the 7th of August, 1982. His funeral was conducted according to a complex custom of ceremonial honour previously accorded only once before in the history of the Paku to his great grandfather, the famous 19th century war chief, Linggir "Mali Lebu." This particular form of mourning custom (or adat pana) is known as sigi rusa, and of all the honours he received in life none could possibly have meant more to him than this, bestowed, as it was, by his Paku kin and neighbours.

Following five nights of lying-in vigil, or rabat, Benedict Sandin was buried in the early morning hours of August 12th, among his Paku ancestors, including Linggir, his grandparents and parents at the Batu Anchau cemetery. Burial was followed by seven consecutive evenings of tungkun api, or burning of candles at the graveside, and by three months of mourning. During the five days and nights of rabat, more than a thousand people journeyed to the Paku to pay this greatly admired man their last respects. (Clifford Sather)

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Anwari Dilmy
Herbarium Bogoriense - LBN, Bogor

With the death of Professor Anwari Dilmy on 25 April 1979, Indonesia lost a man who contributed a large part of his life to safeguard the valuable collections of the Herbarium Bogoriense of the National Biological Institute.

In 1937 he entered the service of the Forestry Department, as a volunteer in the Gombong Resort (Central Java), but was released because of his nationalistic activities and was transferred to Sampit and Kapuas (S. Kalimantan). At the end of the Japanese occupation he was attached to the Office of Governor of Borneo in Yogyakarta. Towards the end of the Independence War he returned to school in Bogor and continued at the Akademi Kehutanan (Forestry College), where he finished his studies in 1952. He was then nominated Forest Conservator of Tarakan District.

Although he was not a qualified taxonomist, his keen mind and his willingness to accept advice was one of the reasons that the valuable

collections of Herbarium were saved for posterity. The buildings were in an abominable state after the World War II, but Anwari Dilmy managed - with the help of his numerous political acquaintances - to obtain funds for new roofings, the first step in safeguarding the collections.

When in 1962 no director of The Botanic Gardens of Indonesia was available, a collegiate was assigned to perform the Director's duties and Dilmy was one of them. In 1970 he moved back to Banjarmasin to become Rector of the Lambung Mangkurat University. Twice he occupied the Rector's seat (8 years). In 1972 he obtained the title of Guru Besar Luar Biasa (Professor Extraordinary). He was very active in expanding connections of the University with many Institutes abroad, making the University a focus for development of S. Kalimantan. He lectured at the same time at the Faculties of Agriculture, Forestry and Veterinary Sciences.

During his tenure as Head of Herbarium Bogoriense, he attended officially Pacific Science Congresses (Tokyo, Hawaii, Bangkok) and the Unesco sponsored Symposia on Humid Tropics Vegetation in Ciawi, Goroka and Kuching. For several years Dilmy was a member of the Standing Committee of Botany in the Pacific Science Association, Member of the National Committee for Natural Resources and Chairman of the Committee of Forestry Publications. He wrote some 25 papers on botanical subjects. (A. J. G. H. Kostermans) Reinwardtia , Vol. 10:1, pp. 5-7, February, 1982

NEWS AND ANNOUNCEMENTS

THE UNIVERSITY OF HULL

CENTRE FOR SOUTH-EAST ASIAN STUDIES

OCCASIONAL PAPERS SERIES

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The Centre for South-East Asian Studies has begun the publication of a series of Occasional Papers. The Papers which are now ready for issue are:

No. 1 'British attitudes to indigenous states in South-East Asia in the nineteenth century' by DK Bassett, 71 pp, 1.50, exclusive of postage

No. 2 'Ethnic classification and ethnic relations: a Borneo case study' by VT King, 49 pp, 1.50, exclusive of postage

It is hoped to publish similar low-cost Papers written by staff of the Centre or associated colleagues approximately twice a year. The Papers will normally reflect the particular interests of the Centre, which is concerned with the study of the economics, modern history, human geography, politics, sociology and social anthropology of South-East Asia.

Institutions, departments or individuals who wish to receive copies of the Occasional Papers should write directly to The Secretary, Centre for South-East Asian Studies, University of Hull, Hull HU6 7RX, England.

REPORT ON THE BUFFALO CENSUS AND SURVEY IN BRUNEI 1980/1981

The Buffalo Project, initiated by staff based at the Sinaut Agricultural Training Centre in September, 1980 proposed a buffalo census and survey to appraise the present buffalo situation in Brunei. The census and survey started in December, 1980 and ended in May, 1981. All four districts were covered in the survey. Buffaloes were found in 24 sub-districts and 104 villages. A total of 977 farmers were recorded, owning 6,157 head of buffaloes at an average of 6.3 buffaloes per farmer. More than 60% of the farmers were interviewed and the results obtained were summarized and discussed.

Each farmer occupies an average of 7.5 hectares to rear his buffaloes and the total area devoted to buffalo is 6,547 hectares. Most of this area is State land and only 11% is under lease to the farmers themselves. Fencing generally is minimal and most areas are prone to flooding. Seven main species of grass were identified. Salt is commonly included in the drinking water of buffaloes but supplementary feeds or crop by-products are rarely fed.

Only three farmers keep personal records of their stock while about 80% had registered their animals with the Department of Agriculture. Most animals died from unidentified causes although drowning was commonly reported. Almost 70% of the animals surveyed are nose-ringed and 74% of the respondents carry out this practice. Very few buffaloes have night shelter. The major problem faced by the farmers is limited land area to increase their stock. Most farmers keep buffaloes as a hobby and not as a business concern.

The Brunei buffalo owner is on the average nearly 56 years old and has over 20 years of experience in buffalo rearing. Despite this, his knowledge of animal husbandry is limited. Only 34% of the farmers are self-employed. The buffalo farmer also owns other livestock, among which chickens and ducks are the most popular. Cattle are reared by about 11% of the buffalo owners. Almost 70% had benefitted from veterinary services and other available Government supported a subsidies.

From the results obtained, number of recommendations were made. These included further investigations to increase data on feed resources and availability particularly in the grazing areas, on the growth rate of calves and on reproductive preformance.

CONFERENCE ON THE SCIENCES IN KALIMANTAN

On the 11-14th of November 1982, a seminar entitled "Conference on the Sciences in Kalimantan" was held at the University of Palangka Raya (Central Kalimantan), under the chairmanship of the rector, KMA M. Usop, M.A. Approximately 30 different papers were presented on a variety of topics in both the social and phyical sciences by participants from all of the provincial universities and Regional Development Planning Boards in Kalimantan, as well as from the universities of IPB and Gadjah Mada in Java. (Michael R. Dove represented Gadjah Mada, and read a paper entitled "The Dual Economy of Rubber and Swiddens in Kalimantan, and Implications for Development".)

In a related development, Rector Usop has announced the readiness of Universitas Palangka Raya to sponsor (via L.I.P.I.), and provide some local services (e.g., dormitory-type living quarters) to, foreign scholars wanting to carry out research in Central Kalimantan, in exchange for which the latter would be expected to present seminars/classes at the university and also supervise university researchers (some of whom would be taken on as research assistants). Rector Usop has also announced their desire to secure finanical support, from an interested donor agency, for a foreign scholar to fill a full-time position at Universitas Palangka Raya as a research consultant. The university's research priorities include the ecologically-oriented study and agricultural development of river-bank environments, peat and swampy soils, and heath forest. The general focus is on hydrological factors in rural development (Michael R. Dove, Ph.D.).

BORNEO NEWS

Regional News

Research workers often immobilize female turtles taken after egg-laying by turning them on their backs for tagging, weighing and measuring. The same researchers have often wondered why such a small percentage of turtles return to the nesting beach in subsequent years. Tag loss, natural mortality and missed turtles may explain this, but a recent study by Rosskopf and Woerpelin has led Peter Pritchard, in the May issue of the Marine Turtle Newsletter, to question this handling technique. Rosskopf and Woerpelin found that the sudden death of a captive female desert tortoise Gopherus agassizi was due to peritonitis resulting from ruptured eggs in the body cavity. This, they say, is common in chelonians and is thought to be induced by trauma to the delicate developing ova. They

advise researchers to avoid trauma to all female chelonids, especially any activity that may lead to the tortoise turning on its back. Peter Pritchard suggests that present handling of marine turtles may be causing rupture of next season's eggs leading to breeding failure or mortality from egg yolk peritonitis. Not for the first time a scientific research practice may be harming the species being studied. (ORYX, XVI, No. 5, Oct. 1982, p. 392)

Brunei News

New Law for Brunei

Brunei's Wildlife Protection Enactment, drafted in 1978, has been approved by HH the Sultan. The act makes provisions for wildlife sanctuaries and prohibits the hunting, killing and capturing of 34 animal species. Offenders face up to one year's imprisonment and maximum fines of $2000. (ORYX, XVI, No. 5, Oct. 1982, p. 401)

Kalimantan News

HARRY WIRIADINATA and M. KATO (Kyoto University) during Jan.-Feb. 1981 explored the Sebulu, Sangkulirang, Kong Kat, Kong Botak, Tabang and Berau areas in East Kalimantan, and collected 1400 nos. herbarium specimens, many of them ferns. At about the same time a team of the Osaka City University ecologists led by H. OGAWA was in the Sebulu area, north of Samarinda, to study the productivity of the lowland dipterocarp forest; S. SUKARDJO of Herbarium Bogoriense joined this group.

HERWASONO SOEDJITO and TUKIRIN PARTOMIHARDJO and party conducted ecological studies of a lowland dipterocarp forest at Wanariset, 38 km NE of Balikpapan, East Kalimantan, and collected 164 nos. herbarium specimens of flowering plants and fungi, on 10-30 Sept. 1981. On 10 Sept.-15 Oct. 1981, J. P. MOGEA made a collecting trip to Wanariset, S.-Kalinju, Kong Kat, and Gunung Menyapa; 349 nos. herbarium specimens and 34 nos. live specimens were brought back to Bogor.

A Japanese-Indonesian-Dutch team, consisteing of K. IWATSUKI, M. KATO, K. UEDA (all Kyoto), M. OKAMOTO (Osaka) and K. MATSUI, (herpetologist, Kyoto), DEDY DARNAEDI and EKO BAROTO WALUJO and R. GEESINK made an exploration-expedition in East Kalimantan from 6 July to 1 Sept. 1981. The trip was not completely successful because of extreme drought; no rain at all during 2 months!

The team collected together near Malinau (lowland rainforest 3°36'N 116°40'E), around Long Bawan (sandstone hill forest 3°52'N 115°42'E) and in Berau (lowland rainforest, limestone hills 1°50'N, 117°15'E). Most of the collections were gathered by two separate groups; the first group (Kato, Okamoto, Baroto Walujo) visited the area around Batu Harun (up to 2000 m, 4°8'N 115°47'E) and Pa Rian (sandstone hill forest 3°50'N

115°42'E); the second group (Ueda, Darnaedi, Geesink) walked to Pa Nado (sandstone hill forest up to 1800 m, 3°52'N 115°32'E) and Pa Milau (sandstone hill forest up to 1600 m, 3°52'N 116°O'E). Besides herbarium (about 4000 collections, where possible in 8 sets) living material was collected, specially orchids, sent to the Gardens at Bogor and Leiden. Much separate alcohol material was collected. Geesink made about 1000 colour slides, and a super 8 30-minutes sound movie. After the expedition he organized in Bogor and in Kyoto a practical course entitled "How to use Thonner's key in practice", which was received enthusiastically (Flora Malesiana Bulletin, September 1981, Number 35, pp. 3733-4).

SOEDARSONO RISWAN returned to Indonesia in November after completing his doctoral dissertation on "Ecological studies on primary, secondary and experimentally cleared mixed dipterocarp forest and kerangas forest in East Kalimantan, Indonesia."

Sabah News

A survey was made into the inland swamp forest growing on podsols by CHARLES PHILLIPPS. Dacrydium pectinatum/Tristania bilocularis forest was the most extensive vegetation type on the podsols with a taller type dominated by Shorea multiflora on better drained stream side sites. As regeneration of potential timber trees was sparse it appears the area is most suitable as a national park or similar type of conservation area. The great beauty of this - unique to Sabah - vegetation adds to the importance of preserving it. A good number of fruit trees including Durio sp. (poss. D. carinatus) were found growing in swamps infested with Pholidocarpus maiadom.

A survey of the Bod Gaya/Bohai Dulang group of island off the Semporna peninsula was held jointly with National Parks and some Government Departments. Five species of Dipterocarp were encountered including Parashorea tomentella growing near the top of Bod Gaya. Memecylon and Canarium were the most common trees often growing in almost pure stands covering large areas. Both these genera and most of the other trees found there are mainly bird-dispersed. It is possible these forests were started off by pigeons and doves, possibly also hornbills, flying with fruits from the mainland.

A survey was made into the northern part of Kinabalu National Park where some very interesting Dipterocarps were found.

An ecological survey of the Shorea laevis dominated hill forests in Sabah's interior has revealed many interesting facts. One is the great number of Parashorea malaanonan trees which cover the lower and mid-valley slopes; previously this tree was thought not to be so common in the western interior. Parashorea tomentella is also common but to a lesser extent and favours the flatter areas.

Attempts have been made to collect seeds of the 20 or more species of wild Durio growing in Sabah. Fruits of some probable new species have been collected and are soon to be planted in Sepilok arboretum. An interesting observation is that fruits of at least two species of mountain durian (Durio sp. growing at about 3,500-4,000 feet) grow upright on the branches rather than downwards as is the case for most lowland Durios.

G. S. DESILVA presented a case study, "Protected Areas and Turtle Eggs in Sabah, East Malaysia" to the World National Parks Congress at Bali in October, 1982. The organizers will publish the paper in the proceedings of the conference. (Ibid., pp. 3732-3)

Sarawak News

RITA MANURUNG returned to Malaysia in September to resume her post as head of the vegetative propagation section in the Department of Agriculture, Sarawak. Her doctoral studies on "Environment and growth substances affecting gibberellic acid-induced coning of Thuja plicata and flowering in Tabebuia pallida" were largely conducted at I.T.E. Edinburgh.

J. DRANSFIELD and S. SOENARKO DRANSFIELD, of Kew, together with M. J. MARSH of the Gardens, collected c. 400 numbers of palms (to go to SAR, K, BH, L, SAN, BO) and 40 bamboos in April and May 1981, in a joint effort with the Sarawak Forest Department. They visited G. Matang, Bau, Pedawan, Bako, Lambir Hills, Marudi, Semengoh, G. Pueh, Pasir Jangka, G. Gading, Sempadi, G. Gaharu, G. Buri.

S. C. CHIN of KLU has completed field work on subsistence farming at the village of Long Selatong, Baram, Sarawak. Several visits were made between Nov. 1976-Apirl 1980, including a continuous nine months stretch between Nov. 1976-August 1977. More than 500 numbers (nos. 2500-3091) were collected, consisting of a very assorted lot (including some bryophytes). Material will go to L (except for some 'firsts' which were retained by SAR).

A. C. JERMY and JOSEPHINE RANKIN (BM) did field work with emphasis on ferns in Sarawak (nos. 14832-15263) and Sabah (nos. 15301-15530), late in 1980. The total harvest was 661 numbers; one set was given to the Kinabalu Park Herbarium. (Ibid.)

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