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NOTES FROM THE EDITOR

"Where does all the material for the Bulletin come from? Do you solicit it or is it just contributed?" asked one of my research assistants who was proof-reading this issue. I replied that some of the material is solicited, especially book reviews, but that a substantial part of it is contributed by persons who share interests in the study of Borneo.

The current issue is illustrative of the broad network of persons and diversity of interests which led to the creation of the Bulletin and have brought it into the second decade of its existence. Research Notes, describing linguistic and social change, were sent from the United States and Malaysia; Brief Communications, analyzing the state of soil science and land development, were written by persons working in the Netherlands and Indonesia; and the Abstracts and Bibliography report on recent research in the fields of primatology, anthropology, botany, and zoology by individual scholars and multidisciplinary teams.

The questions present an opportunity to emphasize that the continuation of the Bulletin as an informative and useful publication is dependent on materials submitted by persons who have lived in or conducted research on Borneo. We encourage your reports on recent fieldwork, re-interpretations of earlier research, responses to notes and communications, and reviews of any writings dealing with Borneo.

I am delighted to report that financial contributions reported in the last issue and received since its appearance make it possible to print the current issue and leaving a small balance in our account. Recent contributors to the Council include Helen Appell, J. B. Ave, Martin Baier, Gale Dixon, Peter R. Goethals, Victor T. King, Wolfgang Marschall, Rodney and M.C. Needham, J. R. Palmer, and Leigh Wright.

THE BORNEO RESEARCH COUNCIL

The Borneo Research Council was founded in 1968 and its membership consists of Fellows, an international group of scholars who are professionally engaged in research in Borneo. The goals of the Council are (1) to promote scientific research in the social, biological and medical sciences in Borneo; (2) to permit the research community, interested Borneo government departments and others to keep abreast of ongoing research and its results; (3) to serve as a vehicle for drawing attention to urgent research problems; (4) to coordinate the flow of information on Borneo research arising from many diverse sources; (5) to disseminate rapidly the initial results of research activity; and (6) to facilitate research by reporting on current conditions. The functions of the Council also (cont. p. 61)

RESEARCH NOTES

A NOTE ON THE LOSS OF INTERVOCALIC *-H-* IN BRUNEI MALAY

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Rarely is it possible to catch an historical sound shift in process and identify the pattern to which it apparently is attaining. Brunei Malay, however, provides exactly this. Dyen (1971) has cited a male speaker of Bandjarmasin (Borneo) Malay who still retains intervocalic *-h-* (VhV) in certain words where Standard Malay has dropped it. Many such speakers are to be found in Brunei where the loss of intervocalic *-h-* seems to be an ongoing process.

In normal spoken Brunei Malay, the word for "crocodile" is *buaya*;[1] but in certain literary contexts or where archaic forms are needed for metre (as in *pantun*-making[2]) the form *buhaya* often appears. In careful speech the word for "language" is *bahasa*; but in everyday speech, especially in rapid speech, the form is *basa*, showing loss of the intervocalic *-h-* and assimilation of the resulting double vowel to a single *a*. The verbal form *sahut-menyahut*, "ululating," shows intervocalic *-h-* retention while the nominal form *saut-sautan*, "ululation," shows loss.

Native speakers of Brunei Malay are not unaware of the linguistic process whereby intervocalic *-h-* is disappearing. When making intentional archaisms they at times use the form *tuha* (insertion of intervocalic *-h-*) for the normal *tua*, "old, aged". There is a vague feeling that this may in fact have been the "oldendays" form. But at times speakers will playfully make an archaism which they feel never really existed. This is done by saying *duha* for *dua*, "two". Since the modern form of the word "eight" is known to be *lapan*, and the older form known to be *dualapan*[3] the archaism is seen as playful. However, there may be some carryover from the phrase *dua raka*, common literary form *duha raka*, "betraying, not properly reciprocating" (e.g., a child refusing to acknowledge its own parents) which has implications of something being other than it ought, and hence a duality.

By contrast, intervocalic *-h-* is retained in certain words. Thus *tuhor*, "low" (of the tide); *tuhot*, "knee"; *bahaya*, "danger"; *tahan*, "endure, sustain"; and *dahan*, "branch", show no signs of losing intervocalic *-h-*.

Intervocalic *-h-* is absent, and by native speakers is thought never to have been present, in such words as *jauh*, "far, distant"; *sauh*, "anchor"; *buah*, "fruit"; and *tuah*, "courage". But here the apparent double vowel is in

fact a diphthong conditioned by the final *-h-* which follows. This is a different phonetic environment which involves the question of final aspirates, laryngeals, and stops in Malay and by implication in Proto-Malay and Austronesian, matters outside the scope of the present paper.

To round out the comparison with Dyen's findings the following list presents the Brunei Malay equivalents of the words in Dyen's list (1971:39) of critical words for the reconstruction of laryngeals. (Omitted are the words *tua*, *buah*, and *buaya*, already discussed.) Of the words with reconstructed **q* the equivalents are: *jait*, "sew"; *dahi*, "forehead" (*-h-* always present); *pait*, "bitter" (*-h-* retained only in the name of the kingdom Majapahit); and *taun*, "year" (*tahun* with retained *-h-* is a relatively rare literary form). Of the words with reconstructed **h* the equivalents are: *daun*, "leaf"; *kait*, "to catch with a hook, to crochet"; *lauk*, "fish" (the usual accompaniment of rice); and *naik*, "ascend". Of the forms with reconstructed *nothing* the equivalents are: *banua*, "continent"; and *laut*, "ocean" (Murut *laud*, "ocean"). Of these only *dahi*, "forehead", shows no loss of intervocalic *-h-*, possibly in part due to the fact that the resultant form *dai* would sound very much like *tai*, "feces". The word *tahun* appears only in literary readings which may be influenced by Arabic orthography.[4]

The question which presents itself, then, is in what phonetic environment is loss of intervocalic *-h-* occurring in present-day Brunei Malay. Subject to further research, the following may be suggested. Retention or loss of intervocalic *-h-* is associated with, and possibly conditioned by, the nature of the word final. Loss seems to be occurring in environment back high to central low, as in *-ua-*, retention occurring in environment back high to back mid, as in *-uo-*. For environment central low to central low, *-aa-*, the conditioning factor appears to be more remote. One possibility is that presence of a full consonant following the second *a* leads to loss, and semi-vowel following the second *a* leads to retention. Under the condition of word final aspirate, *-h*, intervocalic *-h-* seems not to have existed. It is problematic in environment central low to back high, *-au-*. In environment central low to mid high, *-ai-*, intervocalic *-h-* is retained except where the presence of a final stop, *k* or *t*, conditions its loss. And in environment central low to back high, *-au-*, intervocalic *-h-* may be either reinforcing an already existing phonemic distinction or be in the process of itself acquiring value as a phonemic distinguisher.

The foregoing suggests that fuller phonetic and phonological study of Brunei Malay in the future should have considerable importance for Austronesian linguistics. For here is an example of a phonological shift in progress: the loss of intervocalic *-h-*, which has been completed in other dialects of Malay. Elucidation of the structural features conditioning this intervocalic *-h-* loss promises to shed light on the fundamental structure of Malay phonology and its historical evolution.

Notes

1. When it is used at all, since saying "crocodile" may cause a crocodile to appear, one commonly uses the circumlocution *nini di sungai*, "grandfather in the river."

2. *Pantun* are rhymed quatrains with rhyme scheme ABAB.

3. Speakers analyze this as being 2 - *lapan*; the meaning of *lapan* is generally considered to be "4" (2 times 4 equals 8) or possibly as "10" (10 minus 2 equals 8). This analysis is at least partially by analogy with Murut where Brunei Malay speakers think of "8" as being *duang na lapang*, and "12" as being *duang na pulong*, seen as directly corresponding to Brunei Malay *dua-puloh* (*puloh*= 10). Likewise in traditional Brunei Malay "22" is *dua likor* (*likor* = 20), "23" is *tiga likor* (3-*likor*), and so forth from 21 through 29. "Thirty" is *tiga puloh* (3-*puloh*).

4. *Kulat taun*, a type of mushroom, is sometimes pronounced as *kulat ta'un* (' is a glottal catch).

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RECENT STUDIES OF THE ORANG MIRI

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The Miri or *Mirek* are a small cultural group, with a population of some 2,500 persons, living in the immediate vicinity of Miri town, in the Fourth Division of Sarawak.

Linguistically, the Miri speak a language of what Robert Blust (1972:13) has termed the "Lower Baram" subgroup of "North Sarawak" languages. This subgroup includes besides Miri, Dalik, Berawan, Kiput, Narum, Belait, Tutong, Lelak, and Lementing. The speakers of these languages appear to be the descendants of an early population of the Lower Baram and its tributaries and the smaller rivers near the coast immediately to the north and south.

The Miri were originally interior people of the Miri River (*Likk Mirek*), Padang Liku, Sungai Taniku area, who were forced into a coastal habitat as a result of the downriver expansion of the Kayan and converted to Islam between 150 and 180 years ago. Historically, their closest ties were with the Dalik, the original inhabitants of the lower and the middle Sibuti to the south, and with the Bakong to the east. All three groups are now Muslim, and so Malay, or *Melayu*, by ethnic identity, and today are greatly outnumbered locally by other cultural groups.

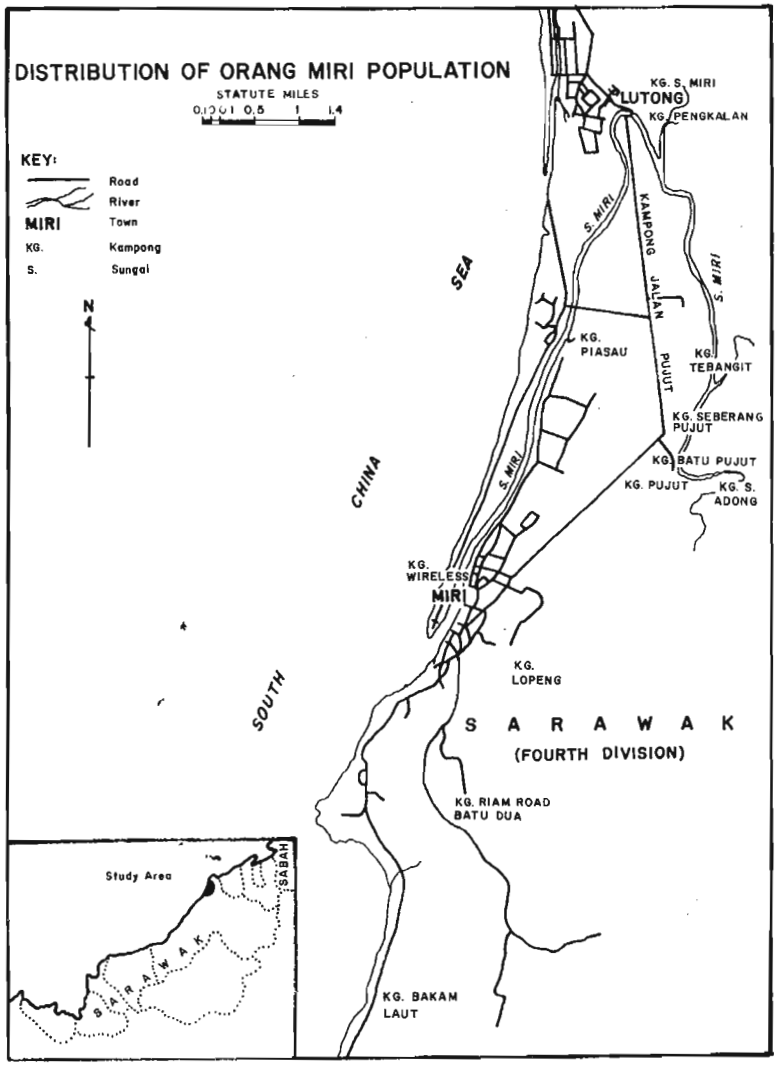
The Sarawak Museum (1976:2; Kedit 1975:33-34) has given special priority to the study of the Miri, Narum, and related groups, and beginning in 1975, as part of a Museum-sponsored program, "to collect oral traditions of minor groups--especially in the Fourth and Fifth Divisions" (cf. Kedit 1975:34),

a final-year student from the Universiti Kebangsaan Malaysia, Julaihi bin Bujang, carried out a brief study of the "Orang Miri." The results, in the form of a short ethnographic sketch (1976a) and a collection of oral historical traditions, are on file in the Sarawak Museum.

Regrettably, the material contained in these reports is almost impossible to interpret because of the extreme naivete with which it is presented. Most seriously, from the internal evidence of the names of villages mentioned in the reports, it is apparent that Julaihi bin Bujang's research was carried out not among the Orang Miri at all, but primarily in the Sibuti area among the Dalik and, to a lesser extent, among the Bakong. However, the source of data is never clearly specified and these groups are treated indiscriminantly. In reconstructing "traditional culture", which is Julaihi's main purpose, this is perhaps not so serious so far as the Miri and the Dalik are concerned, but for the Bakong it is particularly troublesome as their past affinities with these groups have yet to be established. Many of those identified as "Bakong" are Penan-speakers and there is evidence that the cultural origins of the existing group are heterogeneous (cf. Sandin 1958:655-56). Besides the main Bakong river, Bakong settlements extend also into the Sibuti area, where the Bakong live in close proximity with the original Dalik inhabitants of the river (Sather 1976).

For two weeks in April, 1977, and a further month in December-January, 1978, a graduate student from the Universiti Sains Malaysia under my supervision, Tunku Zainah Tunku Ibrahim, carried out a study of the Orang Miri, primarily at Kampung Pengkalan Lutong, a predominantly Miri village of 27 households, located adjacent to the Lutong bridge, east of the Miri-Lutong road, about a half-mile south of Lutong town. In addition to making a fairly detailed study of Kampung Pengkalan Lutong, Zainah paid shorter visits to other Miri settlements, including Kampung Tanjung Batu, Pujut, Kampung Seberang Pujut, Kampung Jalan and Kampung Bakam Laut. During the first field session, she carried out a survey of Miri settlements on which she based her estimate of the current Miri population at approximately 2,500 persons. These settlements are located chiefly at Pengkalan Lutong, Tanjung Batu, Kuala Adong, Tebangit, Seberang Pujut, Jalan Pujut, Lopeng, Riam Road-Batu Dua, Sungai Miri Kechil, Piasau, and Bakam Laut (see map on page 44). The latter is the largest of these settlements. Miri settlement is scattered and much of this population is found interspersed with other people, although in each locale the Miri tend to live by themselves, if not in their own village or village ward at least in a separate concentration of households. Tunku Zainah found this tendency an important factor preserving the Miri's sense of their distinctive identity as *bangsa Mirek*. Except for the dense web of social ties joining together the members of these local settlements, the Miri community exists only subjectively, without any concrete institutional expression.

The results of Tunku Zainah's research were presented as a Master of Social Science Thesis (1978). Although her thesis has to do primarily with the larger question of Malay ethnicity and ethnic assimilation in Sarawak, using the Miri as an example of an indigenous group which historically *masuk Melayu*, that is, assumed, through conversion to Islam, a Malay ethnic identity, she presents ethnographic background on the Miri which is of considerable interest, particularly in view of what little has been previously written about this group.



(After Tunku Zainah Tunku Ibrahim 1978:29)

Part of the Miri's subjective sense of a separate, second identity is based on the preservation, in the memory of the elderly members of the community, of a distinctive history as a group, different from that of other local Malays. Tunku Zainah reports that according to elderly informants the Miri were formerly divided into two groups, the Mirek Bahut and the Mirek Permaisuri. The former were the "original Miri", the latter the followers of a Celebes-born "queen" (*permaisuri*) and her son, Tahir, who married a local woman, Timah. Tunku Zainah records some of the oral traditions that surround Sureng and Deng, heroic leaders of the Mirek Bahut and Permaisuri, who plotted to make her son leader of all the Miri. This division is of no significance today.

The original home of the Mirek Permaisuri was at what is now Kampung Wireless in the Miri urban area. With the later growth of Miri town and the arrival of newcomers from other parts of Sarawak, the Miri retreated, abandoned their land and settled beyond the outskirts of the town area.

Similarly in the preceding century, the Miri retreated downriver in the face of Kayan raids. These are frequently mentioned in the oral traditions. In moving into the coastal zone to escape these raids, the Miri came into contact with Malays, particularly the Brunei, with whom they intermarried, gradually converting to Islam and adopting a Malay way of life. Conversion involved not only a change in religion, but the assumption of a new identity, as *orang Melayu*. Tunku Zainah dates this process by the use of genealogies. From this material it is clear that the Miri did not convert as a community, but gradually over at least two generations, between 180 and 150 years ago.

Basically, Tunku Zainah sees ethnicity as a matter of self-perception and social recognition. The members of an ethnic group may share common patterns of behavior, but the existence of such a group cannot be defined solely in behavioral terms; rather, it rests on what people feel about themselves and the way they are view by others. Tunku Zainah argues that ethnicity may be approached in both objective and subjective terms. Ethnic groups exist as social facts, or cultural realities, being objective in the sense that they have boundaries, recruitment procedures, identifying characteristics, and other objective criteria that permit classification. But these groups are also subjective categories and ethnic identification is one technique that people employ to sort out on particular occasions who is "us" and who is "them" for various purposes. In looking at the process by which a group assumes a new identity, as the Miri did in becoming Malay, Tunku Zainah finds the subjective approach to ethnicity the more useful. Like Judith Nagata (1974) she argues that Malay ethnicity is not an "all or nothing" assumption. The Miri, like other "para-Malays" in Sarawak, preserve "dual identities", as both Malay and, in this case, Miri. One or the other identity comes to the fore, depending on the situation. Miri-ness, she finds, is exposed primarily through language, kinship, and local community ties, and by the sense of a separate history; Malay-ness by religion and behavior associated with religion.

To the Miri, the subjective sense of their second identity, as Miri, is both stigmatizing and a source of loyalty. The Miri take pride in the

fact, validated by oral traditions, that they were the original inhabitants of the Miri area. Yet at the same time, they have retreated passively in the face of newcomers and see themselves, and are seen by others, as politically powerless and economically "backward". To some extent, Miri-ness defines, within the local Malay community, an inferior economic and social status. While accepted as Malays, the Miri as a group tend to be relegated to a lower status than others. In part this reflects their objective lack of economic success, but, as Tunku Zainah shows, it is also symbolized, in an interesting way, in belief surrounding a local *keramat*, a place of pilgrimage to which people go to seek spiritual favor. This *keramat*, located in Ulu Sungai Miri, is said to be the grave of a martyred Muslim saint. According to other Malays, the Miri are the descendants of the saint's pagan murderers, who are suffering under his curse. Thus, while the Miri regard themselves as Malay, and are accepted as such by other Malays, they also maintain a second identity which, through these beliefs, is perceived also by others, chartering the distinctive position they are seen as occupying within the larger Malay community.

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BRIEF COMMUNICATIONS

Soil Maps and Swidden - A Caveat

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In his recent critique of Appell's hypothesis concerning environmental determinism in shaping land tenure patterns among various groups of swidden agriculturalists, Weinstock (1979) assembled a considerable amount of ecological data from published sources such as rainfall records, soil survey reports, and scientific papers. He acknowledged that many of these data were too general to be used to give adequate support to arguments refuting or denying the Appell hypothesis, yet he used them to reach the conclusion that Appell's hypothesis is unwarranted.

Now it is entirely reasonable that someone wishing to obtain an idea of the soil conditions of an area should consult the published soil surveys. However, it is very easy to misunderstand the soil map and report and come to the conclusion that, for example, all the areas on the map having the same colour and name should have identical soil conditions. In fact, this is very rarely the case; like legal documents, soil maps must be read with care, the small print must be understood, and the reader must have come comprehension of how the map was made in order to appreciate its significance and limitations. This is equally true whether the soil map is consulted as a working document for agricultural development or to assist in research into the behaviour of swidden agriculturalists in Borneo. In order to appreciate the value and limitations of soil maps we must first understand their aims, how they are made, and how the soil data are classified and presented.

First, the aim of most soil surveys in all countries is to obtain an inventory of the soils of an area, usually with a view to agricultural development. In most countries, and especially Third World lands, agricultural development means the introduction of new technology, capital investment, getting people to adopt new methods and also frequently to move to new lands. These aims conflict totally with those of the swidden farmer who will be attempting to continue to farm the same areas in the same traditional way by interacting with the vegetation-topsoil cycle.[1] They also conflict because the development scheme clearly means the removal of the original vegetation and topsoil, and their replacement by a mono-crop or mixed cropping system for perpetuity. Thus, soil surveyors will be conditioned to think in terms of the most permanent characteristics of the soil and how they will support proposed developments. This means that the soil survey, and the soil classifications used, as we shall see below, concentrate on the landforms and subsoil properties of the environment.

Second, most soil surveys in tropical lands are carried out at a reconnaissance scale. This means that they will be surveyed and published at scales of 1:70,000 - 1:500,000 or smaller. (At a scale of 1:200,000 a square kilometre is represented by a square 5 x 5mm. on the map.) The soil boundaries shown on the map will not have been mapped from ground observations but by interpretation of landform and vegetation patterns seen on stereo air photographs. In some lands where the air is clear, the photographs are very sharp, but in Borneo and other tropical lands the high humidity reduces the quality of the images and makes interpretation very difficult. Also, a high forest cover can easily obscure important landform features that could suggest useful soil differences not always apparent from the tonal patterns shown by vegetation, particularly those resulting from swidden regrowth. In consequence, the quality of the soil boundary placing depends greatly on the skill of the surveyor and how he relates the stereo image to his knowledge of the ground.

When the boundaries of the mapping units have been provisionally drawn by air photo interpretation, and if possibly by a brief ground check (by no means easy in the Bornean rainforest!) the units will be traversed and sampled to determine what kinds of soil they contain and how these soils are distributed in the landform unit delineated. Because of costs, time,

and access difficulties only a few key examples of each type of mapping unit will be sampled, and then only to discover the most commonly occurring soils therein. If the unit is found to comprise several kinds of soil in a definite geographical relation--e.g., soil A on hill crests, soil B on mid-slopes, and soil C on footslopes of the same landform unit--the unit will be called a soil association. If the unit contains several soils whose geographical pattern cannot be resolved at the mapping scale used, it is called a complex. Both associations and complexes will be drawn as single-colour areas on the map and will be called by a single name in the report. In some instances the information given relates only to the dominant soil in the unit, other soils being ignored as unimportant or just not found because the survey scale is too small.

It is perhaps salutory to note that these map units can only give a broad impression of the main soils occurring in an area. Even in countries where soil survey is practiced at a scale of 1:25,000 or 1:50,000 (e.g. the Netherlands, England, and United States), for these much more detailed surveys having many more ground observations per square kilometre than a reconnaisance survey, it is accepted that a named soil unit may include up to 30 percent of other kinds of soil. Even this value may be too optimistic, as some retrospective sampling programmes have suggested (Beckett and Burrough, 1971; Webster and Butler, 1976). We must therefore not expect that the soil at a given location is necessarily sandy and poor because the location occurs in a map unit comprising poor soil. The map suggests that the soil will most probably be poor, but this, of course, is insufficient precision when facing the complex ecological problems involved in swidden.

The soil is sampled by digging a pit, usually 1.5 - 2 metres deep. The soil profile will show a series of horizons--bands of different colour and possibly texture--beginning from the leaf litter and humus-rich topsoil down through various whitish, reddish, greyish or brownish layers (the subsoil) to weathering rock or parent material. Each horizon will be described in standard terms, and samples will be taken for laboratory analysis. The topsoil and litter usually receive a cursory description and the surveyor concentrates on the horizons beginning just below the topsoil to those just above the weathered parent material or the bottom of the pit, whichever comes first. The soil profile site will also be described according to its landform and micro-relief, and the vegetation will be described in terms that would leave a botanist blinking at their abruptness.

Let us now consider how a soil profile might be classified. If, as a result of the field and laboratory measurements a soil profile has

> a subsoil layer that is enriched by 1% or more eluvial clay than the immediately overlying horizons, and this subsoil layer has a base saturation of less than 50%, and the subsoil as a whole has less than 1.5% organic matter (humus) in any part, and shows no effects of poor drainage, and has no red mottles[2]

it is classified as an Orthic Acrisol in the FAO/UNESCO Soil Map of the World Legend. This is one of the classes of soils mentioned by Weinstock and is well known to be widespread in Sabah and Sarawak. However, the reader will note that the definition of the Orthic Acrisol says nothing about its absolute sandiness, clayiness, or fertility.[3] These are features

that might be reflected at the next level of soil classification into soil families on the basis of soil parent material. Even this level is very generalized. There are many other factors such as land use, vegetation, precipitation, temperature, degree of erosion and micro-relief that can contribute to considerable within-class variability. For example, in the reconnaisance soil survey of Sabah (Bower et al 1975) we mapped Orthic Acrisols into four soil families based on four broadly defined groups of soil parent material. Within some of these families the soils described ranged from sandy (less than 20 percent clay) to clayey (more than 35 percent clay and less than 20 percent sand) and in base saturation from very low (less than 5 percent) to moderate (50 percent). It should be clearly recognised that even though these different soil profiles were described and classified, at the mapping scale used (1:250,000) they could not be mapped out as separate families, but were delineated as associations or complexes.

The value of the reconnaisance soil survey lies not in being accurately able to predict the soil conditions at any given location, but rather that, once being at a given location and having sampled the soil, or having the accurate and specific data for the site, one can match the soil with those described in the report. In this way, the experience of using soils of a similar class elsewhere can be transferred to the site in question. The reconnaisance survey is an important prelude to later, more detailed studies. As it stands, it is of little help to people wishing to decide issues that require strictly local, detailed information, particularly if the information required concerns the topsoil properties of the soil. In passing, it must be mentioned that maps such as the FAO/UNESCO Soil Map of the World, being generalized compilations of data from small-scale reconnaisance maps, are even less able to give precise soil details about a given site.

As an example of how conditions may vary within a given soil class let us consider the behaviour of various members of the Orthic Acrisol group under swidden agriculture in Sabah. During 1970-1973 my colleagues and I mapped a considerable area of Sabah, from the West Coast (Sipitang to Kota Belud) to the Kalimantan Border (Bower et al op cit.), in terms of soil associations containing Orthic Acrisols. The landforms supporting these soils ranged from river and marine terraces, through low, dissected hills to the steep mountains of the interior. The parent materials ranged from various kinds of mixed alluvium, some stony, sandy or clayey, to the sandstones, shales, greywackes and mudstones of the various clastic formations. Swidden was practised throughout the area; on the coastal terraces and low hills by the Kadazan (Dusun) groups, on the Crocker Range and the hills bordering the interior valleys of Keningau and Tambunan and inland on the mountains by various Murut groups. Population density is greatest on the coast (200-300 persons/square kilometre) and decreases markedly inland (1/square kilometre in Pensiangan).[4] Swiddens are cut approximately every 7-8 years in the coastal area (following the Rungus time scale) and approximately every 12-15 years in the interior.

It was significant to note that the poorest regrowth and the least productive swiddens often occurred not on specific classes of Orthic Acrisols,

but in areas with the greatest population pressure, specifically along the coastal zone and along the inland valleys. There, the regrowth consisted of low biomass *lalang* (Imperata cylindrica) and scrub. On the inland mountains the regrowth is vigorous forest, except near Tambunan[5] where *lalang* and bracken clothe the steeper slopes. Poor regrowth after swidden, or land dominated by *lalang* and scrub, also occurred on the gentler slopes of the hills and dissected terraces of the Sook Plain. Although this area does not have a high population density, the soils are extremely deeply weathered and the soil parent material was never encountered within two metres of the surface.

Clearly, many effects are combining to limit the productivity of swiddens on these soils. One effect, not reflected in the Orthic Acrisol definition, but later shown to be important in discriminating between various classes of Orthic Acrisols (Burrough and Webster 1976), is the presence or absence of weathering rock in the soil profile within the reach of plant roots. Although the nutrients slowly released from these minerals are not reflected in the classification criteria such as base-exchange capacity, they nevertheless benefit the vegetation and are reflected in the vigour of the regrowth. This is one of the reasons why the vegetation in the Sook Plain is so poor, and the regrowth on the interior mountains is much better. Population pressure, and the frequency of cutting are also very important, as is the size of the area used for swidden. Inland, where cutting has been infrequent, the areas cut at any one time have also been relatively small. A forest reservoir remains nearby to replenish the sites with tree species seeds for regrowth. On the coast, the inland valleys and Sook, the forest has mostly been totally replaced by scrub. The plant reservoir is poor, dominated by scrub and *lalang*, whose roots form a dense mat over the soil, increasing runoff, strangling competing seedlings, and providing minimum cover. This scrub is cut frequently, sometimes every year, or the *lalang* burned, partly because of population pressures and partly to provide new grass shoots for the many water buffaloes. It is also important to note that the Chartered Company encouraged the people to use scrub rather than forest for swidden. Their regulations prohibiting the cutting of trees more than seven years old could more easily be enforced along the coastal areas and inland valleys than deep inland, and may have exacerbated the effects seen today (Colony of North Borneo 1951).

The problems of swiddens cannot be solved by considering general data for selected and widely separated parts of Borneo or the world. They require a concerted study of many natural and social factors. Because these factors are so complex, it seems premature to dismiss or acclaim any hypothesis of swidden farmer behaviour thought to result from environmental determinants, without a thorough local study. For the Rungus at least, it should be considered that they live nearer the coast than the other peoples mentioned by Weinstock, and have for centuries been more under the influence of Sulu than central Borneo. It would be more worthwhile comparing in detail, their customs, behaviour and environment with nearby groups in the southern Philippines than with other people living over 1,000 kilometres away in central Kalimantan, particularly when the environmental data used are so general, and demonstrably unsuitable for the purpose.

Notes

1. According to current understanding, rainforest vegetation and topsoil exist in a more or less closed cycle. Dead leaves, twigs, and trees falling to the ground are quickly decomposed into topsoil humus whence their nutrients are returned to the vegetation. There is only a little net loss of nutrients from the topsoil by leaching and erosion under primary forest conditions, and little uptake from the subsoil. The farmer breaks this cycle by burning the vegetation and the litter to release plant nutrients for his crops. Since the available nutrients in primary rain forest, topsoil and subsoil are approximately in the ratio of 20:2:1, it follows that once the vegetation has been burned, the topsoil exposed, depleted and eroded, there is little fertility left. Under swidden conditions this fertility can only be restored by allowing the vegetation and topsoil to accumulate over a period of many years.
2. Definition compiled from FAO 1970.
3. Because base saturation is expressed as a percentage, it gives no immediate indication of the actual level of plant nutrients in the soil. The total exchangeable base and exchange capacity give a better indication of fertility. These figures should be given in the soil survey memoir.
4. Figures compiled from the 1970 census (Department of Statistics 1971).
5. Tambunan has been at maximum saturation for many years. Owing to acute shortages of agricultural land, people have been emigrating from the valley for over 30 years (Burrough 1974).

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Tidal Swamp Land Development

William L. Collier
The Agricultural Development Council

The Agricultural Development Council, Inc. (P.O. Box 62, Bogor), is sponsoring a research training workshop on the Economic Potential of Swamps in Kalimantan. This workshop is in cooperation with the University of Lambung Mangkurat which is located in Banjarmasin, and the University of Palangkaraya, Palangkaraya, Central Kalimantan. The workshop will be held for approximately one month with the central purpose of describing and analyzing the potential of the swamps in South and Central Kalimantan. The Workshop's main purpose is to train people in resource economics and the second purpose is to carry out a research project on the economic potential of swamps and the related rivers and near shore seas in Kalimantan. Part of the workshop will be several weeks of very intensive interviewing of transmigrants, spontaneous migrants, and local residents throughout the coastal area of South and Central Kalimantan. A report of the Workshop is expected within several months.

At the Symposium on Tidal Swamp Land Development Aspects, held in Palembang, February 5-10, 1979, William Collier read a paper entitled, "Social and Economic Aspects of Tidal Swamp Land Development." The paper, with an extensive bibliography, is 35 pages long and includes the following sections:

1. The Swampy Lands of Indonesia
2. Tidal Swamp Land Development
3. An Inventory of the Swamps
4. Declining Rice Yields and Income
5. Irrigation Facilities of Transmigrants only for Drainage
6. Capability of Transmigrants to Open Forested Land for Rice Production
7. Lack of Fresh Water for Transmigrants
8. Buginese Systems of Tidal Swamp Development
9. Role of the *Marga* in Swamp Land Development
10. Relations among Local Residents, Transmigrants and Spontaneous Migrants
11. Land Development for Spontaneous Migrants
12. Seasonal Migration to the Swamps
13. Population Pressure on Local Residents' Resources
14. Forest Exploitation by the People

Interested readers may obtain a copy of the paper by writing Dr. Collier.

NEWS AND ANNOUNCEMENTS

Weyerhauser Plans New Timber Mills, Aids in Reforestation[1]

Weyerhauser Co., a Tacoma, Washington forest products concern, is planning new timber processing plants in Indonesia. The plans were announced recently by Indonesia's Industry Minister, A.R. Soehoed.

The company currently has one lumber mill in East Kalimantan and has proposed building as many as five lumber and plywood mills within the next five years. According to a company spokesman, how many of the new plants will be lumber mills and how many will be plywood mills has not yet been determined.

The Weyerhauser spokesman said each new mill will have the same capacity as the existing mill, about 120,000 cubic meters of timber products. The existing mill is reported to have cost $6 million when it was built six years ago.

Like the existing mill, the new ones will be operated by International Timber Company of Indonesia, a joint venture in which Weyerhauser is the majority partner. But the Indonesian partner, Tri Usaha Bakti, will soon acquire the majority holding.

Reforestation Program

Weyerhauser, through International Timber, has also been taking part in Indonesia's reforestation program. Known for its expertise in growing trees faster and healthier, the company has already replanted nearly 10,000 acres in a 1.5-million-acre tract in East Kalimantan. A company spokesman calculates that the cost of replanting each hectare (about 2.5 acres) is $340-$400. But this should yield a $7,500 profit at current market prices when the timber is harvested some 15 years from now.

With Japan, Taiwan and South Korea eager to get hardwoods there are ready markets close to where the woods are harvested. Weyerhauser also expects a good market for lumber in North America and Europe.

If the reforestation project is successful, Indonesia will be able to increase its timber yield without further depleting a valuable natural resource. The country will also benefit from new housing and roads built by the company as part of its East Kalimantan operations.

To conserve its forest resources, Indonesia now allows only 20 percent of the trees on any one hectare to be cut and then only those trees more than 20 inches in diameter. Indonesia has also decided to export less raw material and more finished products for which new saw mills are urgently needed

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[1] Reprinted, Indonesia Development News, Volume 2, Number 10, June 1979, p. 4, by kind permission of The Editor.

1980 Conference on Indonesian Studies

The 1980 Conference on Indonesian Studies will be held at the University of California, Berkeley, from July 31st to August 2nd, 1980. The topic of the conference will be, "Ecological Issues in Contemporary Indonesia." Suggestions for papers on traditional ecological relationships of man to land, perspectives on adaptations from either a social or natural science perspective, and analyses of current problems in the wake of economic development, would be most welcome. Please send all proposed paper topics to:

Eric Crystal
Center for South and Southeast Asia Studies
Berkeley, CA 94720

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Joseph A. Weinstock has prepared a Directory: Malaysia, Singapore, & Brunei Studies Personnel/Programs/Resources, which has been published by the Malaysia, Singapore, & Brunei Group of the Association of Asian Studies. The Directory may be ordered for $3, or with a one-year subscription to the M/S/B newsletter, Berita, for $5.

Distribution of Berita is now on a subscription basis. Annual subscription rates are $3. for individuals and $5. for institutions. Orders and correspondence regarding Berita and the Directory should be addressed to:

John Lent
Journalism, School of Communications and Theater
Temple University
Philadelphia, PA 19122

or,

Kent Mulliner
Southeast Asia Program
Ohio University
Athens, OH 45701

B O R N E O N E W S

Regional News

MICHAEL DOVE started a two-year post-doctoral fellowship in agricultural development in May. Funded by the Rockefeller Foundation under their "Conquest of Hunger" program, Dove will hold the fellowship at Gadja Mada University, Yogyakarta, where he will be a research fellow with a joint appointment to the Population Institute and the Department of Anthropology. Dove hopes to divide his time between Yogyakarta and Kalimantan Timur where he intends to study swidden groups.

Kalimantan

BERNARD J.L. SELLATO has spent one-and-a-half years in the Upper Mahakam area of East Kalimantan, and has just been granted a fifteen month research permit by the Lembaga Ilmu Pengetahuan Indonesia to carry on linguistic studies on the Penihing language, and among some more or less linguistically correlated smaller Punan and Punan-like groups. Dr. Sellato's fieldwork, sponsored by Professors DENYS LOMBARD, Director, Ecole des Hautes Etudes en Sciences Sociales, Paris, and JEROME ROUSSEAU, McGill University, Montreal, will last from December, 1979, to September, 1980. His mailing address in Indonesia is: c/o Mr. Maringka, Jalan Mandala Raya 16, Tebet Utara Dalam, Jakarta Selatan.

The Basel Mission has recently appointed REV. CHRISTOPH ZIMMERMAN to the post of Area Secretary for East Kalimantan and special advisor for agricultural projects in its Basel headquarters. Rev. Zimmerman is a pastor of the Reformed Church of Canton Bern and worked in Banjarmasin with the Gereja Kalimantan Evangelis from 1964 to 1971. From 1971 to 1974 he took a course in agriculture at the Swiss College for Agriculture in Zollikon. From 1974 until this year he has been stationed in Tarakan, combining agricultural extension work with pastoral work among villages in inland East Kalimantan, under the auspices of the Gereja Kristen Permancar Injil.

PETER F. COCKBURN, formerly of the SAN-Herbarium, completed field surveys of the East Kutai and Tanjung Puting Reserves. His address is 4 Ivy Cottages, Whitemans Green, Cuckfield, West Sussex, RH1 5DD, England. Mr. Cockburn reports that Forest Flora of Sabah, Volume 2, is in the press.

Sabah

The BRATHAY EXPEDITION TO SABAH (1977) from Ambleside, Cumbria, U.K., explored Mount Trus Madi, the Tawai Plateau, and Mount Kinabalu, between 1 August and 1 October. The primary aims of the expedition were to make ecological studies of Nepenthes in the field. This work included comprehensive collections of 102 herbarium numbers by R. HOBBS, plus numerous live plants, all of which were sent to Kew. M.F. GARDNER of Bangor, Wales, made more general collections, giving priority to Ericaceae, Gesneriaceae, and Zingiberaceae. Ten days were spent exploring the Kaintano Ridge on Mount Trus Madi. The moss forest extends from about 1700 m to 2700 m. It was here that two small colonies of Nepenthes lowii and N. edwardsiana were discovered, the latter only previously known from Mount Kinabalu.

Sarawak

JOSEF BOGNER spent a month in Sarawak during September, 1978, collecting aroids which were dried in the SAR-Herbarium. B.L. BURTT spent about two months beginning mid-August 1978 in the Ulu Linau area of Belaga and the Lambir N.P. at Miri, collecting Gerneriaceae and Zingiberaceae. SAR-Herbarium staff accompanied him. The staff of Kuching collected 78 specimens in Telok Belian, Santubong, which had not been explored.

BOOK REVIEWS, ABSTRACTS & BIBLIOGRAPHY

ABSTRACTS

Macaca fascicularis of Eastern Borneo: Ecology, Demography, Social Behavior, and Social Organization in Relation to a Refuging Habitus

Nicholas Alexander Fittinghoff, Ph.D. Dissertation, University of California, Davis, 1978

This dissertation reports primate fieldwork in rainforest along the Sengata River, which forms the northern border of Indonesia's Kutai Nature Reserve. The study site was located at approximately 117°28' east longitude and 0°32' north latitude in Kalimantan Timur, the easternmost province of Indonesian Borneo. Work on the Sengata began on January 26, 1973 and ended on January 30, 1974.

The main subjects were three large groups (20 or more monkeys per group) of M. fascicularis, locally called *kra*. L group and R group, habitually occupied sleeping-trees that opposed each other across the river. L group was studied most, but frequent observations were made of the other two, and these and other *kra* were surveyed during 48 boat trips along a measured 10-km stretch of river front.

Chapter I describes the monkeys, the study area, and the survey stretch, and reports climatic measurements.

Chapter II identifies *kra* as a riverine-refuging species, i.e., as one whose groups forage inland each day but return to familiar riverine trees to sleep. The refuging pattern is described quantitatively for groups along the survey stretch. It appears energetically costly, since *kra* may visit particular inland fruit sources on successive mornings, and since they travel arboreally most of the time. Predator avoidance is an unlikely explanation, since predation on *kra* appears negligible. Competition seems to provide the explanation, because Sengata River *kra* enjoy a locomotor-feeding advantage over competing anthropoid species (Pongo pygmaeus, Hylobates muelleri, and Presbytis aygula) in riverine vegetation, and because a group of *kra* can discourage groups of conspecifics from invading its home range by making itself conspicuous to other *kra* along and across the river.

A group of *kra* is loosely associated: the count and composition of the monkeys returning to its main sleeping-site may vary nightly. Thus the users of a site may be considered a *kra* community, from which the members returning evening after evening can be considered successive interdependent samples.

Chapter III uses 52 such samples, treeward progressions of monkeys, to estimate the age-sex composition of the L-group community, incidentally producing simultaneous confidence intervals for mean age-sex-grade

proportions. It also suggests that the composition of L group is representative of the local population and the species, and it proposes demographic norms for a group of *kra* that enjoys a favorable forest habitat.

Chapter IV uses the travel patterns and resting interactions of L group to investigate relations among age-sex grades. *Kra* often refuge as "strings" of monkeys, and the chapter analyzes the patterns of combination of adult males, adult females, subadults or large juveniles, medium or small juveniles, and females with ventral infants in the strings. The analysis produces predictions concerning associations between age-sex grades during travel, and the predictions seem confirmed by analyses of five "affiliative" and four "agonistic" behaviors displayed by the resting group. Each behavioral analysis derives from a frequency matrix for dyadic interactions among age-sex grades, and collectively the analyses suggest the course of social relations that each sex experiences during ontogeny. That course helps prepare each sex for sexually appropriate adult roles (roles whose performance appears to enhance the actor's inclusive fitness).

Chapter V, the final chapter, summarizes Chapters II-IV, mentions problems that surfaced during fieldwork, discusses the methodological significance of the study, and relates the substantive findings to macaque evolution.

Orangutan Adaptation at Tanjung Puting Reserve, Central Borneo

Biruté Marija Filomena Galdikas, Ph.D. Dissertation, University of California, Los Angeles, 1978.

Orangutans (Pongo pygmaeus) were long considered to be the most enigmatic of the great apes. Although recent orangutan field studies (MacKinnon 1971, 1974; Horr 1972, 1975; Rodman 1973) have expanded our knowledge, a paucity of detailed, long-term data still remains. Over four years (1971 to 1975) we collected 6,804 hours of direct observations on wild orangutans (including 14 habituated individuals) at the Tanjung Puting Reserve in coastal Central Indonesian Borneo (Kalimantan Tengah). The basic units of orangutan populations consist of lone adult males, adult females with one or two dependent offspring and independent immatures who sometimes associate with the natal unit. Adult males are almost entirely solitary, except when consorting. Adult females spend 5 to 17% of their time with other orangutans while independent immatures are in contacts with other units 40% of the time. Almost all groupings involve males and females or females exclusively. Contact between lone males is relatively infrequent and almost invariably non-social. The major differences between chimpanzee and orangutan sociability lie with the males, not the females. Some orangutan females are almost as social as the least social chimpanzee individuals observed at Gombe National Park.

Although non-consort rape occurs, consortship represents the effective mechanism of orangutan reproduction. A high degree of male-male competition, augmented by female selection of consort partners, excludes some males from reproduction. While avoidance or mild aggression characterizes encounters between lone males, violent chases and combats occur when males contact each

other in the presence of an adult female. Since orangutan females are less conspicuous than males and locate males to initiate consortship, female selection may assume a greater role in orangutan mating systems than among African pongids. This may explain both the lack of overt physiological signals associated with orangutan estrus, and the appearance of perineal swellings shortly after conception.

We observed 11,338 foraging bouts. Orangutans are the largest frugivores on our planet. Frugivorous diet and the distribution of fruit resources in Southeast Asian tropical rain forests enforces the isolation of individual orangutans from one another and leads to an ecological separation of the sexes, in line with differential roles in reproduction. The flesh of ripe fruits may contain few toxins with the result that ripe fruit is exhausted before individuals are satiated. For this reason, individuals compete whenever they forage together at preferred fruit sources. Among orangutan age/sex classes solitariness is correlated with large size. At Tanjung Puting male-female differences involve differential utilization of the ground with adult males spending 66 min/mean day on the ground and adult females, 3 min. Adult males have longer mean day ranges than females and also utilize different proportions of resources of resources in their diets, consuming substantially more termites and less bark than females. Mean distance between food sources is considerably less for orangutans than chimpanzees which may account for differential adaptations. I suggest that ecological separation of the sexes, as I found in chimpanzees and orangutans, was a pongid requisite for hominid evolution.

Migration and Its Alternatives among the Iban of Sarawak

Christine Padoch, Ph.D. Dissertation, Columbia University, 1978

The Iban of Sarawak, who are largely a population of shifting cultivators of hill rice, have been presented in previous ethnographic works as prodigal exploiters of their environments. Their agricultural methods have been described as wasteful, and have been described as necessitating continual territorial expansion or migration.

This dissertation, based on field research in Sarawak, attempts to broaden this usual description of Iban resource use by documenting changes that appear in agricultural methods and other behavioral patterns as Iban communities are faced with decreased opportunities for expansion. The method used for studying such changes was the comparison of several Iban settlements differing in little but the span of time they had existed in their approximate present locations, and therefore also in the amount of previously unfarmed land they possessed within their territories.

The description of Iban resource use that emerged from these comparisons was of a changing and flexible system, suggesting that migration is not the Ibans' sole response to change in resource availability. Although territorial expansion continues to occur in most areas, the rates of emigration experienced by some communities are very low. Many other behaviors which appear to act as suitable responses to resource limitation, and are therefore "alternatives" to migration, are noted among residents of areas of long Iban occupation.

These alternatives include shifts in agricultural practices, particularly to the use of more conservative cropping-fallow regimes and more labor intensive farming patterns, as well as increases in the rates of borrowing of land, of temporary wage labor migrations, and lower rates of human fertility and population growth. The multiplicity of factors or responses that were detected, each presumably alone quite inadequate as a response but all together apparently successful, is notable, as recent works on population growth and resource depletion following the "Boserup model" often stress only one response--agricultural intensification--to the problem of limitation of land.

Also to be noted is that the factor perhaps most frequently accused of disrupting a supposed balance between shifting cultivators and their environments--involvement in markets--is found in the Iban case to be indeed a very important, but more conservative than destructive influence. Participation in activities through which income for the purchase of market goods is obtained, appears to significantly affect long-term patterns of resource use largely by influencing rates of population growth, slowing growth in long-settled regions, spurring it in pioneering zones.

The data presented in this dissertation suggest that among Iban shifting cultivators, constant migration and prodigal forms of land use are not the "addictions" that other ethnographers have considered them to be; even in their notorious farming practices and movement patterns the Iban can indeed respond effectively to differing conditions by varying their behavior in appropriate ways. When migration is no longer easily accomplished, the Iban manage to find alternatives to it. More broadly, this dissertation serves to show that dynamism and flexibility, rather than changeless equilibrium, can be characteristic of patterns of resource use among "traditional" shifting cultivators.

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Other Items: Personal news, brief summaries or research activities, recent publications, and other brief items will appear without the source specifically indicated. The Editor urges those contributing such news items to send them in the form in which the contributor wishes them to appear rather than leaving this to the discretion of the Editor.

All contributions should be sent to the Editor, Borneo Research Bulletin, c/o Department of Anthropology, College of William and Mary, Williamsburg, Virginia, 23185, U. S. A.

STYLE FOR CONTRIBUTIONS

Please submit all contributions double spaced. Research Notes and Brief Communications should be limited to approximately eight double-spaced pages. Footnotes are to be avoided wherever possible. Bibliographies should be listed alphabetically by author at the end of the contributions: author should appear on a separate line, then date, title of article, journal, volume number, and pages. For books, include place of publication and finally publisher. References in the body of contributions should be cited by author's last name, date, and page number as follows: (Smith 1950:36-41). For punctuation and capitalization refer to Bibliographic Section.

Names mentioned in the News Section and other uncredited contributions will be capitalized and underlined.