

BORNEO RESEARCH BULLETIN

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NOTES FROM THE EDITOR

The Borneo Research Council Endowment Fund is at the half-way mark of our projected goal of US\$ 10,000. In November 1978, James F. McDivitt, "commending the efforts of the Borneo Research Council in producing the twice yearly bulletin," encouraged the Division of Ecological Sciences, United Nations Educational, Scientific and Cultural Organization, to provide contractual support towards the Endowment Fund of the Council. In his letter of January 19, 1979, Malcolm Hadley of the Division of Ecological Sciences, writing that his division was "impressed with the presentation and content of the Bulletin," notified the editor of a one-time grant of \$800 for the Endowment Fund. On behalf of the members of the Council, Fellows, and subscribers, I want to express our appreciation to those persons responsible for this grant.

We have received the first payment of interest from the Endowment Fund. This payment, together with the numerous generous contributions noted below, have repaid the advance made for publication of the September 1978 issue, and should be adequate for the production of the 1979 issues.

Although we are half-way toward the goal of the Endowment Fund, it still is necessary for us to reach the amount projected in order to ensure the financial future of the Bulletin. To this end, gifts to the fund will still be welcome.

Our appreciation is due the following persons for their contributions to the support of the Council: Dr. and Mrs. George Appell, Martin Baier, Stanley Beidler, Supriya Bhar, Dr. and Mrs. P. A. Burrough, P. K. Cassels, Matthew Charles, Chin See Chung, William Collier, E. J. H. Corner, the Earl of Cranbrook, C. H. Crisswell, Richard Fidler and Ruth Barnes, Wayne Frank, Jack Golson, Linda Kimball, Dietrich Kihne, Craig Lockard, David McCredie, A. R. G. Morrison, Rodney Needham, Carsten and Inge Niemitz, Robert Nicholl, H. Arlo Nimmo, Robert M. Pringle, Robert Reece, A. J. N. Richards, Jérôme Rousseau, Mr. and Mrs. Paul Sack, Dr. and Mrs. Clifford Sather, Barbara Smith, Orville Smith, David and Cristina Szanton, T. Watabe, C. H. H. Wake, James Warren, Joseph Weinstock, William D. Wilder, and Inger Wulff.

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 (cont. p. 36)

RESEARCH NOTES

ECOLOGICAL DETERMINISM:

IS THE APPELL HYPOTHESIS VALID?

Joseph A. Weinstock
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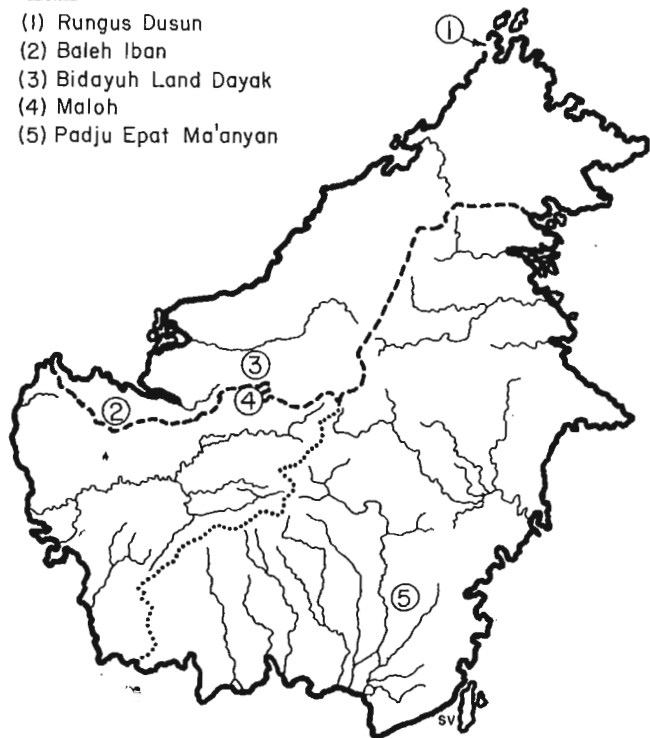
In an attempt to explain the differences in patterns of land tenure used by swidden cultivators of Borneo, Appell (1971) proposed his hypothesis of ecological determinism. While studying the Rungus Dusun of Sabah, Appell encountered a system of land tenure unlike that reported for most other tribal groups who practice swidden cultivation in Borneo. Looking at selected environmental factors for three areas of the island, those of the Rungus, the Iban and the Bidayuh, Appell found what he thought to be significant environmental differences that would affect swidden cultivation and hence land tenure practices. Using these environmental factors Appell put forth an hypothesis proposing environmental factors as determinants in shaping land tenure patterns. Replies to Appell's hypothesis by Dixon (1974) and King (1975) have questioned this position.

The problem with Appell's hypothesis, as well as Dixon's and King's replies, has been a conspicuous lack of empirical data. Other than rainfall statistics used by Appell and King, and a little geological data used by Dixon, very little actual environmental data is proffered either in defense or criticism of the hypothesis of environmental determinism. Frequently, value judgments such as "poor soil" or "relatively fertile" or "soils of poor quality" have been made by each author to support his position without any actual study of edaphic conditions of these areas. The objective of this study is to examine the actual environmental data, particularly the edaphic, for the three areas cited in Appell's (1971) article (the Rungus Dusun of the Kudat Peninsula of Sabah, the Baleh Iban of the Rejang River of Sarawak, and the Bidayuh Land Dayak of the Kedup River of Sarawak) as well as the additional two mentioned by King (the Maloh of the Embaloh region of the Kapuas River of West Kalimantan and the Padju Epat Ma'anyan of the Barito River of Central Kalimantan). The environmental data for these five areas will then be analyzed to ascertain the possible validity of the hypothesis of ecological determinism.

The major difficulty encountered using this approach has been the lack of detailed edaphic information for the five areas. General data exist for the island as a whole, but the quality of detailed edaphic data for the specific areas of concern here range from reasonably good for the Rungus and Land Dayak areas to almost nonexistent for the Maloh area.

KEY

- (1) Rungus Dusun
- (2) Baleh Iban
- (3) Bidayuh Land Dayak
- (4) Maloh
- (5) Padju Epat Ma'anyan



MAP I
Location of the Five Groups

Part of this problem lies in my inability to obtain some agronomic materials, but more important is the absence of agronomic research for much of the island. The data available however should be sufficient for our purposes.

(A) Appell's Hypothesis

It is important first to recapitulate briefly Appell's position (1971), and the points made by Dixon (1974) and King (1975) in refuting Appell. Appell noted (1971:17) that the concept of village territoriality was recognized by the Iban, the Land Dayak, and the Rungus. Similarly, King (1975:214) found the same to be true of the Ma'anyan and the Maloh. The point of divergence in patterns of land tenure among the five groups was whether there was permanent tenure or tenure of limited duration. The Iban, Land Dayak, Maloh and Ma'anyan all practice what Appell calls "permanent tenure." Under this system, permanent use rights to a parcel of land are established by the felling of primary forest. This right is vested in the individual or household that has done the clearing; the parcel is used jointly by members of the household. Even after this property has reverted to jungle, the individual or household maintains primary use rights to it. While under government law no "legal" title has been issued, according to *adat* law (traditional law) no one else may use this property without prior permission from the use rights holder(s). After the death of the original clearer, his descendants inherit use rights to this parcel of land, thus, theoretically, maintaining tenure in perpetuity.

In contrast to the system of permanent tenure, the Rungus have a system of "tenure of limited duration." A Rungus household (domestic family is Appell's term) clears a new area of forest for use as a swidden, but unlike the aforementioned groups, the Rungus household does not establish permanent use rights over this land. Instead, they retain use of this property only until all the crops planted are harvested. The land is allowed to grow back to jungle, but once the forest fallow has been sufficient to allow the land to be cultivated again, any resident household in the village may use it for its swidden. In this manner, land is redistributed annually among resident households of the village (Appell 1971:17).

Curious as to why patterns of land tenure varied between the Rungus and the Land Dayak and Iban, Appell looked to environmental differences in the three areas for a possible solution. Finding what he considered significant factors in the environmental data, he hypothesized that

... the increased rainfall in Sarawak areas in conjunction with more productive soils tends to encourage the regeneration of tree species in a swidden and discourage the growth of weeds in comparison to the Rungus area. Thus, because of fewer weeds invading the swidden after the first year's harvest, and because young forest has a better chance for a good burn than primary forest

in the Iban and Land Dayak areas, there is greater economic value in secondary forest which results in the development of permanent use rights over swidden areas (Appell 1971:19).

The primary data upon which Appell relied in formulating his hypothesis was that of rainfall. King (1975) found that by including the Maloh and the Ma'anyan in the comparison, Appell's interpretation of rainfall statistics appeared to be erroneous. Dixon (1974), while adding nothing to the rainfall issue, noted what he considered to be significant geological formations in the Land Dayak area of Sarawak which contradicted Appell's characterization of that area as having more productive soils.

(B) Precipitation Statistics

Inasmuch as precipitation statistics were the cornerstone of Appell's hypothesis, I wish to discuss these first. Since I am including the Maloh and the Ma'anyan, I have composed a rainfall table (page 6) using Appell's data for the Rungus, Iban and Land Dayak with the addition of data for the Maloh and Ma'anyan areas. Like Appell's data, the statistics given are from the closest recording stations. These statistics can be assumed to be relatively reliable, but it must be kept in mind that variance in annual precipitation can be significant in these areas just as can variance in precipitation from one river valley to another within a single area and year.

Using the statistics in Table 1, let us look at what King has said regarding the Maloh and Ma'anyan areas. King states (1975:13) that the mean annual rainfall on the coast of Pontianak is approximately 125 inches and that this decreases towards the interior, where the Maloh live, due to the sheltering effect of the upland ranges bordering the upper Kapuas River basin. The figure he gives for the annual rainfall at Pontianak correlates well with the data from the old Dutch weather station there,² but looking at figures for weather stations in the upper Kapuas River basin we find that the figures are appreciably higher than at Pontianak, not lower as expected by King.³ Looking at what King has said about the Ma'anyan area, we see a reverse error. Citing Hudson, King (1975:13) uses the figures of 100 to 140 inches of rainfall per annum for the Barito River basin. Again, looking at the records of the old Dutch weather stations, we find that the actual rainfall is lower than reported by King.⁴

With this data in hand we can see that the Ma'anyan area and the Rungus area have nearly the same annual rainfall and the Maloh area has even more annual rainfall than either the Iban or Land Dayak areas. Taking just the July to September period, which is the critical period for burning the accumulated slash in preparation for planting, we can see the same relationships as with the annual figures. Thus, as noted by King (1975:13-14), the Maloh have more problems achieving a satisfactory burn than do the Rungus. This tends to support Appell's hypothesis. Contrarily, King notes that the Ma'anyan area has low rainfall during

Table 1. Precipitation Statistics^a

Month	Rungus	Land Dayak	Iban	Ma'anyan	Maloh
January	16.20	15.45	16.87	11.77	15.35
February	7.80	12.83	12.07	10.59	14.92
March	7.54	12.08	13.28	12.40	14.96
April	5.31	12.86	12.54	9.06	16.85
May	5.80	8.48	13.40	7.52	13.43
June	5.69	7.17	8.36	4.96	10.59
July	3.92	8.61	8.94	3.58	8.70
August	4.25	7.30	9.57	2.72	10.12
September	4.79	11.86	11.83	3.03	11.18
October	6.61	12.79	13.64	4.76	18.27
November	6.99	12.55	11.72	9.29	18.58
December	16.15	10.61	13.36	12.13	16.65
Totals	91.05	132.59	145.58	91.81 ^b	169.60

^a All data given in inches (original data for Kalimantan in mm).

^b For the village of Tamianglayang which is about 9-10 miles from Hudson's Ma'anyan village of Telang the annual precipitation was recorded as 90.6 inches (Driessen et al., 1976:13).

Note: Rungus, Iban and Land Dayak precipitation statistics taken from Appell (1971:19). The actual recording stations are as follows: Rungus: Langkon Estates, Sabah; Land Dayak: Tabakang, Sarawak; Iban: Kapit, Sarawak.

Ma'anyan and Maloh precipitation statistics taken from Mohr (1944:387-8). The actual recording stations are as follows: Ma'anyan: Amoentai (Amuntai), Kalimantan Selatan; Maloh: Poetoessibau (Putussibau), Kalimantan Barat.

the burning season similar to that of the Rungus area and thus would contradict Appell's hypothesis. Even with somewhat erroneous data, King has still pointed out an inconsistency in Appell's hypothesis.

It is interesting to point out that the whole issue of variance in rainfall as it is used here is not particularly relevant. The lowest rainfall area still has over 90 inches of precipitation annually with no true dry month,⁵ and the temperature range is similar in all five areas. Thus, considering the rainfall data given here alone, with all other factors being considered equal, the vegetation and regrowth in all five areas should be approximately the same. In fact, the lower rainfall in the Rungus and Padju Epat areas is probably a positive factor in that it indicates the probability that nutrient losses from the soil due to leaching will be less than the other three areas.

(C) Forestry Regrowth

Most individuals writing about swidden cultivation have been concerned with the length of the fallow period. This is a justified concern; it is well known that when the fallow period becomes too short, ecological degradation sets in, in direct relationship to the degree to which the fallow has been shortened. The shorter the fallow period, the quicker the ecological degradation. What has not been fully explored is the critical point at which swidden cultivational practices change from being in balance with the ecosystem to being ecologically destructive. In the case of Borneo, all sorts of figures have been used to establish the number of years necessary to maintain an ecological balance. Dixon (1974:9) summed up this problem when he stated that "in some places eight years may be quite adequate for soil and vegetation regeneration, in another place a short distance away, fifteen years may be too short." While this is quite true, we are provided with no clue as to where we might find the critical point between ecologically sound and ecologically unsound swidden fallowing.

A basic assumption implicit in the writing of Appell, Dixon, and King, as well as most articles on forest swidden, is that the difference between land left fallow for a short time (meaning seven or eight years as in the case of the Rungus) and land left fallow for a period 50 percent longer (12 or so years as reported for the Bidayuh) is great. In absolute terms, land left fallow for 12 years will have developed a greater biomass of forest components than land which has been fallow only eight years. Likewise, the accumulation of most, but not all, nutrients in the ecosystem of a 12-year regrowth forest will be slightly higher than that of an eight-year regrowth forest. The important question, however, is whether it is economically reasonable to allow land to lie fallow for 12 or 15 years instead of only seven or eight years. While little study of this problem has been undertaken in Borneo, we might look at research done in Zaire where the major soils group and climate (a tropical udic moisture regime)⁶ are similar to those of Borneo. Studies in area of swidden cultivation in Zaire show that approximately 90 percent of the maximum biomass and nutrients of secondary regrowth is attained

in the first eight years (Sanchez 1976:351-3).⁷ It can be presumed that in some soils the 90 percent plateau will be reached sooner and in others later. For specific areas of Borneo, the point at which this 90 percent plateau is reached will have to be determined. The point to be made here is that without actual agronomic studies, a 12 or 15 year fallow should not be considered as necessarily much better than an eight year fallow.

Appell, in his hypothesis (1971:19), states that "... more productive soil tends to encourage the regeneration of tree species in a swidden and discourage the growth of weeds..." Looking to edaphic research done elsewhere on the island, Appell's correlation of weed growth with poor soils can be seen to be unwarranted. Driessen et al (1976:13) in their study of Tamianglayang, a village quite near the site of Hudson's Ma'anyan research in Central Kalimantan, investigated the belief that weedy swiddens were abandoned because of poor soils. Their studies found that these soils were even richer in plant-available nutrients than those newly cleared of forest fallow.

(D) Edaphic Conditions

So far it has been seen that precipitation and vegetative regrowth has not indicated the poorer environment that Appell believed determined the land tenure practice of the Rungus. This leaves just the edaphic conditions of the Rungus area as the possible environmental determinate to validate Appell's hypothesis. In approaching the issue of edaphic conditions of the five areas of concern here, I wish to first look at an assumption that I believe is implicit in the writing of Appell, Dixon, and King. Just as there is the assumption that a fair degree of homogeneity exists among all the people of one tribal group, say, the Iban, Appell, Dixon and King appear to assume that a fair degree of homogeneity in terms of soil exists in the "Iban area" or the "Land Dayak area." A group such as the Iban or the Land Dayak covers a large territory; this assumption can easily be seen to be fallacious. Even in the case of the Rungus who inhabit a relatively small area of northeast Sabah, there is a tremendous amount of variation in soils and agricultural potential. Thus, when I refer to the Iban I mean only the small area in the vicinity of the Sut River where Freeman did his actual research; for the Ma'anyan I will mean only the Telang area where Hudson worked; for the Land Dayak I will mean the upper Kedup River region where Geddes did his research; for the Maloh I will mean the Embaloh basin region where King worked; and for the Rungus I will mean the upper Matunggong River region where Appell did his research. Even restricting the scope of this study in such a manner is insufficient to insure total accuracy in evaluating the edaphic conditions of these areas. Within these general village-sites edaphic conditions vary greatly from one micro-environment to another, such as riparian land to foothills to mountain slopes all within the same square mile.

To account for his belief that the Rungus area had less agricultural

potential than either the Iban or Land Dayak areas, Appell (1971:19) stated that "... it would appear that the Rungus area is characterized by more sandy soil than either the Iban or Land Dayak areas." For the Ma'anyan area, Hudson (1967) claimed poor soils characterized by a high proportion of sand. Are these claims of sandier soil in the Rungus and Ma'anyan area borne out by actual edaphic studies? Turning first to the soil map of Borneo prepared by FAO/UNESCO (1972: Sheet IX), we find that the predominant soil in the Rungus, Iban, Land Dayak, and Maloh areas is the same, an Orthic Acrisol. While there is slight difference between the associated soils and inclusions in the Iban, Maloh, and Rungus areas and the Land Dayak area, there is no indication of sandier soils in one of these areas over the others. Since the FAO/UNESCO soil map of Borneo is at a scale of 1:5,000,000, it cannot be relied upon to provide conclusive evidence that sandier soil does not exist in one of these four areas. The purpose of mentioning this map is that even at such a small scale it shows the area near Telang as having inclusions of Ferric Arenosols which are characterized by quartz sands, thus verifying what Hudson has said about the soil in the Ma'anyan area.

Turning to other soil maps of greater detail, what can be discerned about these areas? Looking at just the Rungus and Land Dayak areas, the only two areas for which I was able to obtain detailed edaphic studies, I found no greater likelihood that there would be a larger sand component in the soil of one area over the other. The soil map of Kudat (Belsham 1969), at a scale of 1:125,000, showed the Rungus area to be mixed alluvium and marine terrace soils in the riverine plains and sandstone and minor shales in the upland regions. For the Land Dayak area, the parent materials are sandstone, conglomerates, and pleistocene sands and gravels (Andriessse 1972: Map 5 at a scale of 1:500,000). The soils are mixed alluvium in the riverine plains and shales, phyllites, mudstones, and sandstone in the upland areas (Andriessse 1972:168, 172, and Sheet 2 at a scale of 1:100,000). While Appell may have encountered particular Rungus swiddens that had a high sand content, the evidence cited here indicates that the area in general has no greater sand component in the soil than does the Land Dayak area.

Dixon (1974:9), in his reply to Appell, noted geological formations in the Land Dayak area of the First Division that he believed to be important to this issue. He stated that "... the limestone base of this area may be responsible for different soil and drainage conditions which naturally support a forest with a relatively limited number of species." I question Dixon's perception of the forests being more limited in the number of species than other areas of Borneo, but this is not the point of concern here. Dixon intimates that a geological formation of limestone in the Land Dayak area causes this area to be as "poor" agriculturally as Appell claims is the case in the Rungus area. Soil maps of the First Division of Sarawak (Soil Map of Sarawak at a scale of 1:500,000 and Andriessse 1972: Sheet 2 at a scale of 1:100,000) do indeed show limestone, but only in small pockets in the western portion of the First Division. Limestone is not the underlying base of the region as a whole and none of the limestone deposits shown on the

maps are as far east as the Kedup River area where Geddes did his Land Dayak research (1954a). In the areas that do have limestone, it is just as likely to be a boon as the bane suggested by Dixon. Unless the limestone is in the form of surface rock outcroppings, it could be a favorable factor in the soil as it would raise the pH level in otherwise low pH soil.

One last point to look at here is the edaphic conditions in the Ma'anyan area. King (1975:13) cited Hudson's description of poor soils in the Padju Epat region, coupled with low rainfall, as contradictory of Appell's hypothesis. The precipitation issue has already been discussed, but what of the edaphic conditions in the Padju Epat region. In his doctoral dissertation Hudson (1967:108) shows a map of the Padju Epat region with swamp lands west of Telang and a dry land area east of Telang. He characterized the soils of Padju Epat as having eight to ten inches of sandy topsoil lying on a base of red lateritic clay. According to the FAO/UNESCO soil map (1972: Sheet IX) the Padju Epat area of the Barito River is in the intersection of three major soil groups. As already mentioned, one of the soil groups has been reported to have a high quartz sand content. Analysis of the sand fractions of various profiles from Tamianglayang, a village about 10 miles from Telang, gives a quartz content of 95 to 99 percent (Driessen et al., 1976:4). The swampy area near Telang is reported to have inclusions of Thionic Fluvisols, more commonly known as acid sulfate soils. The peculiar characteristic of acid sulfate soils is that they have a low pH level which gets extremely low if exposed to air for any length of time.⁸ This would make these soils difficult to manage, especially for a group such as the Ma'anyan who do not have the technical expertise necessary to handle acid sulfate soils. For the dry land area, the FAO/UNESCO soil map indicates inclusions of plinthite; this would account for the red lateritic clay reported by Hudson.⁹ In short, the conditions reported for Tamianglayang by Driessen et al. (1976) appear applicable to the Telang area. In their report, they stated that chemically the soils of Tamianglayang were extremely poor with weatherable minerals virtually absent. In addition they noted the physical instability of the soils; they slake easily and are easily eroded.

(E) Conclusions

As can be seen by the environmental data presented here, Appell's hypothesis of ecological determinism appears to be unwarranted. The data presented here are not perfect since, as mentioned earlier, the micro-environments within a single village territory can vary widely. Nevertheless, all indications are that Appell's hypothesis is invalid. According to the environmental data, the Ma'anyan area would appear the one group most likely to develop a different form of land tenure if ecological determinism were valid.

Although Appell's explanation of ecological factors as determinants in

variations in land tenure does not fit the areas now inhabited by these groups, one might propose that these patterns were established in the past in another environment and are followed today only out of tradition. I do not know where the Rungus originated, so I cannot speculate whether this might be the case. Possibly the Rungus' ancestral homeland was situated in an environment more conducive to communal ownership of land rather than individual ownership of parcels of land. While this might be the case, I have serious doubts since this does not work with the Kayan and the Kenyah.

According to Rousseau (1974:118-20) the Kayan have communal ownership of land similar to that of the Rungus. The Kayan claim the Apo Kayan region of East Kalimantan as their ancestral homeland. Whittier reports (1973:57-62) that the Kenyah have a system of permanent tenure similar to that of the Iban and the Land Dayak. The Kenyah, too, claim the Apo Kayan region of East Kalimantan as their ancestral homeland. In fact, members of both groups have villages still located in the Apo Kayan as well as living in close proximity to each other in several places in Sarawak such as in the upper Baram River region. If both Whittier and Rousseau are correct in their reports regarding land tenure practices, then any ecological explanation for variation in patterns of land tenure would be invalid.

Environmental conditions do not provide an adequate explanation for variance in patterns of land tenure among the swidden cultivators of Borneo. An explanation for this variance will have to be found in the cultural and social aspects of these communities. Environmental factors do play an important role in Dayak agriculture, but as of yet we do not fully understand the interaction of the environmental and sociological spheres of swidden communities.

Notes

1. While the Rungus household as a social entity does not "own" land it does have permanent tenure rights through the village corporate entity. As a member of the village corporate entity it holds permanent use rights to village land as a whole rather than to separate parcels.
2. With 52 years of observation the figure of 3261 mm (128.4 in.) is given for Pontianak (Mohr 1944:387).
3. With 29 years of observation the figure of 4308 mm (169.6 in.) is given for Poetoessibau (Putussibau) and figures only slightly lower are given for other recording stations in the upper Kapuas River basin (Mohr 1944:387).
4. With 52 years of observation the figure of 2332 mm (91.8 in.) is given for Amuntai (Amuntai) (Mohr 1944:388).
5. The lowest is 2.72 inches of rainfall for the month of August in

the Ma'anyan area. All five areas most likely have udic moisture regimes.

6. An udic moisture regime is defined as one in which the control section of the soil is not dry for more than 90 days a year.
7. It is interesting to note that the level of potassium (K) actually decreased after eight years.
8. "When these deposits are exposed to air and the soil is low in calcium carbonate, FeS₂ is oxidized to ferric sulfate and free sulfuric acid, producing pH values on the order of 2 or 3" (Sanchez 1976:86).
9. Laterite is a rather loose term which has been applied to soils in the tropics. The term plinthite has replaced it in referring to a soil that hardens irreversibly upon exposure to the air.

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AN ETHNO-HISTORY OF THE KELABIT TRIBE OF SARAWAK¹

A BRIEF LOOK AT THE KELABIT TRIBE
BEFORE WORLD WAR II AND AFTER

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Summary

The relatively recent crystallization of the term Kelabit had the subtle dramatic effect of giving an identity to a loose regionally inherent ethnic group, bringing them together as a single tribe. Previous to this, the Kelabits were considered as part of the Murut tribe. Evidence for this exists in the obvious commonality of the Kelabit and Murut languages. These points are discussed in Chapter I.

The origins and migration of the Kelabit tribe are still matters of anthropological speculation. Chapter II discusses this topic. Have the Kelabit been long established in the highlands or have they come more recently? Did they come up the Baram River from Brunei in the northwest, or from Indonesian Borneo (Kalimantan) in the East? Were they driven by wars, famine, or by the aggressiveness of the local Kayan and Kenyah?

Chapters III and IV take the reader to Bario and its surrounding valley. The longhouse and consequent life styles, the traditions, customs and rituals of the Kelabit as existed prior to 1945 are described. Highlighted are the initiation and burial customs. The Kelabits' social structure is also described and discussed. It is shown that basically the tribe consists of three classes. At the apex is the *Paran* or the high class aristocrats; the bulk of the population, the *Upa-Upa* or "half-half" below the *Paran*; and at the bottom of the pyramid are the *Anak Katu* or followers, and a small number of slaves who do not form a class. This social class structure was rigid and had its impact on marriage-contracts, tribal rights, and responsibilities.

One of the most striking and outstanding aspects of the tribal traditions is the nature of responsibilities and appointment of tribal leaders. Chapter V attempts to capture this significance and four recent *penghulu* are discussed.

Having established a clear idea of the original Kelabit tribe in its environment, the paper goes on to show how foreign influences came in and began to make their presence felt. Chapter VI describes the visits of Europeans, officials, and missionaries. It shows the establishment of the first school, airfield, and health centre. In this chapter, the first changes came to the Kelabit and the stage is set for further future change.

Chapters VII and VIII consider and discuss two major aspects of the change in the Kelabit. First is the adoption of Christianity and the resultant loss of many customs and traditions considered pagan. Second is the development of education and educational facilities, and the tremendous impact of education.

The paper concludes with a brief, almost nostalgic resume of the Kelabit history as it leads into the future.

Commentary

It would be nice if they could write for themselves, but until early 1946, when we opened the first school, none of them could write. Now, four of them have travelled a month to the coast and then to the capital, Kuching, for a teachers training course. In a few years, they, who are natural orators, singers, bards, and moulders of words (as of iron and ivory, hardwood and horn), may well be able to tell their own tale. Meanwhile, willy-nilly, it falls to me, the only white man so far to live among and get to know them.

- Tom Harrisson

These are the words of the late Tom Harrisson, the first white man to study and write extensively on the Kelabit. This was in 1949 in an article, "The Uplanders of Borneo," which appeared in Asian Horizon Vol. II. Today, twenty-seven years later, the Kelabit themselves finally begin to write for themselves about themselves.

I have always been interested in the history of the Kelabit tribe to which I belong. The Kelabit tribe is a very small tribe, if not the smallest tribe in Sarawak, numbering only about 3,000 out of the Sarawak population of more than 1,000,000. The Kelabit are quite progressive, and it is interesting to know their past, especially their origins, migration, and culture. I have been interested to look into the factors which have caused so much change in such a small and isolated tribe.

The reason why the above topic was taken was mainly because of interest and the realization of the need to write a history of the Kelabit tribe, however brief, before it vanishes altogether. Every society must have some past, and the Kelabit's past is really fast disappearing as the memories are vanishing under the "bleaching" effect of the present. The Kelabit are progressive people, easily adaptable to new things, and discarding old ones as fast as new ones come. As it is, already there is only a handful of the Kelabit old people who have experiences and know of the past life of the Kelabit. So there is a real need to capture whatever we can before it goes with these people. Besides for mere interest and recordings, I also sincerely hope and wish that this work of mine will arouse the interest of other Kelabit, to write and do some

research on at least some aspects of the Kelabit past. Indeed, I do not have only Kelabit in mind, but also the other neighboring tribes with whom the Kelabit have had contacts since time immemorial. I believe they too need to write about their past so that future writers and researchers may have "two sides of the story" for better understanding. Finally, I would like if possible to expose the hitherto comparatively unknown Kelabit to my readers as one of the tribes among the many societies of Sarawak. I am aware of the danger of digressing from the topic since the history of any group cannot be confined to a few topics, especially when not even a general history of the people concerned has been written before.

In the course of my work, I came face to face with some of the problems of historiography, such as finding sources and dealing with the sources, which include both manuscripts and non-written materials. The year 1945 is chosen as a dividing point because events which effected great changes in the lives of the Kelabit occurred around that time. It marks the turning point when Kelabit discarded paganism for Christianity; it preceded the year when the first school was introduced among the Kelabit (February 1946), and more accurate and comprehensive records of the Kelabit were kept after this date.

Objective

The objective of this Graduation Exercise is to try to record part of the Kelabit past before it disappears altogether. The people who know the history of the Kelabit--their customs, practices, traditions, songs, legends, etc.--are generally old, from 60 to 80 years. The people who come after them are not very interested to know and learn about these things, since they are no longer practiced nor appropriate for the present society. Some details, such as names of persons and places, are included to enable future researchers to locate these people and places for more information.

Scope of Study

This paper covers generally the origins of the Kelabit and their developments to the present. This includes information about the Kelabit themselves, their customs, practices, longhouses, leaders, and the factors that have brought changes in Kelabit society. Prior to 1945, very little was known about the Kelabit by outsiders, hence, very little was written about them. They were rarely visited by government officials and their visits to towns were infrequent. The Kelabit had no concept of dates nor did they keep proper calendars. Since 1945, more accurate records have been kept and much more written about the Kelabit.

Research Problems

The problems of historiography, alluded to above, derived from both written and non-written sources. I encountered considerable difficulty in locating books and articles concerning the Kelabit. Although there

are many books written on natives of Sarawak, most only mention the Kelabit in passing. There is one book, World Within, written by Tom Harrisson in 1959, and some articles written specifically about the Kelabit. While these are good records of the Kelabit past, they were written by western writers. The writings of westerners are not bad intrinsically, but one cannot ignore the fact that these writers were people who visited the Kelabit only briefly, and may not really have understood the Kelabit. All of them worked through interpreters, and there is always the problem of mistranslation, misinterpretation, and other inevitable bias. Very few of the writings fall before 1945, so that what was written after 1945 was done when the Kelabit were in the transitional period between Paganism and Christianity. There is also the problem of lack of interest by the local people, especially the Kelabit themselves, on the writings of the Kelabit past. This is shown by the fact that all writers except for two, Galih Balang and Malarn Maran, both Kelabit, are western foreigners.

The problem of the non-manuscript sources was more complex. The non-manuscript sources consisted of oral evidence and visual remains of the past. The problem with oral sources was mainly in the locating of the right people to interview and in getting the necessary information from them. Although there are many Kelabit who experienced the pre-Christian era of Kelabit life, few of them remember or care to relate very much of their experiences. There are many things which most of them do not know, leaving only a very few, mostly very old Kelabit, who know something. During the course of interviewing people, I was directed to a few selected people considered to be suitable. The problem with these people was that they were mostly very old and were suffering from failing memory. They were illiterate and had no concept of dates of events; thus, as stated above, it is necessary to keep 1945 as a rough dividing point in Kelabit history, as it is only after 1945 that dates can be more accurately determined. A further problem was getting people to confine their explanations to the topic in question. This is mainly because of their misunderstanding of what is wanted. There is also the problem of their inability in saying the names of white visitors properly, such names being a good indicator for dates. An example here is "Tuan Plesud" and "Tuan Murud." While "Tuan Murud" has been identified as Mr. Eric Mjoberg, the first white man on Mount Murud, "Tuan Plesud" remains the obscure first missionary to visit the Kelabit-Kerayan highlands. There is, of course, the question of how reliable the information given is, because while attempting to relate the past to today's context for the young Kelabit interviewer, the informants face the problem of presenting facts accurately since the use of "deeper" and more comprehensive Kelabit language is not very well understood by the younger generation. The language spoken today by the young is quite mixed with new terms from Malay and even English, thus not all of the vocabulary of the original language is used. Most informants also feel that they have related everything to other researchers earlier, but we do not see much of this information published as yet. Many stories, songs and chants have been forgotten because of the lack of use of them with their pagan pre-Christian themes. All Kelabit today are staunch Christians.

As for visual evidence, this includes archaeological remains left by the people of the past. There are many such remains to be found throughout the Kelabit highlands, but it is impossible to visit all and to do so would mean making some excavations, as most are covered by undergrowth, trees and bushes.

Another problem I faced in the course of my research was my own personal inexperience. I am new to this field and do not have the experience to go about the research more adequately. Other problems were lack of financial support and lack of time. I did much of my research in the Sarawak Museum Library and the Archives, and at the Sarawak State Library in Kuching. This is more than 500 miles from my longhouse, and while doing it I had to find lodging and board which is quite expensive. On the second stage of my research, I was detained at Miri for three weeks because of transportation problems. The plane was fully booked by holiday-makers, and the rainy spell in March and April forced scheduled flights to Bario to be cancelled. This may be passed off as ill fortune, but it should be noted by future researchers because this happens every year, April being the month of the important Easter Convention for the Kelabit. As a month was spent in Kuching and three weeks in Miri, and another week of inactivity at Bario as far as research is concerned because of the Easter Convention, there was little time for research. I had only three weeks to do my research. In the Kelabit highlands, the main problem is the travel between longhouses which may take a day of more of jungle trekking. Work on the first night in each longhouse is out of the question since, besides being tired, one has to converse with the villagers on various unrelated topics for courtesy's sake. Even if an informant was present, one had to find an opportune moment in which he was free, unless one paid him for losing the day's work. It is respectful to give "courtesy payments" in the form of small articles such as soap, sarong, shirts, and other such items. To cover all the Kelabit longhouses would have taken more than a month and would have been costly, thus only nearby longhouses of one to two days' travel were visited. To avoid getting really "stranded" in the highlands because of the rainy season, I had to catch the earliest plane after some time, to come back for the opening of the 1976-77 session. The personal problems I faced may also be faced by other undergraduate researchers on the Kelabit in the future. It could be even worse if he were a non-Kelabit, mainly because of the language barrier, and the problem of striking relationships with the local people.

Research Methodology

The main method used, besides reading and note-taking, was personal interviews with many Kelabit informants in the longhouses of the Bario area, Pa' Lungan, Long Dano, Pa' Dalih, and Batu Patong. There was no fixed questionnaire used, because all the interviews were carried out informally. This was so because at the time of interviewing the farming season had started and the informants could not afford to stay away for a long period of time and at night they had to retire early for rest. In at least one case, I was able to tape statements, mainly stories and

legends from one informant. This proved to be a bit costly. While I could not interview everyone, correspondence was made with many more informants, especially on topics after 1945. Most of these informants were literate. This method proved to be a partial success, because while many responded to inquiries, others had no time to do so. Replies came in gradually over a long period of time, and this in some way hindered the work. This method proved a bit costly as stamped, self-addressed envelopes had to be sent, as there was no post office in Bario where these could be purchased. On the whole, it proved most worthwhile and useful. As for books and articles, much use was made of articles in the Sarawak Museum Journal. The Sarawak Gazette, Journal of the Malayan Branch, Royal Asiatic Society, newspapers, newsletters, and pamphlets from a variety of sources.

As this work might be the first of its kind, it is hoped that it can provide a basis for future research on the history of the Kelabit. Only the late Mr. Tom Harrison has written quite extensively about the Kelabit. His numerous articles and his book, World Within, make good and interesting reading.

Note

1. This paper was the Graduation Exercise submitted to the Jabatan Sejarah, University of Malaya, in partial requirement for the fulfillment of the Degree of Bachelor of Arts, Honours, 1976-77.

B R I E F C O M M U N I C A T I O N S

Indonesian Forestry at a Glance¹

More than 60 percent of Indonesia's total land mass is tropical forests--approximately 300 million acres. As the richest nation in forest resources in Southeast Asia, the Republic's forestry is often called a "green gold mine," and, if fully exploited, could provide both enormous revenues and more than one million jobs.

Forest product exports--primarily to Japan, Singapore, Taiwan and Italy--are already the nation's second largest foreign exchange earner, after petroleum products. Gross earnings rose from \$101.8 million in 1970 to \$951.2 million in 1977.

Forest Investment

More than 440 national and foreign companies--including American, British, Japanese and Australian firms--have been granted licenses to develop more

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than 100 million acres of forest, at an aggregate total investment value of approximately \$1.3 billion.

Foreign investment--valued at approximately \$575 million--accounts for almost half the total capital invested in forestry. Major investors are companies from the Philippines (\$306 million), South Korea (\$62 million), Japan (\$49 million), Malaysia (\$49 million), Hong Kong (\$38 million) and the United States (\$34 million). This investment in forestry represents some 8 percent of the total value of all approved non-oil foreign investment projects of year-end 1977.

In 1975, the Government reassessed the heavy reliance of the timber industry on foreign investment. Under a May 1975 decree, foreign participation was excluded from new timber developments and foreign companies holding Forest Utilization Rights were obligated to transfer a majority equity holding to national holders within ten years. The Government still, however, offers considerable incentives to foreign investors wishing to invest in timber related industries, such as pulp and paper. Since the passage of the Domestic Investment Law of 1968, the Government has also approved 278 domestic investment projects with an aggregate investment value of Rp. 186 billion as of the end of 1975.

Foreign companies operate under contract-of-work agreements, which require them to share a certain percentage of their profits with the Government. Certain incentives have been provided in the form of tax holidays and duty-free import of project goods.

Types of Forests and Woods

Of the 300 million acres of forest in Indonesia, about 47 million acres or 16 percent is accessible for immediate harvesting. Some 34 percent of these forests are located in Kalimantan, 31 percent in Sulawesi, the Moluccas, and Irian Jaya, 23 percent in Sumatra and the rest in Java, Madura, and Nusa Tenggara. Conservationists report that no less than 20-25 million cubic meters of timber could be harvested annually, without damaging the country's forest reserves.

According to the Forestry Directorate General of the Agriculture Ministry, the country's forests break down like this:

- Approximately 130 million acres of the forested acres are classified as production forests ready for exploitation.
- Approximately 60 million acres are protected forests.
- Approximately 9 million acres are nature preservation forests.
- More than 100 million acres are reservation forests.

The largest productive forests, totalling about 54 million acres, are located in Kalimantan. Of the remainder, 22 million acres are in Sumatra, 5 million in Sulawesi, 4 million in Java, 3 million in the Moluccas, 1,475,000 in Irian Jaya and 172,000 acres in Bali and Nusa Tenggara.

These forests produce various kinds of wood species:

- Meranti is found in abundance in Sumatra, Sulawesi, Kalimantan and the Moluccas.
- Agathis is common in Java, Madura and Kalimantan.
- Keruing is found throughout Kalimantan and Sumatra.
- Tall pines grow in Sumatra and Java.
- Ramin is found in Kalimantan, exclusively.

Teak is Java's specialty wood and nearly all the nation's furniture is made of teakwood.

Meranti and ramin are used in the manufacture of plywood and veneer. These buoyant woods are resistant to insect and fungi damage and are easily transportable. Other Indonesian woods are used mainly for the production of mixed hardwood chips, paper, fiber and chipboard.

Growth Prospects

By 1980, log production is projected to reach 25 million cubic meters and foreign exchange earnings could surpass \$1.5 billion.

During the same period, sawed timber output could reach four million cubic meters, half of which would be exported to European, Middle Eastern and Asian markets.

A total of 1,000 medium and small-scale sawmills and 16 plywood mills were in production during 1977. Ten additional plywood facilities are under construction.

Currently, some three-quarters of all Indonesia's domestic paper needs are imported. Most domestically produced paper and pulp is produced by five State-owned corporations. In addition, Indonesia's per capita consumption of paper--at 12 kilograms per annum--is relatively low by world standards (United States per capita consumption is approximately 290 kg. per annum). This, then, is another part of the forestry sector with considerable growth potential.

Distribution and Status
of the Asian Elephant: Borneo¹

The history of elephants in Borneo is something of a mystery. It is thought that those present today originated from elephants given in 1750 to the Sultan of Sulu by the East India Company and then liberated in North Borneo. The peculiar distribution today, limited entirely to the north-east corner (see map in de Silva 1968, for example) supports this view. However, there seems little doubt that elephants occurred in

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Borneo before 1750. While Pigafetta's account of tame elephants at the time of Magellan's visit to Brunei in 1521 and Laufer's reference to a China-Borneo ivory trade in the Middle Ages are not in themselves conclusive proof, much stronger evidence of wild *E. maximus* during the Pleistocene comes from Hooijer (1972). The elephant would therefore join the ranks of Borneo's strange losses of modern species that were native to the region in prehistoric times, along with the tiger, tapir and others. As Harrisson (1961) who also quotes a possible Bornean fossil of *E. maximus*, points out, man was once more numerous and powerful in Borneo than has usually been supposed, and had an often decimating influence on the local fauna. This may explain the demise of these species.

In 1961 Burgess published the first account of the modern distribution in North Borneo and noted that elephants were being seen further west than previously, probably due to human disturbance. Davis (1962) and Medway (1965) give the same distribution--the east coast south of the Sugut River and south into Kalimantan, with limits in this direction imprecisely known. Western limits were also indefinite, but records of elephants at Penangah on the Kinabatangan were described as 'recent' by Burgess (1961) who also said they were occasionally seen near Pensiangan, perhaps having come from Kalimantan. De Silva (1968) largely concurs with this distribution, but extends the range north beyond the Sugut to Paitan. These references to expansion are additional evidence for an original distribution localised in the north-east. Various Dutch sources--Jentinck (1884), Muller (1916), Witkamp (1932), Van der Meer Mohr (1932), Habbema (1934) and particularly Westermann (1939)--report a limited distribution in the extreme north-east of Kalimantan also. Before 1934 Kalimantan's few elephants lived only in the upper-Sembakung River in Tindung district. Unfortunately there is no recent information on Sabah or Kalimantan for comparison or to show whether expansion has continued, as seems likely.

The elephant has had some sort of protection since the 1936 Wild Animals and Birds Preservation Order, but development inland from the prime lowland sites near the coast appears to have displaced the elephants. De Silva (1968) records that numbers in such areas have dropped since the early post-war years; while herds of 100 were recorded in 1946, Davis (1962) mentions herds of only 20 or more as not uncommon. Throughout Sabah crop damage has increased along with increased development, as have deaths due to crop protection. Six thus died in 1964, 20 in 1965, and 30 in 1966.

Numbers

In 1949 Keith estimated Sabah's elephant population as 2000, the same number Burgess gave in 1963, and de Silva (1968) accepted this with reservations. It may be that no reliable estimate has been made since 1949, if ever. If the distribution in north Borneo were better known, an estimate could be computed from densities in similar habitats in Malaya, but until proper surveys are done 2000 has to stand.

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NEWS AND ANNOUNCEMENTS

Human Ecology and Economic Development
In Kalimantan and Sumatra

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The notion of problems was featured in the assignment given to me for the workshop at which this paper was originally presented,¹ and there will indeed be discussion of problems in the paper. It must, however, be said at the outset that there are problems about the definition of problems (cf. Vayda and McCay 1977). A great deal depends on whose standpoint is used and what goals are sought. Shifting or swidden cultivation, for example, may be regarded as a problem from the standpoint of forestry interests insofar as it wastes valuable timber, but, from the standpoint of the shifting cultivators, their practices may be answers to problems of wresting livelihoods from poor-soil areas where more intensive modes of land use would themselves be problematic. Interventions to promote economic development (for example, increased production of timber for export or increased commercial food crop production) may be extolled as paths to a better life for shifting cultivators in Kalimantan and elsewhere. However, it must be recognized that such interventions can also bring problems, including the disruption of traditional coping mechanisms and the displacement of people from their familiar environments to new ones where new hazards present themselves.

Recognition that development efforts can create problems for local populations should not be taken to imply, however, that people would be

better off without such efforts. But it does point to the desirability of basing the efforts on authentic understanding of the people's actual situation and their real problems, needs, and capabilities. Unfortunately, as noted in recommendations for development of programs by the new United Nations University in Tokyo, the present push throughout the Third World to develop rural areas is being hindered by a lack of understanding of ecosystems and knowledge systems at the local level, and there is an urgent need for research to correct this state of affairs (The United Nations University; Recommendations from the Rector to the United Nations University Council, 9 January 1976).

In the present paper, I will use illustrations from Indonesian Borneo (hereafter referred to as "Kalimantan") and from Sumatra to indicate three broad categories of subject matter in which research is especially needed. Before discussing these categories, I shall provide some background information on patterns of land use by local populations.²

PATTERNS

Within Sumatra and Kalimantan, there is considerable variation in patterns. Among the contrasts is that between agricultural modes of production and the hunting and gathering which are still the main subsistence activities of a few bands of Punan in the Kalimantan interior and the scatter of so-called Kubu in Sumatra's eastern lowlands and foothills. Broad contrasts within the category of agricultural patterns are those between permanent and shifting cultivation, between growing annuals and growing perennials, and between rainfed and irrigated farming. In addition, special methods of growing rice or other crops or practicing animal husbandry have developed in accord with environmental constraints and opportunities in such distinctive habitats as the tidal swamps along Kalimantan's southern and western coast and Sumatra's eastern coast, the shallow lake (*Iebak*) area of South Sumatra, and the freshwater Alabio swamp of South Kalimantan.

Besides the variations from place to place, there may be variations through time in any one place. Thus, in both the coastal swamps and the central and southern Sumatran uplands, some farmers initially cultivate rice and other annuals in particular plots of land and then, with decline in the yield of the annuals, use the land mainly for perennials such as coconuts, rubber, coffee, and pepper. Clearly inapplicable to such farmers are assumptions favored by some development experts to the effect that rural people's agricultural practices are governed primarily by tradition and are therefore essentially static and unresponsive to fluctuations or other kinds of changes in the environment. Indeed, unlike farmers in some of the other tropical rainforest regions of the world, most of the rural people of Sumatra, including those of the interior uplands, have long had commercial production as a substantial component of their agricultural activities (Pelzer 1978) and most have been able to switch from one crop to another in response to changes in external markets. Because of being isolated by extensive river rapids, some people of the Kalimantan interior, such as the Kenyah Dayaks of the Apo Kayan (the plateau at the Kayan River headwaters), have been less involved in producing cash crops. But even among such people,

there are well established patterns of making long journeys, what the Kenyah call *peseiai*, to sell forest produce and handicrafts and to buy salt, cloth, kerosene, iron and other goods. Modern commercial patterns are thus not unfamiliar even to such people. Since the early 1950's, a desire to facilitate their participation in these patterns has induced many of the people to move permanently from their upriver homelands to downriver areas. A government program to improve the living conditions of resettled people in fourteen downriver communities was instituted in 1972 (Rasyid 1976; Kartawinata *et al.* 1977; cf. Whittier 1973:222-224).

In some parts of Kalimantan and Sumatra, the rural population has been augmented in recent years by government-sponsored migrants from Java and Bali (see the references in Meyer and MacAndrews 1978, chapters 4 and 5). Although the sites of governmental transmigration projects have often been in marginal land with poor soils (largely because this has been the land not already settled and exploited by indigenes or so-called spontaneous migrants) or in land whose fertility can be maintained only with irrigation works that the government has often been slow to develop, the economic circumstances and quality of life in the transmigration areas nevertheless constitute an improvement for many migrants over what they previously knew in densely populated rural Java, where most of them, according to surveys, had little or no land to farm. Thus, the government's offer of land, even if only one or two hectares, and its assistance with various services are unquestionably attractive to the poor Javanese who join the transmigration program. Of interest for us to note in connection with variations in patterns of land use is that in some areas, such as parts of Lampung, there are developing new symbiotic patterns whereby local people with extensive land holdings hire Javanese transmigrants to tap rubber trees and cultivate rice or cassava for them. These local people regard Javanese patterns of intensive cultivation with some antipathy, since their own more extensive patterns of land use, notwithstanding the smaller labor inputs, give them better returns on poor soils and unirrigated lands. The opportunities for wage labor or for sharecropping or share-tapping on the land of the local people may be welcomed by Javanese migrants as supplements to the often meager incomes to be derived from working their own farms. In parts of East Kalimantan, many migrants have turned to ironwood-cutting for additional income.

PROBLEMS

What I have indicated about variations of land use in the preceding paragraphs presents formidable challenges for research. I want now to consider the three broad categories of subject matter in which research needs to be pursued.

Research on land use systems already in local operation (as distinct from those being promoted from international or national research centers planning offices, or extension headquarters).

As remarked in the final report of UNESCO's 1974 Regional Meeting on Integrated Ecological Research and Training Needs in the South East Asian Regi-

local people have often evolved, presumably through trial and error, viable solutions to problems of land use in so-called marginal areas and some of these solutions may provide better bases for development than would the solutions proffered by experts having little familiarity with local conditions (UNESCO 1975:19; cf. Chambers 1978; Glass and Thurston 1978). Rather than taking the view that the local people are necessarily backward or ignorant and incapable of formulating their needs, diagnosing their problems and devising solutions, we might in fact regard them, as suggested in a recent article on upland "problem soils" in Indonesia, as qualified consultants on how development in the marginal areas can proceed (Driessen et al. 1976). Indeed, the authors of the article state that during several years of work in the *ladang* areas of Kalimantan and Sumatra, they became firmly convinced that shifting cultivation is a very sophisticated system, drawing its strength from the fact that it does not combat the "ever-aggressive jungle" (as might seem to be the case to outsiders watching farmers burn the forest) but rather uses limited resources in a way which, in comparison with modern mechanized agriculture, causes little damage to the environment.

Evidence of definite conservation practices was found by Kartawinata and me among the Kenyah shifting cultivators that we interviewed at Long Nawang in the Apo Kayan in 1978. For example, the people were making their swiddens at some distance (ca. 6 km.) from their longhouses but were deliberately avoiding cultivation of nearby northern slopes because the primary forest there was, they said, needed as a reserve and as a source of house-building materials. These people do not at all conform to the common characterization of shifting cultivators as "non-settled" farmers who continually move on to new areas of forest and leave unproductive *alang-alang* (*Imperata cylindrica*) grassland in the wake of their migrations (see, for example, FAO 1976:6). On the contrary, there has been a permanent settlement at Long Nawang for about a century (Whittier 1973: 31ff.), and, by means of a judicious alternation of cropping and fallowing, the people have not turned their territory into grassland but rather have maintained most of it in secondary forest.

Similarly, in the case of the locally evolved system of farming and fishing the shallow lakes (*lebak*) along the Ogan and Komering rivers in South Sumatra, such features as the careful scheduling of activities in accord with changes in the water levels of the lakes or the use of traditional mechanisms for the adjudication of disputes between farmers and fishermen (Vaas et al. 1953) are answers to distinctive local problems to which such agencies as Indonesia's Central Research Institute of Agriculture and the agricultural extension service have hardly addressed themselves. Before attempts are made to introduce new systems of land use and resource management in these shallow-lake areas (see, for example, the large-scale, capital intensive drainage and irrigation scheme recommended in FAO 1976), there needs to be research on the system already there and its present effectiveness, viability, and potential for improvement.

Another example of a traditional system dealing effectively with environments that have thus far proved difficult to develop with the more capital-

intensive means that the Indonesian government and various development agencies have tended to favor is the system used by the Banjarese and Buginese people for growing rice, coconuts, and other crops in the tidal swamp areas of Kalimantan and Sumatra. Research scientists working with the Soil Research Institute in Bogor have characterized the system as follows:

Adapted agricultural practices, plant varieties and water management are blended in a highly sophisticated agricultural system which - in its traditional form - combines ingenious soil conservation with the highest possible production. A close relation exists between environmental conditions and local crop and cultivation techniques (Driessen and Ismangun 1972:347).

The Buginese and Banjarese themselves, as spontaneous migrants, have been extending their system along the tidal swamps of Sumatra's eastern coast. At least in the last few years, they have sometimes been doing this in competition with the government's program of building canals to develop the swamps for permanent settlement and rice cultivation by Javanese and Balinese transmigrants, among whom a cropping system involving new, high-yielding rice varieties and agrochemical inputs is being promoted (Hanson and Koesoebiono 1977). Observations that I made in the tidal swamp areas of Jambi in 1977, as well as reports that crop failures led government-sponsored transmigrants in tidal swamp areas of South Sumatra to forsake their farms and settlements, suggest that the traditional system of the Banjarese and Buginese may have some advantages in comparison to the government system (cf. Hardjono 1977:74). Moreover, the fact that some Javanese seen by me in Jambi and by other investigators in South Kalimantan (Soeratman et al. 1977:32) have learned the traditional techniques from the Banjarese and are now successfully applying them suggests a relative absence of cultural as well as environmental constraints to using the traditional system not only for the development of the tidal swamps but also for better meeting the needs of government-sponsored transmigrants to the tidal swamp areas (cf. Pelzer 1945:223-224).

Mention may also be made here of the unique, elegant, and ingenious system that Banjarese farmers have developed for the production of eggs by more than half a million ducks in approximately 100 square kilometers of the Alabio swamp in South Kalimantan. In this system, the birds are carefully managed and are provided with feed that includes fresh sago palm, cooked fish, and finely chopped fresh snails. A laying duck produces 200 to 250 eggs annually, and a farmer's net income from his flock may be higher than U.S. \$2,400 per year. Besides the swamp farmers who own and manage the laying ducks, there are various specialists associated with the system, including hatchery operators and sago vendors. Some recent reports on the system are noteworthy for the close attention they pay to an indigenous industry and to the possibilities of using it as a model for development elsewhere (Robinson 1977:36-37; Robinson et al. 1977; Kingston et al. 1978 and n.d.).

The existing social groupings, networks, and leadership patterns involved in land use and their possible roles in either facilitating or inhibiting socially and ecologically sound economic development.

In the case of land use and agricultural development by Buginese in the tidal swamp areas, it may be significant that their migrations (as distinct, for example, from the more individualistic and more urban-oriented migrations of the Minangkabau of West Sumatra) are characteristically made by groups of kinsmen and friends who have previously worked together or exchanged their labor (Lineton 1975a, chapter 6; cf. Lineton 1975b). The migrants thus arrive in new tidal swamp areas with already established bases for mobilizing the labor necessary for felling forest and digging canals. Probably most conducive to effective pioneering is the fact that Buginese social networks are geographically extensive (no doubt as a result of past Buginese pioneering and maritime and trading activities) and that information about opportunities in new lands can therefore be quickly transmitted to would-be pioneers. Such social factors may be as critical as any technical ones for success in economic development.

As noted in the Asian Development Bank's recent Asian agricultural survey (1977:227-228), an important traditional obstacle to socially sound and equitable development is the widespread institutionalization of patron-client relationships whereby poor farmers depend on richer ones for obtaining employment or credit, for selling their harvest, and sometimes for getting land to farm. In some Indonesian cultures, such relationships date from the precolonial past, but the relationships no doubt were further promoted by such features of Dutch colonialism as the system of forced cultivation established in Java and West Sumatra (the so-called "Culture System") and the rewards and responsibilities given to village leaders as part of the system. At present, even outsiders may become clients. Thus, it has been noted that the "village level worker, who is supposed to channel Government help and service to the poorer rural strata, often becomes a client of the rich farmers and naturally favors his patron" (T. Scarlett Epstein in a report cited in Asian Development Bank 1977:228). Horizontal groupings of the poorer farmers are needed to counteract this hierarchical structure and to ensure that more of the benefits of development reach the lower strata (cf. Collier 1977 and 1978). As the Asian Development Bank's survey notes, a basis for such groupings often exists in the form of informal groups such as labor exchange teams for various agricultural operations. Research is needed to determine how these informal groups work in particular societies (for example, among the matrilineal Minangkabau of West Sumatra as compared with the patrilineal Batak of North Sumatra) and to determine what possibilities they afford for more formalized collective efforts in development and in gaining its rewards.

The problems that arise from specific interactions between people and their environments and among the people themselves in particular places.

If solutions are to be found to the problems that people actually have,

there is a need for better information on what those problems are. For example, although all who are familiar with the Kayan River in East Kalimantan know that travel by *perahu* (canoe) from the Apo Kayan to the coast is difficult, it is not generally recognized that the difficulty has been increasing for the Kenyah in recent years. The route involves going on foot for 25 miles past the falls and rapids, but the country in which this walk is made is too rough for portage to be feasible. Accordingly, the Kenyah formerly built new *perahu* at the end of the walk or else used *perahu* left from previous trips. The diminishing availability of these options has been described as follows:

The first of these options is becoming very difficult; several generations of travelers on the route have removed most of the nearby trees suitable for canoe hulls. Storage of canoes is becoming risky. Kenyah would not take a canoe stored at one end of the rapids without the explicit permission of the owner, but coastal peoples are now beginning to venture upriver as far as the rapids, and, according to the Kenyah, their appearance coincides with the disappearance of stored Kenyah canoes (Whittier 1973:116).

The early history of plantation agriculture in Sumatra provides an example of disruption and problems arising from the advent of foreign entrepreneurs and may serve to warn us of similar dangers for Dayak shifting cultivators in connection with present timber concessions in Kalimantan. Malay rulers granted land concessions to the first plantations without much regard for the rights of the local populations in North Sumatra. The initial contracts between the rulers and plantations referred only vaguely to "village lands" which were to be excluded from the land concessions, but there was no heed paid to the fact that the local people, as shifting cultivators, needed much more than the lands designated as "village lands." The people revolted and the Dutch government had to intervene to make some adjustments, but the region became a major food-deficit area (Thee 1977). The extent to which present-day shifting cultivators in Kalimantan face similar difficulties is unclear, but the Kenyah in a "resettlement" village on the Telen River in East Kalimantan did complain to me in 1978 that the land left to them after the granting of concessions to timber companies was so little as to require them to re-use the same plots after fallow periods of five years or less rather than after the desired 10-year periods.

Further examples of the kinds of problems that may arise and that need to be studied and better defined have become available as a result of the Indonesian government's transmigration program. Thus, a major problem for Javanese migrants in the upland site of Sitiung in West Sumatra are the depredations committed in their gardens by the free-ranging cattle of neighboring Minangkabau indigenes. These people fence their gardens and say that the Javanese should do likewise, but, for some unknown reason, this solution has not seemed practicable to the Javanese. When I interviewed them in 1977, the Javanese were calling for a ban on the free movement of cattle and were planning to have meeting

about it.

In the case of the transmigration project near Buginese settlements and farms in the Upang Delta of South Sumatra, a serious pest problem has resulted from the fact that the Buginese have been planting traditional slow-maturing rice varieties and the Javanese and Balinese migrants have been planting fast-maturing, improved varieties with a low resistance to area pests and diseases. Because of different harvesting times for the different rice varieties, a continuous food supply has been available for such pests as the stinkbug *Leptocorisa varicornis* and this has enabled them to build up their number to dangerous levels (Hanson and Koesoebiono 1977:21-22, 32).

Another way in which transmigration projects are leading to disruptions of established patterns of land use in Sumatra and Kalimantan is by inducing shifting cultivators to return to farm some sites prematurely, i.e., before long enough periods of fallow for the sites. The shifting cultivators are doing this in order to establish their claims to land and compensation in areas known to be planned for development for transmigration.

All of these examples of problems in transmigration projects illustrate the dangers of developing programs for particular groups without taking into account the larger systems within which those groups will have to operate (cf. Wade 1976 on "target group" thinking). The problems thus generated, like other problems arising from specific interactions in particular places, are apt subjects for investigation.

At present, there is, unfortunately, a deficiency of personnel trained to conduct the needed research in the three broad categories of subject matter which I have indicated. I want to close therefore by expressing the hope that universities in Indonesia and in other developing countries will develop human ecology or rural ecology curricula for the training of professionals competent to conduct research on the interaction of rural people with their environments and to evaluate economic development programs and research activities with respect to their likely effects on rural ecosystems and their effectiveness in reaching and benefiting a broad spectrum of people.³

Notes

1. The original, shorter version of this paper was entitled "Human Ecology and Human Settlements in Kalimantan and Sumatra: Patterns and Problems" and was presented at the East Kalimantan Man and Biosphere Program Workshop on 24 March 1978 in Samarinda, Indonesia. The original version is being published (as part of the Workshop Proceedings) by Lembaga Ilmu Pengetahuan Indonesia (the Indonesian Institute of Sciences) in Jakarta.

2. I visited Sumatra in 1975 in connection with the Indonesian Man and Biosphere (MAB) program and again in 1977 in connection with a

U.S. Agency for International Development consultancy on the development of agricultural research in Sumatra. The purpose of my four visits to East Kalimantan in 1976-78 was to help in the development of MAB projects concerned with changes in the human use of the provinces tropical forest (see Kartawinata et al. 1977).

3. A proposal for a rural ecology curriculum to be offered by Mulawarman University in Samarinda was presented at the East Kalimantan Man and Biosphere Program Workshop in March 1978.

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Royal Geographical Society's
Symposium on Gunung Mulu National Park, Sarawak

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On 12 - 14 September, 1979, in London, the Society will hold a Symposium to discuss the results of their five month expedition to study, at the invitation of the Sarawak Government, the two hundred square miles of this newest and largely unexplored National Park in Sarawak. For 15 months, from June, 1977 to September, 1978, 115 scientists from seven countries participated in what amounted to 10,000 man-days of scientific survey and recording.

The research carried out fell under the heading of five programmes. The

land form and meteorological programme was directed by Dr. Marjorie Sweeting of Oxford University. With three assistants and eleven collaborators, her team established a number of experiments to test the geomorphology, hydrology, and slope stability in the very interesting limestone formations around Gunung Mulu and Gunung Api.

To counter-balance the work done on the surface, the speleological team, directed by Dr. A.C. Waltham of Trent Polytechnic, surveyed and mapped some 50 kilometres of unexplored caves, discovering caverns and a cave passage which, in international opinion, are regarded as possibly the largest so far discovered anywhere in the world.

A soil survey jointly directed by Lim Chin Pang, Chief Soil Surveyor, Sarawak Department of Agriculture, Kuching, was carried out with a team of collaborators from the Departments of Agriculture and Forestry.

On the biological front, a vegetation survey already begun by the Forestry Department of Sarawak was completed by Dr. J.A. R. Anderson, formerly Assistant Conservator of Forests, Sarawak, and now a forestry consultant in Singapore. Mr. Paul Chai, Forest Botanist in Kuching, was directly concerned with this aspect of the Expedition while at the same time acting as General Scientific Liaison Officer. Throughout the Expedition, 20 botanists have collected flowering plants, ferns, bryophytes, fungi and lichens, the top set to be lodged in the Forest Herbarium, Kuching, and other sets in the Aarhus, British Museum, Copenhagen, Edinburgh, Kew and Leiden as appropriate.

A faunistic survey was also carried out under the general direction of the Earl of Cranbrook who, as Lord Medway, was a former lecturer at the University of Malaya, Kuala Lumpur, and an authority in mammals of Borneo. Here, 33 specialists in varying groups from spiders to insects to birds and mammals have added to the knowledge of what is living in the Park. Already over 240 species of any have been identified, some 600 species of spiders, and as many as 5,000 beetles have been estimated for the entire Park. Just over 60 mammals and 264 birds have been recorded.

Ecological work was orientated around a study of the nutrient balance in three major forest formations: alluvial, hill dipterocarp, and kerangas forests. Dr. John Proctor of Stirling University directed this programme and with the collaboration of eight scientists, two of whom were, with Proctor, in Mulu for over 12 months.

The Symposium aims to discuss the results of these programmes and will show how such baseline information can be used for the immediate and most tangible aim of the Expedition, namely to draw up a Management Plan for the Park. This aspect of the work was funded by World Wildlife Fund both locally in Malaysia and at international level. It is intended that the papers given at the Symposium together with other baseline data will be published by the Sarawak Museum in a special volume as Hand-Book to Gunung Mulu National Park. In this way, we hope the results of the

Expedition are presented for others to build upon. From the many transparencies taken, a film-strip will be prepared for use in Malaysia and other Southeast Asian schools.

The overall scientific programme has been coordinated by A. C. Jermy, Botany Department, British Museum (Natural History), Cromwell Road, London SW7 5BD, England, from whom further particulars concerning the Symposium, material collected, and forthcoming publications may be obtained.

BORNEO NEWS

Regional News

Those interested in joining the INTERNATIONAL SOCIETY OF TROPICAL ECOLOGY should contact Professor William Hoe, Department of Botany, University of Hawaii, 3190 Maile Way, Honolulu, Hawaii, 96822, U.S.A. Annual subscription is U.S. \$10.50 for those from developed countries, and U.S. \$5.50 for others, and this provides a subscription to the journal Tropical Ecology, which has recently been reorganized and brought up to date.

The first issue of SEAS NEWS, the newsletter of the Centre of South-East Asian Studies, School of Oriental and African Studies, University of London (Malet Street, London WC1E 7HP), is issued this October. It will be produced once a term in the future, and copies may be obtained from the Centre Secretary.

Sarawak News

IAN BAILLIE has successfully gained his Ph.D. with a thesis entitled "Studies of soil-forest relationships in the Dipterocarp forests of Sarawak." This work, which was completed as Research Scheme R3018 of the Ministry of Overseas Development, was based on field work undertaken in 1963-66 by Peter Ashton and in 1969-72 by Baillie and U.N.D.P. survey teams under the auspices of the Forest Department, Sarawak. Mr. Baillie now works at the Polytechnic of North London.

RICK FIDLER is back in Rhode Island after participating in an international, interdisciplinary institute on cross-cultural/multi-cultural research at the East-West Center in Honolulu. During a three-month field survey on the Big Island of Hawaii, following the institute, Fidler collected data for the drafting of future proposals to study the adaptive organization of ethnicity in two multi-ethnic communities, Hawi in North Kohala and Naalehu in Windward K'au. Hawaii and Malaysian Borneo share similar causal factors in the historical development of their multi-ethnic societies; thus, the former provides a social laboratory to continue these studies when research in the latter is not currently viable.

RITA MANURUNG is in Edinburgh, at the Institute of Terrestrial Ecology, where she will be working for most of this year on vegetative propagation of tropical trees with Dr. K. Longman.

Following the death of his father, LORD MEDWAY has succeeded to the title of (5th) Earl of Cranbrook and in future wishes to be known by this name. His home address and his interest in all things Bornean remain unchanged.

BOOK REVIEWS, ABSTRACTS
& BIBLIOGRAPHY

G. N. Appell. Ethical Dilemmas in Anthropological Inquiry: A Case Book, Waltham, Massachusetts 02154, U.S.A., Crossroads Press, Shiffman Center, Brandeis University.

This book consists of 90 cases contributed by anthropologists and sociologists to serve as the basis of organizing case discussion sessions of ethical issues in social inquiry. The case materials are organized into sections based on the major social relationships involved: Relations and Responsibilities to Host Community; Relations and Responsibilities to Respondents and Informants; Relations with Host Government; Relations with Representatives of Outside Agencies and the Public with Respect to the Host Community (including missionaries); Relations with Other Social Scientists and Responsibilities to the Profession; Dilemmas in the Use and Misuse of Social Science Knowledge; Publication: Responsibilities and Liabilities; Relations and Responsibilities to Funding Agencies; and Issues in Teaching.

Each section includes an introduction to the cases, references to relevant literature, and a list of related case materials from other sections. The Introduction to the book includes a discussion of the value of the case method in developing skills in ethical decision making and provides instructions on how to use the case method. The appendices include references to longer case materials, a bibliographic discussion of the major ethical issues inherent in social inquiry, and a cross-referencing of cases to that the instructor can select cases illustrating these issues.

Individual cases or series of cases are available separately.

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THE BORNEO RESEARCH COUNCIL (contd. from p. 2)

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 include providing counsel and assistance to research endeavors, conservation activities, and the practical application of research results.

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Research Notes: These should be concerned with a summary of research on a particular subject or geographical area; the results of recent research; a review of the literature; analyses of the state of research;

and so forth. Research Notes differ from other contributions in that the material covered should be based on original research or the use of judgment, experience and personal knowledge on the part of the author in the preparation of the material so that an original conclusion is reached.

Brief Communications: These differ from the foregoing in that no original conclusions are drawn nor any data included based on original research. They also differ in consisting primarily of a statement of research intentions or a summary of news, either derived from private sources or summarized from items appearing in other places that may not be readily accessible to the readers of the Bulletin but which have an interest and relevance for them. They will be included with the contributor's name in parentheses following the item to indicate the source. Summaries of news longer than one or two paragraphs will appear with the contributor's name under the title and prefaced by "From".

Bibliographic Section: A Bibliography of recent publications will appear in each issue of the Bulletin, and, consequently, reprints or other notices of recent publications would be gratefully received by the Editor.

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.

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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.