Borrower: GDC

Lending String: *PBB,BMC,DUQ,EIB,LYU

Patron: ;dept; ;type; Amith, Jonathan

Journal Title: Social science information /

Volume: 13 **Issue:**
Month/Year: 1974**Pages:** 9-28

Article Author:

Article Title: ; Folk biology in the New Guinea highlands

Imprint: Paris ; The Council, [1967?-

ILL Number: 13528044

Call #: Bound Periodicals

Location: 4th Floor

ARIEL
Charge
Maxcost: $25IFM

Shipping Address:
Library - ILL
Gettysburg College #132
300 N. Washington St.
Gettysburg, PA 17325-1493

Fax: 717-337-7001
Ariel: 138.234.152.5
Email:

RALPH N.H. BULMER

Folk biology in the New Guinea Highlands *

1. There are two levels of ethnobiological enquiry. One is the determination of the biological species, cultigens and cultivars which are of significance in human ecology, and the study of the ways these relate to men on the objective biological dimension. The other level is the study of human conceptualisation and classification of plants and animals, and knowledge and belief concerning biological processes. While it is possible to proceed quite a long way in the first kind of enquiry without seriously touching the second, the reverse is not possible. The investigator of systems of biological knowledge and belief is largely wasting his time if he lacks objective information or the techniques for obtaining for himself objective information about flora and fauna.

While ethnobiological studies in the first sense formed part of the very first scientific anthropological enquiries in New Guinea, in the pioneer work of Miklukho-Maklai in the 1870's [1], intensive specialist enquiries into indigenous knowledge and classification of plants and animals have had to wait until a very recent date. Though one must pay tribute to the work of such pioneers in New Guinea ethnobotany as Miss Beatrice Blackwood [2], and to the awareness of such other ethnographers working before World War II as Malinowski, Fortune, Bateson and Williams of the importance of accurate determination of plants and animals of cultural significance, it was not until the 1950's that the scale of ethnographic research encouraged specialisation, and the intensification of research in Melanesia by professional biologists facilitated collaboration between ethnographers and natural scientists in this region. Before, for example, Dr. Barrau's early publications became available it was difficult for the ethnographer not previously experienced in tropical botany even to identify correctly certain of the major species of cultivated food plants.

But perhaps most important of all for the development of ethnobiological studies in New Guinea as elsewhere was the impetus provided by the work of Dr. H.C. Conklin and others in the "ethnoscience" movement in the United States; and then, from 1962 onwards the resounding impact of Professor

Soc. sci. inform. 13 (4/5), pp. 9-28.

Lévi-Strauss' *La pensée sauvage*, which at one stroke conferred respectabili and legitimacy on these kinds of enquiry, so that, at least in the British anthr pological tradition, the specialist in ethnobotany or ethnozoology was mac to feel no longer that he was merely indulging himself in idiosyncratic an peripheral past-times, but was somewhere much nearer to the mainstream social anthropological development.

Nevertheless the bulk of recent contributions has been made as minor adjunc to other projects. Studies by ethnographers and geographers of horticultur systems such as those of Mlle Girard (1967) among the Buang, Dr. David Le among the Abelam of the Sepik Valley and Drs. Nancy Bowers and Marily Strathern in the Western Highlands have conveyed, as a by-product, som valuable insights into New Guinea knowledge and classification of plant But the major contribution to date in New Guinea ethnobotany is Dr. Fra çoise Panoff's excellent study of Maenge horticulture and classification domestic plants. Meanwhile we await further publication of Dr. Nanc Bowers' extensive field materials, as also the results of recent research b Dr. H.C. Dosedla and Mr. Terence Hays and by the botanist Dr. Jocely Powell, all of whom have worked in the Highlands [3].

The earliest productive reports on New Guinean classification of anima came not from anthropologists but in brief summary statements from th zoologist, Dr. Ernst Mayr, regarding the extent of accurate discrimination zoological species by some of the New Guinea groups who had assisted hi on his collecting expeditions in the late 1920's and early 30's. Dr. Ma established something of a tradition among professional vertebrate zoologis working in New Guinea, nearly all of whom appear to have made extensiv use of the cooperation of local people as hunters and informants, and many whom have taken the trouble to record in their publications the vernacul names for creatures they collected. Some have gone further than thi Dr. Jared Diamond has published a brief but valuable paper on Fore bird classif cation (Diamond, 1966), and in his recent monograph, *The avifauna of th Eastern Highlands of New Guinea* (1972) he includes a cogent statement (pp. 9 92) on the extent and accuracy of Highlanders' zoological knowledge. Tw other professional zoologists, Dr. Jeanette Hope of the Australian Nation University and Mr. Peter Dwyer of the University of Queensland, both whom have made field studies of mammals in the Highlands, have paid detaile attention to indigenous systems of classification. Their reports, as yet unpu blished, should prove most valuable.

I think I was until very recently the only anthropologist working in Ne Guinea to pursue ethnozoological enquiries in any depth, though over th past few years a growing number of my colleagues have taken advantage of th availability of good modern handbooks on certain groups of animals (bird fishes) and of improving opportunities to get specimens identified by exper and even to enjoy visits in their field stations from professional biologist My own work has been undertaken primarily among the Kyaka Enga of th

Baiyer Valley, Western Highlands (17 months in 1954-1960) and among the Kalam [4] of the Kaironk Valley, Schrader Range, Madang District (18 months in 1960-1973). It was only in 1972 that another anthropologist with specialist interests in ethnozoology, Christopher Healey of the University of Papua, New Guinea, commenced field studies (Healey, 1973).

2. In the two Highlands communities in which I have done most of my field-work, knowledge of natural history is very extensive. Of course there is considerable variation in the range and accuracy of individual knowledge. This variation depends on sex and age, but even more on interest and aptitude, on the restrictions and opportunities created by locations of residence, garden land, and hunting territory and radius of geographical movement, and on opportunities for communication of information from other people.

There is little that is esoteric about their knowledge of natural history — which is one of the factors which facilitate ethnobiological investigation. Highlanders freely and indeed enthusiastically convey information both to each other and to the interested outsider. At the same time, in the complex synthesis of information received from others and personal experience which constitutes an individual's store of knowledge, I am struck most forcibly by the very important role of personal experience. Time and again my informants refer back to personal observation, and neither to the authority of tradition nor to the testimony of others, in justifying the categories they use and the interpretations of biological process they offer.

This is a very important point to remember in attempts to delineate and interpret the systems of classification New Guinea Highlanders adopt. The framework has of necessity to be flexible, to permit each individual to fit into it as much as possible of his unique experience. While it may be irritating to lexicographers and biologically-oriented systematists who like words to have restricted and unambiguous referrents, it is a great convenience, in fact a necessity, for the field naturalist working outside the tradition of modern science with its reference collections and reference literature, to extend or restrict the meaning of words used as taxonomic labels, with considerable latitude.

A further point which has gradually forced itself on my attention is the absolute necessity of taking an ecological perspective in one's attempts to describe and interpret systems of folk-classification of plants and animals.

First one must appreciate the geographical limits of the ecological space within which individual human communities, and indeed individual human naturalists, operate. Any one preliterate human community occupies only one tiny fragment of the earth's surface — and also, even with the extension backwards of its oral tradition, one brief moment of time. Thus the total number of animal and plant species with which it can have significant relations is only a minute proportion of the total number of animal and plant forms

accessible or potentially accessible to modern science. While in global spac and time all animate life is continuous, restrictions of space and time at onc impose discontinuities, and in the micro-space occupied by a single huma community, or set of related communities, objective discontinuities abounc This is not solely because of the reduction in total number of species presen but because competition for ecological niches restricts the number, in an limited area, of closely similar forms.

These discontinuities are particularly obvious where they occur in plant and animals which operate at an ecological scale approximately equivalent t that of man, or at a scale only one or two removes smaller than that of huma ecosystems. Little as may be known about the precise size and territori requirements of minimal effectively surviving breeding populations of even th commonest and most easily observed animals in a country like New Guine it is clear that most vertebrate animals, in whatever collectivities they occu operate in a space which man can readily relate to his own.

Further, within the ecological domain of any single human community, high proportion of animals and plants are restricted to particular ecologic zones, and the patterned nature of the plant and animal communities the constitute can scarcely avoid human attention [5].

Thus the ecological grid both objectively ensures a high degree of discont nuity between the forms present of animals and plants, and because man' own survival depends in part on the notice he takes of his ecology, provide one very significant dimension for his classification of these same forms.

By ecology we understand of course much more than just patterned spati distributions. When I say that an ecological perspective is vital to interpre ting folk systems of classification of plants and animals, I want also to stres that, at least in the communities in which I have worked, a vast amount c apparently accurate knowledge is possessed about aspects of the integratio of the plant and animal communities — of the topographic, soil and climati conditions required by wild as well as cultivated plants, of the kinds of plant and their parts which provide food or refuge for different kinds of animal of which animals prey upon which other animals, and of the role of birds an mammals in the propagation and dispersal of certain plants.

The recognition of both the objective and subjective importance of ecolog to human communities throws light on the problem of the classification an naming of apparently useless animals and plants. If one sees individual plan and animal categories solely in their direct relationships to man, there are man which appear irrelevant, neither utilised nor noxious. However if the relation ships between different kinds of plants and animals are recognised as relevan then a great range of additional forms will very usefully be identified an classified. If hunting or collecting of wildlife are economically or sociall important, or even if these activities are unimportant but accurate observatio of wildlife is still culturally relevant for other reasons (*e.g.* signs of seasona change, omens) then because animals exist in significant relationships wit

other animals and plants, there is a considerable impetus to classify these forms also [6].

My final introductory point is that it is this ecological perspective which requires systems of classification to recognise basic categories, reflecting discontinuities in nature, "in the round", multidimensionally, systematically relating morphological discontinuities with discontinuities in behaviour, as well as in direct cultural significance.

3. The appreciation of ecological relationships is then what in my view underlies the New Guinea Highlanders' systems of classification of plants and animals, which are characterised by a recognition of one or more levels of grouping which are logically "natural", *i.e.* defined, or contrasted with others of the same level, by multiple criteria. At the lower end there is recognition of individual variation in terms of single characters or dimensions, or of only a small and finite number of characters. At the upper end there is some recognition of very large classes which are still "natural" categories in that they contrast with each other in many dimensions, but these are in some cases distorted (partially dismembered and regrouped) in ways which give primacy to a limited number of characters endowed with high cultural significance.

The flexibility I referred to earlier refers both to the number of levels of groupings which can be recognised by native users of the classification, and to the way in which linguistic forms can be applied to these categories. As I shall try to demonstrate a little later, there are interesting differences in these respects in the treatment of different biological domains.

The linguistic forms applied to recognised groupings may be:

a) names which in H.C. Conklin's (1962) usage are "unitary lexemes" (for which I shall substitute the neologism "uninomials");

b) composite lexemes (binomials and trinomials);

c) in the case of higher order groups, compound terms consisting of juxtaposed uninomials (*e.g. kaj-kayn*, "pig-dogs", *i.e.* "domestic quadrupeds");

d) in the case mainly of lower order taxa, uninomials plus *ad hoc* adjectival qualifiers;

e) for some mid-order groupings where appropriate designations in none of the above forms are available, the use of such expressions as, "they are one family", or "... one stock", or "... one father", or, in a few rather special cases, "they are cross-cousins".

In Kalam biological nomenclature most binomials and all trinomials are optional: thus a uninomial is normally a perfectly acceptable alternative for a binomial (*e.g.* a particular locust species can be referred to as either *golbd* or *joŋ golbd*, *joŋ* being the term for a wider taxon including most grasshoppers and related Orthoptera); and a binomial or occasionally even a uninomial can be acceptable alternatives for any trinomial (*e.g.* a frog taxon, a reddish-bellied variant of the species *Litoria angiana*, may be referred to as *pkay*, or

jejeg pkay (*jejeg* being the term applied to a group of variants of *Litoria angiana* which Kalam regard rightly or wrongly as a species, or *as pkay* (*as* being the term for "frog") or as *as jejeg pkay*). However this is an unusual example. More normally the optional alternative to a trinomial is a binomial, with no uninomial possible, as in the case of the cuckoo-dove species *Macropygia nigrirostris* which can be referred to either as *yakt kwwt sapolkod* ("bird smaller-cuckoo-dove *Macaranga*-tree-branch"), or more usually just as *kwwt sapolkod*, but not just as * *sapolkod*).

As one might expect, taxa referred to binomially, whether this usage is optional or mandatory, are always subdivisions of taxa which can be referred to by the first segment of the binomial standing alone. Similarly trinomials are always subdivisions of taxa which can be named by use of the first two segments as a binomial. However it is also possible, though relatively rare, for uninomials to refer unambiguously to divisions of other taxa also named uninomially, but with no option of incorporating the two names into a binomial. Examples are the uses of the terms *pow* and *kwlep* for owlet-nightjars and some other related birds, where *kwlep* are recognised to be a sub-category of *pow* applied to smaller species, but one does not say **pow kwlep* (Bulmer, 1970, p. 1074); and the use of the term *tok* as an alternative term for either *woknaŋ* ("eels collectively" or as an unmarked taxon, "smaller eels") or *asnaŋ* ("large eel") though it is not appropriate to use any of the forms **tok woknaŋ* **tok asnaŋ* or **woknaŋ asnaŋ*.

Two further features of Kalam zoological and botanical nomenclature need attention. One is that uninomials and one particular form of binomial can in some circumstances be used in different contexts to apply to groupings at two or more different levels in a taxonomic hierarchy. The most complex example I have so far recorded is the use of the term *yñ*, applied to some or all known reptiles. I should add that this is a case where, I believe, Kalam taxonomy has undergone revision and extension over the past ten years, since the contact situation has enabled Kalam men to travel extensively both in the regions immediately adjacent to their homeland which are of lower altitude and contain a far greater number and variety of reptiles than their home area does, and also as plantation labourers and in other capacities, to other parts of New Guinea.

In its most frequent and "normal" usage *yñ* is applied to skinks, (SCINCIDAE) small "typical" lizards, of which Kalam name nine subdivisions. However, within the skinks three categories may be singled out as "true skinks", *yñ yb*, against the other six which are *yñ ladk*, "wild" or "useless" skinks. Two of these three morphologically rather similar forms are colonial breeders, (*Scincella* sp. or spp.), with underground colonies providing sufficient quantities of their tiny eggs for women to find it worth their while to dig them up for culinary purposes, while the third is also a very common terrestrial species, the eggs of which are also often found and eaten, though deposited in smaller clutches.

Apart from the skinks there is one other small lizard in the same size range,

though of very different appearance, a gecko (GEKKONIDAE, *Leptodactylus* sp.), known as *wowy*. In contrast to the skinks collectively the gecko may be referred to as a *yñ ladk*, "wild" or "useless" *yñ*., But the contrast *yñ yb* — *yñ ladk* can be applied at yet another higher level. Snakes collectively can be referred to as *yñ ladk*, in contrast to the familiar lizards which are *yñ yb*. Thus ultimately, in admittedly rather special circumstances, the term *yñ* can apply to all known reptiles (turtles were unknown to Kalam, crocodiles known only by repute).

Now, while I have heard individual snakes referred to as *yñ ladk* rather than by the more normal names of *ñom* or *soyŋ*, in contexts of identification I have only heard the latter two terms used. There are yet other examples in the fields of Kalam botany and zoology where a term may be used as a collective designation which would never be used to identify, or even refer to, an individual plant or animal. Thus if one says that a particular individual insect is a *joŋ*, this means unambiguously that it is a grasshopper, locust or cricket. However if one is told that a certain bird eats *joŋ*, this does not mean that it eats only grasshoppers etc. — in fact it may be known hardly ever to eat grasshoppers. It means that the bird is an insectivore, *joŋ* here referring to a collectivity including all insects and insect-like arachnids.

Similarly in the context of identification of plant specimens, *ksod* means only the grass species *Themeda australis* (kangaroo grass); but in other contexts it can refer either to all short grass species collectively, or indeed to the plant communities dominated by *Themeda*, *Ischaemum* and other short grasses which occupy large sections of the local landscape.

The illustrations I have given so far are all of generally accepted usage in the community in which I lived. Let me now give some illustrations of individual usage of uninomials, or uninomials plus descriptive qualifiers, to refer to taxa which are normally implicit or covert, or which are newly created. First within the local home context, then when informants are placed in new situations away from home.

There are two closely related small parrot species present and common in the Kalam domain, the Mountain Lorikeet, *Neopsittacus pullicauda* and Muschenbroek's Lorikeet, *Neopsittacus muschenbroeki*. These contrast in some details of plumage, slightly in size, noticeably in voice, and to some extent in ecology, the Mountain Lorikeet being restricted to high altitude forest whereas Muschenbroek's Lorikeet is present both in the forest and in the bush fallow and cultivation areas. The Kalam name for Muschenbroek's Lorikeet is *gaslŋ*, for the Mountain Lorikeet *kamaygs*. In the context of a discussion with two senior men of the extent to which birds and other animals tend to occur in paired forms, one larger, the other smaller, I was told that *gaslŋ* and *kamaygs* were such a pair, and *kamaygs* was a kind of *gaslŋ*. In another incident one of my best hunters brought me a forest nightjar *Eurostopodus* sp., a very rare bird which no one else had told me about. The hunter described accurately its behaviour and nest, but named it as a *kwlep*, a taxon

normally applied to nocturnal birds of a different and biologically only distantly related genus, the smaller owlet-nightjars, *Aegotheles albertisi*. He spoke in this context of the "common" *kwlep* as *kwlep acb* ("short *kwlep*", referring to its small size and relatively short tail) in contrast to the bird he had brought in.

I must add that there are a few cases I have recorded where Kalam have refused to give a name to a rare bird which they have seen for the first time in their territory. My initial reaction was to attribute these incidents to an admirable caution and concern for accuracy on their parts, and leave it at that. However on reflection I believe that the problem in these cases was partly their limited observation of the new bird, partly the fact that the characters noted appeared to relate it to more than one familiar taxon. This was explicit in the case of the youth who told me he had just seen a new bird he could not name, which was somewhat like both a *ccp* (Goshawk, *Accipiter* spp.) and a *glegl* (Brown Hawk, *Falco berigora*). If it had been conspiciously more like one or the other, I believe he would have said he had seen "a new kind of *ccp*" or "a *glegl* which was different".

The case of the two Kalam youths whom we took to New Zealand for six months, as linguistic informants, is also instructive. The one of them who was the better and more confident naturalist eventually placed nearly all the common garden and bush birds he encountered into Kalam taxa, but only after careful observation in each case, and saying, "it is an 'x', but it is different".

4. I now want to sketch some salient points that emerge in Kalam classification of animals and plants, divided for reasons of convenience rather than logic into four groups: vertebrates; invertebrates; wild plants; cultivated plants.

Vertebrate animals. There is no term for "animals" or "vertebrate animals" collectively in Kalam. Nevertheless there is no confusion or overlap of categories applied to vertebrates and applied to invertebrates, and the only point at which these two are brought together is in the belief that earthworms develop in some cases into snakes or eels.

All known forms of vertebrate animals are named. The basic divisions into which Kalam place them (see Table A) are of very uneven size ranging from *yakt* ("flying birds and bats") with 130 immediate named subdivisions so far recorded, and 180 ultimate subcategories, or "terminal taxa", down to fish other than eels, which, until Japanese and Korean tinned mackerel pike appeared in the trade stores and the Department of Agriculture Stock and Fisheries provided Tilapia for locally-constructed fish-ponds, only included two terminal taxa, fish with whiskers, *i.e.* cat-fish, and fish without whiskers, *i.e.* all the others. The range in size of Kalam taxa reflects the markedly different numbers of zoological species present in the different groups; with,

perhaps a lack of compulsion on the part of the Kalam (in contrast for example with the Kyaka Enga) to divide up the universe exhaustively into large groups (the Kyaka place cassowaries with birds, dirty rats with clean rats, and fish including eels, with quite a number of invertebrate "creepy-crawlies" in the same major taxon as reptiles); and also the special relationships which Kalam recognise between creatures in certain of the smaller major taxa with man (cassowaries, pigs, dogs, eels).

These basic divisions are in some cases what Berlin (1972; 1973) would call "life-forms", but in one case an implicitly recognised life-form, "furred terrestrial mammal", is chopped up into three segments, one of these grouped with frogs, the other two separately named.

There is also some marginal overlap in these taxa applied to furred mammals, in the sense that : *a*) some informants say that one or two lower order taxa fall in two of the major taxa (*i.e.* in both "game mammals" and "frogs"); *b*) there is disagreement between other informants, some of whom place the same taxa only as "game mammals", others only as "frogs"; *c*) certain taxa fall unquestionably in one or other of the taxa "frogs" or "dirty rats", but informants agree with the investigator that the creatures concerned are so similar that it is possible to dispute identifications in such a way that the result decides the major named division the animal falls in, as well as the subdivision.

I relate these last two features, the tripartite categorisation of morphologically very similar animals and the marginal overlap of the categories applied, to ritual and culinary usages. Elaborate ritual-culinary distinctions lead to sophistry, of much the same kind as that of the 17th-century English who debated whether the otter was wholly a beast or partly a fish, or of their Scottish contemporaries who classified the puffin, a sea-bird, as a fish.

If one takes formally named categories, these are arranged in shallow hierarchies, the majority with two levels only, some with three, a few with four; but in the larger groups, additional levels are certainly implicitly recognised as "covert categories" *e.g.* "hawk", "parrot", "bandicoot" — as is demonstrated when Pidgin English is learned, and no difficulty is found in applying terms such as *trelanggau* (= "hawk") or *mumut* (= "bandicoot").

The basic named units correspond in a high proportion of cases to zoological species, and where they do not may either be *seen* as species by Kalam (*i.e.* defined by multiple characters) or seen by them as groupings of species, or as subdivisions of species. In these instances their perceptions in many cases are the same as those of the biological scientist; and in some instances where there are differences of opinion, it may still be the case that the Kalam are right and the biologists wrong, as the scientific investigation of many groups of New Guinea animals is still at an early stage.

There is also some conscious recognition that groups formally named are "varieties", *i.e.* distinguished by characters on a single dimension such as colour pattern alone, but these cases are few and plausible special explanations

can be provided for them (*e.g.* with regard to one very common but highly variable frog species, *Litoria angiana*, and one equally variable and culturally very important species of parrot, *Charmosyna papou*).

One final point about the classification of vertebrates, and the nomenclature applied to this, is that in one area, that of game mammals, there is a remarkably high incidence of synonyms. These occur for no fewer than 12 out of 28 secondary taxa applied, and in three instances three alternative names are widely used. The proportion in any other group of animals or plants is much smaller. This reflects, in part, the extent to which these animal names are also used as personal names, and the prohibition on affines' and cross-cousins' use of the word which serves as their relative's name.

Invertebrate animals. Here I must confess that much of my data is still unanalysed, and my statements to that extent have to be impressionistic.

Unlike vertebrate animals, not all invertebrates are named by Kalam. There are many creatures, especially very small ones, of which Kalam will say that they do not know their names, or they have no names.

The categories applied by Kalam to invertebrate animals distinguish snails, freshwater mussels, leeches, earthworms, certain intestinal worms parasitic on man and other animals, crabs, scorpions and various other creatures, as well as many kinds of insects and insect-like arachnids. As I have said earlier, the insects and insect-like arachnids can be collectively designated as *joŋ*, though in contexts of identification this term only applies to grasshoppers and related genera of *Orthoptera*. I will take just four examples of taxa applied to invertebrates, to give some idea of the range of classificatory systems applied to them.

Joŋ, as applied to grasshoppers and their near relatives, includes about 20 subtaxa, nearly all of which are seen by Kalam as species-like units, and some of which do correspond to biological species. Most are eaten, others are regarded as inedible. The classification, which involves in some cases a three-level hierarchy, is essentially similar to that applied to vertebrate groups.

In contrast, there is no collective term in Kalam for "spiders". They have however seven uninomial taxa which between them exhaustively and exclusively cover the group of arachnids which we know as spiders. Any individual spider may be fairly readily placed in one or other of these taxa. Following Kalam criteria, I have been able to construct two simple alternative keys, one based purely on morphological characters, the other, simpler and rather more efficient, based also on the kind of web or burrow constructed or utilised, and the location in which found. The zoological identification of my collections of spiders is still unfortunately incomplete, but my 150 or so specimens probably fall into at least 35 zoological species, and these must in turn constitute only a small proportion of the total number of spider species present in the Kalam domain [7]. That the Kalam are aware of the diversity included in certain of the taxa they apply to spiders was borne in on me in the following way. I had asked, routinely, in respect of each of their seven taxa, if

it was edible. And the answer in each case had been "Yes". I had concluded that Kalam ate all kinds of spiders. But when I asked the same question about individual specimens that were brought in, I was told in many cases that, no, they would not eat them. It transpired that while two categories appeared to correspond to "species" in their thinking (and possibly in biological reality) the others each contained a "normal" familiar or standard form which indeed they would eat (and which appeared to correspond to one zoological species, or a group of zoologically closely related species), but other specimens, though placed in the same taxon, would be said to be "a little different", and these would not normally be eaten. Thus in practice each of the named taxa corresponded in a sense to a genus within which a type-species was recognised and eaten but other unclassified species were not eaten (see Table B).

Kosl is the taxon applied to smaller Tabanid flies, noticed by Kalam in part because they bite unpleasantly. Informants recognise diversity among them of size, colour and locations in which encountered, but there is no standard terminology for subsidiary taxa, though terms translatable as "large" or "small", "brown" or "black" may be used *ad hoc* to describe this variation. Tentatively I would say that this corresponds to a genus within which species variation is recognised, but a type-species is not even implicitly singled out.

My final example in the invertebrate field is that of *townm*, "mantises", where, though I would expect more than one species to be present, Kalam ascribe all variation to sex and age.

Well over 100 uninomials are applied by Kalam to invertebrate animals. Without, I must emphazise, yet having done the detailed analysis that I should, I shall be surprised if it does not turn out that the majority of these correspond, in their thought, to groups of species, or, if you like, to "genera", though some, as in the case of the spiders, include unmarked "type-species". Thus, partly in response to the multitude of invertebrate species present in their environment, partly as a reflection of their very uneven level of interest in these animals, their classification is different in overall pattern from that which they apply to vertebrates.

Wild plants. In turning to ethnobotany I must emphasize again how rudimentary and incomplete my enquiries have been in comparison with those I have made in the zoological area; and in particular how hesitant I am to make any statements when there is now a first-class study of a Melanesian system of plant classification available, in the work of Françoise Panoff.

Also I must say that the distinction I draw between wild and cultivated plants is arbitrary in two respects: firstly, Kalam semi-cultivate a considerable number of plants; and secondly some of their taxa embrace both domestic and wild forms.

Kalam have no collective names for "plants", or for "wild plants". Though some hundreds of taxa are recognised, not all wild plants are named. The

exceptions are mainly smaller forest plants, though even of these all the conspicuous common kinds appear to be named.

In comparison with their classification of animals, Kalam classification of plants is complicated by the coexistence of non-taxonomic descriptive categories with formal taxa. The pattern of formal taxa applied is similar to that applied to animals. There are two large taxa, *mon*, ("tree", though this does not include the Pandanus palms, black-palms, bamboos, hollow-stemmed forms such as Piperaceae, or tree-ferns) and *mñ* ("vines", "climbing or creeping plants with strong stems"). Both *mon* and *mñ* are polysemous, *mon* referring to "timber ","firewood" and "fire" as well as "tree", and *mñ* to "rope", "string" and "fibre" as well as "vine".

I have not made an exhaustive count, but would expect *mon* to include in the region of 200 terminal taxa, and *mñ* perhaps 40 or 50. Further primary taxa with smaller numbers of named divisions include *akl* ("bamboo") with 12, *cm* ("black palms") with 3, *alŋaw* ("high altitude nut-bearing pandanus") with 8, *bay* ("fungi"), with over 20. In nearly all the cases so far mentioned taxa of lower order can optionally be referred to by binomials or trinomials incorporating the primary taxon name as the first element.

However there are other categories which would seem to the investigator to be in some contexts of equivalent status, which are named, but which are not formal taxa in the sense that their names cannot be preposed to names for lower order taxa to construct binomials, and that they in part intersect with and in part include other taxa. The most notable examples are *bd*, approximating to "bush or shrub" in English, which can be applied to any free-standing leafy plant from a small *mon* tree or a 20ft *Piper* (*alkn* = Piperaceae spp., *alkn bd* = *Piper* shrub) down to quite small "bushy" garden weeds; and *mj* or *mjkas*, "leaf", "foliage", and by extension, " leafy plants in general". Then there are the further examples, mentioned earlier, in which the name for a particularly prominent category of plants is also used as a term for a larger collectivity of plants of related form, without it being permissible to use this either in identification of individual examples or in construction of binomial names (*e.g. ksod* = *a*) Kangaroo grass, *Themeda australis*; *b*) Short grasses collectively; *alŋaw* = *a*) High altitude nut-bearing Pandanus, *Pandanus julianetti*; *b*) Pandanus palms collectively).

As in the case of animal taxa, formally named hierarchies are shallow, most often with only two levels, but in some instances three or four levels being recognised.

While I have not been able to make anything like an exhaustive count, my strong impression is that the majority of uninomials is normally applied at a level which corresponds logically to that of "species", but that there is more deviation from this pattern in Kalam treatment of wild plants than there is in their treatment of vertebrate animals.

Cultivated plants. There is no Kalam taxon corresponding to "cultivated plant" though the word *tap*, which has a remarkable range of referrents, the

most general approximating to "thing" or "something", can apply in some contexts to "vegetable food" collectively. The twenty-five or more primary taxa include *m* (taros, *Colocasia*, *Alocasia* and *Xanthosoma*) with wild and nearly 50 cultivated forms recognised in a four-level hierarchy, *ped* (yams, *Dioscoraea* spp.), *kānm* (bananas), *maj* (sweet potato), *nŋay* (*Pueraria*), *gam* (sugar-cane), *sakop* ("pitpit", *Saccharum edule*), *saby* ("pitpit", *Setaria palmaefolia*), *bep* (*Rungia klossi*), *sag* (cucumbers), *amos* (gourd, *Lagenaria*), *sblam* (cordyline), *cgoy* (tobacco), *kānp* (*Oenanthe javanica*) and others mainly of lesser importance.

One interesting point is that although there is no collective term for sweet-potato, yams and *Pueraria* in everyday speech, in the ritual "Pandanus language" (*cf.* Bulmer, 1967, pp. 12, 15) a single term is applied to all these taxa, though not to taro, for which a different substitute name is used.

Uninomially named cultivars or groups of cultivars are in most cases seen by Kalam as contrasting in multiple characters. For example, sweet potato taxa are distinguished by shape, colour and quality of leaf and of vine, and hairs on leaf and vine, as well as by size, shape, skin-colour, flesh-colour, texture and flavour of the tuber. Thus logically they are "species" rather than "varieties". And we may again say, as with vertebrate animals and wild plants, that most uninomial taxa are logical "species".

5. In conclusion, I wish to set one aspect of Kalam biological classification against certain generalisations proposed by Dr. Brent Berlin on the basis of the very impressive work he and his colleagues have undertaken on Tzeltal ethnobotany, and of their review of a number of other published studies in ethnobotany and ethnozoology. Many of the points these authors make in their recent papers (Berlin, Breedlove and Raven, 1968, 1973; Berlin, 1972) I thoroughly agree with, but I have no time to spell these out here. But I also have certain reservations.

Berlin suggests that the great majority of what I have here called uninomial taxa should be termed "generics" or "folk-genera". This suggestion is linked to his argument that the evolution of systems of folk-classification normally follows a pattern in which "generics" appear first; followed by "specifics" (subdivisions of generics which normally have binomial names) and "life-forms" (taxa of higher rank than generics, designated by uninomials, which are few in number in any folk-classification but include large numbers of generics — *e.g.* taxa such as "tree" or "bird"); followed by "varietals" (subdivisions of "specifics", always designated by polynomials) and "intermediates" (uninomial taxa ranking between life-forms and generics — *e.g.*, if "tree" and "bird" are life-forms, "parrots", "hawks" and "conifers" might be "intermediates"); followed finally by "unique beginners" (*i.e.* terms for "plant(s)" and "animal(s)" collectively).

Three further generalisations of some importance made by Berlin are that

in any one folk-system many generics, often the majority, are not divided into specifics; that varietals occur infrequently except in the case of culturally important domesticated plants and animals; and that many folk-classifications include a sizeable minority of generics which are not included within any life-form, and which Berlin refers to as "unaffiliated generics".

While one can certainly accept Berlin's view that the uninomial categories which he distinguishes as "generics" appear normally to be much the most numerous taxa in folk-classifications of plants and animals, and many of these taxa are psychologically and culturally very salient, I feel some hesitation about accepting his terminology. This is because I agree with Françoise Panoff (1972, p. 101) that logically one cannot conceive of "generic" categories without prior (or at least concurrent) conception of "specifics", and that there are, empirically, too many cases on record where uninomials in fact apply to logical (and often also biological) species.

Thus in three areas out of four in Kalam folk-biology which I have described above, uninomials are applied in the majority of cases to taxa Kalam see as "species", not "genera".

Although it is not explicit in Berlin's argument, it may be that he is influenced by the *de facto* correspondences in Tzeltal and other systems of folk-botany he has examined between uninomials and either "scientific" genera (in the case of wild plants) or cultigens (in the case of domesticated plants). With respect to wild flora and fauna one must expect scientific biology to recognise, in general, more species than folk-biology does, and thus for there to be cases in which what is seen as a (logical) species (a minimal category distinguishable by multiple characters from other categories of similar order) in the folk-system to correspond to a biological genus or other collectivity of species. In Kalam classification of wild plants, many uninomials appear to correspond to botanical species, but I do not have sufficient data to establish whether or not the majority does. In the case of cultivated plants, the majority of Kalam uninomials corresponds to cultivars, though uninomials are of course also used for cultigens, or for groups which include more than one closely related cultigen, or for one or more cultigens together with closely related wild plants. In the case of vertebrate animals, 66 % of Kalam uninomials appear to correspond to biological species, 21 % to groups of species, 11 % to divisions of species (polymorphic or sexually dimorphic forms, or life-stages), and 2 % to taxa which cross-cut species, classing a division of one species with either a division, or the totality, of another (see Table C). If Kalam conceptualisations are taken into account, 77 % of uninomials apply to categories within which they do not recognise complex internal differentiation, 16 % to groups within which such internal differentiation is recognised, and 7 % to divisions (*e.g.* sexually dimorphic forms, or life-stages) within or cross-cutting "species".

One may agree with Berlin that in the normal process of elaboration of a system of classification it is probably standard for a uninomial originally applied to an undifferentiated collectivity to change in time to apply to a

differentiated one. Berlin sees the process of elaboration as, normally, hitherto undifferentiated generics becoming subdivided to include specifics. I would see the same process as, in many cases, one of terms initially applied to single species being upgraded to become generic names, through the recognition of additional related species.

One apparent difference between Kalam and Tzeltal nomenclature is the extent to which binomial and trinomial usages are optional in Kalam. In this respect Kalam is like other languages of the New Guinea Highlands, though within this region there is variation. Kyaka Enga speakers, for example, much more often make use of binomial and trinomial options than Kalam do, a practice consistent with the frequent use Kyaka make of binomials and trinomials in identifying individual people and local descent groups or their segments, as against the infrequent use Kalam make of this device.

If one only tabulated those Kalam uninomials which can *not* form part of binomials except as the first segment of these, then their correspondence would be overwhelmingly with what Berlin regards as "life-forms", and as "unaffiliated generics". This raises two further problems, if one attempts to follow Berlin's schema. One is how to distinguish clearly between unaffiliated generics and life-forms. Berlin suggests that a life-form generally contains a fairly large number of named subdivisions. However the internal differentiation of a taxon may not correlate with the salience that taxon has in local thinking. As noted above, Kalam refer to larger groups of fauna by variously conjoining two or three of the terms *kaj* ("pig"), *kayn* ("dog") and *kobty* ("cassowary"), all of which have very few subdivisions, either with each other or with *yakt* ("flying birds and bats") and *kmn* ("game mammals") both of which have many named subdivisions. This surely suggests that, in at least some contexts, pigs, dogs and cassowaries are taxa of equivalent order to flying vertebrates or game mammals — and also that the cassowary is more than an "aberrant bird" and the dog more than an "aberrant game mammal".

A second difficulty with the concept of "life-form" is that some taxonomic categories of this general order do not in fact coincide neatly with obviously distinctive groups of fauna or flora (*e.g.* the Kalam taxa *as*, "frogs and certain small furred mammals" and *kmn*, "larger furred mammals" or " game mammals"). Here the polysemous nature of terms applied in many languages to certain taxa which would appear to constitute legitimate "life forms" (notably, terms for "tree" also being used for "timber" and "firewood") suggests that these taxa may be defined as much by cultural evaluation (technological utilisation, dietary and culinary status, economic and ritual significance) as by their objective biological characteristics [8].

Thus I do not believe that we can yet demonstrate correspondences between the cognitive statuses of folk-taxa and the nomenclature applied to these which are of sufficient intra- and cross-cultural regularity to enable us to arrive at a simple typology. There is an obvious danger in advancing, prematurely,

a typology of the kind Dr. Berlin proposes, namely that it may lead ethnographers and lexicographers to distort data by forcing it into inappropriate pigeonholes, and in particular into failing to appreciate and record the degree of flexibility and elasticity which is probably a very general feature of folk-taxonomies. Thus for the time-being we should continue to use two sets of terms, one to describe the cognitive status of taxa, and also of the "covert categories" which are related to these, for which "genera", "species" and "varieties", and perhaps also "life-forms", may be appropriate designations; and the other to describe the nomenclature applied[9].

This argument has relevance to ethnographers and lexicographers who are not specialist ethnobiologists, but who need to grasp the referrents of at least some categories which are applied to plants and animals. When their informants give the name of some plant or animal as technologically or ritually significant, what should they expect this name to refer to? The work of H.C. Conklin should once anf for all have disposed of the naive assumption that a folk-taxon will in almost all circumstances simply equate with a zoological or botanical species or genus, cultigen or cultivar. Berlin is suggesting that nomenclatural status of a taxon should at least give some guide to its conceptual content. But this seems, unfortunately, not to be good advice if intended to apply globally. Probably the best the folk-biologist can at present do for his non-specialist colleague is to advise him of the ways nomenclature is likely to relate to taxonomy within a particular cultural and linguistic area and tradition, and in respect to particular groups of animals and plants. Further, provided that the ecology of the cultural region concerned has sufficient uniformity, he may even, without defying Conklin's principles, be able to provide a list of conspicuous and culturally significant animal and plant species which are almost certain to be recognised and unambiguously named. It is my hope that we can do this shortly for the New Guinea Highlands. Even though such a list would constitute only a small proportion of the total number of plant and animal forms recognised by any single Highlands community, it would include many of the more important kinds, and if every ethnographer and linguist in the region could get these accurately identified, the value, for many fields of antthropologie, would e considerable.

(Table A. Ftn. Cont.)

6. This is the one group that fits awkwardly in this Table, as it is possible to set out the taxonomic hierarchy in different ways so that it may have four, five or six levels, or be treated as from two to four separate and shallower hierarchies, with snakes and one, two or three categories of lizards regarded as separate primary taxa. Further it is the only group other than *tok* ("eels") where the primary taxon name is not mandatorily or optionally used in polynomials applied to all subordinate taxa (see text).

Table A. *Kalam taxa applied to vertebrate animals*

Primary Taxa	Numbers of subordinate taxa [1]				Numbers of names for subordinate taxa [2]	
	Secondary	Tertiary	Quaternary	Terminal	Uninomials [3]	Binomials [4]
1. *kaj* ("pigs")	2	—	—	2	0	1
2. *kayn* ("dogs")	2	—	—	2	0	1
3. *kobty* ("cassowaries")	3	—	—	3	0	3
4. *yakt* ("flying birds and bats")						
flying birds	128 (25)	67 (2)	4	172	141	39
bats	2 (2)	8	—	8	8	0
5. *kmn* ("game mammals")	28 (2)	4	—	30	29	1
6. *as* ("frogs and certain small mammals")						
frogs [5]	20 (3)	8	—	25	23	3
small mammals	11 (1)	2	—	12	11	2
7. *kopyak* ("dirty rats")	3	—	—	3	2	0
8. *yñ* ("lizards and snakes") [6]	5 (3)	15 (3)	9	23	22	4
9. *tok* ("eels")	2 (1)	2	—	3	2	1
10. *kobsal* ("fish other than eels")	2	—	—	2	0	1
Totals	208 (37)	106 (5)	13	285	238	56

Sources: Data collected in Kaironk Census Village, Upper Kaironk Valley. This table updates Table 1 in Bulmer, 1967, p. 7, but is still provisional, including only material collected and analysed up to December 1973.

1. Figures in brackets are for taxa which are non-terminal, *i.e.* subdivided into taxa of lower order.

2. Synonyms are omitted.

3. In nearly all cases these names are also optionally binomial or trinomial, through preposing names of primary and/or other taxa of higher order. Further, in 31 cases these names can be used for taxa of more than one order, in lower-order usage either unmarked or optionally qualified by the term *yb* ("true", "ordinary") in contrast to other taxa in same sets which have distinctive uninomial or binomial names.

4. In all cases binomials are either mandatory, or may optionally be extended into trinomials, it being impossible to use the final term alone as a name.

5. Tadpoles (1 primary taxon, 3 secondary taxa) are omitted.

Table B. *Kalam taxa applied to spiders (ARANEIDA)*

Kalam taxa	*Overall correspondence* [1]	*Edible "type species"*
1. *wadkl*	Orb-spinners (Argiopidae) other than those included in 3 and 4, plus other webspiders (Tetragnathidae, Theridiidae) and insignificant or unfamiliar spiders of other families if not included in 4.	*Argiope* spp.
2. *sglben*	Very large orb-spinners, Nephila sp. or spp.	*Nephila maculata*
3. *kadŋ*	Shield-spiders (*Gasteracantha* spp.) and other orb-spinners of curious shape.	*Gasteracantha* spp.
4. *kob-kawnŋ*	Tetragnathid spiders (Tetragnathidae), some other web-spiders (Argiopidae, Theridiidae) and some other insignificant or unfamilar small spiders, *e.g.* jumping-spiders (Salticidae).	*Leucauge* sp. or spp.
5. *kabapk*	Huntsman spiders (Eusparassidae) and some trap-door spiders (Theraphosidae)	*Olios* sp. or spp.
6. *molom*	Large terrestrial spiders, especially wolf-spiders (Lycosidae), and some Theraphosidae.	*Varacosa* sp. or spp.
7. *aslwm*	Very large terrestrial spiders (? Mygalomorphae) [2]	?

Notes

1. Chrysanthus (1972) provides a brief account of the spider families in New Guinea.

2. These only occur at lower altitudes outside Kalam territory, and were not collected or examined.

Table C. *Zoological correspondences of Kalam taxa designated by primary lexemes* [1] *: Vertebrate animals occurring in Upper Kaironk Valley above ca. 1600 m* [2].

	Zoological correspondences				
	Species	Groups of spp.	Divisions of spp.	X-cutting spp. [3]	Totals
Kalam taxa applied to:					
Mammals	22	9	2	2	35
Birds	74	22	8	1	105
Reptiles	10	1	2	0	13
Frogs	7	4	7	1	19
Fishes	2	0	0	0	2
Totals	115 (66%)	36 (21%)	19 (11%)	4 (2%)	174 (100%

Notes

1. Following definition of Berlin, Breedlove and Raven (1973), but omitting four taxa which they would regard as "life-forms".

2. A very few zoological records of creatures, nearly all birds, which are both very rare and very unfamiliar to Kalam have been disregarded. 69 taxa have been omitted from this table which apply only to vertebrate animals found outside the upper Kaironk Valley (18 for mammals, 37 for birds, 9 for reptiles, 4 for frogs, 1 for fish).

3. *I.e.* a division of one species classed with a division, or the totality, of another species.

Ralph N.H. Bulmer (born 1928), Professor of Social Anthropology at the University of Auckland, New Zealand, is doing research in Kalam tribal area, Papua, New Guinea. Recent publications : "Karam classification of marsupials and rodents", Journal of the Polynesian Society *81 (4), 82 (1), 1972-1973 (with J. I. Menzies) ; "Selectivity in hunting and in the disposal of animal bone among the Kalam of the New Guinea Highlands", in :* Themes in economic archaeology *(in press), "Totems and taxonomy"*, Proceedings of Australian Institute of Aboriginal Studies Biennal Conference *(1974).*

Notes

* This paper, presented to the Colloquium "Écologie et Société en Mélanésie", held in at the Maison des Sciences del'Homme, Paris 16-18 May 1973, was written while I held a Visiting Fellowship at Clare Halle, Cambridge, and enjoyed the facilities of that institution and the warm hispitality of its members.

I am grateful to Dr. Roy Ellen for his comments on an earlier draft of this paper. I am also indebted to Dr. Brent Berlin for the courtesy and trouble he has taken to provide me with drafts and pre-publication copies of the article by himself and his colleagues which I refer to.

1. N. Miklukho-Maklai, 1886. See also the excerpts from his journals, in Fischer, 1955.

2. For references to publications of authors mentioned in section 1 of text, and not otherwise cited, see Conklin, 1972 and Australian National University, 1968.

3. For listing of current and planned research projects, as also publications and reports from 1968 onwards, see the quarterly newsletter *Man in New Guinea.*

4. Spelled "Karam" in previous publications (Bulmer, 1967, 1968, 1970; Bulmer and Menzies 1972-1973; Bulmer and Tyler, 1968).

5. This point is well made by Donald Thomson (1946, pp. 165-167) in his brief account of animal and plant classification among the Wik Monkan Aborigines of Australia.

6. *Cf.* Lévi-Strauss, 1962, p. 8.

7. I am deeply indebted to the late Fr. Chrysanthus, OFM, for his enthusiastic and painstaking identification of my specimens. His death in 1972 occurred, unfortunately, before the larger part of my collections could reach him, but his help nevertheless made possible what sense I have been able to make of Kalam classification of spiders.

8. Some Australian Aboriginal languages illustrate well the intersection of "life-forms" with taxa defined primarily in terms of cultural relevance. In Wik Monkan, for example, there are terms for "bird" and "fish" and for a large number of different kinds of birds and fishes, but these taxa are included in a wider taxon which also contains terrestrial mammals other than dog, and which may be glossed "animal foods " (Thomson, 1946, p. 166). In Wanindiljaugwa of Groote Eylandt there are taxa which correspond to "large land animals", "flying things, including birds", and "fish and other sea-animals", but the term for the last of these is polysemous, also referring to "flesh-food in general" (Worsley, 1967, pp. 147, 153).

9. A rejection of Berlin's taxonomic typology entails a rejection of at least part of the evolutionary sequence in which the taxonomic types are supposed to appear. There are additional grounds for criticising this sequence, which are not relevant to the present paper. Nevertheless Berlin (1972) makes a number of very useful points about the ways in which taxonomic hierarchies and nomenclature change. The lists of processes he provides merits close attention, and should provide a valuable impetus for further examination of variation and change in taxonomic usage, and of the social contexts in which these occur.

Références

Australian National University (Department of Anthropology).
1968 *An ethnographic bibliography of New Guinea.* Canberra, ANU Press. (3 vols.)

Berlin, B.
1972 "Speculations on the growth of botanical nomenclature", *Journal of language in society* 1: 51-86.

Berlin, B.; Breedlove, D.E.; Raven, P.H.
1968 "Covert categories and folk taxonomies", *American anthropologist* 70: 290-299.
1973 "General principles of classification and nomenclature in folk biology", *American anthropologist* 75: 214-242.

Bulmer, R.N.H.
1967 "Why is the cassowary not a bird? A problem of zoological taxonomy among the Karam of the New Guinea Highlands", *Man* 2 (1): 5-25.
1968 "Worms that croak and other mysteries of Karam natural history", *Mankind* 6 (12): 621-639.
1970 "Which came first, the chicken or the egg-head?", pp. 1069-1091 in: J. Pouillon; P. Maranda (eds.). *Échanges et communications.* The Hague/Paris, Mouton.

Bulmer, R.N.H.; Menzies, J.I.
1972-1973 "Karam classification of marsupials and rodents", *Journal of the Polynesian Society* 81 (4): 472-499, 82 (1): 86-107.

Bulmer, R.N.H.; Tyler, M.J.
1968 "Karam classification of frogs", *Journal of the Polynesian Society* 77 (4): 333-385.

Chrysanthus, Fr.
1972 "Spiders", pp. 1094-1096 in: *Encyclopedia of Papua and New Guinea*, vol. 2. Melbourne, Melbourne University Press.

Conklin, H.C.
1962 "Lexicographical treatment of folk taxonomies", pp. 119-141 in: *Problems in lexicography: Report of the Conference on Lexicography held at Indiana University, November 11-12, 1960.* (See also Conklin, 1972, p. 45.)
1972 *Folk classification A: topically arranged bibliography.* New Haven, Conn., Department of Anthropology, Yale University.

Diamond, J.M.
1966 "Zoological classification system of a primitive people", *Science* 151 (3714): 1102-1104.
1972 *The avifauna of the Eastern Highland of New Guinea.* Cambridge, Mass., Nuttall Ornithological Club.

Fischer, D.
1955 *Unter Südsee-Insulanern.* Leipzig, Koehler und Amelang.

Girard, F.
1967 "Les gens de l'igname", *Journal d'agriculture tropicale* 18 (8/9): 287-338.

Healey, C.J.
1973 *Hunting of birds of paradise and trade in plumes in the Jimi Valley, Western Highlands District.* Department of Anthropology and Sociology, University of Papua, New Guinea. (MA qualifying essay.)

Lévi-Strauss, C.
1962 *La pensée sauvage.* Paris, Plon.

Miklukho-Maklai, N.
1886 "List of plants in use by the natives of the Maclay-coast, New Guinea", *Proceedings of the Linnaean Society of New South Wales* 10: 687-695.

Panoff, F.
1972 *Maenge gardens: A study of Maenge relationship to domesticates.* Canberra, Australian National University. (Unpublished Ph. D. thesis.)

Thomson, D.F.
1946 "Names and naming in the Wik Monkan tribe", *Journal of the Royal Anthropological Institute* 76: 157-168.

University of Papua, New Guinea (Department of Anthropology and Sociology).
1968 *Man in New Guinea: A newsletter of anthropological and sociological research.*

Worsley, P.
1967 "Groote Eylandt totemism and *Le totémisme aujourd'hui*", pp. 141-159 in: E.R. Leach (ed.), *The structural study of myth and totemism.* ASA Monograph No. 5.