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BIOLOGICAL CLASSIFICATION FROM A GROOTE EYLANDT ABORIGINE'S POINT OF VIEW[1]

JULIE WADDY
Angurugu Community Bag Service No. 1,
via Darwin, N.T., Australia 5791

ABSTRACT.—This paper reviews the contributions of Berlin, Bulmer, Dwyer, Hunn and Randall to the interpretation of folk classification systems. The problems of comparison of folk taxa with scientific taxa, of determining the degree of perception of discontinuity, of assessing the cognitive status of folk taxa and of the nature of folk taxonomies are identified and discussed. Biological classification from the view point of Aborigines on Groote Eylandt in northern Australia is described using Berlin's set of terms as a convenient reference point. Examples given provide additional evidence for the notion of a basic unit of perception within folk classification systems though this unit cannot as yet be satisfactorily defined. It is suggested that folk taxa may be arranged in contrast sets according to purpose and that only those sets required for the purpose would be called on to generate a hierarchical classification.

INTRODUCTION

In recent years increasing interest has been taken in the principles of folk classification. Research workers have been fascinated by the relatively high degree of correspondence between folk biological taxa and scientific taxa. Our scientifically trained minds immediately see the parallels between folk categories at different levels of inclusiveness and the scientific hierarchy. The major contributions based on exhaustive studies of either the plant or animal kingdoms in a particular culture have been from Conklin (1954), Bulmer and co-workers (1968-1977), Berlin, Breedlove and Raven (1974), Hunn (1977) and Hays (1979). Each of these researchers has described the folk classification system of the area studied as hierarchically organized. However, while these folk classificatory hierarchies are similar in many ways, researchers have interpreted them from different perspectives which has led to different taxonomic structures accompanied by different sets of terms.

The reasons for these differences I consider to be threefold. Dwyer (1976:425) identified two of these issues in reporting his analysis of Rofaifo mammal taxonomy, viz. 1) 'To what extent does the folk classifier perceive the same entities as the scientific zoologist?' and 2) 'What is the cognitive status for folk of taxa located at different levels of their zoological taxonomy?' The third issue has been raised by Randall (1976:544), viz. Are hierarchical classification systems stored as such in the memory or are they only a result of classification behavior on the part of the folk classifier?

THEORETICAL ISSUES

Comparing perceptions.—Dwyer has pointed out that determining the correspondence between two systems is a question of perception. There must be some way of establishing their relation. He selected the scientific species as the objective unit with which folk taxa, regardless of status, must be compared. Berlin advocated comparison of the scientific species with his folk genera, though he has also compared it with his folk species (Berlin et al. 1973:267-8, 1974:102). However I agree with Hunn (1977: 64) that 'it is not the case that the scientific species *must* be selected.' I understand him to be saying that, while the scientific species is indeed a basic objective unit, irrespective of evolutionary theory, we need to take cognizance of the range of scientific species in a given environment before determining the degree of correspondence. Hunn has devised

what he calls a coefficient of dissimilarity, which is calculated after removing any scientific taxa that cannot be found in the local environment plus scientific taxa below the level of (labeled) terminal folk taxa. This measure is not affected by the cognitive status of folk taxa. It utilizes scientific taxa as the objective basis of comparison with folk taxa of whatever status. It should be noted that despite the objectivity of the scientific species it necessarily has a cognitive status within the scientific classification hierarchy.

Implicit in Dwyer's first question is the western scientifically oriented view point. The question could equally have been framed: To what extent does the scientific zoologist perceive the same entities as the folk classifier? As there are many folk classification systems but essentially only one scientific classification system comparison would certainly be easier if the degree of correspondence is determined with reference to the scientific system. But a further difficulty is in determining a unit from within the folk classification system to which general agreement can be given. To my mind no-one has yet been able to suggest a satisfactory objectively defined unit from within the folk system.

Berlin, Breedlove and Raven (1973:215) proposed the folk genus, defined largely on the basis of the distinction between primary and secondary lexemes. Thus generic taxa are so called because they are labeled by generic names. Hunn (1977:45) has suggested that this association of taxa and names should be verified by specifying independent criteria for recognizing types of names and types of taxa. I have heard Berlin has now had second thoughts in the light of more recent examples that do not fit easily into his original scheme.

Bulmer and Tyler (1968:349) proposed the specieme or folk species which is the lowest level taxon defined in terms of multiple criteria. The specieme is seen as a 'natural' category within the environment—'something crying out to be named,' as someone has said. But Bulmer too has had second thoughts about this concept in the light of Kalam interchangeable usage of names at apparently different levels of inclusiveness. The rejection of these two apparently objective units brings us to the second issue raised by Dwyer.

Cognitive status and perception of discontinuity.—Assessing the cognitive status for folk of taxa within their zoological (or botanical) taxonomy revolves around what are perceived as 'natural' categories within their environment. Bulmer (1970, 1974) considered that, in the case of locally familiar organisms, the majority of folk taxa corresponded to 'natural' categories, i.e. to those defined on the basis of multiple criteria. When such folk taxa correspond to recognized scientific taxa it is then tempting to assume that these folk taxa refer to 'natural' categories of equivalent cognitive status. It is much easier to match taxa with scientific species, genera, families, etc. than it is to establish with certainty that they are 'natural kinds' in the perception of the local people (Bulmer, pers. comm.).

In discussing Lévi-Strauss's concept of *espèce* which has been translated as species, Bulmer (1970:1072) identified one of the assumptions underlying Lévi-Strauss's argument, viz. 'that in any total folk-classification of plants and animals there are certain important lower order categories which are seen as "objective" by the users of the classification . . . ' Bulmer (1970:1081) then argued that 'Karam zoological classification, at the lowest level, is concerned with objective discontinuities in nature.' He considered that the basis of such objectivity is in the observable differences between biological species although he recognized that not all folk taxa will be classified in a biologically realistic manner.

Hunn (1977:50) has indicated that the majority of folk taxa can be recognized by characteristic configurations and are defined by significant discontinuities between contrasting categories. Underlying his mathematical treatment of these discontinuities is the assumption that the points at which discontinuities are perceived vary from culture to culture, and between folk and scientific taxa because the perception of discontinuity—in Hunn's terms, the perceptual salience—varies. Hunn's approach seems to readily include all folk taxa whereas Bulmer's approach accepts some and makes exception for others.

The perception of discontinuity may be affected by: 1) identifiable characteristics, 2) cultural significance, and 3) frequency of observation. If the identifiable characteristics of two or more scientific taxa are minimal and there is little or no difference in their cultural significance then they may be perceived as one entity even though the differences between them may be recognized. Similarly, if an animal or plant is only rarely encountered it may be included with another scientific taxon, and thus again be perceived as one entity. At this point I would differ with Bulmer and Dwyer who consider terminal unlabeled subdivisions of taxa to have the same status as labeled terminal taxa. To me they appear to have fallen into the trap of assuming that correspondence with scientific taxa implies the same degree of perception of discontinuity despite Bulmer's awareness of this trap (Bulmer, 1970:1078). Discontinuities are not perceived at the same point.

As against Bulmer and Dwyer, I would say that the basic perception of discontinuity, the *basic* units as seen by folk themselves, must firstly be labeled, i.e. named, and secondly be undivided, i.e. perceived as a unitary whole which, on occasion, can be further subdivided. Linguistically labeled subdivided taxa, such as Berlin's folk species, represent a different degree of perception. Their identifiable characteristics would not be expected to differ as much as the identifiable characteristics separating undivided taxa, though the subdivided taxa may still be defined on the basis of multiple criteria. Linguistically unlabeled subdivisions of a taxon represent a different degree of perception again. I fail to see how an unnamed subdivision of a taxon can have the same conceptual content as a labeled taxon nor, for that matter, how a secondary lexeme can have the same conceptual content or cognitive status as an undivided primary lexeme. Berlin, Breedlove and Raven (1973:240) go so far as to say that there are different psychological processes involved in distinguishing taxa at different levels of inclusion.

I think it is implicit in the work of Berlin, Hunn and Hays that it is only the named taxa, at least at the lowest levels, which truly reflect the perception of discontinuity and thus of 'natural' categories. There are differences in the degree of the perception of discontinuity as indicated above. It is these differences which give rise to differing cognitive status and thus the different levels of a taxonomy.

The problem arises in seeking to assess the cognitive status of those taxa at the lowest levels and likewise of taxa at higher levels of inclusion. It is at this point that Berlin has confounded the questions of perception and of cognitive status as Dwyer (1976:433) claims. Berlin's folk genus purports to convey both cognitive status and perception of discontinuity—without, however, the degree of discontinuity being satisfactorily defined.

Hunn (1977:51) has sought to redefine the status of generic taxa in terms of 'the width of the gaps isolating taxa and the "width" of heterogeneity, of the taxa themselves.' The major difficulty of such a formulation, as Hunn himself has said, is the problem of measurement.

The nature of folk taxonomies.—Berlin, Breedlove and Raven (1973:216) have recognized folk generic taxa as the basic building blocks of all folk taxonomies, i.e. the most commonly referred to groupings of organisms in the natural environment and the most salient psychologically. They have then ranked folk taxa by inclusion relationships to produce five levels of inclusiveness (Fig. 1).

They have allowed for the possibility of intermediate levels but the latter are generally covert in their experience. Equivalent rank, or cognitive status, is maintained for taxa of equivalent lexemic status and psychological salience. Thus the majority of folk generic taxa are found at Level 2 regardless of whether or not they are terminal taxa. Some taxa of generic rank, i.e. unaffiliated generics, are raised in level because of the lack of a superordinate taxon. Although Tzeltal does not have labeled unique beginners for the plant and animal kingdoms, Berlin, Breedlove and Raven's hierarchical classification has allowed for this possibility. They have essentially taken the observed system, started at the top and worked down in order to impose the levels of their hierarchy but allowing the same rank to appear on more than one level. Hunn (1977:53) and Hays (1979:253) essentially followed Berlin, Breedlove and Raven's schema but with minor modifications.

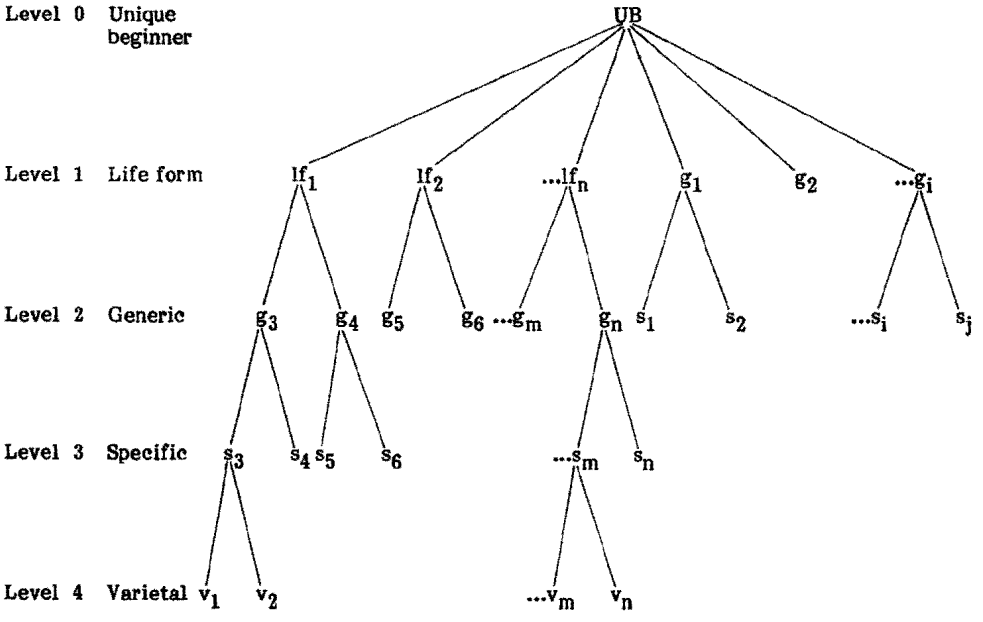

FIG. 1–Schematic presentation of Berlin's schema. (Adapted from Berlin, Breedlove & Raven, 1974:26).

In establishing his hierarchical classification of Kalam vertebrates Bulmer (1968: 622) began with the most inclusive labeled taxa, i.e. primary taxa, and worked downwards, through as many as three additional levels, to the terminal taxa. A schematic interpretation of Bulmer's data is shown in Figure 2 for comparative purposes.

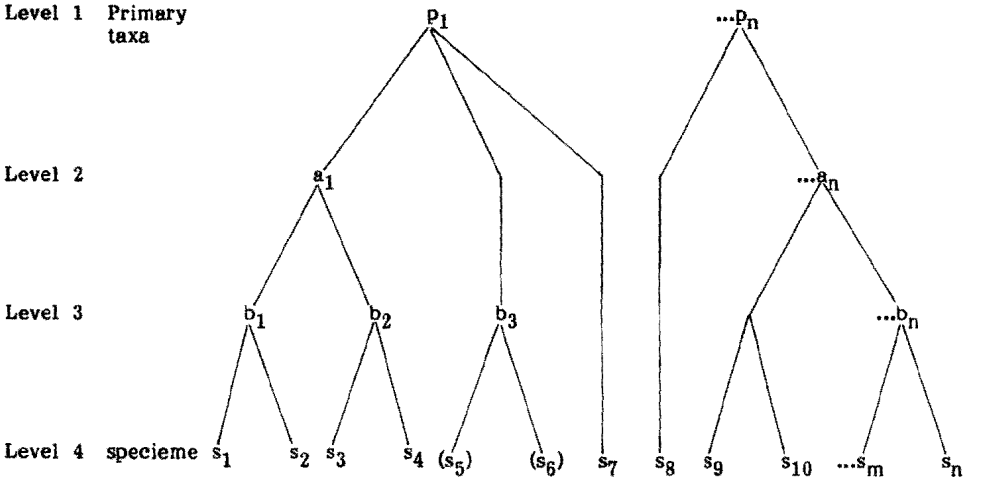

FIG. 2–Schematic interpretation of Bulmer's data.

Bulmer's primary taxa vary considerably in their degree of internal variation. In his experience terminal taxa may be at any of four levels but most are at Level 2. In the majority of cases it is the terminal taxa which represent the 'natural kinds' or folk species that Bulmer considered the Kalam themselves recognize. In some instances these 'natural kinds' are unlabeled subdivisions of a terminal taxon and could be considered as covert species. Thus the rank, or cognitive status, of folk species cannot be fixed within the hierarchy, either by position or by the terminology employed. I find it difficult to accept that the cognitive status of the basic units of perception can be variable.

Dwyer (1976:435) used Bulmer's concept of 'specieme' or folk species but reversed the levels applied to taxa. In other words he worked from the bottom upwards through categories of increasing inclusiveness. Again a schematic interpretation of Dwyer's data has been provided for comparative purposes (Fig. 3).

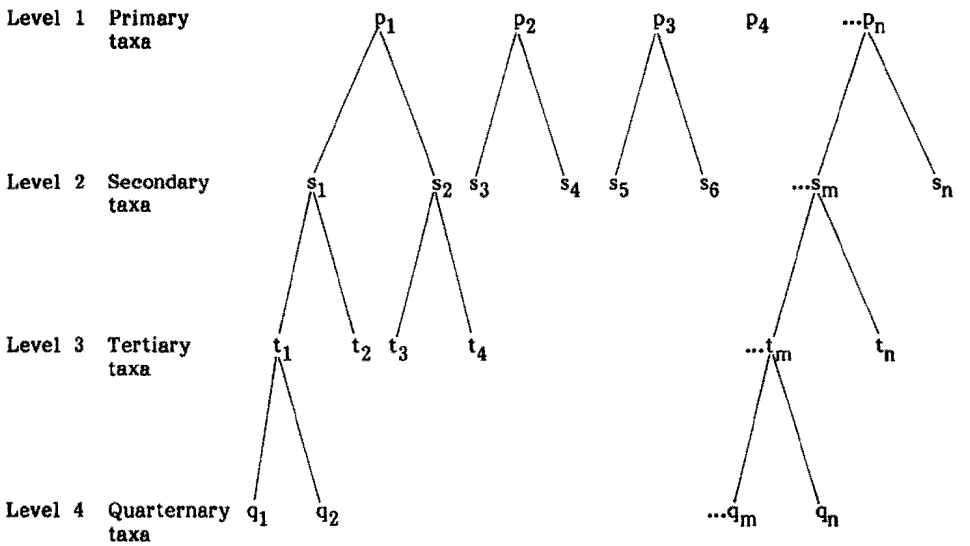

FIG. 3–Schematic interpretation of Dwyer's data. ( ) designate unlabeled taxa at the lowest level.

From the figure it will be seen that unlabeled subdivisions of taxa have been given equivalent rank to labeled undivided taxa. As indicated in the previous section, I would question the validity of Dwyer's interpretation. Since Dwyer's study is limited essentially to mammals he gives no examples of taxa equivalent to Berlin's unaffiliated generics. However he does give examples of taxa not included in any but the highest level of inclusiveness.

Each of these workers has assumed that there is a valid observable hierarchical system of folk classification. Randall (1976:546) questioned this, suggesting that while the various adjacent levels of a hierarchy may well represent valid relationships, the total hierarchy is something contrived in the mind of the informant, generated by appropriate questioning. The trouble, as Randall has seen it, is that there may be instances of non-transitive relationships appearing in such hierarchies where, for argument's sake, a scrub oak is a kind of oak and an oak is a kind of tree but a scrub oak is not a tree, it is a shrub.

Randall favored a non-hierarchical classificatory schema, based on an association between categories and their perceptual characteristics stored directly in the memory (Fig. 4). By his mixing of categories from a variety of special purpose classification systems, e.g. food classification, with the general purpose biological classification system, the complexities of Randall's system are mind-bogging, especially if there is a high degree of binomialisation.

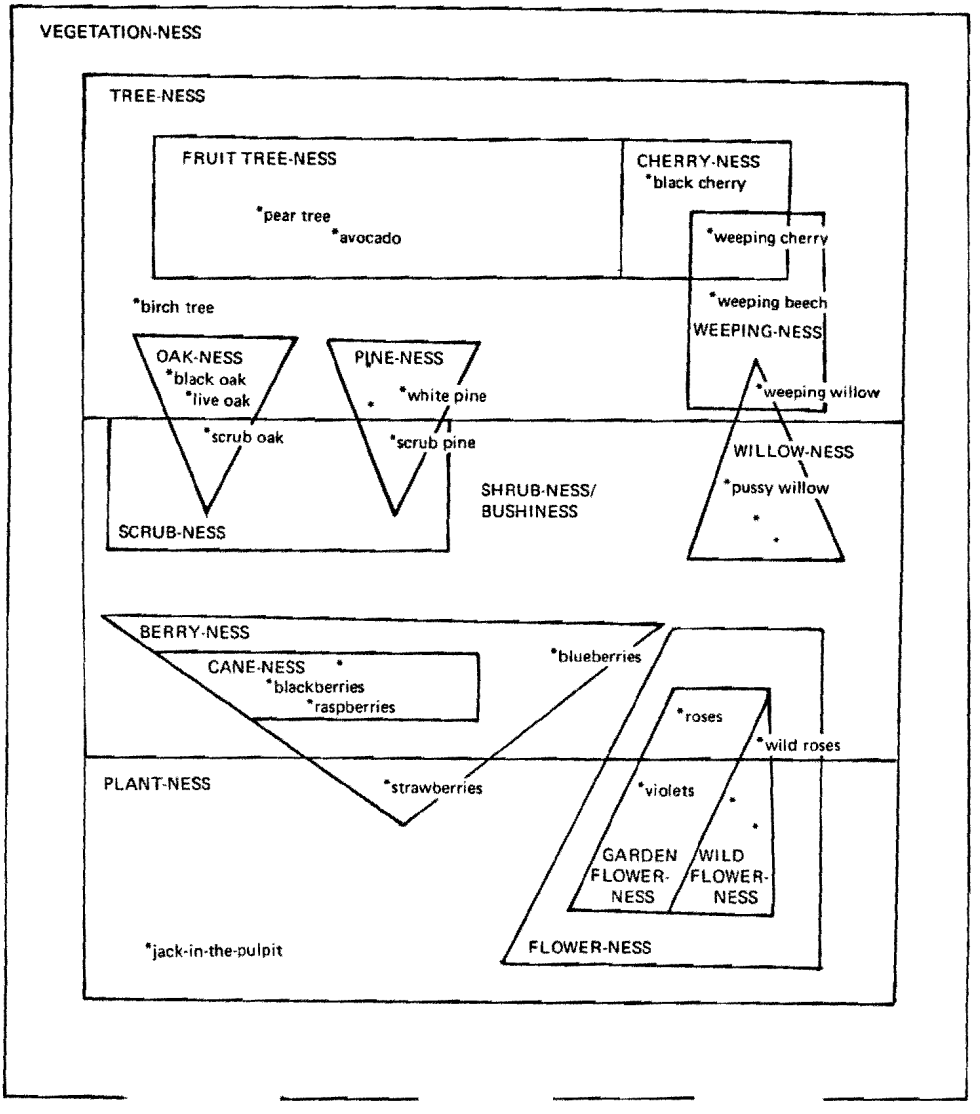

FIG. 4–Randall's model. A memorisation of characteristics model of some English plant categories. (Randall, 1976:551).

In other words the basic problems still remain: How do we determine what are 'natural' categories within a folk classification system? How do we determine their cognitive status? and, How is the folk classification system derived? I want to return to these questions after first discussing biological classification from the point of view of Groote Eylandt Aborigines.

GROOTE EYLANDT CLASSIFICATION

Groote Eylandt, which is roughly 40km wide and 60km long, is situated in the Gulf of Carpentaria, (Fig. 5). I have been living at Angurugu on Groote Eylandt since 1975.[2]

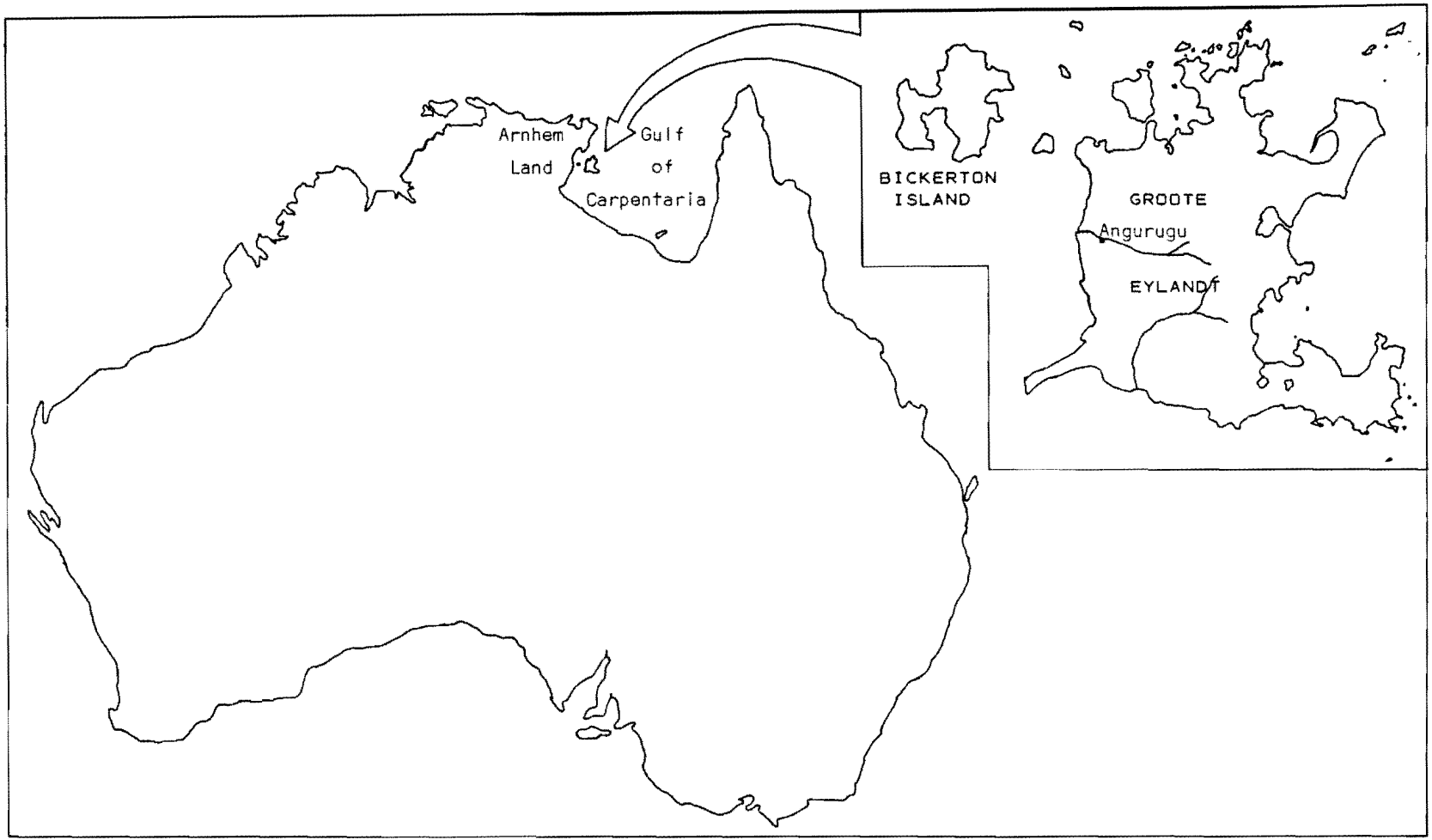

FIG. 5 – Map showing Groote Eylandt and surrounding islands in relation to the mainland of Australia.

The language spoken by the Aborigines of Groote Eylandt is Anindilyakwa, a language that is confined almost entirely to Groote Eylandt and surrounding islands. This language is characterized by its multiple noun classes, its extensive prefixing and suffixing systems, and by its very long words.[3]

I have drawn on a comprehensive inventory of some 220 plant taxa obtained largely by Dulcie Levitt (1981), and some 420 animal taxa, many of which were first recorded by Judith Stokes, linguist with the Church Missionary Society at Angurugu. Although the list of folk taxa is virtually complete the number of scientific species represented by these taxa is still not finalized. Much of my work in the early stages of the project was in obtaining scientific classification of animal specimens. Having gained familiarity with almost all animal and plant kingdom taxa on the island, at least through references if not with the actual specimens, I then turned my attention to the classification system as a whole.

Much of the information which follows has been patiently imparted to me by Peter Nangurama, a man about 55 years old of the Wurrawilya clan with an extraordinary knowledge of the plants and animals on the island. He is a recognized local authority. I have also learned a tremendous amount from a number of the old women. It is only the older folk who lived as young adults in the bush who have any extensive knowledge. There have been very few discrepancies in the naming of taxa but there may be slight changes when some of the less clearly defined areas, such as covert categories, are checked with other people.

For convenience I shall use Berlin's set of terms as a point of reference in describing Anindilyakwa taxa.

The Plant Kingdom: Amarda.—Unlike the majority of languages, Anindilyakwa has terms which are used as unique beginners both for the plant kingdom, viz. *amarda*, and for the animal kingdom, viz. *akwalya.*[4] The term *amarda* is also used to refer to one of the two life form taxa. These taxa are based on binary opposition of woody vs. non-woody. Thus *eka* refers to all woody plants, viz. trees and shrubs, and *amarda* includes all non-woody plants, viz. grasses, sedges, rushes, herbs, vines, creepers, ferns, seaweeds and so on (Fig. 6).

The only plant which does not fit unambiguously into these two life form taxa is the cycad or burrawang, *Cycas angulata.* The burrawang stem is soft rather than woody, despite its tree-like form, but is deep-rooted like other trees.

Within the woody plants there is a total of 114 generic taxa. Nangurama has grouped them into eight categories, partly on the basis of similarity in form and partly on the basis of shared habitat. Three of these categories are further subdivided into three or four categories. One of these latter categories is named, viz. *alyukwurra* the paperbarks. The seven taxa included within *alyukwurra* (Fig. 7) all appear to have the same psychological salience as other generic taxa, such as the examples in Figure 6. Thus *alyukwurra* has been interpreted as a labeled intermediate taxon in Berlin's terms.

The non-woody plants include a total of 79 generic taxa. Nangurama has grouped these taxa into three large covert categories and one small one which includes the six seaweed taxa. An alternative grouping was proposed by another local authority on the basis of root form. He divided each of the two larger categories into two. The existence of these alternative categories suggests that they may not be as well-defined as the covert categories reported by Berlin, Breedlove and Raven (1968:294-296).

In comparison with the data on plants presented by Berlin, Breedlove and Raven and by Hays, there are extraordinarily few labeled taxa of specific rank in Anindilyakwa. One example is in the group of grasses with awned seeds *dingarrkwa. Dukwulyadada dingarrkwa* meaning 'white seeds' refers to *Aristida browniana* and *dumurrijungwa dingarrkwa* meaning 'black seeds' refers to *Pseudopogonatherum irritans,* neither of which has particular cultural significance. Other examples of specific taxa found are big-leaved/ small-leaved (3 generic taxa), good/ bad (of no use) (1generic taxon), and the 'real' or 'true' one, (several instances).

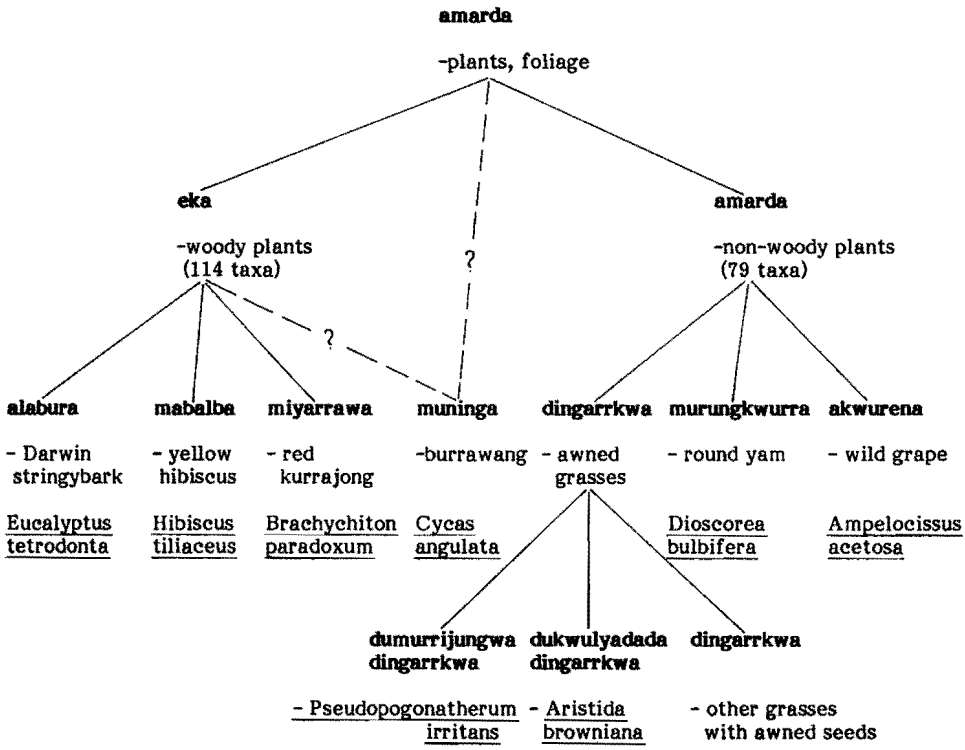

FIG. 6—Biological classification in the plant kingdom from an Anindilyakwa speaker's point of view. Numbers of taxa are those designated generic by Berlin.

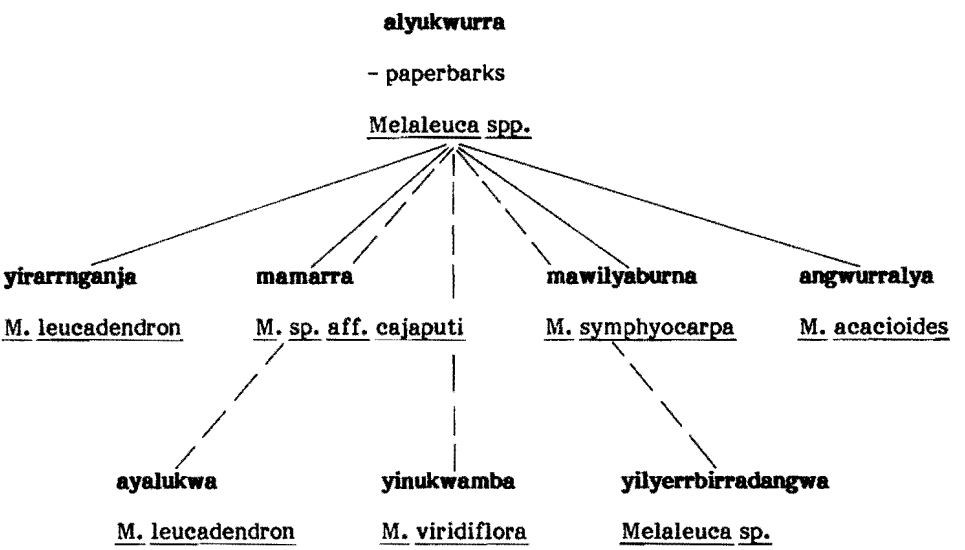

FIG. 7—Terminal taxa included within the folk taxon *alyukwurra* paperbarks.

The Aborigines of Groote Eylandt were hunters and gatherers who relied largely on fish and turtles, some land animals and on bush fruits and roots. They ate few seeds and no leafy vegetable matter. It will be interesting to see if other hunter-gatherer societies also have such a sparsity of folk specifics. If so it would support my contention that folk specifics and folk varietals may have developed largely in societies where agriculture plays a significant role in the economy and there is a subsequent need to make finer distinctions within a taxon. This seems to be a corollary of Berlin, Breedlove and Raven's finding that the proportion of folk specifics is much higher among cultivated and protected plants than among other plants (Berlin et al. 1974:99).

The Animal Kingdom: Akwalya.—As previously noted the unique beginner for the animal kingdom is *akwalya.* The first division (Fig. 8) including *akwalya* 'animals in the sea' and *yinungungwangba* 'animals on the land' seems strange in comparison with scientific thinking.

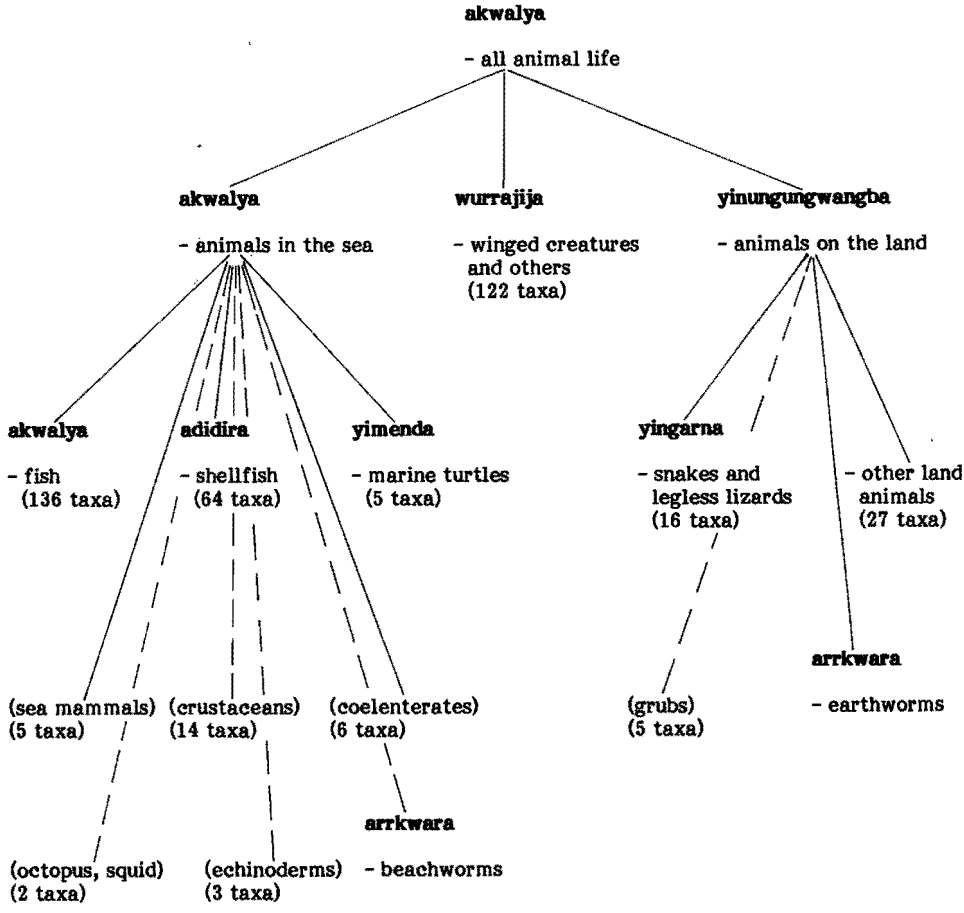

FIG. 8—Biological classification of the animal kingdom from an Anindilyakwa speaker's point of view. Numbers of taxa are those designated generic by Berlin.

However the naming of these two categories reflects the basic dichotomy between life in the sea and on the land that is borne out in other areas of life for the people of Groote Eylandt. The old Anindilyakwa word for women, *warningaribumanja*, when literally translated, means 'people of the land' whereas the men are people of the sea. Although it became apparent that this division was the source of a number of anomalies resulting in nontranstivity, e.g. land snails that are classified with marine molluscs, there was no way in which this division could be deleted, despite my informants' awareness of the need to stick to purely animal classification without interference from special purpose uses such as food source. To me it seems that habitat must be accepted as a valid factor influencing folk biological classification. At least for the Groote Eylandt Aborigine at this level of inclusiveness, habitat cannot be dismissed as interference from a special purpose classification.

There has been some difficulty as to the relative status of *wurrajija* 'winged creatures and others'. Nangurama wanted this taxon to be included within both land animals and sea animals, which would have violated normal taxonomic principles. Another knowledgeable man has given *wurrajija* equal status to land and sea animals. The latter view point is followed in Figure 8. This aspect of the classification system needs to be checked further.

The primary focus of the taxon *wurrajija* appears to be birds. When asked for defining features of the taxon, the immediate response given was 'wings'. It is thus easy to see how most insects, flying foxes and bats are included. Both winged and non-winged forms of green tree ants in particular are easily recognized. Green tree ants crawl on one's body as do other ants and insects, ticks, spiders and even scorpions and caterpillars. So one can understand how the taxon has been extended to include almost all arthropods. Grubs that live inside trees or in the ground are an exception.

Nangurama arranged sea birds (34 generic taxa) into two large and three small covert categories. He considered land birds (40 generic taxa) as one large covert category in contrast to six covert categories of insects (45 generic taxa) and one covert category of bats and flying foxes (3 generic taxa).

Labeled life form taxa included within *akwalya* 'animals in the sea' are *akwalya* 'fish', *adidira* 'shellfish' and *yimenda* 'marine turtles'. *Akwalya* 'fish' divides into *aranjarra* which includes all the cartilaginous fish and *akwalya* which includes all the bony fish (112 generic taxa) including a small subdivision of freshwater fish (8 generic taxa) (Fig. 9).[4]

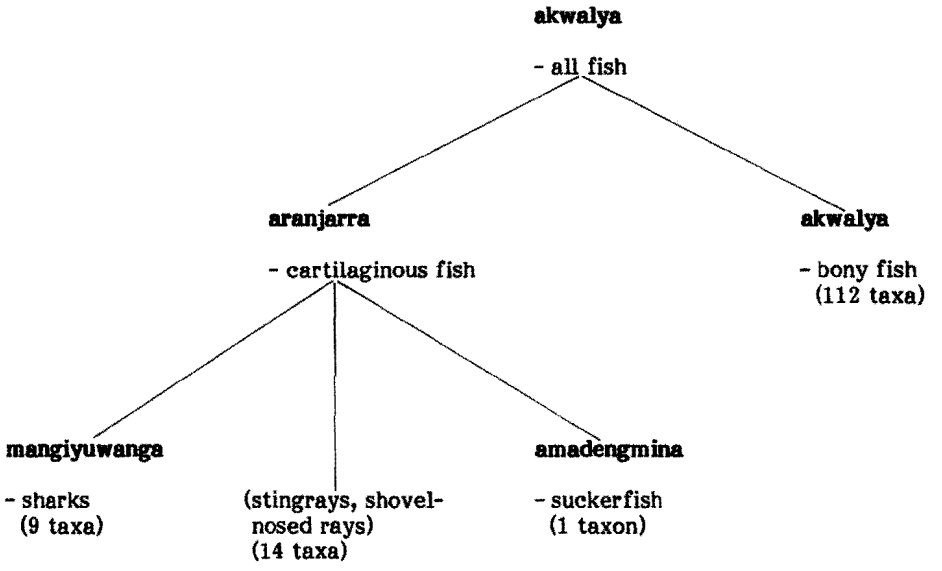

FIG. 9–Labeled categories within the folk taxon *akwalya* fish.

Aranjarra is further subdivided into *mangiyuwanga* 'sharks' (9 generic taxa), an unlabeled category which includes stingrays (11 taxa) and shovel-nosed rays (3 taxa) and the generic taxon *amadengmina* 'suckerfish'. This means that, in Berlin's terms, there are labeled intermediate categories at two levels, an unusual feature in relation to other languages.

The life form taxon *adidira* includes almost all members of the phylum Mollusca and also hermit crabs. The only exceptions are the octopus and the squid. Nangurama has given five covert categories of five or more taxa and fifteen covert categories of one to three taxa, making a total of 64 generic taxa. Land snails (2 taxa) and freshwater mussels (1 taxon) are included in this life form and are thus examples of nontransitivity.

The taxon *yimenda* 'marine turtles' is interesting because of its apparent status as a life form taxon but one which includes only five, or at the most, six generic taxa. Life form taxa tend to include a large number of generic taxa (Hunn 1977:44). In addition to the labeled taxon *yimenda* 'marine turtles' there are three significant but covert taxa which can be glossed as Crustacea, marine mammals and Coelenterates. Scientific categories such as these are very distinctive and yet are limited in species diversity, or at least in readily observable species diversity in a given area such as the seas adjacent to Groote Eylandt. The existence of generic taxa, of equivalent cognitive status to other generic taxa within the total system, within each of these more inclusive categories suggests that these higher level categories should be considered as life form taxa, whether named or covert. These higher level taxa are in contrast to other labeled life form taxa. Thus neither *yimenda* 'marine turtles' nor any of the generic taxa in question can be dismissed as unaffiliated generics.

The largest covert taxon is the Crustacea. There is a labeled intermediate taxon *alkwa* which includes all the bait crabs (9 generic taxa) but not the large edible mud crab, *Scylla serrata.* There are three other taxa of generic rank included in the life form taxon. One of these taxa is *amilyungwurra* 'freshwater yabbies and shrimps' which is now extended to include prawns. In its original meaning it is another example of nontransitivity.

The other two covert taxa are marine mammals (5 generic taxa) and the Coelenterates (6 generic taxa in 2 or 3 groups). There are another three to five groups containing one to three generic taxa and totalling seven or eight taxa. Approximately two thirds of all animal taxa are found in or near the sea.

There is one definite labeled life form taxon within *yinungungwangba* 'land animals'. *Yingarna* includes all snakes as well as legless lizards and the eel *Piscodonophis boro. Yingarna* is subdivided into *dingarna* 'pythons and tree snakes' (9 generic taxa) and *yingarna* which includes the remainder but especially the poisonous snakes (7 generic taxa). Sea snakes are included with pythons and tree snakes and thus provide another example of nontransitivity.

There is some debate as to whether the remaining land animals, i.e. 4-footed land reptiles and mammals, should be polysemously labeled or not. Within this grouping there is a covert taxon of marsupials and rodents (9 generic taxa), another of goannas, lizards and the crocodile (11 generic taxa), another of skinks and geckos (4 generic taxa) and three ungrouped taxa. Although the crocodile is the saltwater species, *Crocodylus porosus,* it is seen as a land animal because it lays its eggs on land. Inclusion of frogs and tadpoles, which were not seen as related by the majority of old people (i.e. pre-contact times), within this group is ambiguous. Otherwise the only unaffiliated generic taxon on land is *arrkwara* 'earthworms'. This taxon is also used for beachworms but because it is unaffiliated has been placed within both land and sea animals, thus avoiding problems of nontransitivity.

Labeled subgeneric divisions in the animal kingdom are rare. Binomially labeled specific taxa are limited to the 'real' one. In most instances where more than one scientific species is included in the one Anindilyakwa taxon, the differences between the species are recognized though not labeled. For example, there are three doves all called *darrawurukukwa. Geopelia humeralis,* the bar-shouldered dove, is larger than the other two species. *G. cuneata,* the diamond dove, is about the same size as *G. striata,* the peace-

ful dove, but it is not as common as the other two species. The distinctions between the two most common species are clearly recognized and yet there is no indication of any labeled subdivision of the taxon. This folk taxon is one of the best known taxa today. It is also a totemic taxon.

The use of different names for younger forms of certain taxa, where the young are known to develop into the adult form, is more common. These names have not been included in the numbers of generic taxa quoted above. As far as I can establish thus far, there is no case where the so-called young and adult forms represent different scientific species.

DISCUSSION

Where differences between species are recognized but not labeled, such as in the case of the doves, I have interpreted these subdivisions to be unlabeled specific taxa, or covert specifics following Berlin's typology. Bulmer and Dwyer would regard these subdivisions as speciemes. For Groote Eylandters it is generally irrelevant which member of a labeled taxon is considered. As Berlin (1976:392) says, 'subgeneric taxa are recognized (linguistically) primarily because of the close attention they receive as a result of their cultural significance'.

The lack of labeled subdivided taxa and the fact that labeled subdivisions are so rarely used, even if they exist, in this folk classification schema makes it relatively easy to determine the 'natural' categories at the lower levels. Additional evidence that these named categories are basic to the perception of Anindilyakwa speakers comes from an unusual source. Dwyer (1976:441) hints at, but provides only a very general example of, a possible relationship between social organization and biological classification.

Australian Aborigines have a totemic classification system which differs from place to place. On Groote Eylandt each clan has a number of totems which may or may not be folk biological taxa. The relationship with biological taxa in particular is personified so that a man who sees, for example, *wurruweba* a red-winged parrot flying overhead, might say, 'There goes my brother-in-law!' If several scientific taxa are included in the one folk taxon, such as the doves, it wouldn't matter which of the scientific taxa was sighted, nor whether there were any subdivisions, named or unnamed, the relationship would remain the same. Nor is there any example of any totem which is a taxon at a higher level of inclusiveness.

'Natural' categories of this kind are all represented by simple primary lexemes and appear to be of equivalent psychological salience, thus supporting Berlin's concept of a folk genus but, as I have indicated from my previous arguments, we need to be wary of such agreement. Perhaps this agreement does no more than reflect a widespread general pattern of relationship between nomenclature and taxonomy (Bulmer pers. comm.).

This leads into the second question of how we are to determine cognitive status. Whether the term folk genus or folk species or specieme or anything else is applied to the basic units as perceived by Groote Eylandt Aborigines, there seems to be an equivalent cognitive status based on apparently equivalent degrees of cognitive perception. They do not worry about the finer details of discrimination between any subdivisions of the taxon. The unit which they themselves 'see' is the labeled category which is not subdivided. There is one instance in Anindilyakwa of a subdivided taxon where one member of the set is labeled by a simple primary lexeme, viz. *dubudekbuda* oystercatchers, *dubudekbuda dadumamalya* Pied oystercatcher and *dakwurrinya* Sooty oystercatcher. The taxon *dubudekbuda* is a totem of the Warnungwamakwula clan. The name *dakwurrinya* is used specifically in the songs of that clan. I wonder whether subdivisions of taxa need only be referred to in the context of some special purpose, yet at the same time are available for inclusion in the general purpose biological classification. If so, it would give additional substance to Berlin's concept of folk genus. It is this basic labeled 'natural'

category which I see as the potential unit of agreed perception of discontinuity *and* cognitive status. I think that is what Berlin, Hunn, Hays and I have all been groping towards. Just how we can objectively define it in a manner satisfactory to all remains a problem.

Randall (1976:550) has raised the issue of special purpose classification systems. Bulmer (1974:24), in commenting on Berlin's schema, has noted that folk taxonomies generally seem to be characterized by considerable flexibility and elasticity, contracting or expanding according to context. Dwyer (1976:438) suggests there is a need for flexibility in that the same folk taxon can apparently change its status within a folk taxonomy. Hunn (1976:520) has said that taxonomic structures are inadequate as models of the process of classification.

In the light of these comments and the dissatisfaction with systems previously outlined, I would support Randall's suggestion that folk taxa are stored in the memory simply as a series of (direct) contrast sets, as defined by Kay (1971:877), but I would suggest that the contrast sets remain free to be manipulated as required rather than fixed within a hierarchy. Each contrast set represents perfectly valid relationships. Such sets could readily be ranked by vertically overlapping set inclusion relationships to produce a hierarchical classification. Nontransitive relationships, (for example, a land snail is not a sea animal), are then explained as inclusion of non-typical members of a set by virtue of form or behavior. In the Groote Eylandt Aboringinal biological classification there is only one contrast set, viz. the dichotomy between land and sea animals included within the unique beginner for the animal kingdom, which gives rise to all nontransitive relationships. Apparent change in status of a folk taxon would be explained by the formation of an additional contrast set at a higher level. I would take this to include polysemy of folk taxa, though I don't think that was what Dwyer intended.

The Groote Eylandt Aborigines can produce a hierarchical food classification system which overlaps considerably but is by no means identical with the general purpose biological classification system (Waddy in press). The overlap of terms such as *akwalya*, which in the food classification systems means all edible flesh, but in the biological classification system means all animal life, highlights the need to be particularly careful that terms included in a particular hierarchy are rightly included for the purpose of that classification. On the other hand their totemic classification system results in an entirely different grouping of folk taxa, completely crosscutting higher biological folk taxa in many instances and lacking in hierarchical depth.

If folk taxa are arranged in contrast sets according to purpose, then only those sets required for the purpose would be called on to generate a hierarchical classification. This would appear to me to provide the flexibility and the potential for overlap which has been observed.

Because Kay's contrast sets are defined upon taxa rather than upon the lexemes that realize them (Kay 1971:874), it seems reasonable that a contrast set may contain unlabeled taxa, i.e. covert categories, as well as, or even in place of, labeled taxa. This does not seem to violate his definition that a contrast set is composed of just those taxa which are immediately preceded by the same taxon.

One problem still remains. Unfortunately, as Berlin (1976) says, members of the same contrast set often do not exhibit the same degree of internal variation. This is where I think that Hunn's idea of monotypic genera or indeed of higher level monotypic taxa can be applied. Certain taxa, termed unaffiliated generics by Berlin Breedlove and Raven (1974:219), do not appear to have the same psychological salience as the more inclusive life form taxa, even though technically they can be included in the same contrast set. Berlin, Breedlove and Raven rank these taxa as generic on the basis of linguistic criteria which are now being questioned. It would seem either that these unaffiliated generics, which may themselves include contrast sets, lack membership in a higher level contrast set or that the next higher level contrast set is one-membered. For such an interpretation to be valid however we still need to be able to define the basic 'natural' category within the folk taxonomy and that to me depends on perception of discontinuity.

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NOTES

1. The data on Groote Eylandt included herein was first presented in a paper to the Botany Section at the 50th Congress of the Australian and New Zealand Association for the Advancement of Science, Adalaide, May 1980. That paper was rewritten and presented during the symposium, Ethnobiology: Folk classification, uses and knowledge of plants and animals in Australisia, in the Anthropology Section at the 51st ANZAAS Congress, Brisbane, May 1981. I am most grateful to Brent Berlin, Ralph Bulmer, Peter Dwyer, Terence Hays and Kenneth Maddock for their helpful comments on these papers.

2. The provision of a grant-in-lieu-of-salary by the Austrailian Institute of Aboriginal Studies to support this research from April 1976 to March 1981 is gratefully acknowledged.

3. Although many long words in Anindilyakwa are at least partly analyzable most words used in this paper are of one morpheme or are prefixed by a noun class marker of one or two letters. One exception is *yinungungwangba* where yi- is the 'y' noun class marker, *nung-* is normally a prefix meaning 'belonging to' but the significance of *ngwangba* has apparently been lost.

4. The terms *amarda* and *akwalya* are used polysemously. It seems that the primary focus of *amarda* is on non-woody plants such as grasses and that the term has been raised in status for use as a unique beginner. This is akin to the process discussed by Berlin (1972: 66-71) of raising the status of a particular tree name to life form status.

The primary focus of *akwalya* appears to be flesh food, in particular, fish. Within the biological classification system its focus is on fish in general, as evidenced by the very common phase, *'Akwalyuwa,'* given in answer to the question, "Where are you going?" However in appropriate contexts the term *akwalya* can be raised in status to include all animals in the sea or all animal life (as opposed to plants). In this way its use is akin to the double use of the English 'animal' referring both to mammals and to the whole animal kingdom.