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INTEREST, USE, AND INTEREST IN USES IN FOLK BIOLOGY

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Impressively detailed folk classifications of animals and plants have now been reported for a wide range of human societies (Brown 1984) and several regions of the world are represented by intensive, long-term field studies, such as that of the Kalam by Ralph Bulmer and his co-workers. General, if not universal, features of these systems have been identified – though agreement on these is not complete (Hays 1983) – and we are no longer surprised to learn of folk biological taxonomies five or even six levels in depth with inventories approaching or exceeding a thousand distinct named taxa.

By contrast, with the exception of gardening hobbyists and amateur naturalists the folk systems of average urban Westerners appear to be relatively simple. Content to make only the grossest kinds of distinctions, perhaps many of us share the indifference expressed by that Everyman, Alexander Portnoy, who says (Roth 1971:251):

Greenery I leave to the birds and the bees, they have their worries, I have mine. At home who knows the name of what grows from the pavement at the front of our house? It's a tree – and that's it.

Why should there be such a contrast? Why do “the folk” classify their natural surroundings in such detail?

Anthropologists have generally offered two kinds of general answers to the latter question. The first, which may be designated the *intellectual view* and is represented by Lévi-Strauss (1966:9,10) among others, contends that classifying “has a value of its own”, which is to satisfy a pan-human “demand for order”. In this view, intellectual curiosity drives the systematist, for whom “the universe is an object of thought at least as much as it is a means of satisfying needs” (Lévi-Strauss 1966:3). Indeed, if the recent arguments of Hunn (1976) and Brown (1984) are correct, the world is a cooperative object, providing natural discontinuities to meet the aesthetic and intellectual demands of the human mind.

The second kind of answer – which may also help to explain why many urbanites appear to demand *little* order and seem oblivious to many “natural discontinuities” – is a *utilitarian view*, espoused recently by Hunn (1982) but suggested earlier by our informant Portnoy, who accounts for his indifference (Roth 1971:251):

The kind [of tree] is of no consequence, who cares what kind, just as long as it doesn't fall down on your head.

For decades, “anthropologists have taken elaboration of vocabulary as an indication of the interests of particular cultures and of differences among them” (Hymes 1964:167). Thus, selective proliferation of names and the associated conceptual distinctions they label is interpreted as corresponding to “cultural foci”. In Portnoy's period and civilisation, there may be little social necessity for, or payoff in, being able to distinguish, say, a “beech” from an “alder”. But for those who live “close to nature”, such as the Kalam or Ndumba (in the Eastern Highlands of Papua New Guinea), a knowledge of the natural environment assumes an importance unimaginable to Portnoy. In Ndumba, plants are directly employed in the production of virtually all traditional foodstuffs, medicines, clothing, implements, weapons, and structures (Hays 1974, 1980, 1981). It seems obvious that with such a great dependence on the environment as a resource pool, a high cultural premium is placed on detailed botanical knowledge. To recognise and call a thing *satari* (‘woody plant’) is not enough: nearly all *satari* can fall on your head, given the right circumstances, but the fruits of only some trees are edible, while others may be poisonous; only *some* woods are strong enough for fencing, while others will break quickly. Such examples could be multiplied, but the

point is that in Ndumba one must learn to distinguish among the trees, shrubs, vines, etc., in order to exploit them properly and in order to communicate about them, both of which are basic requirements for participation in Ndumba society.

While a utilitarian view is intuitively satisfying, it is not without its difficulties, some of which are inherent in any "adaptationist programme" (cf. Hays 1982). Specific supporting instances are easy to find; e.g., Ndumba distinguish between two kinds of ?una within a larger category *hohondi*, which includes various beans. One kind, ?una *tuananaana* ('genuine' ?una [*Lablab purpureus* (L.) Sweet]) is eaten, while the other, ?una *nerira* (a feral form of *Phaseolus lunatus* L.), is shunned since to eat it is said to cause vomiting. Here we surely have a case in which knowledge of the distinction between these two plant classes could be seen to have practical consequences. However, this is a carefully selected example from Ndumba plant classification, and others could be cited of distinctions made by Ndumba that seem to correspond to no consequential differences in behavioural responses to the organisms.

What is required for a utilitarian view to be convincing is the demonstration of a *systematic* relationship between the "uses" of plants (or animals) and their treatment in folk biological systems. A prerequisite to such a demonstration is a satisfactory way of assessing or measuring the relative "cultural significance" or "importance" of plant and animal classes.

ASSESSING USEFULNESS

A radically "emic" approach might employ modified versions of old parlour games, asking hypothetical questions of one's informants such as, "If you were going to be isolated on a desert island, which three plants would you want with you?" or, "If Ndumba were on fire, which three plants would you save first?" The answers you would get, however (if you were able to get your informants to take the game seriously), would likely be as variable and inconsistent as those my own Ndumba informants gave me when I asked them, on several occasions, to simply rank order the fifty folk genera of plants which are used for food. About all that clearly emerged from these sessions was that the orderings were influenced as much by personal tastes, impending social events, and even the season of the year, as by any systematic "emic" standards or measures.

Nor do attempts to derive such measures inductively from informants' statements or observed behaviour promise completely satisfactory solutions to the problem. For example, Hunn (1982:843) has proposed that an "activity signature" be constructed for each folk taxon, consisting of "the set of all culturally valid imperative sentences in which the noun X occurs as object". Such sentences, exemplified by "bake camas in the underground oven for three days", are heuristically useful indicators of what might be done with a plant, but it is difficult to imagine how one would ever reach closure on the set of all possible imperative sentences concerning any, let alone all, folk classes. Like the "traits" listed by American anthropologists in the 1930s, such instructions seem indefinitely expandable or "splittable" (e.g., "bake camas alone. . .", "bake camas with onions. . .", "bake camas. . . for three days", "bake camas. . . for three and a half days [for those who like them well-done]", etc. Moreover, without an *a priori* measure of the relative significance of *acts or consequences themselves*, how would one distinguish between instructions (hence, plants) such as "drink a tea made from the leaves of *x* to cure blindness" and "push aside the branches of *y* when walking down a path lest its thorns scratch your legs"? "Activity signatures", seemingly destined to be ever-incomplete (and particularly so if one is forced to work largely with "memory culture") might end up as nothing more than dictionary entries if there is no interpretive scheme by which they can be assessed and compared.

My own inductive attempts have been no less problematic even when elicited statements could be combined with first-hand observations of behaviour in a subsistence-based economy. In my continuing fieldwork in Ndumba since 1971, I have maintained a file for each plant (and animal) class including all reported and observed "uses", i.e., contexts in which it would be consequential to distinguish one plant from another and respond differentially to it. The total number of distinct "uses" for plants in Ndumba currently stands near 300, and "use scores" for individual plant classes range from 0 to 17. This approach has the merit of allowing scaling of relative "cultural importance" since one can say not only that plant class *x* has *n* uses, but also that it has, say, *twice as many* uses as does plant class *y*. The weakness of this method, however, is that it entails the implication of equivalent importance to all plant classes with the same use score. Thus it is not self-evident, although doubtless of significance, that among the plant classes with a use score of "1" are included

food plants, medicines, and trees which are used only for firewood. Obviously, some system of *weighting* various uses is required to avoid quantification for its own sake.

To avoid as much subjectivity as possible – how does one decide, after all, whether wearing aromatic leaves in one's armband as "love magic" is more or less important than eating a leafy vegetable with one's supper of sweet potatoes? – I have worked for some time trying to develop a second measure based on the notion of "functional equivalence". For the majority of the plant uses in Ndumba of which I am aware, two or more plant classes may be functionally equivalent; e.g., saplings or branches of any of more than 100 folk genera of 'woody plants' might be suitable for yam and bean prop sticks. For other purposes, however, only one named plant class is considered by Ndumba informants as appropriate. For example, if one wishes to gather fronds which may be burned and the ashes made into salt, one plant (a fern of the genus *Asplenium*) must be sought. Some plants are functionally unique in several use contexts; e.g., the "paper mulberry tree", *Broussonetia papyrifera* (L.) Vent., is used in 12 different ways (out of 17 total uses) for which there is no substitutable plant. In all there are at least 60 Ndumba folk genera of plants which have at least one apparently unique use and it seems reasonable to accord them, in this sense at least, higher relative cultural importance than those plants which are members of functionally-equivalent sets.

Hunn (1982) has raised the objection that "functional equivalence" may be an illusion resulting from characterising uses too grossly. Citing my example of "tuber eaten" as a use for which many Ndumba plant classes are mutually substitutable, he (1982:841) points out that for Sahaptin edible tubers

no two such taxa are precisely alike with regard to how, when, and where they are used and who makes use of them. In fact, we may propose the working hypothesis that no two folk biological taxa, if their practical significance were adequately described, would be found to be precise functional equivalents.

This "hypothesis" threatens to be unfalsifiable since further eliciting or observations could always disclose additional uses or specifications for the use of a given plant – thus we are back to the problem of never attaining closure and, consequently, no real "test" of such a "hypothesis". Still, I would agree with Hunn that "tuber eaten" is a very gross way to characterise the "use" of a sweet potato. I also suspect that if one took into account taste preferences, size, soil requirements, growing speed, etc., Ndumba tuber classes could be shown to be distinctive in one or more ways. But this seems to lead us further into the morass created by "splitting", and in the absence of an analytic scheme that would allow us to *weight* these distinctions – within a particular system or across cases for comparative purposes – our goal seems no closer to realisation.

Such analytic schemes have been used by some ethnobiologists, in each case unabashedly imposing "etic" assumptions and priorities on the data. For example, Berlin and his co-workers (1974:96) have proposed a typology of four categories based not on the uses to which plants are put, but on the varying degrees of human action involved in their propagation. Thus, "cultivated" plants are accorded the highest cultural importance; "protected" plants are wild but "critically important" and thus are kept in abundance through human intervention; "significant" plants "receive no special treatment by man" but have "some cultural significance"; and "unimportant" plants are wild, unprotected, and have "minimal or no known cultural utility".

The use of this typology has yielded some interesting correlations with other phenomena, as in Berlin et al.'s (1973) study of retention of plant names in historically-related languages, Geoghegan's (1976) analysis of polytypy in folk taxonomies, and Brown's (1977, 1979) comparative studies of the content of life form categories. However, human involvement in propagation is a very poor predictor of Ndumba plant classes' "use scores", with the vast majority of high scores found for wild plants. (It is also unlikely that "domesticated" ~~is~~ "wild" is a contrast that would predict relative "importance" of animal classes; the highly *salient* Kalam cassowary (Bulmer 1967) comes to mind immediately.)

A more serious problem inherent in the scheme stems from its implication, as with my own simplistic calculation of "use scores", that all plant classes within each category have equivalent importance or significance. This is manifestly not the case in Ndumba where the sweet potato, for example, which provides the vast bulk of daily food intake, is only misleadingly equated with other food plants or, indeed, with any other plant class with which it would be grouped as "cultivated". Furthermore, phrases such as "some cultural significance" or "minimal cultural utility" *presume*, but do not provide, some means of measuring or otherwise assessing the various uses of plants.

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Turner (1988) addresses this need, and her approach (1988:275) usefully acknowledges the complexity of "cultural significance", which might vary in "quality" (the nature of the role of a plant in contributing to survival), "intensity" (the level of attention given to a plant due to its impact on daily life – a revisiting of Berlin's scheme), and "exclusivity" (the degree to which it is preferred over other alternatives – apparently a version of my "functional equivalence" notion); moreover, she recognises that "cultural significance can change over time" – a particularly thorny problem for those reconstructing systems no longer in everyday use. Turner (1988:282-3) then proposes that the values of these three variables ("Q", "I", and "E") be multiplied to yield an "Index of Cultural Significance" (ICS), a procedure which, for her Salish cases, produces scores of 1-106 for different plant classes.

Such a numerical approach, of course, depends on quantifying the key variables of "quality", etc., and this Turner (1988:286) achieves by adopting an *a priori* utilitarian framework: "various types of uses are assigned predetermined values based on qualitative assessment of their contribution to survival" (1988:286). Thus, within her typology for "quality of uses" (1988:280-1), primary food plants are given a value of 5; secondary foods, 4; medicines, 3; ritual or spiritual uses, 2; and so on until one reaches plants recognised but not "used", which have a value of 1. d

In Turner's (1988:287) view, this approach "seems more rigorous and less subject to bias and subjective judgement than a simple evaluation by the researcher, or even by native people within the culture". Nevertheless, it proceeds from a very *strong* bias, viz., that "survival" is the key motivation (or selective force) behind folk systems of classification. Also, she herself (1988:277) admits that "evaluating the cultural significance of plants . . . [is] a complex and intricate problem, requiring a series of subjective decisions on the part of the researcher". It is Turner, after all, who has decided that medicines play a lesser role in "survival" than do secondary foods.

Elsewhere (Hays 1982) I have expressed a number of concerns with "adaptationist" approaches that hope to explain folk biological systems in terms of their "survival" value, including one which relates to the critical juncture of folk belief systems and "the real world" which, presumably, is the setting for "survival". I cannot see that Turner has solved the problem I (1982:91) raised earlier:

[When] we are seeking the practical consequences of folk distinctions among organisms, [are we] concerned only with *real* consequences or also with those which are only imagined to exist? For example, in Ndumba. . . one kind of yam is forbidden to males during a certain stage of their youth on the grounds that to eat it would cause them to grow "crookedly", just as the tuber itself is "crooked". One might say that this is a taxonomic contrast which reflects "utilitarian" Ndumba concerns, but it is highly questionable whether a boy's physical growth pattern really would be affected if he confused the forbidden yam with another. . . [Similarly, in ethnomedicine] we find many careful distinctions drawn among plants on the basis of reputed phytochemical properties for which there is either no, or negative, scientific evidence.

Sometimes, of course, "the folk" have made discoveries about their natural world that have eluded Western science, as in the "croaking worms" of Kalam (Bulmer 1968b). But is it likely that the survival of Ndumba infants is really jeopardised if men cut down *naama'saasira* (*Bubbia* sp.), an act with the reputed effect of causing the breasts of the woodsman's wife or mother to swell and "die"? Those who would "explain" folk conceptualisations of plants and animals in terms of their survival value require from us a leap of faith in the proposition that the folk construct these views of the world because it is good for them – whether they know it or not, and whether we know it or not.

ETHNOBIOLOGY AS ETHNOGRAPHY

This discussion began with a question: "Why do the folk classify their natural surroundings in such detail?" One of the reasons why no simple answer has been proposed is that it is not a simple – or a single – question. At the least we require first an answer to another question: Are we trying to describe and understand human behaviour (including the mental and linguistic acts of classifying and naming plants and animals) in terms of its *effects* or its *motivation*?

When we are concerned primarily with its *effects*, then "utilitarian" hypotheses are indeed appropriate, but we need observation as well as elicitation: we must discover how the conceptual and terminological distinctions elicited from an informant actually inform *differential responses* to organisms when they are encountered in the world, and then convincing demonstrations that these responses – rather than some other ones – make a difference.

In addition to a better understanding of the natural world itself in scientific terms, we need better ethnography, which can yield more comprehensive approaches to the determination of "uses" than are suggested by the typologies so far proposed. As Bulmer (1968a:316) has observed:

a tree or plant may have no direct use for food or technology, but the ability to recognise it and the knowledge that its blossom, fruit, foliage, epiphytes or the insects which are found in it regularly provide food for certain kinds of birds or mammals, or that it regularly provides shelter for them, are highly relevant to the hunter.

Discovering how a system works, then, requires insights which can only come from an intimate and thorough grasp of the full context in which it operates.

These are also needed, of course, if it is *motivation* that we seek to identify and understand, but here we may find that the folks' objectives have little or no clear relationship to "survival". In Turner's (1988) scheme, "ritual or spiritual uses" of plants are awarded only one-half the points given to "secondary foods". Yet the "need" to distinguish among organisms with contrasting ritual significance could motivate the drawing of such a distinction irrespective of the demonstrable efficacy of the ritual in promoting "survival". Similarly, aesthetic considerations underlie much of the attention Ndumba men devote to birds, the plumes of which can "make or break" one's appearance at a festival and esteem in the eyes of others. And how are we to account, in terms of "survival", for the diligence with which one of my informants sought out *particular* spiders to bring home to his house because he so admired the beauty of the webs they – and only they – construct?

To the best of my knowledge, Ralph Bulmer never published a general "explanation" of Kalam folk biological classification systems. I suspect that this is not because of a lack of interest in achieving such on his part, or a failure to appreciate the use to us all of such a culmination to his decades of exploring that particular corner of the human world and mind. Rather, I think it is because the tutelage of Saem Majnep and his own passion for the natural world around him made him ever-cognisant that what often "counts" – but resists counting – is the *salience* of organisms. Until that can be incorporated into our notions and measures of "importance" or "significance", cassowaries and kiwis, and big bouquets of roses, will haunt our schemes.

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