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THE CHICKEN AND THE EGG-HEAD REVISITED: FURTHER EVIDENCE FOR THE INTELLECTUALIST BASES OF ETHNOBIOLOGIAL CLASSIFICATION

Brent Berlin
University of California, Berkeley

> . . . the discontinuities in nature. . . which zoologists and botanists regard as species. . . would always have been regarded as species since zoology and botany became sciences, regardless of the theoretical rationales applied (Ralph Bulmer, 1970:1083).

One of the major issues in ethnobiology[1] concerns the growing debate surrounding the *bases of ethnobiological knowledge.* It is a curious debate, and one that shows something of the cyclical nature of alternative explanations in social science that are popular at one moment in time, then fall into disfavour, only to be rediscovered again by a younger generation of scholars.

The current focus on the bases of ethnobiological knowledge includes proponents who can be readily grouped into two camps. Borrowing some terminology from Terence Hays and Darrell Posey, these two camps can be conveniently named the *intellectualists* and the *utilitarianists.* Proponents of the intellectualist position argue that ethnobiological knowledge, and especially that knowledge associated with the classification of biological diversity, is fundamentally cognitively motivated. There are at least two varieties of the intellectualist stance. The first and historically prior is associated with the French structuralism of Claude Lévi-Strauss and is best articulated in his important work, *The Savage Mind* (1966). A second version was later developed in the United States by ethnobiologists trained in the tradition of ethnoscience, and in New Zealand, as seen in the pioneering work of Ralph Bulmer (Atran 1985a, 1985b, 1987, 1990; Berlin 1972, 1973, 1976, 1992; Berlin, Breedlove, and Raven 1973, 1974; Berlin and Swift, in preparation, Boster, Berlin, and O'Neill 1986, Boster, n.d., Bulmer 1967, 1968, 1970, 1974a; Bulmer and Tyler 1968, Bulmer and Menzies 1972-73, Hays 1974, Hunn 1977, 1979 [but see below], Patton, Berlin, and Berlin 1982). While the two varieties of the intellectualist position differ in important ways (see Berlin and Berlin 1983), they both share the view that human beings everywhere recognise the *inherent order and structure* in the biological world quite independently of whatever practical value plants and animals may be thought to possess.

The utilitarian position, represented in the work of several ecologically focused ethnobiologists in England and France, as well as a number of American ethnoscientists who have abandoned their earlier intellectualist stance, presents a modern version of the functionalist views of the great ethnographer Malinowski who saw ethnobiological knowledge as the quintessence of primitive pragmatism (see Morris 1984). In Malinowski's words, "The road from the wilderness to the savage's belly and consequently to his mind is very short. For him the world is an indiscriminate background against which there stands out the useful, primarily the edible, species of animals and plants" (Malinowski 1974:44, original edition 1925). The neo-Malinowskian utilitarians claim that the major purpose of ethnobiological classification is to assist human populations in adjusting to their particular habitats by giving names to just those plant and animal species that have practical consequences for human adaptation (see Hays 1982 for a critical summary of this position). The recent writings of Hunn 1982, Morris 1984, and Brokenshaw and Riley 1980 are most directly typical of this position. A recent paper by Posey (1984) represents an attempt to arrive at some middle ground between the two views. (Broader, although ultimately neofunctionalist arguments that open a Pandora's box of possible sociological and symbolic explanations in ethnobiological classification can be found in Ellen 1986 and Ellen and Reason 1979, 1986; Friedberg 1979, Sillitoe 1980, 1983; Dougherty 1981, Randall and Hunn 1984, and Hallpike 1979. I will be concerned in this paper with addressing the strongest form of the utilitarian hypothesis as set forth most clearly by Hunn (1982) who, unlike some of the more sociologically oriented approaches, takes care to form his argument in a concise and coherent fashion.)

In what ways might the major differences in interpretation separating the utilitarianists and the intellectualists be fruitfully explored, and what kinds of evidence would be critical in evaluating the plausibility of either argument? A clue may be found by examining the differences between intellectualists and utilitarianists on the issue of *which* plants and animals are singled out for naming in any particular ethnobiological system of classification. Although obvious, it is first necessary to point out that no system of biological classification, including the taxonomy of modern biological systems, is totally comprehensive in its categorisation of the living world. The number of organic beings on the earth runs to the millions and systems of folk botanical and folk zoological classification name but a small proportion of the naturally occurring species of plants and animals in any particular localised habitat. What, then, underlies the choice of individuals in pre-literate societies to name and classify those biological organisms that *do* get labelled?

For the utilitarianist, the answer seems simple enough. Hunn, perhaps the leading proponent of utilitarian arguments in ethnobiology today, states that since there are far too many distinct pieces of biological reality to be dealt with linguistically, "... the alternative... is to impose a selective process based on *utility*. If we are to explain why a particular subset of the available natural discontinuities is selected for cultural recognition, we must model this selection process. This requires us to consider the practical consequences of knowing or not knowing some plant or animal" (Hunn 1982:834, emphasis added). Or, as Posey has stated, "[intellectualists] do not explain *why*... certain natural domains are classified and named while others are not. This question is best investigated from the utilitarian/adaptationist approach" (Posey 1984:123, emphasis in original).

There are a number of logical and procedural problems with this *a priori* position. If the plant and animal species named in systems of ethnobiological classification were selected for linguistic recognition primarily on the basis of their utilitarian importance, then it should in theory be impossible to predict which classes or organisms will be named prior to conducting relatively complete ethnographic and ethnobiological investigations in any particular society. One of the major lessons of ethnography is that the belief systems of human societies are multifaceted and culture-specific. The relativist utilitarian would surely be the first to proclaim that the pragmatic, culturally defined significance of plants and animals must be *discovered* not *deduced*. On the other hand, to the extent that one is able to predict which plants and animals in some society will be named *without prior knowledge of the cultural significance* of these organisms, the utilitarian argument loses much of its force.

How might one approach the problem of predicting which of the thousands of organisms in any particular local habitat might have the privilege of being named? The space available to me here is far too short to elaborate the full argument (see Berlin 1992), but its essential outlines can be seen by considering the following, not-too-hypothetical example.

Let us imagine a day in the rainforests of the Amazon in the late 19th century. A European naturalist, someone with the scientific curiosity of a Bates or a Wallace, is actively engaged in systematic zoological collecting. His goal is to develop a local faunal inventory of the major vertebrates found to inhabitat the forest and streams of an area transcribed by, say, a 30 kilometre radius of his field site. As he begins his collections, what does he see? He is not confronted by a vast continuum of animal species gently and imperceptably merging one into the other, species *x* gradually becoming species *y*. What he perceives is an array of discrete, discontinuous pieces of biological reality. As Ernst Mayr stated years ago, "At a given locality, a species of animal is... separated from other sympatric species by a complete gap. This is the [unidimensional] species of Ray and Linnaeus" (1969:37). Furthermore, some of these species are seen to be more similar to one another than others and some are so strikingly unique as to be thought of as unrelated to any other species in the area.

On the basis of these "... observed similarities and differences among groups of organisms" (Mayr 1981:510), our naturalist now begins to classify the animals he has collected. He begins to arrange them in groups based on their overall similarity or resemblance (Simpson 1961). In addition, he begins to note that some organisms can be grouped into ever more inclusive groups. This is possible because he recognises, along with Darwin and many pre-Darwinian biologists before him, that "... all organic beings are found to resemble each other in descending degrees, so that they can be classed in groups under groups" (Darwin 1859:431).

In constructing his classification, our natural historian finally attempts to codify the perceptual facts with which he is presented. He will observe that the differences between two groups or organisms are relatively small, and he will want to place them relatively close to one another in his growing taxonomy. Other creatures will appear to be perceptually very different, and he will place them rather far apart in his classification. Being a good taxonomist, he will try to construct a hierarchy of groups under groups which recognises that the differences between two species of the same genus represent a perceptual difference that is considerably smaller than those differences which separate two genera of the same family. Likewise, he will note that two genera of the same family are more similar to one another than either is to a genus in a separate family (see Figure 1).

To continue with our example, imagine now another zoologist residing in the same area where our 19th century natural historian is presently collecting specimens. Unlike our western trained taxonomist, this person is illiterate and has no particular interest in producing a faunal inventory of the vertebrates in the region, although he could easily do so from memory. He has even worked as a collector on an occasional basis with the European who has found his knowledge of the local fauna to be rather extensive. As you will now have guessed, this zoologist is an Indian.

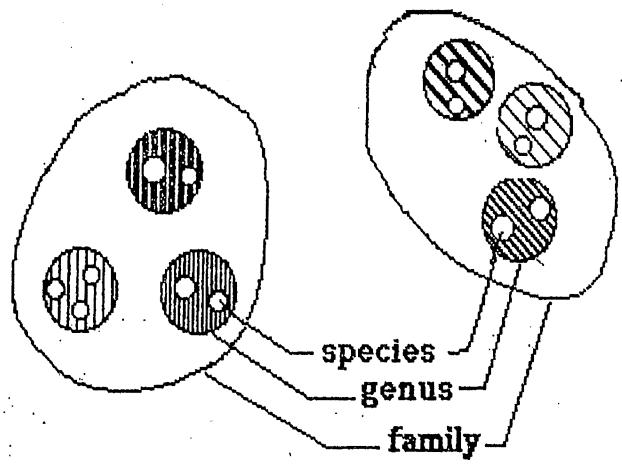

Figure 1. Schematic grouping of taxa by degree of similarity (after Simpson, *Principles of Animal Taxonomy*, 1961:117)

Along with the European natural historian, our indigenous zoologist will have looked out upon the same forest and streams, will have regularly seen most of the same animals, and will have developed an implicit system of ethnozoological classification. And, along with the western scientist, he will have used exactly the same kinds of perceptual cues of similarity and difference in the recognition and consequent naming of groupings of organisms. An obvious but necessary qualification is required here. Notice that in the preceeding passage I wrote "... will have seen most of the same animals". If our Western zoologist had special collecting equipment, such as fine-meshed bird nets, and if he worked systematically at night to collect bats, he will be likely to have captured a number of these rapid flying, nocturnal creatures that our indigenous ethnozoologist will never have seen. This is simply because the behaviour of these animals makes them essentially unobservable by native peoples.

Now we are ready to consider the intellectualist and ultilitarianist positions on which groupings of animals are likely to be named. Again, Hunn, speaking for the utilitarian view, is unambiguous: "[Ethnobiological] classification is *highly selective and [knowledge of] the practical significance of organisms is important in the selection process*" (Hunn 1982:835, emphasis added). If this is true, one would have to spend a good deal of time talking with our indigenous ethnozoologist prior to making any predictions on how he might classify the species of the region.

The intellectualist argument, however, leaves issues of utility aside as concerns the underlying bases of ethnobiological classification and makes a straightforward prediction: To the extent that the western scientist and native ethnozoologist see the *same species* [of vertebrates], and to the extent that the two systems form their groupings on relative degrees of similarity and difference among the species, then the western and folk systems of classification should potentially correspond closely as regards which species are singled out for naming. Since they are classifying exactly the same animals, the taxonomy of the European, based on no knowledge whatsoever of the cultural importance of the animals he is collecting, should be nearly identical to that of our indigenous ethnozoologist. If this is true, one should be able to use the scientific system as a road map for predicting which organisms will be named in the folk system.

Before moving on to look at some actual data, let me explore the analogy of the road map a bit. As is well known, on any good road map, some of the lines representing highways will be highlighted, thicker and easier to read than others. These are the main highways, the well-travelled routes, the basic freeways of transport. Likewise, in a scientific classification of local species, some organisms will be highlighted in that they are more highly distinctive than other species in the area. They gain their *distinctiveness* as a consequence of the larger numbers and relative weights of the morphological, and to some extent, behavioural characteristics that separate them from organisms in the area. In comparison with other species of the local fauna, these distinctive taxa are at once relatively *homogeneous* (in terms of their internal biological diversity) as well as relatively *isolated* (in terms of the "... size of gaps [separating them from] adjacent taxa" (Sneath and Sokal 1973:291). (My colleague Paul Kay says that such species suffer from a high degree of "phylogenetic loneliness"). Such perceptually distinctive organisms should be the best candidates for names in any ethnobiological system of classification. Ironically, Hunn was the first to make this observation in print. Other things being equal, he stated "... the probability that a group of organisms will be recognised and named is directly proportional to the [distinctiveness] of [that group] as determined by scientific taxonomic analysis" (Hunn 1977:72, cf. also Hunn 1979).

Can taxonomic distinctiveness be defined? For our purposes, a good operational definition is relatively straightforward and can be read directly from the structure of the biological taxonomy of the species in any local habitat. In general, species that occur as members of locally monotypic genera should be perceptually highly distinctive in that there are no congeners (i.e. species of the same genus) with whom they might be confused. Monotypic genera within monotypic families should be even more distinctive. These are the isolated beacons of biological reality that literally cry out to be named. (Figure 2).

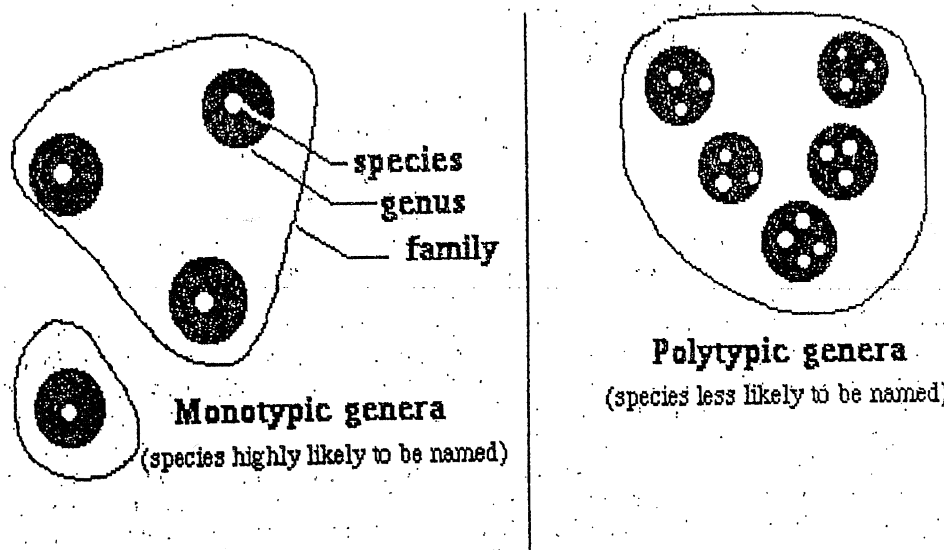

Figure 2. Schematic representation of taxa indicating likelihood of being recognised linguistically in any ethnobiological system of classification

We now have in hand the makings of an experiment that is relevant to the utilitarianist/intellectualist debate on the bases of ethnobiological classification. If one assumes that monotypic genera are perceptually highly distinctive, then the following hypothesis is suggested; it is a simple hypothesis and is divided into two parts:

1. *If a scientific genus,* x, *is monotypic, it will be recognised in the folk system by an indigenous name,*
2. *The indigenous name will be restricted in its meaning to the single monotypic genus,* x.

Our intellectualist hypothesis, in addition to predicting that all monotypic genera will be named, requires that the names be tightly referentially restricted in their range of meaning. If, as we have claimed, monotypic genera are quite perceptually distinct, one should not expect a common folk name to apply to more than a single genus.

THE DATA

One can now set out to determine to what extent the scientific taxonomy can be used as a predictor of the naming characteristics of the folk ethnobiological system. To elaborate a test of our hypothesis, I will draw on data collected among the Huambisa and Aguaruna, two Jivaroan speaking peoples who reside along the Upper Marañón River and its tributaries in the rainforests of the Peruvian montaña. For purposes of this experiment, it will be convenient to restrict its scope to three major vertebrate groups – the mammals, birds and fishes.

Through the collecting efforts of a team of zoologists working with me in an interdisciplinary ethnobiological research project,[2] relatively complete faunal inventories for the three major vertebrate groups have been compiled. As can be seen in Table 1, the biological diversity of this region of the Peruvian rainforest is high, with over 100 mammalian species, 280 bird species, and 240 species of fish attested in our collections. The mammals are grouped into 76 genera, 56 of which are locally monotypic. Fourteen of these 56 genera are bats and, with the exception of the vampire bat and certain large fruit bats, are rarely if ever observed closely by the indigenous populations in the region. The 280 species of birds in the region are grouped into some 178 genera, 137 of which are locally monotypic. Finally, the 240 fish species are grouped into 89 scientific genera, 65 of which are locally monotypic (see Table 1).

TABLE 1
DISTRIBUTION OF NUMBERS OF MONOTYPIC AND POLYTYPIC GENERA OF MAMMALS, BIRDS AND FISH IN THE UPPER MARAÑÓN RIVER REGION OF AMAZONIAN PERU.

	Monotypic genera	Polytypic genera	
% monotypic			
Mammals (N=76)	57	19	(78%)
Birds (N=178)	137	41	(76%)
Fish (N=89)	65	24	(73%)

Following standard ethnobiological data collection procedures, large numbers of native informants were interviewed in an effort to elicit indigenous names for species of mammals, birds, and fish in our collections. As with all systems of folk biological classification, variation in naming was common. Both lexical (distinct linguistic forms) and phonological (simple phonetic variants) synonomy in the names for different species was a general feature. Detailed knowledge of the animals varied among individuals, with sex and age of informant being the primary factors underlying level of naming competence. Males always knew more names for birds and mammals than did females, and older males had more complete knowledge of the animals than did younger males. Male and female differences in knowledge for the fish species were less pronounced, probably as a consequence of the fact that both sexes share in the harvesting of these creatures and have the opportunity to observe them about equally well. For present purposes, the native name for a particular species is considered to be the name most commonly given in our various elicitation tasks (see Berlin, Boster, and O'Neill 1981 and Boster, Berlin, and O'Neill 1986 for a discussion of methodological procedures).

RESULTS

Recall that our hypothesis has two parts: (1) monotypic genera will be named in the folk system and (2) named genera will be labelled by expressions that are restricted in meaning to just those genera (i.e. not range over a number of genera).

The results relating to the first part of the hypothesis are quite clear-cut. *None* of the monotypic genera of mammals, birds or fish lack a well-established common name, i.e. none are known simply by such general expressions as 'that's just a bird', or 'it's just some kind of fish'. True, as stated earlier, informants will vary in their ability to apply the names of these animals consistently in standard elicitation tasks, some perceptually close genera at times being confused. The general patterns of agreement in our naming data are unambiguous, however, in showing that each monotypic genus does have a common, well-established name. (In two naming experiments, for example, *Daptrius americana*, the common red-throated caracara, was called *yákakau* by 19 of 21 informants on test 1, and by 20 of 23 informants on test 2. Data for the remaining monotypic birds, mammals, and fish showed similar distributions.) All of these creatures are sufficiently distinctive as to require their being recognised linguistically in the folk system.

The second part of the hypothesis concerns the range of application of folk names to monotypic genera. Table 2 addresses this question. Analysis of our naming data indicates that the 57 monotypic mammal genera are grouped into 38 basic Jivaro ethnozoological taxa that I have referred to elsewhere as folk genera (see Berlin 1972, 1973, 1976, 1992, Berlin, Breedlove, and Raven 1973, 1974). The 137 monotypic bird genera are grouped into 114 folk genera and the 65 monotypic scientific genera of fish into 41 folk genera. Clearly, there is no exact correspondence between the number of biological and folk biological taxa in each system. In all cases, there are fewer folk categories than scientific taxa. But how many of the Jivaro folk genera correspond perfectly with recognised scientific genera? The answer is seen in Table 3.

TABLE 2
CORRESPONDENCE OF NAMED JIVARO TAXA (FOLK GENERA) TO MONOTYPIC SCIENTIFIC GENERA OF MAMMALS, BIRDS, AND FISH IN THE UPPER MARAÑÓN RIVER VALLEY, AMAZONAS, PERU

	Monotypic scientific genera	Jivaro folk genera
Mammals	57	38
Birds	137	114
Fish	65	41

TABLE 3
RANGE OF APPLICATION OF JIVAROAN FOLK GENERIC NAMES FOR MONOTYPIC MAMMAL, BIRD, AND FISH GENERA IN THE UPPER MARAÑÓN RIVER VALLEY, AMAZONAS, PERU

	Folk generic name applied to a single monotypic genus	Folk generic name applied to two to more genera
Mammals (N=38)	34 (89%)	4 (11%)
Birds (N=114)	91 (80%)	23 (20%)
Fish (N=41)	30 (73%)	11 (27%)

The pattern shown in Table 3 is striking; for all three vertebrate groups, folk generic names are highly restricted in their range of application to their respective monotypic genera. This is the case for 89% of the mammal names, 80% of the bird names, and 73% of the fish names. These results strongly confirm the second portion of our hypothesis.

It is revealing to examine the exceptions to our hypothesis for it appears that they are readily understandable on perceptual grounds. In several cases, a single folk generic name ranges indiscriminately over a rather diverse set of genera, examples of which are diagrammatically presented in Figure 3.

Cases of underdifferentiated mammal genera are the bats and the two monotypic genera of spiney rats,

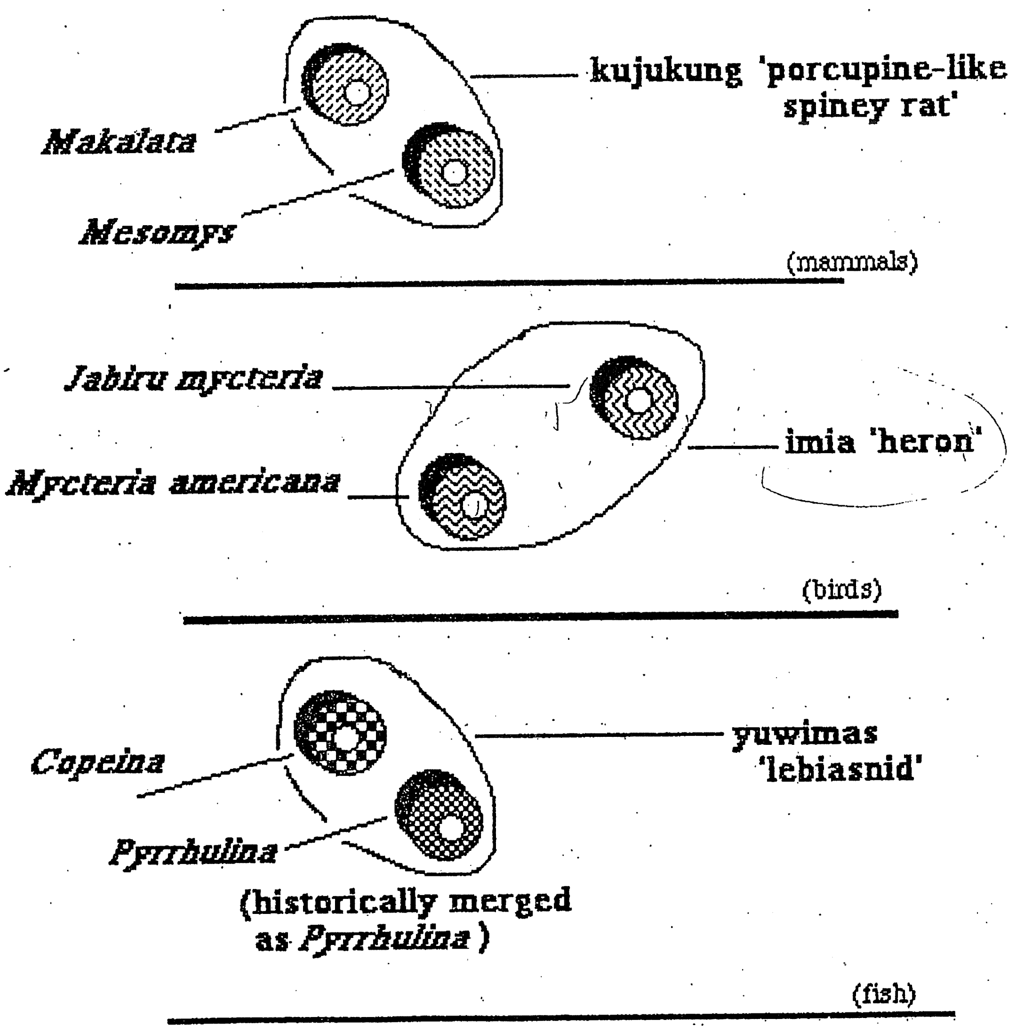

Figure 3. Schematic representation of underdifferentiated Jivaro folk genera of mammals, birds, and fish

Makalata and *Mesomys*. These latter genera are grouped under the folk generic taxon, *kujukung*. Because of their spine-like hair, they are likened to the porcupine, *kuju*, from which their name is clearly derived. Like the bats (*jiincham*), these species are cryptic nocturnal animals and rarely seen by the Jivaro. That they should be lumped into a single category is understandable on perceptual grounds.

Among the birds, the storks are an example of an underdifferentiated folk generic taxon for our Jivaroan informants. Both *Jabiru* and *Mycteria* are treated by the Huambisa as undifferentiated members of the folk genus *imia*. These are very similar white storks, with bare heads and heavy black bills which from a distance are difficult to distinguish. It is not without interest to note that this striking similarity is seen, as well, in the scientific names for the two birds, with the generic name of the American Wood-Ibis, *Mycteria*, serving as the specific epithet for the genus *Jabiru*, i.e. *J. mycteria*, literally 'Mycteria-like Jabiru'.

Finally, among the fish, one can cite the two lebiasinid genera *Copeina* and *Pyrrhulina*. Here, the folk generic term *yuwimas* applies equally to both genera. These two genera are quite closely related and, until recently, were joined in the single genus *Pyrrhulina*. Their separation today is justified solely on the basis of dentition: *Pyrrhulina* has two complete rows of teeth in the upper jaw while *Copeina* shows but a single row. This single character, of course, is not visible to the Huambisa who base their grouping on overall gross morphology.

More commonly, when a Jivaro folk genus refers to two or more scientific genera, the folk genus itself is further divided into sub-classes that can be called folk species, as seen in Figure 4.

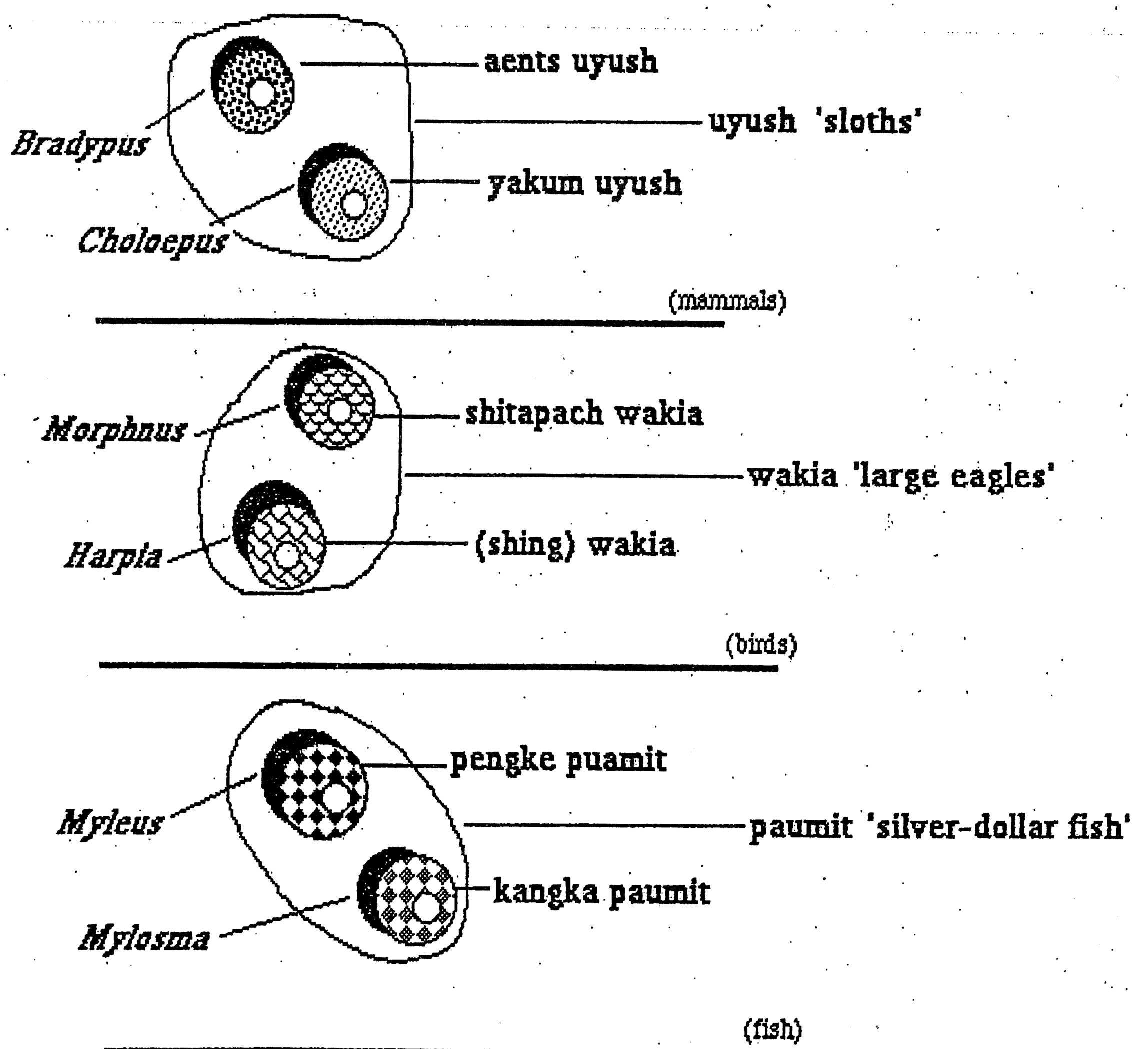

Figure 4. Examples of Jivaro polytypic folk genera of mammals, birds, and fish indicating nomenclatural recognition of monotypic biological genera

Thus, while the Aguaruna apply the term *uyúsh* to both the two- and three-toed sloths in the area, *Choloepus* and *Bradypus*, they nonetheless recognise the differences between these genera in their ethnobiological system of classification as indicated by the two folk specific names *aents uyúsh* (lit. 'man sloth') for *Bradypus* and *yakum uyúsh* (lit. 'howler monkey sloth') for *Choloepus*.

In a comparable fashion, the Huambisa refer to both the crested and harpy eagles (*Morphnus* and *Harpia*) with the folk name *waíkia*. In contexts where the two must be distinguished, the former is called *shitapach waíkia*, lit. 'lesser *waíkia*' in contrast with *shing waíkia* 'true or genuine *waíkia*'..

A final example among the fish is seen in the treatment of the characid silver dollar fish genera *Myleus* and *Mylosma*. In the folk system, both genera are grouped in the folk genus *paumit*. The included scientific genera are nonetheless recognised by the more specific terms *pengke paumit* 'true *paumit*' and *kangka paumit* 'gross-bodied *paumit*', and are distinguished primarily on the basis of relative size.

These nomenclatural patterns provide us with clues about the size of the gap that actually separates locally monotypic genera. One would predict that mammalogists will judge the two sloth genera to be closer morphologically, than, say, any of the monotypic genera of anteaters in the region, with whom the sloths are most closely related phylogenetically. Ornithologists would, I predict, note that the crested and harpy eagles are closer perceptually to one another than either is to *Spaetustyrannus*, another locally monotypic hawk. And ichthyologists would not dispute that the readily perceptual differences separating *Myleus* and *Mylosma* are many fewer than those that separate two other monotypic genera, say *Paragoniales* and *Salminus* of the same group of characid fishes. Although I do not want to push too strongly on this point, it may be that in some highly predictable ways, the nomenclatural properties found in the folk system provide a more accurate guide to the natural affinities among groupings of locally monotypic genera than does the western scientific system itself.

CONCLUSIONS

In this paper, I have presented data that bear on the ethnobiological debate concerning the bases of ethnobiological classification. I have shown that one can, to a large degree, predict which species in the three major groups of vertebrates in a particular localised habitat will be named in the folk system solely on the basis of a knowledge of the structure of the taxonomic classification of these species in the western Linnaean system. That this should be so supports the assumption that both systems recognise those portions of biological reality that are most distinctive in terms of their gross, overall observable characteristics. Furthermore, these data support the view that ethnobiological classification, and to a large degree, modern scientific biological classification, is motivated primarily by human beings' intellectual efforts to codify linguistically the biological reality that confronts them. To do otherwise would be, it would seem, difficult and highly improbable.

The utilitarian might respond, of course, that the most distinctive creatures in any particular region are precisely those that will be found to be highly significant in terms of their cultural importance. As Hunn has stated, "Biologically natural categories. . . will tend strongly to be categories *useful for many human purposes*" (Hunn 1982:834, emphasis added). Aside from the fact that such a view is logically *ad hoc*, it is not supported empirically. More than half of all of the mammals given linguistic recognition by the Aguaruna (and Huambisa) serve ". . . no direct use either as food or for material goods" (Patton, Berlin, and Berlin 1982:124, see also Berlin and Berlin 1983). Of all of the edible species of mammals, only 11 contribute 1% or more toward total animal consumption and in no case does the total rise to more than 9%.

Birds play an even less important role. Some 30 to 40 bird species, mostly the larger game birds, contribute an average of 8% by weight to all animals consumed, but none of these species contributes more than 3%. By far the most dietarily significant bird is the introduced chicken.

Fish are more important in Jivaro diet than either birds or mammals or the two combined, contributing more than half of all animal biomass consumed. Nonetheless, very few scientific genera account for the majority of fish consumed. By far the largest contributors are a few genera of Loracariid armoured catfish, several large pimelodid and doradid catfish, and a handful of species of characids (see Berlin and Berlin 1983 for a detailed statement of the relative contribution of animals to diet among the Aguaruna and Huambisa).

The majority of vertebrate animals known to the Jivaro cannot be shown to have any immediate utilitarian importance, assuming that it might be possible to develop some direct measurement of utility. Such a measure, by the way, is critically absent from the utilitarian program. Utilitarianists, however, are not daunted by problems of assessing direct importance. As Bulmer once argued, in a rare neo-functionalist statement,

> If one sees individual plant and animal categories solely in their direct relationship to man, there are many which appear irrelevant, neither utilised nor noxious. However, if the relationships between different kinds of plants and animals are recognised as relevant, then a great deal of additional forms will

very usefully be identified and classified. . . [Since] animals exist in significant relationships with other animals and plants, there is a considerable impetus to classify these forms also (Bulmer 1974a:12-13).

Surely, if one is allowed to define utility in such an open-ended fashion, counter examples are ruled out on *a priori* grounds. In this neo-Malinowskian world, plants and animals are classified since, by definition, all of them are functionally related to one another in ways as to make their linguistic recognition in the ethnobiological system adaptive. The circularity of this crude ecological argument makes it, in the final analysis, untestable, a view that Hays (1982) pointed out several years ago. Such a tautological position reduces ethnobiological classification to something comparable to a classic Rube Goldberg cartoon, where a character finally gets a cup of coffee by indirectly manipulating a complex apparatus of wires, multiple levers, pulleys, and toggle switches.

The general dimensions of the intellectualist/utilitarianist debate should now be clear. It seems that one need not invoke utilitarian motivations as the bases of ethnobiological classification any more than one would argue that Western Linnaean taxonomy was erected for purely pragmatic reasons. As Simpson and others before and after him have stated, ". . . readily recognisable and definable groups of. . . organisms do really occur in nature" (1961:57). Both the western and folk systems of biological classification will record the fundamental affinities among the differences between organic beings. Both will name the most distinctive groupings of organisms in any particular habitat. Both will act as codifiers of nature's inherent plan.

NOTES

1. This paper is dedicated to the naturalist/ethnobiologist Ralph N.H. Bulmer, who perhaps more than any other single individual set the standards of field research, evidence, and analysis that have led to modern ethnobiology as a discipline. While recognising the importance of social and cultural factors in ethnobiological classification, he never faltered in this stance on the centrality of the perceptual bases of ethnobiological classification and its natural taxonomic structure. The title of my paper derives, of course, from Bulmer's classic characterisation of the significance of natural taxonomy as the foundation of folk systems of biological classification (Bulmer 1970). This important paper appeared at a critical historical juncture in ethnobiology and helped to codify the emerging reorientation of anthropology away from its traditional relativist perspective. Unfortunately, the relativist view in the forms of so-called post-modernist interpretive social theory, a fundamentally narcissistic and scientifically nihilistic position, appears to be re-emerging as a new force in anthropology, one that I am certain Bulmer would have moved to counter.

The sustained collaboration of James L. Patton (mammalogist), John P. O'Neill (ornithologist), and Camm C. Swift (ichthyologist) as partners in the Second Ethnobiological Expedition of the University of California to the Upper Marañón River is much appreciated. I am grateful for the comments and collaboration of Elois Ann Berlin for work on the nutritional aspects of Jivaro ethnobiology, and to James Shilts Boster for his conceptual and quantitative contributions to analysis.

Finally, in spite of Eugene Hunn's current position on what I believe to be an overriding and unfounded significance of utilitarian factors in ethnobiological classification, he was the first to present a formalised perceptual model to account for the observed regularities found in all systems of ethnobiological classification.

2. Research among the Aguaruna and Huambisa has been generously supported by the National Science Foundation (BSN7-17485), the Language Behavior Research Laboratory and the Museum of Vertebrate Zoology of the University of California, the Museum of Natural Science of Louisiana State University, the Missouri Botanical Garden, the Los Angeles County Museum of Natural History, the National Fish and Wildlife Laboratory of the U.S. Fish and Wildlife Service, and the Center for Latin American Studies, University of California, Berkeley.

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