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*Ethnoscience, Cognition,  
and Utility*

Edited by  
Glauco Sanga and Gherardo Ortalli

  
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## CHAPTER 2

## Arbitrariness and Necessity in Ethnobiological Classification: Notes on some Persisting Issues

Roy Ellen

### The Role of Non-cultural Factors in the Human Configuration of the Natural World

In her paper in this collection, Marta Maddalon distinguishes three different semantic domains: color, kinship, and the natural world. All are qualitatively different in terms of the "things" classified. Colors are not really "things" at all, but rather properties of things, while kinship classes refer to the properties of the relations between things. Of the three domains, only natural kinds map directly onto real things in an objective world.

In an important sense, then, the objective "thinginess" of nature sets it apart from many other semantic domains (Ellen 1996), and what separates it from other domains that classify objects (say, cultural objects) is the degree to which we can organize it according to its plausibly conjectured evolution. Thus, classifying natural objects *a* and *b* together is more likely to indicate (though not always) natural historical affinities (common origin) than, say, a classification of furniture. I agree with Maddalon that we underestimate the difficulties of categorizing the natural world precisely because it consists of concrete entities with utilitarian referents. But to speak of the thinginess of the natural world is simply to acknowledge the universal human imperative to turn the natural world into things and to think of the things so identified in terms of their essential qualities. This is not to say that such a capacity is innate in the sense of springing into action from the first moment of postpartum development; it is simply to recognize the existence of a process that takes place over time, a consequence of interaction between normal developmental processes and environmental stimuli.

Much hinges on the extent to which the classifying of the natural world is indeed "spontaneous." It is clearly spontaneous in the sense that it is conducted in the context of a large number of previous classifying acts,<sup>1</sup> is subject to much learned cultural knowledge, and is rule-bound. However, Berlin (1992) and others would go beyond this and say that the degree of spontaneity is hugely constrained, not simply by cognitive mechanisms (the character of sense perception), but by innate abilities to recognize "nature's plan." Whatever the case, we would be advised, when speaking of the origins of classifying behavior, to employ the language of ontogeny rather than that of predisposition.

I accept that folk classifications co-evolve with the plants and animals that are their subject, and in the most general sense agree with Boster (1996) that at the level of clearly-discriminated prototypes of natural kinds, humans "carve nature at the joints," that there are certain discontinuities that are so protean, so much a part of the experience of so many human populations, that they can be said to be universal. I believe this to be true for natural kinds as a phenomenal type, but also "unique beginners" such as plant or animal. One is reminded here of the position adopted by Reed (1988), that "animacy" or "animality" is not simply an end-product of classification based on multiple cognitive discriminations, but relates to a wired-in ability of the brain to distinguish an organic form that registers a particular kind of saliency which matches objective phylogenetic features. Since hominids have evolved in environments that display a particular phylogenetic and phenomenal discontinuity, it is not entirely surprising that they should demonstrate a capacity to (a) utilize a notion of natural kind that assists the management of diversity, and (b) recognize more diffuse prototypes in non-cultural ways (e.g., "animal," "plant," "perhaps" "tree," "bird," "fish"). However, such artifacts of cognition are logically different from "life-forms" in the sense developed by Berlin (e.g., Berlin, Breedlove, and Raven 1973). These latter vary cross-culturally (Atran 1998: 568 n4), but do not always partition "the living world into broadly equivalent divisions." The notion of "life-form" relates to linguistic and categorical discrimination (and to "rank").<sup>2</sup>

However, much emphasis (e.g., Boster 1996; Brown 1984) has been placed on the roots of natural-kind classification in evolutionary psychology when there is equal reason to believe that classifications that cut across morphologically "natural" classifications, such as edible nonedible and dangerous nondangerous, may be in part a consequence of non-cultural recognition abilities, in this case those which seem to be reinforced through the limbic-frontal-cortical system (Fox 1989). Thus, humans may not see "stones," but they may well perceive objects in their environment with the properties of stones which can serve a particular purpose, and be grouped accordingly (Ingold 1992). We certainly need to investigate further the extent to which "affordance-based" classification can operate independent of cultural inputs or contexts. However, my own view is that these cognitive propensities are so abstract as to tell us relatively little about how people classify in their everyday lives, at lower (and more functional) levels of discrimination. On the whole, non-cultural input operates in terms of the process of categorization, rather than underpinning particular categories, while certain regularities may be the product of general mechanisms operating across different and very varied domains, constrained by the data being organized.

### Theoretical Validity of the Taxonomic Approach

The most discussed specificity of classifications of the natural world concerns the extent to which they are necessarily rendered taxonomically, and the extent to which there is a clear relationship between cognition and the very stuff of classi-

fication. I have stated my own views on this point most recently in *The Cultural Relations of Classification* (1993). In brief, I agree that the principle of taxonomy is a powerful one available as a universal classifying strategy. There can be little doubt also that people classify living things into increasingly inclusive groups, and that this provides a useful inductive framework for making systematic inferences about the properties of organisms. But this need not imply taxonomy in the formal or domain-specific sense. Systematic contrast and class inclusion are present across a number of domains. It is particularly striking in the case of plants and animals because of their "thinginess" and because they are the outcome of an evolutionary process that is reflected in patterned physical and behavioral resemblances (as discussed above). In the domain of living kinds these tendencies converge in a particular way, not obviously because of the features of the mind that does the classifying, but because of regularities in the objective world which is classified and to which the mind responds.

It would seem that some cultural profiles encourage taxonomic thinking as a way of representing relationships between things more than others (see e.g., Lancy and Strathern 1981), and some sub-cultural contexts encourage it more than others (e.g., formal literary-based operations in classroom contexts). Moreover, because of the propensity of most anthropological researchers to rely heavily on a taxonomic approach embedded in Western science, it is easy to yield taxonomies in patterns of data collected from non-literate informants. In asserting a universal "abstract taxonomic structure," the approach seems all too often to be to delete features of peoples classifying behavior of living organisms which do not fit the expected pattern, until such a pattern is obtained.

Brent Berlin (Berlin, Breedlove and Raven 1973; Berlin 1992) has consistently argued in favor of the universality of taxonomy for ethnobiological schemes, but this only really works if we also assert the clear separation of *general-purpose* from *special-purpose* schemes, that is those that are logical and "natural," from those that arise to meet the needs of particular cultural requirements. However, the effective demonstration of the empirical primacy of taxonomy depends on the extent of linkage between categories (in often flexible ways), ways that undermine implicit taxonomic levels and contrasts and the general-purpose/special-purpose distinction. It also depends upon the ease with which ethnographers can elicit transitivity statements (of the kind *a* is a *b* and *b* is a *c*, therefore *a* is a *c*). It is, then, basically an appeal to our common (cultural) sense.

Atran (1998: 563) no longer thinks that folk taxonomy defines the inferential character of folk biology as suggested in *Cognitive Foundations of Natural History*, and his recent findings do not uphold the customary distinction between general-purpose and special purpose classifications. This is consistent with the results of my own ethnobiological ethnography (e.g., Ellen 1993: 123-24). Nuauulu, like Itzaj Maya, do not "essentialize ranks," which would violate their primary concern with "ecological and morpho-behavioral relationships" in favor of abstract properties. The development of worldwide scientific systematics has until recently explicitly required rejecting such relationships (Atran 1998: 561-2) with their crosscutting classifications. However, as Professor Minelli pointed out in our discussions, the

needs of modern taxonomy direct us much more to an "un-ranked systematics." I believe that one of the problems central to the methodology that we use to generate so much of our ethnobiological data is not knowing quite how independent the system of ranks that we discover may be from the kinds of concepts with which we start. On the whole, it is my experience that empirical ethnographic reality is rather of a single dynamic conception of the relations between categories, which allows for the generation of particular "classifications" depending on context. Thus, the variable position of palms in ethnobotanical schemes is an excellent example of the preeminence of local and cultural considerations, but also of some general fundamental ambiguity (Ellen 1998).

I agree with what I understand to be Atran's current position, that the more dense our knowledge the more we deviate from the general model, and that in a very real sense taxonomies are the result of "degenerate knowledge," that is they only become possible by simplifying experiential complexity in ways which makes knowledge less useful. The failure to integrate the classification of domesticates into general accounts of the working of classifications of the natural world, given the practical importance of such classificatory knowledge for most humans, is a major problem; it is not just a "special case." I also find the idea expressed by Maddalon that cultural selection of domesticates makes taxonomy possible by heightening the differences between categories of cultivars a neat and fertile one, and one that reinforces the interpretation of other current work (e.g., Shigeta 1996).

### Symbolic and Mundane, Social and Non-social

Humans classify the world about them by matching perceptual images, words and concepts (Ohnuki-Tierney 1981: 453). The operations work equally in terms of unmodified sense data or their cultural representations. In this sense, the cognitive and cultural tools available to do this do not distinguish between the social world and the non-social world, although this has become a conventional distinction in the analysis of classification. Similarly, classification can treat its subject in a pragmatic and mundane way or by using various symbolic allusions. Since so much of what we sense and experience is mediated by social consciousness, and since the boundary between the mundane and the symbolic is often unclear, it has sometimes been difficult, in practice, to know where to divide these two axes. It seems to me that there is more consensus on the principles of categorization than on the status of patterns of categories that are the outcome.

The distinctions between symbolic and mundane classifications and between those of the social and non-social worlds cannot always be neatly drawn: symbolic things are in an important sense practical, and practical classifications of the non-social world often rely on metaphors that are ultimately social, as in the use of the terms "genus" and "family" to organize plants and animals. Attempts to bring these aspects of classifying behavior together have met with varying degrees of success. Those who espouse extreme formulations of the universalist (formal) relativist (symbolic) divide sometimes claim that they are engaged in separate kinds of

endeavor, and that one body of work should not invalidate the other. This is, I think, the view that Mary Douglas (e.g. 1993: 161-65) has defended for the symbolists, and Brent Berlin for the formalists. However, although I notice no inclination on the part of Douglas to shift ground in the face of recent evidence and arguments, Berlin does appear to present a moderated version of his early views in *Ethnobiological Classification*.

Rather differently, some (including myself) have stressed the intrinsic empirical connections between the mundane and the symbolic. I find support for this view in Maddalon's discussion of metonymy and metaphor in the evolution of natural-kind classification. It is impossible, for example, to make sense of Austronesian terms and categories for "bird" and for "tree" without considering utilitarian and symbolic criteria. I also find support for this view in what we can discover about the historical development of particular natural-kind classifications in Europe and elsewhere (as evidenced by Trumper's and Maddalon's examples of the relationship between early Latin and dialect Italian classifications of different kinds of organisms), and their remarks on the interplay of similitudes between various spheres of the natural world, and the impact of culture contact and history on ethnobiological classification.

It is self-evident that we generate classifications, think about nature, and articulate knowledge about the environment in social contexts. Sometimes, even, we use forms of intelligence which appear to have evolved to cope with social interaction between humans to make sense of the natural world. In other words, we "anthropomorphize" nature through what Mithen (1996: 164-84) describes as "cognitive fluidity," the merging of different kinds of thought processes. As human beings, as opposed to say sticklebacks or even chimpanzees, it would seem, we can do little else.

However, when we do engage in classificatory acts as humans, we systematically repress or forget or ignore certain characteristics and associations of particular natural things, and exaggerate and foreground others. Any one species presents too complex an aggregation of traits to take into account in routine practical memory storage and information handling. This is why, for example, numerical taxonomy does not provide a good model for understanding how human minds process data—it is just too multidimensional. Sometimes this simplification results in more naturalistic classifications, sometimes it results in more symbolic ones, or a combination of the two. This is very clear when we look at graphic icons for natural species in different aesthetic and writing traditions. I think that on the whole I am rather suspicious of theories that claim that we should try to conflate or aggregate all meanings of nature and natural things all of the time in order to achieve some inductive understanding of the whole. When we do, we often generate cognitive contradictions that pose spurious interpretative problems for those scholars seeking an overarching synthesis. Maybe it is the ability to cope with these contradictions, to separate out potentially awkward representations of the same perceptual reality, that is itself some kind of universal mechanism of the mind.

The difficulties of assigning things to categories may be made easier, then, by imposing culturally agreed boundaries, or indeed by creating these inadvertently

or deliberately through genetic and other physical manipulations of the natural world, e.g., breeding varieties of plants that emphasize phenotypic difference for aesthetic reasons or planting trees individually to display their architecture in ways that are often occluded in natural settings. Because parts of our experience of the world are complexly continuous, it is occasionally necessary to impose boundaries to produce categories at all. Sometimes these can be quite arbitrary, and even in such an apparently technically precise area as engineering design, it is now apparent that the scope for cultural arbitrariness over technical necessity is considerable (e.g., Lemonnier 1992).

With analytic (that is paronymic) classifications of material things (e.g., the human body), there is a large degree of cross-cultural conformity, as one might expect. But with biodiversity, it is different; some gaps are bigger and more salient than others, in most environments, and therefore serve as more widespread (even universal) markers in classifying behavior. What is it that makes a tree a convincing life-form? Our experience, in many diverse environments, does not make it automatic that we recognize it as a clearly separate bounded kind of thing, as we can see in any photograph of a stretch of forest. Trees often merge imperceptibly into bushes (Ellen 1998). They are often polythetic in definition, single features being neither essential to group membership nor sufficient to allocate an item to a group. It may seem, therefore, that categories vary according to the complexity of their definition, rather than simply the scope of their content.

### Classifying as a Cognitive Process and Classifications as Cultural Artifacts

Early models of ethnobiological classification were heavily constrained by adherence to linguistically defined entities and a language-based interpretation of how classification worked, even if formal recognition was given to the separation of category and label. This model has been described by some (e.g., Bloch 1991) as the "linear-sentential" model of culture. With a shift away from the use of distinctive features, emphasis on core-periphery models and cognitive prototypes, and a growth in the use of psychological at the expense of linguistic approaches, greater recognition has been given to how we might classify and engage with objective differences in the natural world without necessarily using language as an intermediary.

Problems arise when the *process of classifying* (the cultural and cognitive mechanisms by which the assignation of objects, concepts and relations to categories is achieved) is conflated with *classifications* (the linguistic, mental and other cultural representations which result). This reifies schemes as permanent cultural artifacts or mentally-stored old knowledge, when they are more often properly understood as the spontaneous and often transient end product of underlying processes in an individual classifying act. We might call such a misinterpretation "the classificatory fallacy" (Ellen 1997).

To extend this distinction, and make it more productive, it is useful to employ the model of agency and structure (structuration), which we owe in its sociological form to Anthony Giddens (e.g., 1986). Thus, the relationship between classifying as a cognitive and cultural process and "a classification" as a representation is recursive and dialectical: you cannot have one without the other. The classifying process is always situated in and assumes some context of previous classifications, while itself modifying the context for the next classifying act. As this largely operates within the constraints of human culture and memory, it is clearly a matter of degree, depending on the knowledgeability of the classifier, the variability of the contexts, and the entities being classified. I believe this model to be well adapted to an understanding of the classification of natural kinds (see figure 2.1).

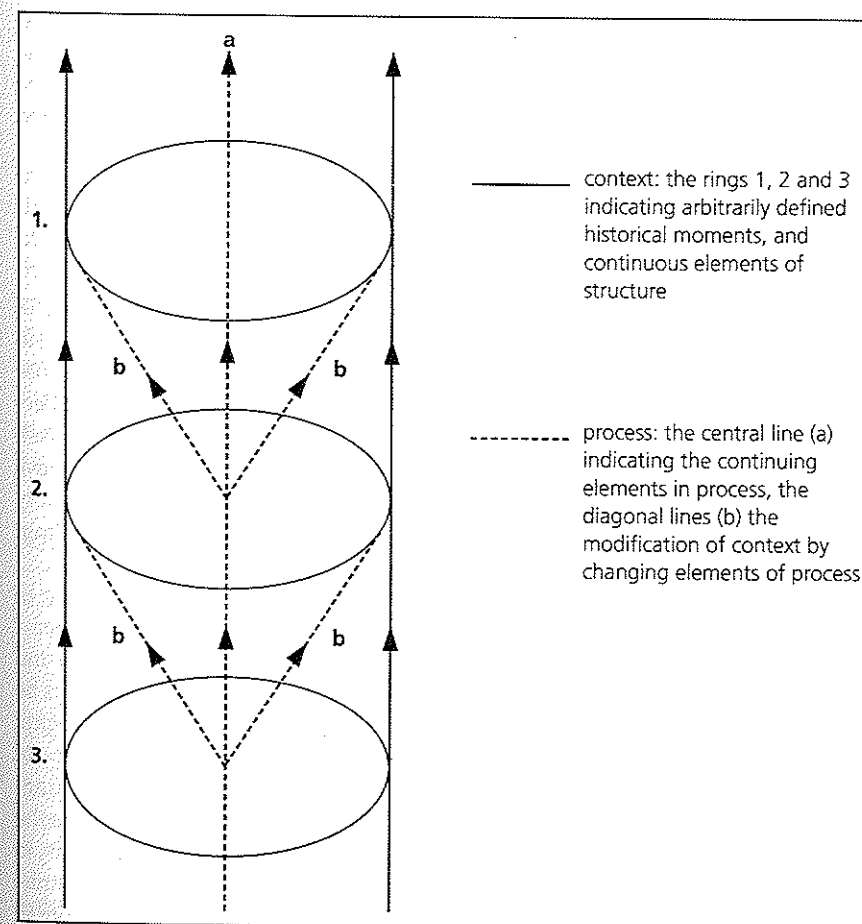


Figure 2.1 The Classificatory Relationship between Context and Process

Classifications of all kinds connect culture, psychology, and perceptual discontinuities of the concrete world. Confusion has arisen in the past from failure to distinguish clearly between individual instruments of cognitive process and the collective medium in which these operate, comprising belief, cultural representations, and social practice. It is also crucial to distinguish information storage from representation, abstract knowledge of the world, and the pragmatic schemata we use to negotiate our way through it. Our propensity to classify in the ways that we do results from the possession of certain innate cognitive skills, plus an ability to organize our perceptions through culture (aided by language) based on models drawn from somatic experience (such as right and left and bodily rhythms), and from social and perceptual experience of the material world. The form that a particular classification takes will sometimes be a culturally defined whole, but often as not will be the outcome of interaction in particular circumstances: the interplay of past knowledge, material context, and social inputs. Classifications as things, therefore, are not the inventions of individuals, but arise through the historically contingent character of cultural transmission, linguistic constraints, metaphorical extensions, and shared social experience in relation to individual cognitive practice.

### Classificatory Knowledge and Applied Knowledge

One problem that has emerged in recent years is a consequence of the growth of interest in practical "indigenous knowledge." We can now see more clearly than in early discussions of the distinction between special-purpose and general purpose classifications that the way people use knowledge of the natural world to understand the world or to modify it, in real situations and the organization of such knowledge, does not always fit the kinds of models of classification which have emerged in ethnobiological work, and that we sometimes refer to as "classificatory knowledge." The former is often about abstract representation, the latter about knowledge for use.

Ethnobiological knowledge is the consequence of practical engagement in everyday life, and is constantly reinforced by experience; its adaptiveness stemming from the multiplicity of ways it can be organized (including classified) and the redundancy that is built into this process. Such classifications must always be fluid and negotiable, produced as well as reproduced. Although ethnobiological knowledge may focus on particular individuals and may achieve a degree of coherence in rituals and other symbolic constructs, its distribution is always fragmentary: it does not exist in its totality in any one place or individual, despite the extraordinary oral encyclopedism of the likes of Alonso Ton Mendez (see Berlin, in this volume) or Saem Majnep (Marcus 1991). Such knowledge is socially distributed. Indeed, to a considerable extent it is devolved not in individuals at all, but in the practices and interactions in which people themselves engage. We must expect this to be reflected in classifications.

The things we call ethnobiological *classifications* are, therefore, an emergent product of the application or core folk biological knowledge. I have described this

as *prehension* (Ellen 1993: 229): those empirical processes determined by the interaction between knowledge, context, purpose, and innate cognitive tools which give rise to particular classificatory outcomes.

### Conclusion

Looking at classifying behavior more generally, and seeing the connection between the ethnobiological classifications of others, the classifying behavior of ordinary people in Western contexts, and the classifications that have been sanctified by the growth of science, I agree with Maddalon that the use of the concept "folk" has arguably closed-off lines of enquiry and focused heavily on particular human groups. It is important to recognize the cognitive and cultural similarities at work in the "indigenous" knowledge of others and the "tacit" knowledge of ourselves. Such knowledge operates in relation to even the most complex and advanced of modern technologies (Ellen and Harris 2000).

Ethnobiological classifications generally organize knowledge that is orally transmitted, or transmitted through imitation and demonstration. The corollary of this is that writing it down changes some of its fundamental properties. Writing, of course, also makes it more portable and permanent, reinforcing the dislocation that arises when knowledge that is rooted in a particular place and set of experiences (local or indigenous), and generated by people living in those places, is transferred to other places. And although there has been a constant interaction between folk and scientific classifications throughout history, I am gratified that Atran now acknowledges that he might have been hasty in identifying taxonomy in science and in folk science as a simple manifestation of some common pan-human hard-wiring.

### Notes

1. The phrases "classifying act" or "an act of classification" are used purely as a rhetorical device here, and I fully accept that in real life acts of classification are embedded in real situations and hardly separable from what goes on before and what comes afterwards. Indeed, the "act" may evolve, be reinforced or rescinded, over a period of time, as in, for example, drawing a person's attention to an object.
2. Thus, although the basic image prototype of "tree" may have existed for millions of years, the life-form category and term seem relatively recent (Witkowski, Brown, and Chase 1981), while its earliest labeling appears to have involved functional considerations reflected in tree/wood polysemy. Some life-forms, it appears, are more natural than others.

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## Tackling Aristotelian Ethnozoology

Oddone Longo

## Why just Aristotle?

One might wonder why a paper dealing with Aristotelian zoological classification should be considered relevant to the concerns of the present conference: after all, it seems rather extraneous to its (ethno)linguistic and anthropological focus. The response is that the Aristotelian “system,” despite all incongruities and inadequacies we discover in it today with the benefit of hindsight, remains the first organized classification of living beings in the history of Western science, or at least the only one that survived the loss of most of ancient Greek scientific works. It long provided the model for subsequent classifications, though in actual fact, from Pliny down to Gesner and beyond through the centuries, and with a few exceptions like Albertus Magnus, systematic vision tended through the centuries to be sacrificed to an episodic, merely erudite, or even marvellous pattern of description of single animals. When scholars began to reconsider, with Linnaeus and his successors, the systematic organization of animal species, it was Aristotle that they were obliged to use as their starting point, and it was the progressive superseding of the Aristotelian conception, as a whole and in detail, that provided in later times the platform for the launch of the new zoological science.

A survey of some aspects of the Aristotelian classification practice, and particularly some problems of a linguistic nature, might therefore appear justified in this occasion.

At the same time, and with a view toward recovering and reusing the legacy of knowledge and issues we have received from the ancient world, the inclusion, however anomalous, of that legacy as a subject for consideration in a conference of primarily anthropological and (ethno)linguistic matters may suggest a role for the sciences of antiquity that is different and more significant than the one commonly assigned to them. Reciprocally, an updated, critically and historically oriented recovery of Greek scientific and speculative tradition may turn out to be of some benefit to present-day logico-linguistic and anthropological sciences. This general view was already taken up twenty years ago by Scott Atran in a paper devoted to aspects of Aristotelian definition and classification of animals in a logico-epistemological perspective, a perspective however different from the one I am pursuing here (Atran 1985).