FOLK BIOLOGY: A FRONTIER OF COGNITIVE ANTHROPOLOGY

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Brent Berlin, Dennis E. Breedlove, and Peter H. Raven. *Principles of Tzeltal Plant Classification: An Introduction to the Botanical Ethnography of a Mayan-Speaking People of Highland Chiapas.* New York and London: Academic Press, 1974. xxii + 660 pp. Tables, figures, maps, illustrations, appendixes, references, and indexes. $39.50 (cloth).

Roger Keesing strikes a plaintive note in his recent critique of the "new ethnography" wondering, "whatever happened to ethnoscience?" (1972: 299). His elaborate answer is an autopsy in search of a corpse, for the ethnoscientific tradition is alive and well (cf. Quinn 1974). Berlin, Breedlove, and Raven's *Principles of Tzeltal Plant Classification* is proof. Theirs is a pioneering effort. Only Conklin's unpublished Philippine research (1954) led the way. Previous work in ethnobotany was largely motivated by the search for new uses of plants. This research tradition recorded much useful information on how men have used their botanical environment, but practically no data relevant to illuminating the cognitive processes involved in man's conceptualization of that environment. The program of anthropological research that came to be known as ethnoscience indicated that an understanding of "culture" as cognitive process required new data: exhaustive accounts of whole systems of native concepts. *Principles of Tzeltal Plant Classification* is such an account of a far from trivial domain.

The book is the product of more than a decade of collaboration between four men: Brent Berlin, linguistic anthropologist; Dennis Breedlove, field botanist; Peter Raven, botanical theorist and herbarium specialist; and Alonso Mendez Ton, Tzeltal ethnobotanist, politician, and man of the world. Early results have been reported in nearly a dozen articles by the authors, while other anthropologists have been directly stimulated by their work (e.g., Kay 1971, Gal 1973, Stross 1973, Hunn 1973a, 1975, Hays 1974, Hage and Miller n.d.). There is ample data here for botanists, ethnobotanists, linguists, cultural ecologists, and cognitive theorists, and methodological innovations for investigating folk classification. The study is a model of care in the recording and reporting of data. Not least, the theoretical issues raised should occupy our attention for years to come.

The book is organized in two parts: the first of five chapters, the second an encyclopedic inventory of all Tzeltal plant taxa adequately documented for the Tenejapan dialect. The several appendixes and indexes facilitate access to the data for special purposes and limited comparisons. The setting (Chapter 1) is rather sketchily described, focusing on technical accounts of linguistic distributions and botanical geography. A summary account of the conceptual framework of the research (Chapter 2) and a description of the methods employed (Chapter 3) follow. The authors' debt to the ethnoscience tradition is obvious here. Question frames used to elicit initial term sets are detailed. Linguistic criteria for distinguishing *names* from descriptive phrases are made explicit, as are psychological techniques employed to expose covert organization in the data.

Critics of ethnoscientific research deride the "white room" style of data collection attributed to ethnoscience, and stress the weakness of relying too heavily on a small number of key informants. Such criticisms do not

apply to the *Principles of Tzeltal Plant Classifications*. The data sought by the authors is behavioral as well as verbal.

> While the initial inventories of plant names obtained from informants served as a guide to native classification, such lists are, of course, of minimal value in and of themselves. Actual identification and classification of plants in natural contexts provides the basic data on the referents of elicited plant names (52).

Thus more than 15,000 fresh plant specimens were named, normally by several informants.

The problem of intra-cultural variability is seriously treated:

> It became clear very early in our research that it was impossible to speak literally of the "Tenejapa Tzeltal classification of plants." In actuality, there are many such classifications, some idiosyncratic, others best described as microdialectal or ecological variants. . . we also have made efforts to present in detail those aspects of plant knowledge that differ among informants and to provide, where we can, explanations as to why such differences exist (58-59).

The extent of inter-informant variation is clearly documented, and the authors' treatment of this variability is innovative. In particular, their distinction between basic and extended ranges of the denotata of names eliminates a large measure of apparent disagreement among informants. The variability problem is conceptualized in terms of Werner's notion of the "omniscient informant" (Werner 1969), the authors' opting for a compromise between defining "the culture" as the union or as the intersection of individual informants' repertoires.

The authors' most outstanding contributions are their elaboration of Conklin's typology of folk biological segregate labels (1962), their definition of taxonomic ranks (called "universal ethnobiological categories" in the present work) and their hypotheses concerning the relations that hold between taxa of various ranks (detailed earlier in Berlin, Breedlove, and Raven 1973). They argue that the taxonomic ranks are five in number and postulate an evolutionary partial order to the labeling of taxa of the various ranks in folk systems of biological classification. The key to their conceptual framework are the *generic taxa*, "the basic building blocks of all folk taxonomies. They represent the most commonly referred to groupings of organisms in the natural environment, are the most salient psychologically, and are likely to be among the first taxa learned by the child" (27). *Life form* taxa and the *unique beginner* are more inclusive than generic taxa, while *specific* and *varietal* taxa subdivide generics. The cross-cultural utility of this typology appears promising from preliminary comparisons (Berlin, Breedlove, and Raven 1973: 227-40).

Nevertheless a serious problem has not been resolved. That is, taxa are *concepts*; thus taxonomic ranks are *psychological* categories. Yet the rank of a taxon, in practice, is determined in large part by the type of name

applied to it, a *linguistic* cue. Furthermore, since taxonomic ranks partition the set of taxa, and since relations of immediate inclusion between taxa of various ranks are restricted by definition, the decision that assigns a particular taxon to a given rank interacts with decisions about the rank assigned to related taxa. Since abbreviation of names and the existence of synonyms of varying lexemic type can effect such decisions, a not insignificant indeterminacy remains with respect to the analyst's structural description. The authors do not discuss this difficulty.

Despite these problems, evidence that taxonomic ranks play an essential role in the analysis of folk systems of biological classification continues to accumulate. Berlin, Breedlove, and Raven's analysis is boldly comparative and diachronic, stating testable hypotheses about cultural universals and the evolution of lexicon. Their work combines concern for an explicit and replicable method and for an accurate rendering of the world of meaning particular to each culture characteristic of the "new ethnography" with the broad comparative and evolutionary interests which vitalized the "old ethnology." As in Berlin and Kay's stimulating prior work on color classification (1969), the rich comparative rewards depend on sophisticated articulation of both emic and etic (i.e., the Munsell color scheme and, here, the Linnaean classification) systems of classification of the portion of experience under investigation.

The following chapter on ethnolinguistic considerations is unique. It is now a commonplace that folk have accurate and detailed knowledge of plants and animals. Conklin, for example, credits the Hanunóo with 1625 named terminal plant taxa (1954: 116). This remains the "world's record." The Tenejapa Tzeltal are credited with 638. Yet the extent of lexical elaboration relating to the description of plant growth stages, plant part terminology (ethnophytography), and the descriptive terminology of color, size, texture, shape, taste, etc., has not been so well documented. Chapter 4 provides an exhaustive inventory of such terms, with excellent illustrations. It is clear that a technical flora could be far more readily translated into Tzeltal than into lay English. This adds a dimension to our appreciation of the wealth of detail in the cognitive worlds of prescientific man.

"The Cultural Significance of Plants" (Chapter 5) contains an odd assortment of information: an intricate blueprint for building a Tzeltal house down to the detail of knots in the thatching and descriptions of tools, household furnishings, and utensils made from plant materials. Hot and cold country agricultural cycles are outlined following the traditional Mayan calendar, cultivated plants are listed, and the role of the major cultigens described complete with their current local market prices. This compilation is of traditional ethnobotanical interest and consequently exhibits the particularistic quality of most such studies.

The initial section of this chapter extends work reported earlier, demonstrating the correlation of the degree of cultural utility of a type of plant

with the complexity of the name applied to it and the degree of polytypic differentiation of its taxon (Berlin, Breedlove, and Raven 1966). Finally the authors discuss the correspondence of Tzeltal and scientific botanical classification, taking this opportunity to modify an earlier position. At the beginning of their work they suggested that folk and scientific botanical classifications were fundamentally different (ibid.). They now cite a "striking tendency for Tzeltal generic taxa to map in one-to-one fashion onto biological species" (101). This revised judgment followed the recognition of the special status of *generic* taxa, demonstrating the value of the innovative conceptual framework discussed above. The progress of theoretical ideas from the start to the finish of their research stands out clearly.

The Flora occupies 360 of the book's 660 pages. It is a museum full of dusty corners, a place to spend a rainy Sunday searching for patterns not guessed at by the curators, a place for browsing. As with most ethnobotanical texts, readers without at least an amateur's interest in and knowledge of plants will find it impenetrable. Yet even a slight familiarity with the characteristics of the plant families and some acquaintance with botanical Latin is amply rewarded. The nearly two hundred clear black-and-white photographs of museum voucher specimens are invaluable, not only serving as a "field guide" for botanical ethnography in the Meso-American region, but also demonstrating the perceptual unity of the numerous covert mid-level "complexes" cited for Tzeltal. These photographs should dispel scepticism as to the reality of such unnamed groupings (cf. Brown 1974, Berlin 1974).

These covert complexes are an important innovation. Seventy-four complexes are recognized, which together include more than half of the 471 generic plant taxa. They play a key role in the organization of the Flora, which is intended to relect the Tzeltal view of relationships among taxa as closely as possible. Generic taxa are first grouped into the four named life form taxa—"tree," "herb," "vine," and "grass"—then a set of unaffiliated generics is treated, and finally a small residuum of taxa whose placement is in dispute. Within each of these groups covert complexes are isolated and their internal structure characterized by dendritic diagrams. Previously we are told that covert structure is established by reference to various data: informal commentary during the course of plant specimen identification, sorting of plant names into groups in terms of "overall similarity" judgments, triads test sorts, folk keys, and paired comparisons (Berlin, Breedlove and Raven 1968: 59-61). Yet in the one instance a sample of this data and the structural description are exhibited side-by-side (172), there is no necessary relationship between them. This must raise some doubt as to the adequacy of the data that presumably exists to justify their numerous detailed summaries of the covert aspect of the structure of the Tzeltal plant domain.

Traditionally, ethnobotanical data are organized in the scientific Linnaean sequence or with respect to the researcher's use categories.

The authors' choice of an emic order may appear to sacrifice ease of use in favor of methodological purity. However, the indexes allow access to selected aspects of the data, while the advantages of the emic order are significant. Not only does that order exhibit the pattern of native classification, but it also facilitates discussion of Tzeltal principles of classification by placing near one another those taxa for which direct contrasts can be specified by the Tzeltal.

Under each generic listing one finds a concise linguistic characterization of the names applied, a capsule description of the known basic and extended ranges, a botanical description and account of the plants' distribution, a discussion of related taxa, and a summary of uses. In each case the variation in the naming of specimens by informants is clearly presented in tabular form.

To demonstrate how the Flora may be used, let us pursue a sample question. For example, we may wish to know the role of the widespread psychoactive genus *Datura* among the Tenejapa Tzeltal. The "General Index" is devoted to broader topics, but the "Index to Non-Tzeltal Plant Names" has a listing for the Latin (as well as for the Engish "jimson weed" and for several common Spanish terms) citing two species, one a "tree," the other unaffiliated. Turning to the text we note that neither species is native and that the only uses cited are medicinal. Other page references lead to various indexes. We note further that the tree species (*D. candida*) is the basic range of a taxon that includes in its extended range, several plants of diverse genera. Perhaps we would like to know if these plants are related to *Datura* from the scientific point of view. Unfortunately, plant families are not regularly cited in the text. Returning to the non-Tzeltal index and referring to the last page number cited for each of the various genera of the extended range, we are referred to Appendix 4, the "Systematic List of Plants," where genera are grouped by family. The *Datura* and each of the five genera of the extended range are from distinct families. Thus it is clear, in this case, that the similarity reflected terminologically is botanically superficial. Other appendixes provide summary Tzeltal-Latin and Latin-Tzeltal "translations;" another is organized by degree of cultural utility. The Flora might have been more succinctly cross-indexed. Nevertheless it has sufficient "redundancy" to be useful for tasks not foreseen by the authors.

Principles of Tzeltal Plant Classification should lay to rest the notion that ethnoscience, by its nature, is incapable of making a serious and lasting contribution to the science of man. Berlin and his collaborators have assembled a mountain of data, exceptionally well documented. They have organized that data in a fashion that is faithful to the original conception of the folk whose knowledge it is. At the same time their organization suggests bold comparative hypotheses, sufficiently well formulated to be subject to test.

Yet I believe their conceptual framework is not adequately grounded.

The idea that folk biological classification is *taxonomic*, in the special quasi-Linnaean sense given formal definition by Kay (1971) and accepted by Berlin et al., has recently been questioned (Hunn 1973b, Kay 1973, and Randall 1973). Is the authors' work, then, already out of date? Perhaps, but it is their own work that is forcing the theoretical issue. Berlin et al. stress the fact that folk taxonomic ranks are not definable in terms of structural position (i.e., taxonomic level) alone, but that taxa are of various psychological types. Following Bulmer (1970) they have stressed the qualitative contrast between generic taxa—each of which is characterized by *manifold* distinctive traits—and specific taxa—which are typically distinguished from their congeners by reference to a limited set of readily specified attributes. Yet these researchers have not yet recognized that life form taxa more closely resemble specific taxa in that regard than they do generics. Given this, it follows that the relations of taxonomic set inclusion presumed to hold between life forms and generics will not hold, as a rule. Since the unique beginner and the complexes are typically covert, we are left with only taxonomic shrubbery in place of taxonomic trees (I believe I owe this image to R. Randall). Theoretical advances may next develop from a close consideration of the nature of the horizontal relations of overall similarity perceived to hold among related taxa, a concern implicit in Berlin, Breedlove, and Raven's distinction between basic and extended ranges of taxa.

Despite these intriguing theoretical developments in folk biology, we must ask what wider relevance they hold for anthropology. There is a curious gap between those anthropological investigations of folk classification inspired by Lévi-Strauss (e.g., Douglas 1966, Turner 1967) and those within the tradition of ethnoscience. It would appear from Berlin, Breedlove, and Raven's Tzeltal data that Tenejapanecos are a people singularly uninterested in the metaphorical manipulations so widely reported elsewhere. One wonders what a student of Lévi-Strauss might have found in the "Tzeltal mind" (cf. Blaffer 1972). It is not that one's theoretical orientation molds the data. Rather the symbolic analyst and the folk biologist are examining two distinct aspects of folk classification (Hunn 1973a: 126-133). Some might judge the symbolic manipulation of categories to be the more fascinating topic (Black 1967: 123). Yet a precise understanding of the denotative meaning of the categories used in myth and metaphor would seem to be prerequisite to the full appreciation of their symbolic value.

The authors have passed up a fine opportunity to initiate a dialogue with anthropological ecologists by posing—if not answering—ecological issues raised by their work. For example, the various plant communities in Tenejapa are described in some detail, but their distribution is not related to factors of land ownership or varying subsistence strategies within the community. Likewise, the fascinating regional contrasts within the Central Highlands of Chiapas are ignored. Why is much of the

neighboring Chamula land eroded, that of Tenejapa not? What changes in plant communities might be expected to follow the construction of new roads, the promotion of coffee cash cropping in Tenejapa, the inevitable population increase? The obvious mutual relevance of folk biology and cultural ecology suggests the possibility of a productive partnership which would transcend the false materialist-idealist dichotomy (cf. Harris 1968).

That the *Principles of Tzeltal Plant Classification* is not yet the final word in no way lessens the weight of its contribution. The solid body of comparative data needed to test and refine the authors' hypotheses will follow from their example. Productive dialogue with other anthropological perspectives may now proceed from a well-constructed foundation. The authors have produced more than a monograph, they have created exciting possibilities.

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