Foreword

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Ethnobiology has changed in many ways since Edward Castetter first coined the term. From its inception it applied to the combined uses of plants and animals by a particular culture but few studies accomplished this goal, then or now. Because of specialized training, most scientists have been more comfortable working in one or the other of the principal life domains—plants (ethnobotany) or animals (ethnozoology). In the past two decades anthropological interests in world view and ecology provided models for the integration of nature. Cognitive principles have demonstrated the importance of biological classification to understand the thought processes of other people and their belief systems. Ecological concerns have been applied to "real world" problems and the many ways indigenous knowledge can contribute to their solution. Ethnobiology as practised today envelops all these approaches into an intellectually exciting and very practical field.

Ethnobiology has evolved into a very delicate fabric after a rough beginning. Clément, in his detailed introductory historical essay weaves ethnobiology's history from a series of disparate papers that were seeking to define a core subject by creating appropriate scientific terminology to one with recognized subjects but with disparate objectives. He methodically reveals the fits and starts that have characterized all subfields that are now recognized as part of ethnobiology. His critical research presents important practitioners who are too often ignored, such as Jacques Rousseau, a once-formidable and highly respected ethnobotanist who, hopefully, will be read by a new generation. He demonstrates that when the various ethno-sciences were fused by Castetter into ethnobiology, our textile was only a double-stranded thread of ethnobotany and ethnozoology, which support each other for methodology and interpretative schemes.

By deftly probing the archives, Clément has discovered two unpublished manuscripts by Alfred Whiting that discern the misgivings that a pioneer ethnobotanist (ethnobiologist) had about the perception of the field and the

anthropological significance of its results. Whiting models his remarks on the activities of his senior mentors. Although he does not identify him, one is Volney Jones, who is "climbing over the adobe walls of a long abandoned mission (Awatovi at Hopi)." In this previously ignored study, Whiting argues that ethnobotany must be part of anthropology to have standing within that discipline and it must engage in comparative studies. Clément has found in that article an early use of "ethno-biology" as a means to broaden the "cultural context" that makes essential field biological data.

In the second article, "Language, Culture and Ethnobotany," published here for the first time, Whiting introduces a contemporary theme, found basic in the other articles in this volume, the cultural analysis of native plant names, his "folk species," from a historical perspective and the comparative study of plant names across tribal and ecological boundaries (Hopi vs. Gosiute). After reading this article it is certain that Whiting's contributions to ethnobiology have been minimized. Clément has added a valuable strand to our growing textile.

Critics have dismissed the anthropological validity of theoretical studies completed with First Nation, Native American and Mesoamerican Indians because they claim these groups have been influenced for too long by Europeans. Such claims miss the creativity of these native people in the face of change and acculturation. Their accommodation and adaptation linguistically and culturally to other cultures did not begin with Europeans and to ignore these studies misses important lessons about cultural survival.

Hunn's ongoing study of Mixtepec Zapotec ethnobiology informs us that their classificatory and nomenclature systems for plants and animals are undiminished by Spanish and Mexican contacts. The internal logic of ethnobiological classification remains consistent, and he tests this cognitive conclusion along three lines. First, he examines the nomenclature for "oaks" and how it reveals details of their knowledge about the natural environment. Second, he compares the details of plant and animal classification by a new method of scientific species recognition ratios (SSRR). This technique depends upon a thorough appreciation of Western biological species by the investigator and his linguistic comprehension of the group under investigation. For the Mixtepec Zapotec he discovers that recognition of species is greater for plants than for mammals and birds. This is an important methodology for investigating ethnobiological knowledge differences among genders, age groups and specialists. Third, he considers the recognition of life forms and how they contrast in their biological schema. This work reveals the complexity of an ethnobiological study and by example why there are so few.

The Gouro of the Ivory Coast of West Africa is becoming a well-known culture for its ethnobiological knowledge because of the seminal contributions of Claudie Haxaire. Here we learn that ethnobiology is not just the nomenclature system but the meaning that named entities have to the culture. The plants live as do people and their lives are intertwined in thought, action and mutual aid. If the metaphorical value of plants and animals is lost, misunderstood or ignored, then no ethnobiology is possible.

This brilliant essay configures the essence of contemporary ethnobiology. The ethnography of the Gouro is succinctly presented because their social organization cannot be understood without knowledge of ethnobiology. Haxaire shows how human anatomy and physiology are related to trees and animals. From their mythological beginning people and life forms have been linked in a brotherhood that provided food (the oil palm) and bases of human world view. Health and cures can only be comprehended with knowledge of their ethnobiology. Furthermore, plant ecological concepts define physical domains (*la brousse*) that are culturally meaningful because of ethnobiological understanding.

Whiting's language article discusses the historical evolution of name changes. In so doing, he reminds us that ethnobiology is not static; names changed in the past and new uses of plants and even the plants themselves entered into cultures. However, the mechanisms for these exchanges remain unexplored in detail.

In northwestern America exchange of botanical materials has reflected plant-knowledge dissemination as well. Turner and Loewen provide a detailed account of cultural interaction in this region rather than centering on a particular group. They acknowledge that patterns of plant exchange, including foodstuffs, probably began in prehistoric times and have continued to the present. Interregional exchanges had critical economic advantages by providing material that was scarce or of inferior quality, and by correcting scheduling conflicts when plants might not be locally available. The trade items were often raw materials; finished items like bags, dugout canoes; or medicines. These multiple trade networks extended the ecological out reach for all the cultures involved.

Exchange impacted language acquisition, as Whiting suspected, and plant ecology. The potential for trade led to changes in plant distribution and abundance through conservation practices of timing harvests and transplant-

ing useful plants. The lesson for ethnobiology is that exchange was an important mechanism for human survival, ecological sustainability and cultural integrity. For the Northwest region the authors' table of societies and items exchanged demonstrates both the extent of the interactions and their importance for all cultures—materially, linguistically and ecologically.

While Haxaire examines the metaphorical aspects of physiology and anatomy in the ethnobiology of the Gouro, a further challenge to ethnobiological studies has been to understand how Native cultures explain reproduction and the resulting offspring of plants and animals. The perspective as shown by Haxaire is not the same as Western science. The gestation time of animals allows ample time for various events to occur in the life of the pregnant woman and her mate to produce unexpected forms of the neonate. Plants—annual or perennial—are also subjected to unpredictable transformations during the growth of the embryo. The results may be accepted or rejected by the agriculturalist. The question often is why the selected decision?

Meilleur examines clonal reproduction in five traditional crops—taro, sweet potatoes, bananas, sugarcane and kava—grown in Hawaii and elsewhere in Polynesia. He explores conventional wisdom about the selection of cultivar forms from these clonal plants and finds that explanations about genetic consequences or rational choices do not apply. He examines folk nomenclature to learn about the categories that are recognized cognitively for each. This is important to distinguish randomness from non-randomness in the selection process. His conclusion is very important for ethnobiology: cosmology and esthetics are important in native agronomic activities.

Whiting appreciated the cultural basis of ethnobiology and asked his colleagues to acknowledge it as the basis for their research. Now his message is salient as Meilleur demonstrates. In Polynesia beauty is a valued cultural principle. Crops are inseparable from cultural precepts. Agricultural selection also favours colourful crops. Colours are associated with cosmology and social relationships. Crops can mediate these principles and represent the linkages between different conceptual worlds. Agricultural practices are multidimensional ranging from microenvironmental varieties, to household staples, to specialized crops, but all must be perceived as dependent upon cultural principles of selection.

Since the 1930s ethnobiology has evolved from a double cord to a beautiful tapestry. The pioneers, delineated here by Clément in text and bibliography, never anticipated how diverse the field would become as the articles in this volume reveal. We can acknowledge precocious anticipation of new research directions as Whiting did, but they required time to be realized and time for new methodologies to develop. The many strands of ethnobiology are in place and undoubtedly will have more added as the field seeks new venues to explore. Already the ecological significance of ethnobiology is appreciated. But this is a nascent metamorphosis of future applications. Ethnobiology is a precursor of conservation biology. Despite Whiting's remarks about archaeo-botany, the mature field of paleoethnobiology has much to contribute to restoration biology and the ecosystemic dynamics of resource management.

The articles in this volume are definitive for illustrating the status of ethnobiology today, its association with anthropology, its dependence upon biological concepts and its promise of important contributions to understanding the mutual interdependence of all life.