## **Book Review**

# Plants and Ancient Man, Studies in Palaeoethnobotany. Edited by W. Van Zeist and W.A. Casparie. 344 pp., illus. A.A.Balkema Publishers, Boston, 1984.

The International Work Group for Palaeoethnobotany first convened in Prague, Czechoslovakia in 1968 and it has held meetings every three years hence. Plants and Ancient Man contains the proceedings of the sixth symposium sponsored by the State University of Groningen in The Netherlands in 1983. The thirty papers presented in this volume cover methodological problems, the use of documentary evidence, ethnographic models, and various European regional studies. A special section is devoted to the identification of archaeological wheats.

The papers by Hillman and Jones discuss the potenials and problems of applying ethnographic models for cereal processing derived from Turkey and Greece, for interpreting prehistoric plant remains. Hillman's contribution also contains a test of his model on a palaeoethnobotanical assemblage from Cefn Graeanog in Wales. Willerding (Central Europe), Behre (Germany), and Green (England) explore the botanical content of medieval maps, tax lists, paintings, court documents, herbals, brewery recipes, cook books, monastic texts, and market records. Green and Behre also compare the documentary evidence with the archaeological record. Forni analyzes the linguistic roots of Indoeuropean agricultural terms to derive a unitary hypothesis for plant and animals domestication that emphasizes the use of fire by prehistoric peoples for environmental manipulation. Kislev (ancient Near East), Jacomet and Schlichtherle (Swiss Lake Dwellings), Janushevich (USSR), and Kosina (modern and prehistoric cultivars) tackle the difficult taxonomic problems of classifying cultivated wheats. The study by Van Der Veen (Iron Age England) compares the results of random and judgement sampling in flotation analyses. The two approaches produce essentially identical patterns but the absolute density of remains recovered from non-random samples is greater. Using experimental carbonization, Wilson tests the differential destruction and distortion of moist and dry samples of 12 common types of European weed seeds. Greig compares the herbaceous "floras" of modern and Iron Age British hay meadows. Van Vilsteren (Medieval Netherlands) examines the interpretation of charred seeds from postholes. Bottema explores the use of animal dung for fuel as a potential source of charred seeds in archaeological sites. Regional studies are presented by Korber-Grohne (Central European fruit trees), Kroll (Bronze and Iron Age Macedonia), Kucan (Iron Age Yugoslavia), Wasylikowa (Neolithic through Medieval Poland), Pashkevich (Scythian and Greek Crimea, USSR), Lisitsina (Neolithic Caucasus, USSR), Lundstrom-Baudais (Neolithic France), Kuster (Neolithic Germany), Pals (Neolithic Netherlands), Straker (Roman London), Knorzer (Roman through 18th century latrines in Germany), and Paap (Medieval Netherlands).

The papers by Hillman, Jones, and Kosina present pioneering applications of multivariate statistical techniques to palaeoethnobotanical data. Few mathematicians would argue with the use of cluster, discriminant function, or canonical correlation analysis on continuous metric data from wheat caryopses. Some statistical purists, on the other hand may balk at the use of ratio or percentage data in the attempts to classify crop processing residues. I feel that these multivariate techniques can be useful tools for pattern recognition and date reduction if used cautiously.

Plants and Ancient Man has a somewhat limited geographical focus. Only the papers by Harris (North America and Australia), Clarke et al. (Australia), and Shay (Manitoba) touch on regions outside of Europe or western Asia. Nevertheless the volume presents data, methods, and ideas useful for any practitioner of palaeoethnobotany. I only hope that the next Symposium scheduled for the summer of 1986 will attract participants from North and South America, Africa, Oceania, India, Southeast Asia, and China so that it will be more truly international in scope.

## **Book Review**

The Analysis of Prehistoric Diets. Edited by Robert I. Gilbert, Jr. and James H. Mielke. 456 pp., illus. Academic Press, Orlando. 1985. \$65.00.

The Analysis of Prehistoric Diets is another volume in the Studies of Archaeology series published by Academic Press. It is designed to summarize the various techniques which the archaeologist can use to reconstruct prehistoric food collection, processing, consumption and the health factors which may be linked with dietary conditions. It provides a useful review of the current "state of the art" in this field. The extensive bibliographies included at the end of each chapter make an excellent starting point for those interested in further research.

There is a basic division of the volume between the artifactual data and the human skeletal data. The preservation of faunal and floral remains is handled by Victor Carbone and Bennie C. Keel and includes a discussion on the various factors which lead to differential decay rates. Animal bone and botanical remains are also treated separately by Paul W. Parmalee and C. Earle Smith, Jr. respectively. Care is given to include detailed information on recovery, processing, analysis and interpretation of these remains. Gary F. Fry's section covers coprolite analysis and how this relates to dietary interpretation. Also included is an extensive review of parasite analysis and the biases which must be considered in interpreting this data.

The section on human skeletal material begins with a discussion by William Stini of growth and development and the physiological factors which strongly influence the adult human form. Although this may not be directly applicable to the archaeological record, an understanding of the complexity and adaptability of the human skeleton in its response to the environment is an asset. Separate chapters follow on skeletal pathologies (Harris lines and porotic hyperostosis) by Debra L. Martin et al., on developmental abnormalities in dentition (enamel hypoplasias and Wilson bands) by Jerome C. Rose et al., and on the incidence of dental caries by Mary Lucas Powell. A review of trace elements in human skeletal material by Robert I. Gilbert does more to convey the complexity of the issue than provide a simplified summary. This is frustrating but probably a more accurate view than normally presented in a volume of this nature. The osteological section ends with a fairly complete review by Jane Buikstra and James Mielke of the use of a skeletal series in the reconstruction of a demographic profile and how this can reflect the overall health of a population. Basic techniques such as sex and age determination are covered as well as the statistical analyses of mortality patterning.

Models appropriate for use in dietary reconstruction are included in various chapters throughout the volume. Bonnie W. Styles presents a chapter on the use of food resource availability for predicting diets within catchment areas and for intersite comparisons. Linear programming models are discussed in a chapter by Arthur S. Keene. While these cannot be applied directly to the archaeological setting, they can provide the archaeologist with important guidelines for understanding nutritional problems in terms of the costs and benefits to prehistoric populations. This volume concludes with a discussion of ethnographic inference and analogy by Mark P. Leone and Ann M. Palkovich.

The Analysis of Prehistoric Diets, while providing a comprehensive survey of current methodology in data collection and interpretation, does not break new ground. Despite its recent publication date some areas are already in need of amendment. Furthermore its \$65.00 price tag places it beyond the reach of most students, for whom it would be most useful, and restricts its acquisition largely to libraries.

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# **Book Review**

Sustaining Tomorrow—A Strategy for World Conservation and Development. Francis R. Thibodeau and Hermann H. Field (Ed.). University Press of New England (Published for Tufts University), Hanover, N.H. & London (1984). Pp. xii + 196. \$22.50 (cloth), \$12.50 (paper).

There is today a plethora of publications on conservation and allied topics. Few there are that merit serious consideration, and many are doing *bona fide* conservation efforts a disservice. Here is a book, written by 19 specialists, that will, if widely distributed and read, most certainly enhance the numerous serious efforts underway towards conservation of nature's bounty.

The foreword by Harold Coolidge, one of the stars of serious conservation activities, and Honourary President, IUCN, is a masterpiece. The introduction, Section 1, comprises two chapters: "The World Conservation Strategy" by L.M. Talbot and An Introduction to World Conservation" by R. Dasmann.

These follow 12 intensely pertinent contributions: Section II, Conservation Objectives: 1) Ecological Processes and Life Support Systems (G.A. Betrand). 2) Preservation of Genetic Diversity (F. Wayne King); 3) Sustainable Use of Species and Ecosystems (G. Budowski). Priorities for National Action: III, 1) National and Regional Conservation Strategies (K.R. Moller); 2) Environmental and Planning and Rational Use (P. Jacobs); 3) Environmental Planning and Rational Use; 4) Building Support for Environmental (W.) Education; 5) Conservation-based Rural Development (D. Western). IV. Priorities for International Action: 1) Environmental Policy and Law (W. Burhenne, Alexandre Kiss and Malcolm Forster, 2) Management of the Global Commons (A. Hollick), 3) Tropical Forests and Genetic Resource areas (T. Lovejoy and A.R. Brash), 4) Regional Strategies for Managing the Oceans (S. Holt), and Food, Nutrition and Population (J. Mayer). There is a fifth illuminating contribution by J.C. Faby entitled Toward Sustainable Development. Sections on abbreviations and contributors as well as a bibliography of 170 items and a full index are appended.

Since conservation must be considered an integral part of economic botany, it is imperative that this new and searching contribution be brought to the attention of students and investigators in this interdisciplinary field of the plant sciences.

> Richard Evans Schultes Botanical Museum Harvard University Cambridge, Massachusetts

Tree Root Systems and their Mycorrhizas. D. Atkinson, K.K.S. Bhat, M.P. Coutts, P.A. Mason and D.J. Read (Eds.). Martinus Nijhoff/Dr. W. Junk, Publishers, The Hague (Kleuver Academic Publishers Group, Dordrecht) Holland (1983). Pp. ix + 525, fig. \$Dfl. 165 (approximately \$66.00).

Consisting of many contributions presented at a meeting of the International Union of Forestry Research Organizations in 1982, a meeting dedicated to tree root systems and their mycorrhizae, this volume will be of immediate interest to a large number of specialists concerned with the broad field of economic botany.

The papers are divided into two wide areas: 1) the development of the root systems of fruit and forest trees, their distribution through the soil and underground productivity; 2) the physiology, structure and epidemiology of infection of roots with mycorrhizae and studies of artificial innoculation. The book helps to fill in a gap between what is known

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from field and laboratory experiments and the practical information required by those constructing models simulating infection and functioning. There is a total of 59 papers by a large number of specialists from numerous countries. Each paper is provided with its own often extensive bibliography and an abstract. A detailed index makes the mass of material presented easily available to the reader or consultant.

One of the remarkable aspects in the publication of this volume is the rapidity in which it appeared—in less than a year following the meeting!

When the high quality of publications and the vast amount of material unavailable elsewhere except in institutions with extensive library facilities are considered, the price is very reasonable in today's market.

> Richard Evans Schultes Botanical Museum Harvard University Cambridge, Massachusetts

Blackmore, Vivian (compiler) (1984) Why corn is golden: stories about plants. Boston & Toronto: Little, Brown & Co. Cloth, 48 pp., \$12.95.

(1981) El maiz tiene color de oro: leyendas vegetales. Mexico, D. F.: Editorial Novaro. (Distributed in U.S. by French & Spanish Book Corp., New York & Los Angeles). Cloth, 48 pp., \$18.50.

If ethnobotany is defined to include folktales about plants then certainly this pair of books, one in English and one in Spanish, is a welcome albiet brief addition to the literature. Written in the form of children's books, they include six traditional Mexican folktales about such subjects as how sunflowers came to exist, why corn is golden, and how a certain people foiled a group of invaders by causing chocolate they had eaten to turn into stones. The books also contain six riddles concerning plants. The English translation is rather good, being relatively faithful to the spirit of the original (except for the riddles). The book is also furnished with large, beautiful watercolor illustrations.

From the perspective of a professional ethnobotanist, it is frustrating that the plants mentioned are not identified, especially in the first story, about how a certain plant obtained the name *Guie'tiiki*, and that the editors are not more explicit concerning the sources of the stories. However, the primary stated purpose of the books is not to communicate information to professionals but rather to amuse children and to educate them about other cultures. To this end they appear rather successful. It would have been wise to include a brief background chapter explaining a little about the cultures from which these stories arose, in particular concerning the religions of the pre-Spanish peoples, which receive prominent attention in several of the stories. Without this, I feel that much of the beauty and deeper meaning of the stories will be lost on the average American child. I also think the choice of material is a little too broad—some from Aztec times, others from contemporary Mexican experience—lending a certain unfocused character to the collection which may confuse some young readers.

Nevertheless, they are delightful books, which would make colorful additions to any children's library.

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### **Book Review**

# The Origins of Agriculture: an evolutionary perspective. David Rindos. Orlando: Academic Press, 1984. \$32.50.

Every once in a while a book appears which seems destined to spark controversy, stimulate imagination, and open the door to entirely new methods of analyzing vexing problems. Rindos' The Origins of Agriculture takes a bold stab at being such a book, and in many ways succeeds, although in other ways it falls short of being the definitive work on the subject.

In the introductory chapters, he critically reviews the literature concerning cultural evolution and the origin of agriculture, pointing out the Lamarckian and orthogenetic nature of many of the ideas in the literature. Next, he considers the "naturalness" of the human/plant relationship, comparing it to other mutualistic plant/animal interactions, such as the ant/acacia and ant/fungi symbioses, concentrating primarily on the changes in the defense and dispersal mechanisms of the plant. He then discusses in similar terms the different types of responses plants exhibit under various human utilization patterns, comparing seed harvest with the use of vegetative parts, and how these differences result from different selective pressures on the plant populations.

Rindos presents his own taxonomy of different types of domestication. First, there is "incidental domestication," which involves no alteration of natural dispersal patterns, but with humans being the effective but usually not the only agents of dispersal. This the author says is a conservative force serving to maintain existing subsistence patterns but which can set the stage for the origin of agriculture. Second is "specialized domestication," in which further evolution occurs solely within the developed agroecology. Throughout the book he stresses the distinction between "domestication," i.e. the establishment of mutualistic human/plant between "domestication," i.e. the establishment of mutualistic human/plant interactions, vs. "agriculture" i.e. the developed agroecology.

In the final two chapters, the author presents original mathematical models representing certain aspects of the origin, intensification, and spread of agriculture. The first is his "general model," a mathematical formulation involving such variables as contribution of domesticates to the diet, relative contribution of wild resources, and relative abundance of domesticates. The model makes several predictions: first, in the early stages involving primarily incidental domestication, increases in population would cause increases in environmental degradation, increases in population would cause increases in environmental degradation. There is a negative feedback restricting further population growth based on wild resources, but the demographic foundations are laid for the transition to specialized domestication. Second, in that transition stage, humans no longer select the best foods but feed on all available food types in proportion to their preceived abundance, increasing diet breadth. Third, the model predicts that domestication permits population increase.

Rindos then presents a second model, the "graphic model," in which he plots the relative value of each food type vs. the amount of each resource available, and uses this graph to make various predictions about diet breadth. In all of this, he makes the assumptions that animals are more highly valued as food sources than plants, wild plant resources are more abundant than those from animals, and domesticates arose from the *less*-valued components of the wild plant class.

Finally, he examines the effects that domestication has on population size. Any mutualistic interaction raises the carrying capacity of both species, and the human/plant relationship is no exception. Hence the increase in population is a result of the domestication rather than its cause. He argues further, reflecting ideas presented in an earlier paper (Rindos 1980), that the most un stable agricultural systems are the ones most likely to spread, since during bad years (assumed to be more common in unstable systems) people are more likely to emmigrate, taking their subsistence systems with them.

The book, although presenting numerous fascinating new hypotheses, is limited by several major drawbacks, primarily emanating from the author's preconceived biases toward his subject matter. Rindos is a devout Darwinian, almost to the point of religious fervor, and attempts to apply the theory of natural selection whenever possible, regardless of the applicability of the approach (see also Rindos 1985 and subsequent comments). His biases show through in other ways as well, for example in his closing statement when he justifies his interest in the origins of agriculture by likening agriculture to an infectious disease. The literature reviews, although extensive and clearly written, should be taken with a proverbial grain of salt, since the author frequently pooh-poohs any ideas at variance with his own. For example, he denigrates the idea that population pressure may have had a contributing role in the development of agriculture, as suggested by Boserup, Cohen, and several other workers, totally ignoring the possibility of a positive feedback mechanism relating population density and agricultural technology.

The models he proposes are only a first approximation of the kind which are needed for this kind of analysis. Any model is only as good as its assumptions, which must be rigorously tested against all the available evidence. Rindos makes liberal use of unsubstantiated assertions and tenuous if not erroneous assumptions concerning how a group of people would react in a given situation. The variables used in the models are also open to question; for example, in the discussion of his graphic model, he stresses that "value" should be defined not in terms of caloric content or other similar quantity but should instead reflect the "technology, preferences, and habits of a culture;" a "human-integrated perception of investment and return, availability, nutrition, and abundance." The use of such a nebulously defined variable runs the strong risk of giving rise to totally unfalsifiable hypotheses. There are many other aspects to the situation which could well yield fruitful areas of inquiry, including those involving dynamic processes internal to the human society, such as demographic, nutritional, and time allocation considerations.

Also missing is the application of a wide variety of models constructed for other ends but potentially shedding light on the problem at hand. There exist innumerable examples of mathematical formulations in ecology, economics, etc., which could be of tremendous dous assistance in some of the things Rindos is trying to do, but he ignores them, preferring to write his own models *a priori*. True, there is a danger in making too bold analogies (of which Rindos himself is guilty); but nor does it pay to spend a great deal of effort trying to reinvent the wheel.

I welcome the approach, and strongly recommend the book, with the appropriate caveats, to anyone interested in the subject. The book presents a bold, fascinating new look at a problem which has vexed workers in several academic fields for decades, and I anticipate that the types of methods used here will be of great value in uncovering here-tofore unsuspected aspects of the situation. If it merely succeeds in provoking controversy and stimulating thought the book will have served its purpose admirably.

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Rindos, David (1980) Symbiosis, instability, and the origins and spread of agriculture: a new model. Current Anthropology 21(6):751-772.

Rindos, David (1985) Darwinian selection, symbolic variation, and the evolution of culture. Current Anthropology 26(1):65-88.

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## **Book Review**

Jimeno Santoyo, Myriam, & Adolfo Triana Antorveza (1983) Medicina, shamanismo, y botanica (Medicine, shamanism, and botany). Bogota: Prescencia. Paper, 156 pp. \$11.50.

This is an anthology containing the following articles, all in Spanish:

- 1. Medicina institucional y saber indigena: conclusions de dos talleres de salud (Institutional medicine and native knowledge: conclusions of two health-care offices). by Myriam Jimeno S.
- Conceptos indigenas de enfermedad y equilibrio ecologico: Los Tukanos y los Kogi de Colombia (Native concepts of disease and ecological equilibrium: the Tukanos and the Kogi of Colombia). by Gerardo Reichel-Dolmatoff.
- 3. Jaibanas, Neles y enfermedad: Litoral Pacifico (Jaibanas, Neles, and disease: the Pacific Littoral). by Nina S. de Friedmann.
- 4. Shamanismo: Irracionalidad o coherencia (Shamanism: irrationality or coherence)? by Miguel Lobo Guerrero & Xochilt Herrera.
- 5. Cosmovision y el concepto de enfermedad entre los Ufaina (Cosmology and disease concepts among the Ufaina). by Martin von Hildebrand.
- 6. Nuestra medicina esta en la naturaleza, en la tierra (Our medicine is in nature, in the earth). by Herbierto Oyuela.
- 7. El modelo de la Medicina Institucional, posibilidades y limites (The model of institutional medicine: possibilities and limitations). by Camilio Arbalaez.
- 8. Las leyes de la Homeopatia (The laws of homeopathy). by Miguel Riveros.
- 9. El concepto de enfermedad y los principios de la Homeopathy (The concept of disease and the principles of homeopathy). by German Palomares.
- 10. Alucinogenos psicotropicos derivados de las planta (Psychotrophic hallucinogens derived from plants). by Hernando Garcia Barriga.
- 11. Un programa alternativo de salud para grupos indigenas (An alternative health-care program for indigenous peoples). by Adolfo Triana Antorveza, & Cesar Mendez.
- 12. Programa de servicios primarios de salud en Choco (Program of primary health-care services in Choco). by Edelmira Perez.

Publications published in languages other than English often receive less attention in the English-speaking world than they deserve; such is certainly the case with this work, compiled and edited by the Colombian Community Foundation (FUNCOL). The main focus of the book is the health-care systems of Colombia, both modern and indigenous, including the interplay between these two often competing forms of treatment and recent health-care projects in rural indigenous areas. It is, therefore, of only peripheral interest to most ethnobiologists, but contains a considerable diversity of material which could be useful in a wider context.

For example, the second article, written by Gerardo Reichel-Dolmatoff of UCLA, discusses native concepts of disease among the Tukanos and Kogis including descriptions of the way herbal medicine fits into the ideological basis of the indigenous health-care system. This approach is not taken often enough in studies of medicinal ethnobotany. This viewpoint is augmented in the fifth article, by Martin von Hildebrand, which analyzes the way the Ufaina conceptualize the different ways in wild and domestic foods contribute to the "energia vital".

Of special interest is the sixth article, written by Herbierto Oyuela, who describes himself as a *curandero* or native healer in the town of Boca de Tetuan Ortega-Tolima. Oyuela discusses clearly and openly the reasons, both practical and philosophical, why the native Americans of his area continue to utilize traditional forms of herbal medicine.

The tenth article, by Hernando Garcia-Barriga of the Universidad Nacional de Colombia, discusses in a very general way the uses, preparation techniques, and chemical constituents of a large variety of hallucinogenic plants and fungi. The emphasis is on those plants utilized by native Colombians, such as *Brugmansia* (i.e. *Datura*), *Banisteriopsis, Anadeanthera, Tanaecium, Virola,* and *Passiflora edulis,* but the article also includes such familiar items as *Cannabis, Psilocybe,* and *Erythroxylum.* 

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## **Book Review**

Hames, Raymond B., and William T. Vickers (1983). Adaptive responses of native Amazonians. New York: Academic Press. Cloth, 518 pp.

This is an anthology containing the following articles:

- 1. Introduction, by Raymond B. Hames and William T. Vickers.
- 2. Machiguenga gardens, by Allen Johnson.
- 3. The cultivation of manioc among the Kuikuru of the Upper Xingu, by Robert L. Carneiro.
- 4. Adaptive strategies of Wakuenai peoples to the oligotrophic rain forest of the Rio Negro Basin, by Jonathan Hill and Emilio F. Moran.
- 5. Neotropical hunting among the Ache of eastern Paraguay, by Kim Hill and Kristen Hawkes.
- 6. Shotguns, blowguns, and spears: the analysis of technological efficiency, by James A. Yost and Patricia M. Kelley.
- 7. Why do the Mekranoti trek? by Dennis Werner.
- 8. Cocamilla fishing: patch modification and environmental buffering in the Amazon varzea, by Anthony Stocks.
- 9. Carpe Diem: an optimal foraging approach to Bari fishing and hunting, by Stephen Beckerman.
- 10. Adaptation and ethnobotanical classification: theoretical implications of animal resources and diet of the Aguaruna and Huambisa, by Brent Berlin and Elois Ann Berlin.
- 11. Nutrition in the northwest Amazon: household dietary intake and time-energy expenditure, by Darna L. Dufour.
- 12. Seasonal factors in subsistence, nutrition, and child growth in a central Brazilian Indian community, by Nancy M. Flowers.
- 13. The settlement pattern of a Yanomamo population bloc: a behavioral ecological interpretation, by Raymond B. Hames.
- 14. Village movement in relation to resources in Amazonia, by Daniel R. Gross.
- 15. The territorial dimensions of Siona-Secoya and Encabellado adaptation, by William T. Vickers.

This book is important not only to students of the human ecology of the Amazon, but also to mathematically oriented human ecologists and ethnobiologists working in other geographical areas. Many of the articles contained here concentrate on quantitative methods of analyzing plant and animal resource utilization patterns, such as optimal foraging and linear programming, increasingly used in anthropological studies (see Smith 1983 for an excellent review).

In the introduction the editors present a brief summary of the history of cultural ecology in the Amazon Basin, along with a synopsis of recent theoretical and methodological advances in the field. Following this Johnson presents an energy input/output analysis of horticultural techniques used by the Machiguenga of lowland Peru, including descriptions of their clearing, planting, weeding, and harvesting techniques, and estimations of the amount of time the people allocate to each phase of this activity. This energy expenditure calculation is then compared to the nutritional benefits incurred from each crop produced. Also included in the article is a treatment of Machiguenga classification of soil and land-use types.

Carneiro next discusses the cultivation of manioc (Manihot esculenta) by the Kuikuru, including the techniques used in clearing fields, planting, cultivating, and processing the crop. He then estimates the amount of manioc produced by the village at 3.2 times the amount actually consumed by the group, using more refined techniques than in previous works, to correct an earlier estimate of 2.5 times (Carneiro 1957), and attempts to account for the excess crop produced. He also includes a summary of the Kuikuru classification of forest types and lists the native names for 46 different cultivars of manioc cultivated by the tribe.

The fourth article, by Hill and Moran, discusses the cultural mechanisms by which the Wakuenai have adapted to soil conditions poor even by Amazonian standards. These mechanisms include organization into patrilineal work groups and the establishment of internal redistribution systems.

The next article, by Hill and Hawkes, uses optimal foraging techniques to analyze hunting patterns among the Ache of eastern Paraguay. The authors discuss various techniques used by the Ache in hunting (shotgun, bow and arrow, etc.), and the amount of time allocated to each of several activities during the course of a typical week, along with the caloric returns to handling time for each species hunted. They use this data to postulate models from optimal foraging theory to explain differences in choices of prey depending on the type of hunting technique as well as potential explanations for differences in the sizes of hunting parties. Finally, they present and compare competing hypotheses concerning which of several objectives for maximization under which the Ache are operating (maximization of individual return vs. maximization of average return of the entire party, etc.).

Yost and Kelley subsequently compare the relative efficiency of shotguns vs. bows and arrows, using the Waorani of eastern Ecuador as their example. Their analysis includes a discussion of input/output ratios for each, and man weight per kill. They also discuss seasonal variation in hunting efficiency.

In the next article, Werner analyzes the trekking phenomenon among certain Amazonian tribes, especially the Mekronti-Kayapo of central Brazil. He concludes that the most likely explanation of this phenomenon is the quest for protein maximization, rather than an attempt to offset an otherwise temporarily short supply of protein, as others have suggested.

Stocks then discusses fishing practices of the Cocamilla of northeastern Peru, who fertilize the lake near their village with garbage, entrails, and human feces, and harvest fish from the lake during the season of highest water levels. This buffers environmental fluctuations and sustains optimal production throughout the year. The author cites this phenomenon as an example of Pyke *et al*'s (1977) "patch modification," and states that the Cocamilla most nearly fit Shoener's (1971) "time-minimizer" category, since they do not spend more time fishing than is necessary to obtain the required catch.

The ninth article discusses the hunting and fishing patterns of the Bari of northeastern Venezuela from an optimal foraging perspective, concentrating on the centralplace and patch-choice (i.e. marginal value theorem) branches of the field. Unfortunately, the author prefaces this with a glaring misstatement of the diet choice aspects of the theory. He states that optimal foraging theory postulates that a forager should harvest a particular species only if there is no other species available which would generate a higher return for time and energy invested. He believes that the Bari forage suboptimally since they continue to hunt despite the fact that they receive several times as much caloric return from fishing, a discrepancy which the author feels he must somehow explain. In fact, the diet choice model states that a foragers should continue to add

species to its diet, in declining order of foraging efficiency, so long as the overall rate of return continues to increase (Pulliam 1974). Hence, diet choice depends not only on the relative efficiences of the various potential prey types, but also on the relative abundancies of prey items higher up on the list.

Berlin and Berlin, in the next article, evaluate various hypotheses to explain the fact that the Aguaruna and Huambisa Jivaro of northern Peru possess an elaborate taxonomy of a large number of zoological lifeforms while only utilizing a small fraction of these species. They eventually reject several adaptationist explanations in favor of a cognitive one, that the Jivaro, like modern taxonomists, are simply recording lexemically the variation and discontinuities present in the natural world.

The following two articles focus on nutrition. Dufour analyzes the dietary composition and time- and energy-budgeting patterns among the Tatuyo of Colombia, concentrating primarily on the caloric content of various wild and domesticated foods. The author mentions protein and micronutrients in the discussion, but presents no new information in this regard. Flowers presents a similar analysis of the Xavante, a group which was primarily dependent on wild foods until approximately 15 years ago, adding data on child nutrition and comparing these data to those gathered among other tribes such as the !Kung which have undergone similar transitions. The author concludes that the increased reliance on agricultural means of production does not seem to add to the reliability of food sources.

The final two articles deal with settlement patterns, Hames working with the Yanomamo of Venezuela and Gross with several tribes of central Brazil. Hames traces the gradual migration of a certain population of Yanomamo eastward through the course of several decades, and analyzes the causes of the migration from several perspectives, concluding that the primary reasons have to do with a shortage of mates rather than with scarcity of food resources. Gross tabulates emic reasons behind village movements given by informants of four different tribes, pointing out that missionary inducement, etc., are far more important than resource depletion from the natives' perspective. He then presents data on the nutrient composition of soils underlying native gardens before, during, and after swidden cultivation.

For the most part, the book is well written and well edited. The articles contained here should serve as an important starting point not only for those planning to work in the Amazon, but also for anyone interested in the various theoretical areas discussed in the book. My only complaints are that the subject matter seems a bit broadly based, with geography and the adaptationist approach being the only unifying similarities among the various papers. Some of the articles, particularly the more mathematically oriented ones, give no more than percusory hints at more extensive treatments of the theoretical aspects of their work published elsewhere (e.g., Johnson & Behrens 1982; Hames & Vickers 1982).

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## Book Review

Voir, savoir, pouvoir: Le chamanisme chez les Yagua du Nord-Est peruvien. (Vision, knowledge, power: shamanism among the Yagua of Northeast Peru). (1983) by Jean-Pierre Chaumeil. Paris: Editions de l'Ecole des Hautes Etudes en Sciences Sociales. Paper, 352 pp.

This book represents an in-depth, multi-faceted analysis of shamanism as practiced by the Yagua, a Native Amazonian people of Peru. The author adopts a holistic approach, stressing the importance of using both psychological and sociological approaches to understand this complex phenomenon.

In the introductory chapters the author reviews the history of anthropological theories on shamanism and briefly discusses the geographical location and ecological relationships of the Yagua. He then describes in some detail the ways in which shamanism is practiced in present-day Yagua communities. Numerous case studies of the experiences of individual shamans are included, and an account of the process of initiation of new shamans as related by one of the practitioners. This is followed by discussions of Yagua cosmology and the role of the shaman in it, and of the sociological roles played both by the shamans as individuals and by shamanism as an institutution. Included are analyses of ceremonies conducted by shamans, several of which are transcribed verbatim both in Yagua and in French, and of the position of the shaman in the internal hierarchy of the group and his role in violent confrontations.

The fourth chapter, entitled "Chamanisme et maladie (Shamanism and disease)", is particularly interesting because here the author discusses in some depth the Yagua concepts of disease causation, the role traditional medicinal practices play in curing illness, according to Yagua ideology, and the uses to which each of over 100 plants is put by shamans in their curing processes.

The book is remarkable for its thoroughness and for the author's willingness to analyze the subject from a wide variety of angles. This holistic approach gives the study a methodological importance far outweighing the empirical data alone.

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## **Book Review**

# On the Trail of the Ancient Opium Poppy. Mark David Merlin, Associated University Presses, London and Toronto, 1984. pp. 324. \$45.00.

The opium poppy, *Papaver somniferum*, source of the modified dipeptide we know as morphine, has profoundly influenced western culture. Morphine was first isolated in a crude form by Derosne, in 1803. The elucidation of its structure was a major goal not achieved until 1952, in the course of which new synthetic and degradative tools were evolved that shaped the evolving science of organic chemistry. Indeed, a complete issue of the prestigious Journal of the Chemical Society was devoted to the investigations of just one man, Perkins, on the structure of morphine. Sir Robert Robinson's acuity in proposing the structure or morphine 29 years before the correctness of his deduction was established led to new stereochemical insights, opened for investigation the field of alkaloidal biosynthesis, and fertilized the developing science of bio-organic chemistry. Within the last ten years, the extensive pharmacology of morphine has burgeoned into a new area of such vastness and importance that it threatens to swamp its parent: I am referring, of course, to the morphine-like peptides, the enkephalins and endorphins. These endogenous opioids exist in the brain (and gut), where the limits of their importance in central nervous systems functioning have yet to be defined.

Apart from their powerful analgetic activities, the opiates are addictive, this latter property, perhaps, impacting society even more markedly than the former, spawning massive social, legal and medical consequences. And let us not forget the literary heritage of the pale white poppy and its encapsulated metabolites. De Quincy's 'The Confessions of an English Opium Eater,' Dicken's 'Edwin Drood,' Cocteau's 'Opium, the Diary of a Cure,' Coleridge's 'Kubla Khan' and the bizarre Sherlock Holmes' mystery of 'The Man with the Twisted Lip' are a few of the stories that spring immediately to mind. A few more seconds thought, and one would have a library sufficient to solace many a winter's day.

The opium capsule is Janus-faced, being a source of oil as well as addiction. Poppy seeds and poppy oil have economic consequence even today, and perhaps early in the history, or prehistory of the poppy, nutrition may have been of more importance than the aspects of the poppy that are so significant for modern man.

Despite the salience of opium, and the vast literature on the subject, there have been few extended, coherent publications on the origins of the man-poppy relationship. 'On the Trail of the Ancient Opium Poppy,' by Mark David Merlin, fills this space on the shelf. This book provides the first overview on the possible origins of the poppy and its prehistoric associations with man.

The genus Papaver contains around 100 species, most of them found near the Mediterranean. Is our poppy, the heavy-capsuled, narcotic Papaver somniferum, a wild species, or is it an escaped cultivar? Is it, like corn or cannabis, one of those plants so useful to man, so domesticated, so cultivated, so selectively bred by man, that where it came from, and what it came from, are no longer easily discernable? Merlin addresses this question without unequivocally answering it. The differences between cultivated and uncultivated ecotypes are confusing. The subject is intrinsically complex, and may be beyond the skill of any one author to clarify. Practically, from the botanical viewpoint, it is not possible to distinguish precise varieties of P. somniferum. It is cultivated world-wide, but, despite the wide range of characteristics, the cultivars merge and hybridize without discernable boundaries. Merlin stresses the absence of truly wild populations of the poppy, and discusses, again without clear conclusion, theories concerning the relationship of P. somniferum and P. setigerum. These are the only poppies that contain morphine. P. setigerum grows wild around the Mediterranean. Are these two poppies independent species or not? If not, which is the father, which the son? The different chromosome numbers, P. somniferum having 2n=22 and P. setigerum 2n=44, have led some, such as Goldblatt, to pro-

pose that the latter is simply a polyploid form of the former. Others, such as Knörzer, hypothesize the opposite. Knörzer defends the onetime popular idea that *P. somniferum* was artificially selected from the wild *P. setigerum*, basing his position on the similarity of *P. somniferum* seeds from Neolithic sites to the seeds of modern *P. setigerum*. One might think it takes a brave man to draw major conclusions from two or three morphological characteristics of seeds abused, buried, dehydrated and charred over a period of several thousand years, particularly when the number of seeds available for analysis is low. But fortune smiles on the brave. Recent work suggests that chromosome number is not fixed for either of the 'species,' both producing diploid and polyploid plants.

Merlin's summary of this particular problem, on page 84, is masterly, but too judicial. He has a reluctance to impose his own viewpoint, his own conclusions, a virtue which however much one may admire in the abstract makes for an absence of signposts for the tyro. Being forced to draw one's own conclusions can make for tiring reading. It is made the more tiring by the delightful, but idiosyncratic, organization of the text, in which subject flows into subject in a stream of consciousness technique, and in which subheadings provide formal interruptions to the text but do not necessarily give information as to what is contained in it. Chapter 4, on 'The Prehistoric Use of the Opium Poppy' provides an example of authorial technique that is repeated in all other chapters. Here, despite the title, we meander through the structures of the alkaloids, their isolation and their pharmacological properties. Merlin accurately points out that the analgetic action of morphine is due to the lessening of apprehension rather than the abolishment of pain. Then we learn of the abuse that followed the two fold introduction of pure chemicals and hypodermic syringes. The significance of synthetic narcotics such as demerol is then touched upon, followed by a disquisition on how to cut a poppy capsule with a penknife. This, by some inexorable process, leads into a discussion of the founding of the Journal of Ethnopharmacology with extended accounts of the botanical distribution of mind-altering drugs and the use of cocoa, Psilocybe mushrooms, and the beautifully-flowered Texas mescalbean, Sophora secundiflora. Copious quotations from the appropriate authorities are interspersed. Then we find ourselves learning about earth goddesses and the relationship between the Roman and Greek gods. The question is posed, as has been posed for many a pharmacologically interesting plant, was the Ayurvedic soma an Ephedra species? This is all interesting, intriguing and confusing. We are traveling on no academic freeway, but hiking uphill through a thick forest. We are left to draw breath during one of the occasional platitudes scattered within the undergrowth of information. 'The opium poppy is one of the most widely known herbal drug plants.' 'The powerful modern opiate drugs and their chemical substituents were certainly not available to early peoples.' 'A particular use of a specific plant substance today does not necessarily confirm its application for similar purposes in antiquity.' True, true, and true.

Merlin is teased and tantalized by every glimpse of movement. He wants to develop ten themes at once. The information comes pouring out. There are several authorities, he gasps, and then lists 29 references, plus an 'etc.'. If the subtitles carry any reference to what comes under them, this appears to be due to chance rather than design. If we use chapter 4 as example, 'Ecological and Speculative Considerations' immediately gallops off into a full-scale discussion of *Cannabis sativa*, the various products of which chafe men's necks, promote good fellowship and small testicles, and provide an excellent edible oil. Hemp and opium poppies are both weeds, we are told. But what is a weed? A detailed definition follows.

In chapter 5, we have a full discussion of the archeological record for poppies in Europe, mixed in with a satisfying drawing of *Chenopodium album*, a photograph of poppy seed pastry (and very nice it looks) complete with recipe, and a discussion as to why prehistoric lake shore dwellers dwelt on lake shores rather than on firmer land.

In short, this book reminds me of the comment of Marshall Bosquet: 'C'est magnifique, mais ce n'est pas la guerre'. Merlin is an encyclopediac investigator, a polymath of impressive scholarship. He is equally at home discussing etymology, criticizing Thompson's tranlations of Assyrian texts, explicating bronze age trade or examining the cultural underpinnings of Minoan civilization. He does not necessarily achieve coherence, but his book is a storehouse crammed with delights, with the information density of a hard disc.

Was the opium poppy a creation of an eastern or western culture? I still do not know, and doubt if anyone does. Merlin, however, succeeds in demonstrating that shards of fact can be used to create whole china shops of speculation in archeology and archeobotany. One of his few concrete suggestions is that the sea-trading Minoans introduced the poppy into the eastern Mediterranean where the evolving Hellenic culture made the plant its own, along with the grape and olive. Other authors (e.g. Daumas, la civilization de l'Egypte pharonique, 1965) have suggested that opium was used in Egypt as early as the 18th Dynasty (BC 1590-1340), and this could have provided a source for later cultures.

The style of the book varies from the condensed and expressive ('It is an outstanding feature of the Mycenean culture that we know so little about so many aspects of it.') to a standard, workmanlike prose that gets the job done. Jargon and the linguistic excesses of the social sciences are eschewed, the compound nouns and polysyllabic backformations marring so much academic prose being absent. Merlin's allusive style, with his reluctance to draw conclusions for the reader, can be illustrated by an extended quotation:

'An interesting point made by Greig and Turner concerns the rise and fall of olive cultivation and its relative importance in ancient Greece. During the Peloponnesian Wars, the Spartan army attacked the Athenian olive groves: "... and this may not have been the first time that olives had been a target of hostilities." It is important to remember that olives were most probably a major oil source for the Myceneans as they were among the later Greeks. In this case, what substitute could have replaced the oil extracted from olives? If importation of olive oil from an external source was precluded during the non-productive replanting period, then perhaps a locally produced vegetable source was not curtailed, it may not have been olive oil that was imported. The pollen diagrams examined by Grieg and Turner Indicate that olive cultivation in Macedonia was intermittent, with two well-defined periods.'

Halfway through the paragraph, it begins to dawn on the reader that this apparent diversion is making the point that poppy seeds may have been a major source of oil in Periclean Greece. This point is buttressed by appeal to data from an earlier culture, the Mycenean, and a later one, the Macedonian. Nowhere, however, is the point explicitly stated. The reader is left to draw the conclusion for himself. This passage also illustrates some flaws of economy, which tire the reader, in the generally acceptable style: organic oil resources (oil); oil extracted from olives (olive oil); importation from an external source (importation); target of hostilities (target). A poor ear is suggested, for example, by the seven jangling p's in one sentence.

But these are mere quibbles, cavils, inconsequential things. In this book we have a magnificent contribution to a complex subject; a source that will be utilized by other investigators over the coming decades. The illustrations, although poorly reproduced, are copious and well chosen. No review can hope to capture the complexity and density of the book. At one point, Merlin refers to Heinrich Schliemann, the discoverer of Troy, that Homeric site where unbridled passion for another's wife lead to a nine year seige, ending in the burning of 'the topless towers of Ilium'. Schliemann has been described as turning legend into history. I venture to suspect that Merlin, too, has turned legend to history in this masterful and scholarly volume.

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