xicolli male jacket, closely associated with human sacrifice); (iv) closed-sewn (this would include the quilted armor in use among both Aztec and Maya); and (v) limb-encasing, a category confined to the warrior suits worn by Aztec warriors. This classification is probably the book's great strength, for at least it gives us a starting point for dealing with the bewildering luxuriance of dress among these most advanced of New World peoples.

But I would like to point out some problems and differences with Anawalt's approach. In the first place, her sample, drawn exclusively from Post-Classic and post-1521 pictorial codices, may be quite unrepresentative of what people in various Mesoamerican culture areas were actually wearing at the time of the Conquest. For instance, the personages in the Borgia Group of codices are exclusively gods and goddesses, and one could hardly expect *them* to exhibit a one-to-one reflection of customary concerns with dress. Thus when Anawalt attempts to document regional and national differences in clothing solely on the basis of representations in these very specialized sources, she may be on shaky ground. It may be reductio ad absurdum, but surely one could not conclude from an examination of the dress worn by the Holy Family and saints in Duccio's *Maestà* that the trecento inhabitants of Siena went about draped in loose-fitting robes.

"Indian women wearing *quechquemitl* and *huipil*." According to the Spanish commentator, the dress of the second woman "is the dress of the Mexicans and of Zapotec, and of the Mixtec, whose [clothing] I have seen. The old men say the manner of dressing of the first woman is that of the Huastec women, which is a nation of this country that is in the northern part of Mexico." [Reproduced in *Indian Clothing before Cortés* from Codex Vaticanus A, fol. 61r]

Second, the representations of clothing in these sources must be extremely conventionalized and oversimplified. Probably the only really accurate depictions of costume in the sources used by Anawalt are in the Codex Mendoza and in the extraordinary Codex Ixtlixochitl, both heavily Europeanized.

Last, any adequate treatment of Indian clothing "before Cortés" should take into account the Maya area and central Mexico during the Classic period; if she had considered such material Anawalt would not have been led into such statements as (in dealing with the *huipilli*, or long blouse), "The costume apparently did not exist among the Mayas until after the Conquest." She also would have appreciated that Mesoamerican dress is far more than construction, for, if the evidence of Classic Maya reliefs, murals, and vase painting can be trusted, costumes were veritable symphonies of important iconographic themes related to legitimacy of title and to the supernatural world.

In spite of these strictures, I would still recommend this book to Mesoamericanists and to students of costume. It has accomplished at least part of what it has set out to do.

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"Four Tarascan women wearing *quechquemitl*." "In many areas the wearing of the *quechquemitl* may have been restricted to highborn ladies. If they were still wearing the garment at the time of the Conquest, it would have represented a pagan status or power symbol and therefore would not have been approved by the Spanish clergy. Even if the *quechquemitl* was not forbidden, the very women qualified to wear it . . . would have been the ones in a position to adopt a new status symbol, European dress. That could explain why the *quechquemitl* disappeared from some regions but continued in use in others where it did not have aristocratic connotations." [Reproduced in *Indian Clothing before Cortés* from Relación de Michoacán, lámina 8]

Maize Retraced Cytogenetically

Chromosome Constitution of Races of Maize. Its Significance in the Interpretation of Relationships between Races and Varieties in the Americas. BARBARA MCCLINTOCK, TAKEO ANGEL KATO Y., and ALMIRO BLUMENSCHEIN. Colegio de Postgraduados, Chapingo, Mexico, 1981. xxxii, 518 pp., illus. $28.

At the time of European colonization of the Americas, maize was grown from southern Canada to central Argentina and Chile, from elevations ranging to 11,000 feet, and under climatic conditions ranging from the Atacama desert, where a decade having any rainfall is rare, to the Chocó region of northwestern South America, where annual rainfall often exceeds 600 centimeters. As a result of this environmental diversity, of differences in the cultures of the Indian agriculturalists, and of the capacity of maize for widespread cross-pollination, maize became our most variable crop plant. It is also our best-studied major crop, with an excellent and expanding genetic map and with well-described landraces.

This book summarizes almost 20 years of work by an outstanding team of maize

cytologists who have studied most North and Central American maize and much of the maize of South America, as well as most of the races of teosinte, the closest relative of maize. Basically, maize and teosinte have the same chromosome number and the same genetic and cytological maps. Few chromosomal rearrangements occur, and those that do occur are usually rare. There is, however, considerable cytological polymorphism for chromosome knobs, distinctive heterochromatic regions that differ in size and chromosomal location. A specific knob size at a specific chromosomal location follows normal Mendelian segregation, and mutation-type events changing knob size and transposition-type events resulting in a new knob-forming position (or a loss thereof) are sufficiently rare that neither has been observed by several generations of maize cytologists. By careful cytological analyses, the authors have distinguished among small, medium, and large knobs (or no knob) at each possible knob-forming site on each chromosome at the pachytene stage of meiosis. By also studying the early diplotene stage of meiosis, they were able to determine the presence and size of each knob on each member of every pair of chromosomes. In addition, they have studied the presence both of B-type chromosomes and of abnormal chromosome 10, two additional cytological polymorphisms found in maize and teosinte.

The authors have convincingly demonstrated a number of associations (i) between specific chromosome knobs and specific routes of maize transfer; (ii) between specific maize knob configurations and specific geographic regions; and (iii) between maize knob configurations and knob configurations of the annual Mexican teosintes.

Of special interest to anthropologists and archeologists are (i) transfer of maize from southern to northern Mexico and the United States Southwest, along the Pacific coast; (ii) a second route for introduction of maize from Mexico into the United States Southwest that apparently ran from central Mexico northward to the Rio Grande; and (iii) two important intercontinental interchanges that are now well documented: Guatemalan highland and Andean South American maize and southern Mexican and northwestern Venezuelan maize. It is apparent that most of the indigenous maize of Andean South America shared a single knob complex, presumably from a single early introduction, descendants of which account for most of the older Andean landraces.

More than half of the book consists of tables and maps that present the voluminous data, collection by collection. With the exception of the northeastern United States, some of eastern Central America, major portions of northwestern South America, and southern Argentina, virtually all maize-growing regions of the New World were sampled. The English text contains very few misprints and is photographically reproduced from typescript on good-quality paper. The book reflects creditably not only upon the authors but also upon its publisher, the Colegio de Postgraduados, Chapingo.

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Cladistics in Action

Advances in Cladistics. Papers from a meeting, Oct. 1980. V. A. FUNK and D. R. BROOKS, Eds. New York Botanical Garden, Bronx, N.Y., 1981. xii, 250 pp., illus. Paper, $29.50.

Only the most ardent of noncomparative biologists can be unaware of the ferment that has made systematics one of the most vigorous and controversial of disciplines. I need not repeat the history here, but there has been widespread debate over three world views—one that emphasizes general similarity of organisms as a basis for grouping and classification (phenetics), one that emphasizes genealogy (cladistics, phylogenetics), and one that attempts to combine both of these aspects of diversity in a classification (evolutionary, or syncretistic, systematics). Two years ago, adherents of the cladistic school decided that there might be some profit in disengaging from the "paradigm wars" and having meetings at which cladists could talk among themselves to explore the consequences of their theories, without the disagreements over words, definitions, world views, and so on, that mark gatherings including members of different schools. This well-produced and attractive book is a document of the first annual meeting of the Willi Hennig Society, a group named after the German entomologist who was the formalizer of phylogenetic methodology. The papers are arranged in four groups: Cladistics and Molecular Biology, Theoretical Cladistics, Botanical Cladistics, and Biogeography and Cladistics.

A more or less sub-rosa antagonism has existed between cladists and many workers who use molecular data in systematics. The lead paper in the molecular biology section brings the debate into the open and clarifies why this antagonism exists. James S. Farris, for years a leading theoretician in numerical methods of phylogenetic analysis (and incidentally the founder of the Hennig Society) presents a fundamental challenge to the use of molecular distance data in phylogenetic analysis. Farris bases his argument on two theses: (i) that it is not clear what data such as immunological distances actually represent from a physical and biological viewpoint, and (ii) that available methods of analysis of molecular distances (for example, Nei's distance) result in phylogenies with nonsensical properties (like negative evolution). Since Farris himself devised one of the most used techniques for analyzing distance data, this paper should be carefully considered by the growing numbers of workers using those data and methods of analysis. Serious implications for molecular clock hypotheses (often supported by clustering methods that assume homogeneous evolutionary rates) are also discussed by Farris.

Following Farris's critique of molecular distance data is a paper by D. L. Swofford that compares several popular methods of analyzing such data, motivated by "the realization that biochemical systematists will undoubtedly continue to rely on distance measures." Perhaps the more idealistic among us would hope that scientists using molecular data will respond to any valid criticisms and search for scientifically defensible methods. Nevertheless, Swofford finds that, as judged by a variety of evaluation criteria, the most effective procedure is that developed by Farris (distance Wagner); Swofford includes an improvement in the algorithm. Another approach to the problem of how to manage biochemical data is taken by M. F. Mickevich and C. Mitter in their paper on methods of analysis for electrophoretic character data. The authors evaluate three methods, preferring Mickevich's transformation series analysis. This procedure has promise for general use with polymorphic characters, and it will be interesting to see how it is developed in the future.

Since many of the papers in this book