Bornean orangutan, fist-walking on wet cage floor. As they walk "terrestrial orang-utans variably place their hands in fisted, palmigrade, and modified palmigrade postures." Subjects also vary with respect to inversion and eversion of feet, and it has been "noted that Sumatran orang-utans are more likely than Bornean orang-utans to approximate plantigrade foot postures." [From R. H. Tuttle and G. W. Cortright, "Positional behavior, adaptive complexes, and evolution," in *Orang-utan Biology*]

netic affinity of *Pongo*. The topics covered in this volume include taxonomy, behavior, ecology, reproductive biology, neuroanatomy, ontogeny, and craniofacial, dental, and postcranial anatomy. The weight of the evidence presented does not support an orangutan-human clade, nor does it vindicate Schwartz's claim that the orangutan is our closest living relative among the extant apes.

The book begins with overviews of orangutan taxonomy, behavior, and ecology. Although much in this section is found in earlier publications by the authors, the chapters on the comparative biology of Bornean and Sumatran orangutans and on their behavioral ecology by Courtenay *et al.* and by Rodman, respectively, are worthwhile reviews. Marks provides a review of his work and that of others on molecular and genetic perspectives on orangutan phylogeny. He concludes that humans and African apes share a common ancestor subsequent to the divergence of the orangutan (although the precise relationships within the African ape-human clade are ambiguous).

Orangutan odontology is discussed by Swindler and Olshan and by Swarts. Swindler and Olshan treat the subject of variability in tooth morphometrics and find no support for the proposal that the molar size-sequence ($M_2 > M_3$) and other dental traits in orangutans indicate a close relationship with humans. Swarts, on the other hand, suggests, on the basis of an analysis of the deciduous premolars of *Pongo*, that orangutans and humans do exhibit a special affinity.

Cranial morphology is discussed by Shea, by Brown and Ward, by Röhrer-Ertl, and by Winkler *et al.* Shea documents the extreme retroflexion (airorhynchy) of the orangutan face, as do Brown and Ward. Whereas Shea believes that airorhynchy may be primitive for hominoids, Brown and Ward believe that retroflexion of the face in *Pongo* and *Sivapithecus* is a shared, derived feature of that clade that dates to 12 million years ago. All authors agree that the craniofacial evidence does not support an orangutan-human clade.

The contributions on postcranial and locomotor anatomy are more uneven in quality than those on the skull and dentition. Morbeck and Zihlman report on the body composition and limb proportions of orangutans, but most of their contribution is based on relative weights of muscle, bone, and skin in the limb segments of two captive orangutans (one male, one female). The goals of the work are puzzling and the method would appear fatally flawed, since it is well documented that the adult weights of captive orangutans average more than twice those of free-ranging individuals. Jungers and Hartman address the question of how orangutan limbs achieve their proportions via ontogenetic scaling. Although functional correlates of skeletal growth emerge from this comparative analysis, the notion of an orangutan-human clade receives no support from multivariate growth trajectories of the locomotor skeleton. Rose provides an excellent account of hand and foot anatomy that further underscores the unusual locomotor anatomy of *Pongo* and the adaptations of orangutan cheiridia for life in the trees. Rose insightfully notes a number of salient features indicative of arboreality, but he, as well as Morbeck and Zihlman, mistakenly refers to a "double-locking" mechanism in orangutan fingers (a feature first suggested by Napier in 1960). In fact the presumed anatomical basis of the "double-locking mechanism," namely a relatively long manual proximal phalanx that exceeds the combined length of the middle and distal phalanges and allows the fingertip to be tucked into the crease between the metacarpophalangeal joint, does not exist. Though Rose finds no orangutan specializations in the earliest presumptive orangutan fossils (that is, *Sivapithecus*) from the Miocene of Pakistan, it appears to this observer that at least one fossil finger bone (GSP 17154) from the Nagri Formation, attributed to *Sivapithecus*, has a decidedly orangutan morphology.

Other chapters in *Orang-utan Biology* deal with reproductive physiology and endocrinology, neuroanatomy, and myology. These substantial contributions do not, for the most part, address directly the question of orangutan phylogeny. The ones that do fail to persuade the reader that orangutans are our closest living relatives. Despite the absence of support for the editor's hypothesis, *Orang-utan Biology* enhances our understanding of this rare and remarkable great ape. The volume further underscores the need for continued research on captive and wild orangutans (and other apes) if the goals of paleoanthropology include a better understanding of human phylogeny and behavioral pathways in human evolution.

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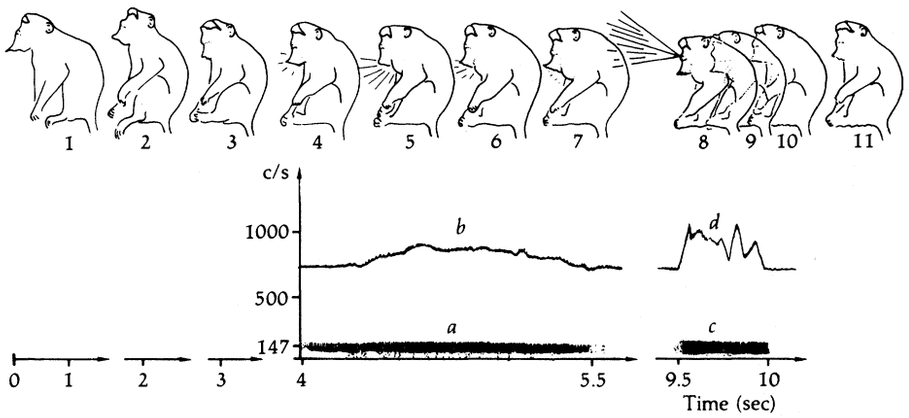
Cercopithecus and Company

A Primate Radiation. Evolutionary Biology of the African Guenons. ANNIE GAUTIER-HION, FRANÇOIS BOURLIÈRE, JEAN-PIERRE GAUTIER, and JONATHAN KINGDON, Eds. Cambridge University Press, New York, 1988. viii, 567 pp., illus., + plates. $120.

The Old World monkeys are the most taxonomically diverse superfamily of living primates, with some 90 to 100 species. A few of these are well known from field studies, mainly the ones that tend to spend a good deal of time on the ground, in the open, where they are easy to study. But it is in the forest, especially the tropical rain forest, that the major diversity lies; and it is only rather recently that the most speciose genus of all, *Cercopithecus*, has really begun to become as well known as *Papio* or *Macaca*. This genus and its closest relatives are the topic of this book; and it is hardly surprising that it has become, in effect, a textbook on the comparative method in primatololgy.

It should not be thought that the book is entirely about field studies: it is, as the title makes clear, about the radiation (evolutionary diversification) of the guenons. So the first section includes papers on fossils, paleoenvironment, distribution, and basic taxonomy. Perhaps the key paper in this section is by Lernould on classification, which brings out the taxonomic problems, and so highlights the inherent evolutionary interest of the group. There are, to begin with, four major taxonomic groupings: three supposedly monotypic (*Allenopithecus*, *Miopithecus*, *Erythrocebus*) and one highly speciose (*Cercopithecus*). Are they all full genera, or only subgenera of *Cercopithecus*? Lernould has them as subgenera; authors of some other chapters disagree. Within *Cercopithecus* proper, how many species? Lernould lists 25 but admits that it is impossible to be decisive, not only because two new species (*C. salongo*, *C. solatus*) have been added within the last dozen years and more may yet turn



"Behavioural sequence accompanying the uttering of 'boom' in [*Cercopithecus*] *neglectus*. 1–3: preparatory phases; 4–7: inflation of the vocal sac accompanied by a sound (spectra *a* and *b*); 8–10: uttering of 'boom' (spectra *c* and *d*) and deflation of the vocal sac." Eight of the ten species of *Cercopithecus* "which possess loud calls utter 'booms.' . . . The production of such calls requires the development of large vocal annexes and a very complex behaviour. . . . Thus, it seems improbable that such a complex phenomenon has evolved independently in several taxa." [From J.-P. Gautier's chapter in *A Primate Radiation*]

up, but also because there are so many cases of semispecies that there are bound always to be disagreements on, to take one instance, whether the highly distinctive *C. sclateri* and *C. erythrotis* are to be kept separate from *C. cephus*: the three interbreed to some extent where their ranges meet, but how much? And to what extent does it affect their genetic integrity? Lernould discusses these problems, as, on separate regional bases, do Oates and Colyn in succeeding chapters; and there is, as an addendum to Lernould's chapter, a useful checklist of hybridization both in the wild and in captivity.

The second part runs from genetics via morphology to behavior, always with the same comparative theme. Four papers are especially significant here. Ruvolo uses both phenetic and cladistic methods for interspecies comparisons of a number of protein loci; Dutrillaux, Muleris, and Couturier study karyotypes by their interesting and unusual morphotype-reconstruction method; Martin and MacLarnon analyze skull and tooth metrics; Gautier compares the vocalizations. Though there are some disagreements, the wide measure of congruence by these four very different methods is most expressive; all four, for example, discover a kinship between two superficially rather different species-groups, the *nictitans* and *cephus* groups, a remarkable and convincing result. Dutrillaux *et al.*'s somewhat unexpected (to this reviewer) conclusion that the forest-living but terrestrial *C. lhoesti* group is related to the savannah-living *aethiops* group and *Erythrocebus patas* is supported both by Gautier and by Martin and MacLarnon, but in this case Ruvolo disagrees.

The third section of the book comes at last to field studies. Many readers will see this as the main feature of the book, but the first two sections have placed the ecology and social behavior firmly in context, and anyone who turns straight to section 3 will have missed the whole point of this carefully planned volume. Apart from a couple of useful review papers on patas (by Chism and Rowell) and vervet monkeys (by Fedigan and Fedigan), the general tone continues the theme of the book: diversity and the light that comparative study can shed on biological meaning. Particularly helpful in this respect are chapters by Cords on mating systems, Rowell on guenons' social systems as compared to those of baboons and their relatives, and Gautier-Hion on the complex theme of polyspecific associations. Finally Struhsaker, Butynski, and Lwanga, in another thought-provoking paper, return to the important topic of hybridization: not this time in captivity or between semispecies, but between well-differentiated, widely sympatric species.

Not the least attractive aspect of the book is its seven color plates, all painted by the phenomenal Jonathan Kingdon (who is also responsible for two chapters). These should convince aesthetically minded primatologists that the *Cercopithecus* group is the one to work on in the future. And don't throw away the dust jacket: Kingdon is there too!

As I hope I have made clear, this is an exceptionally well-edited book, sticking closely to its chosen theme and treating it rigorously: I have not mentioned all the papers in it, but there is not a single one that falls below the general high standard.

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The Archeology of Capitalism

The Recovery of Meaning. Historical Archaeology in the Eastern United States. MARK P. LEONE and PARKER B. POTTER, JR., Eds. Smithsonian Institution Press, Washington, DC, 1988. x, 490 pp., illus. $45. Based on a lecture series, Washington, DC, 1984–85.

Archeology in the early 1980s was in theoretical disarray as the inability of "behavioral" or "new" archeology to provide interpretative depth was recognized by many scholars. Ironically, what came to be known as the "interpretative vacuum" occurred simultaneously with a blossoming of discoveries. Now, as the decade ends, the field has begun to recoalesce around two or three intellectual schools, each of which provides a theoretical and methodological map for doing archeology in an explicit attempt to fill the interpretative vacuum.

The Recovery of Meaning should be evaluated in this context. It is both a clear statement of one of these new schools—cognitive archeology—and a landmark demonstration of the progress that has been made in interpretation.

Explicitly, the book is about understanding "meaning." However, implicitly and substantively it is a study in the archeology of American "capitalism." An archeology of capitalism is not an enterprise to be undertaken lightly, nor will it be completed in a single volume. This work is a forerunner that should set the tone for a wide range of "post-processual" books.

The themes "meaning" and "capitalism" flow parallel to each other, drift apart, and intertwine throughout the book. The volume traces in a series of separate studies the changing meaning of material objects from the time of the Spanish conquistadors until the present. It is not accidental that innovation in interpretation should take place in historical archeology, for the wealth of contextual and non-material information available makes it possible to address a wider range of problems and makes interpretation of meaning easier, richer, and deeper. Historical archeology, a backwater in North America two decades ago, is currently emerging as the theoretical leader. The methodologies being developed in historical