And where Pinky Harrington appears in the bibliographical references, he's John instead of Jean. Nothing to get pick about, lord knows, in a 3-pound book.

And I found my mind broadened. Carmel Schrire says "skinflint" was originally someone who retouched worn gunflints for reuse. I didn't know that. I'll bet you didn't either. (Webster's Unabridged doesn't).

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The Origin of Modern Humans and the Impact of Chronometric Dating, edited by M. J. Aitken, C. B. Stringer, and P. A. Mellars, Princeton University Press, Princeton. 1993. Illustrations, bibliography, 248 pages. $39.50 (Cloth)

by

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The origin of humans, whether at the "point" of divergence from other primates, from other hominid species, or within the last several hundred thousand years, are very active and contested areas of paleoanthropological research. The Aitken *et al.* volume presents 14 papers and an overview of the evidence for and against the emergence of modern humans with a focus on the dating evidence. The papers were originally presented in a 1987 symposium in England and were previously published in two special journal issues.

Two different arguments exist concerning the emergence of modern humans. The *multiregional evolution* model suggests that modern humans arose in several places due to parallel, in-place evolution with regular interbreeding to maintain a similar pattern of evolutionary development. Modern human populations are thus derived from local populations that existed in the same region for upwards of 1,000,000 years. The *out-of Africa* (sub-Saharan) model suggests that modern humans arose no more than 200,000 years ago in Africa and then spread out from their African origin to populate the Old World and much more recently, the New World. Contact between Neanderthals and modern humans occurred in places such as the Middle East and Europe.

The need for reliable dating techniques is critical for assessing the validity of either of these models. Radiocarbon dating commonly used in archaeology to establish time ranges for human use of a site and region, is not useful for the full time range, 30,000 to 200,000, years ago within which modern humans arose. The search for and use of dating methods that are precise and accurate within this time range are the themes common to all the chapters of the book.

The book is logically, but not in actuality, divided into three parts. The first part presents absolute dating evidence for the origins of modern humans (Schwarcz; Aitken and Valladas; Schwarcz and Grün; Miller *et al.*). The presentations are quite detailed about the methods used to obtain the dates discussed. The second part discusses recent work using human DNA (Mountain et al; Stoneking et al.). The concluding part discusses archaeological and/or skeletal evidence for the origins of modern humans (Deacon; Hublin; Bar-Yosef; Clark; Stringer; Mellars, Brown; Smith).

In part one Schwarcz describes how calcite formations, formed through the slow movement of water such as stalagmites and travertines, are useful for determining the human occupation of a site through examination of the ratio of several isotopes of uranium contained in the calcite deposits. A new technique, thermal ionization mass spectrometry (TIMS), can count individual atoms of uranium isotopes instead of counting the decay particles emitted by these isotopes. The TIMS is an order of magnitude more precise than counting decay particles and can be performed on very small samples. Places with geologic deposits formed by running water and used by humans during the last several hundred thousand years occur in Europe, Asia, and Africa. Uranium series dating of these places can provide highly precise chronological information not available through the use of other dating methods.

Aitken and Valladas's chapter summarizes the use of thermoluminescence dating on burnt flint from the site of Qafzeh, Israel; Schwarcz and Grün discuss electron spin resonance on human tooth enamel; and Miller *et al.* discuss the application of amino acid racemization to ostrich egg shells. Miller's *et al.* chapter suffers from too much detail about the chemical analyses performed and presumes a very specialized knowledge that, most likely, is not possessed by the majority of readers.

In part two Mountain *et al.* and Stoneking *et al.* present evidence derived from different sources of DNA to support the *out-of-Africa* model. Mountain *et al.* combine nuclear DNA polymorphism with non-genetic information such as archaeology and paleoanthropology to discuss genetic distances between eight human populations. Separation of these populations begins with a split between Africans and non-Africans. The DNA evidence by itself provides no way to date the split: using archaeological evidence, Mountain *et al.* suggest a separation at 100,000 years ago; however, they do not present the archaeological evidence to support their separation date.

Stoneking *et al.* discuss the dating of mitochondrial DNA (mtDNA) using two new approaches described below. Neither of these approaches is based on the mtDNA analyses of humans and chimpanzees, which Stoneking *et al.* suggest suffer from reliability problems. Mitochrondrial DNA is inherited from one's mother. Stoneking *et al.* and other researchers suggest that the human mitochrondrial ancestor was a female living approximately 200,000 years ago.

Two variables must be estimated to determine the age of the mtDNA ancestor. These are the amount and the rate of sequence evolution. Using only human mtDNA, the reliability of comparisons between mtDNA and humans and chimpanzees is avoided. In addition, human-only mtDNA produces standard errors of the parameters that are then used to construct 95% confidence intervals for the age estimates.

Using archaeological data from Papua New Guinea, Stoneking *et al.* assume that only one migration occurred to colonize PNG. They proceed to estimate the rate of mtDNA within and then between PNG groups based on the mtDNA differences since colonization. Based on these two approaches, a conservative date of 60,000 years was used for the colonization of Australia and New Guinea. The 60,000 year date is based on archaeological data, and an estimate of the rate of the mtDNA control region is then made. Applying the results of the analysis to the human mtDNA ancestor produces a date of 137,000 years ago for the occurrence of that ancestor with a 95% confidence interval between 63,000 to 416,000 years ago. Although the mtDNA ancestor does not have to be a member of our species, the paleoanthropological evidence suggests that she was.

In part three, Deacon discusses southern Africa and modern human origins, with an emphasis on archaeological and paleontological data from Klasies River and Border Cave in South Africa. Hublin describes skeletal and archaeological evidence from North Africa and suggests that the Mediterranean was a major barrier between European and North African human populations during the second half of the middle Pleistocene. Bar-Yosef discusses the Levantine archaeological evidence for modern humans. He emphasizes the importance of diverse archaeological evidence such as spatial relationships between artifacts and features, seasonality, and food choices, for understanding the transition from the Middle to the Upper Paleolithic and the routes of migration.

Clark discusses human fossil evidence and tool assemblages from Europe, Asia, and Africa from the Lower to Upper Paleolithic. He chronicles the technological changes in tools through this broad time period and the impact large scale climatic change had in regional migrations, including the one leading to modern humans emigrating into Asia through the Levant. Stringer focuses on human cranial measurements from fossils and several modern populations and suggests that the strongest evidence for a ancestry between archaic and modern humans is found in Africa. Stringer uses the Penrose Size and Shape Statistic as a simple way to measure similarity between the crania.

Mellars restricts his analysis to archaeological materials from the Middle to Upper Paleolithic transition of Europe, the Aurignacian, to argue that the Aurignacian represents the archaeological correlates of modern human dispersal across the whole of Europe. The dispersal would have displaced co-terminous Neanderthal populations already living in Europe. Brown looks at recent human evolution in East Asia and Australasia and states that arguments in support of regional continuity between archaic and modern humans in these areas must overcome problems of time control, skeletal preservation, and site clustering before this hypothesis can be accepted. The last chapter by Smith assesses the fossil evidence from Africa that is pertinent to the emergence of modern humans. He finds support for the *out-of-Africa* model, but suggests that the incontrovertible skeletal evidence and dating of these skeletal remains used by others to support this model should be critically evaluated before acceptance.

All the chapters favor the *out-of-Africa* model as the best explanation for the emergence of modern humans, though some authors are more cautious than others in fully endorsing the model. Although the *multiregional* model is discussed, no author suggests that it provides a better explanation. Readers will need to review other recent books and articles for arguments in support of the *multiregional evolution* model.

I think all the authors would support more research, especially discovery and reporting of skeletal evidence from Middle and Upper Paleolithic sites in Europe, Asia, and Africa.

The book is well worth adding to your library as it presents very up-to-date information on an on-going contested topic in paleoanthropology, namely, who were our ancestors. The relevance of this book for the history of archaeology lies in continuation of the 85 year-old debate between the *multiregional evolution* and *out-of-Africa* models.

"One Grand Pursuit": A Brief History of the American Philosophical Society's First 250 Years. 1743-1993 by Edward C. Carter II. American Philosophical Society, Philadelphia, 1993. $10.00 (Paper).

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The American Philosophical Society (APS) was founded in 1743 by Benjamin Franklin (then only 37 years old) and is North America's oldest scholarly organization. The archaeological interests of Thomas Jefferson, who became its third president in 1797,