

The Fossil Trail:

How We Know What We Think We Know About Human Evolution

Ian Tattersall

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This volume is an informal account of the known paleoanthropological discoveries and associated historical information up to 1995. Aside from the academic facts, the book also includes descriptions of interactions between specialists in physical anthropology and evolutionary biology. The data is well-presented and situated within a general historical perspective comprising some famous debates, controversies, and hoaxes in human evolutionary studies. There are 17 chapters including Before Darwin; Darwin and After; Pithecanthropus; The Early Twentieth Century; Out of Africa ...; ... Always Something New; The Synthesis; Olduvai Gorge; Rama's Ape Meets the Mighty Molecule; Omo and Turkana; Hadar, Lucy, and Laetoli; Theory Intrudes; Eurasia and Africa: Odds and Ends; Turkana and Olduvai—Again; The Cave-Man Vanishes; Candelabras and Continuity; and, Where are We? Preceded by a list of abbreviations, the chapters are followed by an epilogue, bibliography, and index.

The first six chapters collectively represent the history of the discipline from its humble origins up until the 1940s. These chapters adequately mention such famous figures as Lamarck, Darwin, and Gould (among others) and the impacts of their views on (human) evolutionary studies and hominin phylogeny. In fact, the chapter titles are succinct (e.g. *Before Darwin*, *Darwin and After*, *The Early Twentieth Century*) and quite transparent about their respective contents. Such concepts as punctuated equilibrium and the recognition or definition of individual hominin species are discussed. Chapter One is crucial in that it introduces the topic and establishes the intellectual and philosophical backdrop for the subsequent chapters. Chapter Two discusses the evolutionary concepts devised by Darwin and also outlines the development of lithic analyses and the recognition of technological change by the earlier scholars. In Chapter Three, Tattersall introduces the fossil evidence from Java as initially reported by Dubois and explains the reasons for why Asia was considered to be the 'cradle of human evolution' during the later parts of the 19th century. Chapters Four and Five comprise a discussion on the evidence from Europe and other sites outside of Africa. An important feature is the mention of the Piltdown hoax and other sensitive issues of the time. In Chapter Six, the author goes back in time and discusses the discoveries made in relation to pre-*Homo* species. Important specimens from both South and East Africa are discussed in relation to their interpretations at the time. The second half of the same chapter highlights the discoveries made during the early part of the 20th century, including Neandertals and archaic *H. sapiens*.

After the lengthy historical narrative, Tattersall turns, in Chapter Seven, to the status of paleoanthropology during the middle of the 20th century. In characteristic 'Tattersall' style, this chapter presents a unique and easily-readable description of the academic situation from 1940 to the 1990s (or the modern Synthesis of evolutionary thought in relation to concepts established by Dobzhansky and Mayr). Another focus of Chapter Seven is the advent and utilization of more modern techniques (e.g., radiocarbon dating) by researchers, and the resulting data (dates).

While the first half of the book discusses the early researchers' emphasis on Africa and Asia, the remainder of the book highlights discoveries from Europe and Eurasia and also addresses such issues as cultural interpretations and the origins of modern humans. As much as the earlier historical description is 'neutral' in perspective, the latter portion of the book is more opinionated and insightful. For example, Tattersall notes how modern paleoanthropology has developed from the study of human anatomy rather than general and comparative biological diversity. He compares these facts with the impact from theology at various intervals in the history of the discipline. Most importantly, he also makes obvious (yet again) his support for the 'Out of Africa' scenario of human evolution rather than the 'Multi-regional' hypothesis. He backs his views with data gathered from paleontology, Paleolithic archaeology, and genetic studies.

Chapters Eight (*Olduvai Gorge*), Ten (*Omo and Turkana*), Eleven (*Hadar, Lucy, and Laetoli*), and Fourteen (*Turkana and Olduvai—again*) discuss the evidence from Africa, while Chapter Nine (*Rama's ape meets the mighty molecule*) highlights fossil discoveries in Asia and the impact of molecular studies in addressing associated phylogenies. Chapter Eight presents the then-known data from Olduvai Gorge and starts with the earliest discoveries (*Paranthropus* and *Homo* specimens) made by the Leakeys from the 1930s to the 1960s and the subsequent application of the K/Ar dating method. Again, we are taken back in time in Chapter Nine, which addresses the recognition of specific Miocene apes from northern parts of the Indian subcontinent as predecessors of the *Homo* lineage and subsequent interpretative revisions. This is discussed in the context of molecular genetics and its implications on phylogenetic constructions, where the Ramapiths were taxonomically relegated to hominoid status. Additional infamous localities from East Africa are represented by Chapter Ten, which reviews fossils from the Kibish Formation (Omo) and the Koobi Fora beds (Lake Turkana). This chapter also includes the significance of the KNM-ER 1470 specimen and the related KBS-tuff dating controversy. Lucy and other australopiths (and some *Homo* specimens as well) take a center place in Chapter Eleven, with an emphasis on the anatomy and locomotion of *A. afarensis* (according to Lovejoy and others).

Excepting Chapter Fourteen, which reverts back to Olduvai Gorge and Turkana, the remainder of the book touches upon such issues and concepts as punctuated equilibria and cladistics (Ch. 12); additional important fossils from the Old World, albeit considerably younger than in earlier chapters (Ch. 13); the role of subsistence in early hominin adaptations, recognizable taphonomical processes, and cognitive interpretations and lithic analyses (Ch. 15); and, changing evolutionary syntheses, the significance of mitochondrial DNA; multi-regional and Out-of-Africa scenarios, and various dating methods and their impacts (Ch. 16). The last chapter (17) summarizes the concepts discussed in the previous chapters and appraises the status of paleoanthropology by including a cladogram and an evolutionary tree with the relevant type specimens in time, space, and evolutionary relationships.

There are a number of aspects which can be critiqued. The subtitle of the book is misleading when compared with the book's content. It implies that the book is solely about the *methodological* aspects of paleoanthropology, a theme which is *not* the primary subject and only marginally discussed. Considering the number of chapters dedicated to the strong historical predilections, a more apt subtitle would have been: "*What we once thought we knew about human evolution and why*".

The map of Southeast Asia on p. 65 could have been as well illustrated as the one on p. 78, thus placing Southeast Asia in global geographical context more vividly. Considering the depth and breadth of the topic discussed (human evolution), the epilogue could have been philosophically more robust and significantly longer in length. Finally, the index was not particularly comprehensive—words/topics such as "Asia" and

“India” are missing. Although Tattersall includes excellent drawings of many of the hominin specimens concerned, some photographs of these specimens and associated sites would have enhanced the volume considerably. In addition, some of the (ink) illustrations are not consistent in their quality—a result of more than one contributing artist (e.g., pp. 10 and 13).

Most importantly however, there are numerous features absent in the volume. These would have been more useful in understanding the general topic. They include: presenting a greater number of different hominin evolutionary trees rather of just one; providing a comprehensive but basic timeline outlining important historical events (e.g., publication of *The Origin of Species*, hominin fossil discoveries); acknowledging data (or a lack thereof) from key geographical areas (e.g., India); presenting a table or chart that briefly lists the physical attributes (e.g., brain size, cranial description) of each respective hominin species for comparative visualization; listing the figures before Chapter One; providing a map of the Old World showing important fossil and archaeological localities; and, supplying separate maps for localities in Europe and Near East. In retrospect and in comparison to Tattersall’s other volumes (pre- and post-1995), the deficiencies described above make this volume appear incomplete. At times, Tattersall is skeptical when mentioning such issues as the cognitive abilities of Neandertals compared with modern humans and associated lithic toolkits, and ignores relevant data from parts of Europe (e.g., Spain). Since the book was written, some of these views have been challenged and even disproved and it is assumed that future work will be adequately updated. This being said, the book simultaneously possesses numerous positive attributes as well. In fact, the book reflects the author’s vast knowledge and extensive experience in paleoanthropology and an updated edition of this enjoyable-to-read book would be most welcome.

Tattersall often comes across as being strongly opinionated in his writings, although his comments and views represent empirical assertions coming from an extremely well-read and experienced scholar. For example, this book is well-condensed considering the amount of paleoanthropological data addressed. The information is properly organized (in ‘vintage Tattersall’ style) and perfectly suitable for the lay public who generally do not want to become enmeshed in the often overwhelming scientific details. The facts are accurate and none of the interpretations or views are particularly biased in their presentation. The author intricately weaves our notions of human evolution and links these facts with the social and political atmospheres prevalent during the respective discoveries over the last century and half. The reader is well informed about the scientists and other figures that contributed significantly (and often indirectly) to defining and re-defining the discipline of paleoanthropology, as we know it today. Tattersall also introduces our recognition of the various hominin species and associated constructions of *evolutionary trees* as new discoveries were made over the decades. In that regard, the author is fair in his presentation of the evidence known up until 1995, which includes views contra to his own. He also acknowledges the deficiencies of the discipline and states that they exist in paleoanthropology more than in any other science. Most of these problems are historical and include assumptions and biases at various levels, many of which continue to exist today. He is also open to new interpretations in the future, resulting from more discoveries and better-developed techniques of analyses. Finally, Tattersall includes a comprehensive bibliography for each chapter, so the reader can pursue more detailed literature.

Note: This book was published in 1995 and numerous reviews and comments have been offered by various specialists and other readers. These opinions range from superb to criticizing Tattersall’s approach and his views of the fossil hominin record and associated interpretations throughout the history of the discipline. Some examples of these opinions are: a comprehensive review of the vast literature and data; a book often recommended for and by general public; up to date (until 1995); well-written, well-illustrated, and fairly

inexpensive; fair and un-biased views and presentation of the data; confusing in some of its historical aspects; no photographs; and, no color illustrations.

Book Review: The Fossil Trail: How We Know What We Think We Know About Human Evolution. Ian Tattersal September 1997. The Quarterly Review of Biology. Tectonic movements and volcanism in the African Rift have usually been considered of relevance to human evolution only at very large geographical and chronological scales, principally in relation to long term topographic and climatic variation at the continental scale. At the more local scale of catchment basins and individual sites, tectonic features are generally considered to be at worst [Show full abstract] disruptive and at best incidental features enhancing the preservation and exposure of early sites. The study of human evolution is a multidisciplinary effort known as paleoanthropology. The consensus among scientists is that early hominids first appeared in Africa and shared a common ancestor with archaic chimpanzees. After a period of great diversity, hominids spread from Africa to both Europe and Asia and, eventually, the sole surviving species of *Homo sapiens* emerged. Description. Evolution can be thought of as the adaptation of living organisms, over time, to their environment. Adaptation occurs constantly, so evolution can never be thought of as being complete. The fossil trail: How we know what we think we know about human evolution. London: Oxford University Press. Google Scholar. 8.