

Life among stones and bones

Jacquetta Hawkes

Disclosing the Past: An Autobiography.

By Mary Leakey.

Weidenfeld & Nicolson/Doubleday: 1984. Pp. 215. £12.95, \$15.95.

THE Leakey family, Louis, Mary and their sons Richard and Jonathan, have between them done more to reveal the early ancestry of the human family than the rest of the scientific world put together — or so it seems. Working together and separately in Kenya, Tanzania and Ethiopia, they have unearthed a prodigious number of primate fossils from Miocene apes to early forms of *Homo sapiens*. At the same time they, and Mary in particular, have made an important contribution to our knowledge of the earliest tool forms and their evolution.

I cannot resist thinking of the Leakeys as a unit, yet this book is very much a personal autobiography, opening with chapters on Mary's childhood with its constant travel dictated by her much-loved painter father. She had no regular schooling and drove away unhappy governesses. Can there be any other person today who has never passed a single examination and yet is heaped with honorary degrees and exalted academic honours of all kinds?

Through her father, Mary was already seriously interested in archaeology when, in 1933, she met Louis and they were soon irresistibly in love. Their association, and Louis's abandonment of his wife, rocked Cambridge and echoed round the archaeological world: Mary tells the story fully and with honesty. In the long run this scandal may have been a boon to science, for it meant that Louis, already known for his discoveries in East Africa, got no further support from his college and so was led to settle with Mary in his native Kenya.

In the late 1930s and through the war years they were ceaselessly active in exploration and digging, all the time so desperately short of money that their lives were hard and their work was handicapped. Elspeth Huxley observed "they live on the smell of an oil rag". Yet during the war their great discoveries began — outstanding among them Olorogesailie, where Acheulean handaxes lay massed on the ground like fallen apples, and the Miocene fossils of Rusinga Island in Lake Nyanza, where later Mary's extraordinarily sharp eye was to spot the first skull of *Proconsul*. Although this genus of ape has proved not to be a direct human ancestor, the find, made in 1948, was to lift Mary towards the heights of her independent career.

By this time Louis's staging of the First Pan-African Conference had brought African prehistory wide recognition and helped at last to attract sufficient funds for

the Leakeys to make regular excavations at Olduvai, the great gorge that slices through two million years of Stone Age history. After several seasons there, in 1959 Mary made the discovery which, she says, marked the second turning point in her life after that of *Proconsul*. This was the skull Louis was soon to announce in *Nature* as *Zinjanthropus*, a new genus — which he subsequently had to accept as a robust australopithecine.

"Zinj", alias "Nutcracker Man", brought the Leakeys popular renown and ample funds from the National Geographical Society. Ironically, Zinj had in fact been a disappointment to Louis, since he had always longed to find an early *Homo* which would expose the australopithecines as an abortive sideline of evolution. He was therefore overjoyed when, within a year and slightly lower in the same stratum, Jonathan came upon a larger-brained, more-gracile hominid. He was immediately recognized as having made the tools hitherto attributed to Zinj, and presently Louis dared to name him, again in this journal, as *Homo habilis*. Readers will recall the subsequent

controversy, which continues yet.

Cautiously, Mary recognizes *Homo habilis*, but it is just because she regards wrangles about our ancestral tree as premature — and odious — that she has preferred stones to bones, concentrating her research on material culture. She is still working, and the detection, not so long ago, of human footprints proving beyond doubt that hominids were walking upright over three million years ago, is one of her greatest triumphs.

Disclosing the Past is artlessly though agreeably written, and follows a chronological progress on the course of which science mingles with family and domestic affairs; in particular, the amazing variety of pets that have always shared Mary's homes here occupy many of her pages. I should judge that this very personal, informal chronicle, by a cool observer of both herself and events, will prove a valuable source for future historians of East African archaeology. □

Jacquetta Hawkes (Mrs J.B. Priestley) is an archaeologist and author of many books, among them Mortimer Wheeler: Adventurer in Archaeology (1982).

Truth on the ground

Derek Ager

Memoirs of an Unrepentant Field Geologist: A Candid Profile of Some Geologists and Their Science 1921-1981.

By F.J. Pettijohn.

University of Chicago Press: 1984. Pp. 260. \$25, £23.

ASA regular reviewer, I admit that I do not always read every word of all the books that are sent to me. Life is short and literature is long; I hope I do no injustice by my judicious skipping. But with this book I can honestly say that I read every word and they were all fascinating.

From the title I expected a stout defence of field geology by one of its greatest protagonists, and I presume I was asked to review the book because of remarks I published recently to the same effect. In fact I drafted a tentative opening to this piece saying that I felt like the madam of a brothel being asked if I approved of sex. That still applies and is exemplified by Professor Pettijohn's cry "Why, oh why, can't geology be taught where geology is and not in the lecture hall?". But although the title indicates the author's basic philosophy, the book is much more than that.

Francis Pettijohn was in at the birth of most of the great developments in geology this century, from geochemistry and isotopes to marine geology and basin analysis. In sedimentology he was truly the midwife and through the book we see the vigorous growth of that infant with its crucial importance to the rapidly expanding oil industry in the age of the motor-car.

Of course those of us like Pettijohn, who resist the urge to leap into black boxes, are likely to be labelled as old-fashioned and reactionary. When the thin section was introduced to geology by that great man H.C. Sorby (one of the few British geologists mentioned here), there was a similar resistance to "looking at mountains under a microscope". But fortunately geologists continued to look at mountains just as they now check their satellite pictures with what is quaintly known as "ground truth". What Pettijohn is saying is that there is no other kind of truth. At the same time, like the first-rate geologist he is, Pettijohn makes use of all the tools that are available to him. Thus he was a pioneer in the use of the aerial magnetometer for mapping the Lake Superior ironstones (it had only previously been used for detecting submarines).

But we start from the world of a small Mid-Western town at the beginning of the century, with an unpaved main street lined with hitching posts; the heroic age of American exploration had just ended, with the last of the covered waggons and the great gold rushes. Pettijohn's parents were school teachers in Wisconsin. His father later moved into local university administration and then to the University of Minnesota where Pettijohn began his formal geological education. His distinguished career unfolded through a series of universities, from Minnesota to Berkeley, to Chicago and to Johns Hopkins (the last move largely because Chicago had incredibly abandoned field geology). Like many academic geologists in the United States, he also worked for the oil industry and for the US Geological Survey.

There is in the book more about geolo-

gists than geology. The author seems to have known all the leading participants in the development of American geology during the twentieth century. The old departmental battles are fought over again and we are impressed or bullied by the Great Men; I was particularly taken by the portraits of A.C. Lawson, the "King" at Berkeley (who fathered a son at 88) and of Harlen Bretz (one of my own heroes) who was belatedly awarded the Penrose Medal at the age of 97. Yet there is also a great deal about a vast variety of geological topics, from teaching methods to the effects of current history on the geological world (though to a European the great depression and prohibition seem to figure larger than the two World Wars).

Included, too, are day-by-day accounts of Pettijohn's long early canoe journeys to the north, with painful portages and campsites on Indian graveyards, plus the ever present mosquitoes and blackflies. We experience with him the excitement of going and seeing geology, for instance the discovery of a Precambrian tillite and the three-billion-year-old conglomerate that was the subject of his PhD thesis (on a lake island in northern Ontario). And we are reminded of a world in the early 1930s when \$200 was enough for the expenses of a three-month field season on the Canadian Shield together with those of a graduate field assistant. Pettijohn was always mapping and studying sections, but he was at the same time asking fundamental questions such as how one produces pure quartz sands before the development of land vegetation.

Though the author's main interest is in the sedimentary rocks, he does not say much about fossils. One wonders if this is the result of an early education, in which the literal truth of the Bible was taken for granted, and a first teaching job in a small college where geology had started out as a "Department of Harmony of Science and Revelation". But among his many distinguished later students it is interesting to note John Scopes, the Tennessee school teacher who was to be tried in 1925 for teaching the theory of evolution.

It was observed of Winston Churchill that he both made history and wrote it. Much the same might be said of Francis Pettijohn. This is a splendid, readable history of American geology in the twentieth century, by one who played a great part in its making. □

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Review supplements in *Nature*

Dates of the review supplements to be published in 1985 are: Textbooks 7 March; Spring Books 25 April; New Journals 26 September; and Autumn Books 14 November.

The journals review issue will cover journals which first appeared between June 1983 and May 1984. Publishers will be sent further details in May of next year.

The Pleistocene ways of death

Leonard Krishtalka

Quaternary Extinctions: A Prehistoric Revolution.

Edited by Paul S. Martin and Richard G. Klein.

University of Arizona Press: 1984. Pp. 892. \$65.

THE plot seems simple enough. At the end of the Pleistocene, between 12,000 and 10,000 years ago (yr BP), the mammalian faunas of two continents were decimated. North America lost 33 genera (or 75%) of its megafauna (body size of 44 kg or greater) and four genera of small mammals. The extinctions and extirpations struck two entire orders, the Proboscidea (mammoth, mastodonts, gomphotheres) and Perissodactyla (horses, tapirs), the families of camels, ground sloths, glyptodonts and peccaries, and genera of cheetah, sabertooth cat, bears, giant rodents, deer, musk oxen and moose. In South America, the 46 genera that became extinct were all large mammals: edentates, rodents, carnivores, endemic ungulates (litopterns, notoungulates), horses, mastodonts, peccaries, camels and deer.

Australia's fauna fared no better. During the late Pleistocene, between approximately 40,000 and 15,000 yr BP, some 55 species vanished. The megafaunal tombstone reads two echidnas, two marsupial carnivores, three wombats, seven diprotodonts (large marsupial herbivores), 33 macropodids (kangaroos, wallabies and their relatives), a varanid lizard, a horned tortoise, three birds and a giant snake.

In contrast, the faunas of Europe and Africa emerged from the Pleistocene comparatively unscathed. Of the 13 genera that disappeared from Europe, three (woolly rhinoceros, woolly mammoth, giant deer) were true extinctions, whereas the remainder (rhinoceros, horse, dhole, hippopotamus, musk ox, hyaena, antelope, elephant) survived elsewhere. In Africa too there were numerous local extirpations, but only a handful of species (long-horned buffalo, giant hartebeest, giant Cape horse, two springbok and a warthog-like pig) vanished from the continent at the Pleistocene-Holocene boundary. Africa had already suffered the extinction of 21 genera (one primate, one carnivore, 19 artiodactyls) during the early Pleistocene (1.8-0.7 Myr BP), and nine genera (one elephant, one horse, seven artiodactyls) during the middle Pleistocene (0.7-0.13 Myr BP).

Asia, like Europe and Africa, appears to have suffered only modest losses at the end of the Pleistocene, but an accurate checklist of the genera and species involved has yet to be compiled.

Now the plot thickens: is it a "what-

dunit" or a "whodunit"? One school of palaeobiologists blames rapid climatic and environmental change, namely, the final glacial retreat at the end of the Pleistocene and its consequences: a decrease in equability and in the diversity, quality and quantity of plant resources; a concomitant increase in "continentality" of climate, in seasonal extremes, and in the homogeneity and zonation of plant communities. These biotic changes played havoc with late Pleistocene, co-evolved ecosystems, such as grazing and browsing associations and gestation and growth periods among mammalian herbivores, quickly leading to the extinction of the megafauna, as well as dwarfing among the extinct and surviving lineages. This "glacial retreat" model is specific to the Americas, Europe and Asia,

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REASONS

Peter Murray

Extinct — *Elasmotherium*, from the steppes of Eurasia.

but climatic-environmental change is also invoked to explain the earlier extinctions in Africa and Australia.

A second school implicates a different but familiar culprit, *Homo sapiens*. It claims that a rapidly spreading "front" of palaeolithic hunters decimated the now extinct megafauna of the Americas, beginning in Canada about 12,000 yr BP and ending in Patagonia some 2,000 years later. The same "overkill" occurred in Australia following man's first invasion about 40,000 yr BP; in Africa, the shadow of Acheulean culture hangs over the early Pleistocene extinctions.

For more than 100 years natural historians have camped on either side of this Pleistocene battlefield: climatic-environmental change versus human overkill. Into the fray now marches *Quaternary Extinctions: A Prehistoric Revolution*, a volume armed with 38 chapters and 47 contributors. Extinction is no laughing matter, but, after reading this work, I'm reminded of the quip of the American humorist, Robert Benchley: "The world is divided into two kinds of people — those who divide the world into two kinds of people and those who don't". The two camps, still divided, are almost as entrenched as ever. Nevertheless, the editors, Paul S. Martin and Richard G. Klein, have produced a superb single-volume treatment of Pleistocene-Holocene extinctions and of the debate which surrounds them.

The 38 chapters are organized into seven