Hominid Dualism

Swartkrans. A Cave's Chronicle of Early Man. C. K. BRAIN, Ed. Transvaal Museum, Pretoria, South Africa, 1993. xii, 270 pp., illus. R100. Transvaal Museum Monograph no. 8.

Behind the flashy glamour of discoveries of early hominids lies decades of meticulous and arduous research. It takes vision and daring to organize and carry out paleontological expeditions that might result in finding human ancestors but painstakingly careful analyses to understand the full significance of the results. The Swartkrans projects headed by C. K. Brain are a wonderful example of what a persistent and competent study can reveal about the human lineage.

Persistence and competence are two of Brain's virtues. He began work on the geology of Swartkrans in 1951. Beginning in 1965 he skillfully led the Swartkrans Paleontological Research Project for an uninterrupted 21 years. The results have been remarkably successful. This volume presents the findings of the 1979–1986 excavation in 13 chapters by 12 authors. Topics include geology, taphonomy, paleontology, anatomical features of newly discovered hominids, archeology, stable carbon isotope studies, and much more. The foreword by F. C. Howell provides an excellent summary and overview of the entire book.

Swartkrans became famous from the discoveries by Broom and Robinson of "robust" australopithecines and early *Homo* between 1948 and 1953. Broom and Robinson's work was the first to show that at least two species of early hominid coexisted. Both were human-like in their bodies, but they were quite different in their craniodental morphology. Early *Homo* had a much more human-like dentition whereas the "robust" australopithecines were specialized for heavy chewing. Robinson developed the view that the "robust" australopithecines (which he put in a distinct genus, *Paranthropus*) were an extinct side branch in human evolution specialized for eating plant foods in contrast to the contemporary species of *Homo*, who were tool producers and were more omnivorous and carnivorous. Robinson's view set the stage: Two hominid lineages existed in the Plio-Pleistocene, one "robust" that went extinct and one "gracile" that evolved into *Homo sapiens*. Is it true? Brain's work at Swartkrans approaches an answer by extraordinarily careful and meticulous work carried out by a skillful staff and a team of scientists.

The Swartkrans site covers only about half the area of a football field. It lies in the highveld grassland of the Transvaal, South Africa. The mammalian fauna (reported on by V. Watson, C. S. Churcher, and A. Turner) and the stable carbon isotopes (J. A. Lee-Thorpe and N. van der Merwe) reveal a habitat during times of infilling that is much like what is found today except for the existence of a larger expanse of nearby water in Member 3 times. The geological history of the site is complex, and none but the latest of its fossil-rich sediments can be dated precisely. The earliest layers (Member 1) derive from two separate infillings, both occurring about 1.8 million years ago (a date established by biostratigraphy). Member 2 is about 1.5 million years old, and Member 3 may be as young as 1 million years although there is some evidence that it is slightly older. Member 4 remains unexcavated and Member 5 is radiocarbon dated at 11,000 years. The macrofauna of Members 1 through 3 probably were victims of predation by leopards, hyenas, and larger canids without much porcupine activity.

Among the animal remains are ancient people. F. E. Grine describes the new hom-

"Laura Brain [1966] preparing fossils for removal from Swartkrans breccia with dilute acetic acid." [From *Swartkrans*]

"Clark Howell . . . examining Swartkrans fossils with Bob Brain at the Transvaal Museum," 1970. [From *Swartkrans*]

"Lime-mining at Swartkrans interrupted the Broom-Robinson excavation shortly after it began. Here [1950] John Robinson and Robert Broom are shown with one of the cocopan trucks used by the miners to transport the travertine out of the cave." [From *Swartkrans*]

"One of the problems when looking for fossils in a hard calcified matrix is that the specimen often has to be broken, in order to discover that it is there. For this reason, a clean, predictable break is very desirable, so a machine was made . . . to ensure such breaks in blocks of Swartkrans breccia," shown here being used by Absalom Lobelo, 1968. [From *Swartkrans*]

"In April 1984, a collection of original hominid fossils from Swartkrans was taken to New York for the *Ancestors* exhibition." Here Milford Wolpoff and Chris Stringer examine specimens at a working session of paleoanthropologists. [From *Swartkrans*]

inid craniodental material. "Robust" australopithecines make up most of the sample, although *Homo* is represented by one fragmentary mandible in Member 1 and by about 33 percent of the hominids from Member 2. Member 3 contains nine "robust" australopithecine individuals and no *Homo*. Grine finds support for his view that the Swartkrans "robusts" are distinct enough to warrant Broom's original name for them, *Paranthropus crassidens*. Howell has championed this terminology for a long time, but most authors in this volume and elsewhere use the name *Australopithecus robustus*. Grine documents the interesting fact that this species did not change in morphology through the time span of Members 1 to 3, which may be as much as 0.8 million years. The contemporary *Homo* specimens are too fragmentary for much interpretation. The 38 hominid postcranial specimens are mostly from hands and feet, but R. L. Susman makes a startling interpretation: the hands of the "robust" australopithecines had the key morphological features associated with the dexterity needed to make tools.

The stone tools of Members 1, 2, and 3 are much like the developed Oldowan core choppers of East Africa, according to J. D. Clark. The bone-digging sticks of these members show signs of use for extracting bulbs and roots, according to Brain and P. Shipman, and some of them show prolonged use and a distinctive polish that may have been developed by their use in preparing animal skins. Controlled use of fire is convincingly demonstrated to have been consistently used in Member 3 times by Brain, A. Sillen, and T. Hoering. Cutmarks on bones in Member 3 show stone tool use for butchering according to R. Newman and Brain.

So who made the tools and cut-marks, and who controlled fire? Early *Homo* is the obvious answer, but can the "robust" australopithecine be excluded? On a more general level, is Robinson's dichotomy between tool-producing *Homo* and primitive "robust" australopithecines still useful? Consider the Swartkrans evidence: First, the hands of the "robust" australopithecines were, according to Susman, much more like later *Homo* than like earlier australopithecines. Second, the stable–carbon-isotope studies of Lee-Thorpe and van der Merwe indicate a generalized diet that may have included meat (a conclusion supported by strontium-calcium ratios reported elsewhere by Sillen). Third, the only hominid remains recovered from Member 3 are those of "robust" australopithecines, and that member has the first evidence of controlled use of fire and butchering. Fourth, except for features related to heavy chewing, the crania of the South African "robust" australopithecines are much more like early *Homo* than they are like earlier australopithecines. Fifth, their brains were as large as those of contemporary *Homo* relative to body size. As Brain points out (p. 263), "the Swartkrans investigation has been characterized by surprises, so an australopithecine fire-tender would not be out of character for this remarkable cave."

This volume represents the triumph of a style of research exemplified by C. K. Brain. There is no advocacy of preconceived ideas but a genuine delight in the surprises. George Gaylord Simpson called it simple curiosity. It evokes trust and invites further inquiry.

Henry M. McHenry
Department of Anthropology, University of California, Davis, CA 95616, USA

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