

glacial period provided the sediments in which the bones were buried.

In China, the dating methods have been no more satisfactory than in Java. The many published descriptions of the Peking Man excavations--which excavations have been the main source of information on Homo erectus in China--give confusing and often disagreeing reports. This is because the excavation work was done over a long period, from approximately 1922 to 1980 by several different persons and agencies, under the control of different nations. However, none of the reports describe any dating procedures which can really be accepted as reliable. The great majority of the human fossils and artifacts were found in the cave and limestone-quarry area at Choukoutien (now known as Zhoukoudian), about 37 miles southwest of Peking (now known as Beijing), buried in sediments some components of which were transported into the area by moving water. The article "Peking Man," by the Chinese paleoanthropologists Wu Rukang and Lin Shenglong (Scientific American, v. 248, June 1983, p. 86-94) gives a brief account of how they and other Chinese communist anthropologists and archaeologists used radiometric dating on sediments from the excavation site during the era of communist control from 1949 to 1980. On page 88 they describe some of the erosional and other changes through which the cave and surrounding area passed before, during, and after it was occupied by Peking Man.

As for the dating methods used, radiometric and fission-track dating are useful for determining the time of origin of igneous, crystalline, mineral particles such as those mixed with the burial sediments; but these methods can not tell us when the particles were transported from the site of their origin to the burial site. This problem, plus the fact that a high percentage of the fossil bones and artifacts were removed from their burial sites without the making of exact records of their precise position in the strata, indicate to us that the dating of Peking Man is not scientifically reliable.

Potassium-argon dating has been used a great deal on the australopithecine fossil finds in Africa, and the results have usually been between 2 and 4 million years. (For example, as stated by Eric Delson, in the article "Fossil Man," in the McGraw-Hill Encyclopedia of Science and Technology, 1982, vol. 5, p. 676.) But these dates are not at all certain, because the only way to apply potassium-argon dating in these investigations was to test the sediments (volcanic ash, gravel, etc.) which had been washed in to cover the fossils at some time in the past. Since the specific source of these sediments is not known (i. e., from which volcanic eruption they were derived), the sediments may be from an eruption much older than the bones are. This difficulty is briefly explained by Roger Lewin in the book Bones of Contention, Simon and Schuster, 1987, p. 192 and 194-195, and he tells how very much of a problem there was in trying to date the well-known hominid fossils unearthed in the Lake Turkana area in Kenya. He mentions both the problem of the volcanic ash having been transported in from considerable distances by run-off water, and the problem of "contamination with older rocks"--that is, with sediment grains eroded from older rocks and picked up by the water as it transports the volcanic ash (p. 192). For example, Lewin states that the volcanic-ash sedimentary rock layers in the area of the Koobi Fora fossil site (near Lake Turkana) yielded potassium-argon dates varying from 223 million to 0.91 million years. However, careful visual examination of the sediments can eliminate some of the worst samples. But, in any event, one or both of the two problems we have named concerning the reliable identification of the ash layers is a much more serious problem for dating practically all of the east Africa hominid fossil discoveries than evolutionary anthropologists will admit. Most books and articles on the African hominid fossil finds which are available to the reading public are careless and dogmatic in using the 2 to 4-million-year dates as though there were no doubt whatever regarding their accuracy. This careless dogmatism regarding dates is very evident throughout the entire article by Eric Delson cited above.