

ANTHROPOLOGY

New Age for Ancient Man

Radioactivity, new tool to date the ancestors of the human race, tells us that modern kind of man existed more than two million years ago.

By WATSON DAVIS

► IT HAS taken longer than previously credited for the kind of people now on earth to rise to become what we know as modern man. Evidence now is that man and his cultures extend beyond two million years into the past.

Radioactive dating has given new time determinations for human ancestors and evolution in the dim anthropological past.

The latest "clock" or dating method measures the amount of the chemical element argon in rocks to determine their age. This element is formed by radioactive disintegration from potassium and the ratio of these two elements therefore allows computation of age.

The date of the earliest skeletal remains, generally conceded "human," those of Zinjanthropus discovered in Olduvai Gorge, Tanganyika, was found to be 1,750,000 years when determined by the potassium-argon method by Profs. J. F. Evernden and G. H. Curtis, geologists of the University of California at Berkeley.

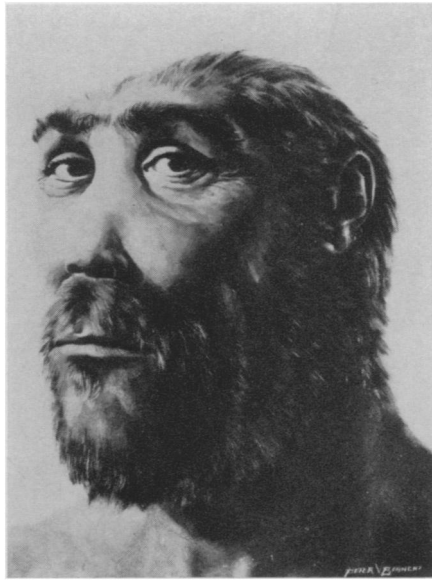
Tools Show Cultures Persisted

The primitive stone tools used by Zinjanthropus were of a culture that is believed to have persisted for about half a million years, or more, and was followed by Chellean cultures that continued until 400,000 to 450,000 years ago. The California geologists suggest it is reasonable that the tool style preceding Zinjanthropus, which is called Kafuan, lasted for a comparable length of time. Tool-making hominids thus are given an antiquity well beyond two million years.

Thus Zinjanthropus, the ancient African toolmaker, who lived some 1,750,000 years ago, and is referred to as an Australopithecine hominid, is the oldest kind of creature yet found that the geologists and anthropologists will allow in the human race. This kind of man was brought to light in 1959 by Dr. L. S. B. Leakey and his wife, Mary, British anthropologists of Coryndon Museum, Nairobi, Kenya, who have made a 30-year search for early man in Africa.

During the past two years the Leakeys have been digging at a site at Fort Ternan, Kenya, where they unearthed the jawbone of a 14-million-year-old unknown primate, new fossil member of the scientific group that includes both man and apes. This 14-million-year-old fossil was dated by the potassium-argon process and has been given the name Kenyapithecus wickeri, recognizing Fred Wicker, the orange grower who sent the Leakeys the first fossil finds from the site.

Kenyapithecus was not a man but seemingly belongs on the road between ape



National Geographic Society

WORLD'S EARLIEST MAN—The oldest "human" of 1,750,000 years ago, the African Zinjanthropus looked like this, as visualized by the artist Peter Bianchi, under the direction of Dr. L. S. B. Leakey, discoverer of the ancient skull. Copyright by National Geographic Society.

and man. He is a welcome find in the gap between Zinjanthropus and a primitive monkey, Proconsul, dated at about 15,000,000 years, an earlier Leakey find in Kenya.

Kenyapithecus seems to have had the potential of speech, because its upper jaw has what scientists call a canine fossa, an upper jaw depression that anchors in humans a muscle that helps control lip movements in speech. Kenyapithecus had another man-like characteristic, a very small canine or eyetooth, which in apes is generally very large.

The Leakeys are coming to the United States this spring, as they did last year, to report to the National Geographic Society which aids their explorations.

While the ape-man of Java, Pithecanthropus, discovered by the Dutch military surgeon, M. Eugene Dubois in 1891, has been dethroned as the oldest man, the opinion now is that he is over a half million years old, instead of the previous estimate of about 300,000 years. The experts in radioactive dating are eager to visit the site of that early discovery and make dating attempts.

Sinanthropus, the kind of early man discovered in China in 1935, needs further exploration and dating but this is difficult today in Communist China.

The search into man's evolutionary ancestral tree is one of the great continuing epics of scientific discovery and it is aided by the development of such methods as radioactive dating and better understanding of physical anthropology of both the human and prehuman species.

Evolution More Positive

The evolution of man from lower orders of animals and his kinship with the apes are more positive now than in the early days of evolution as set forth by Darwin, Huxley and the other pioneers. The time scale of man's evolution and morphological change is similar to that of other animals and he is part of nature with them.

Man, before he became what we are willing to call men, stood erect, used tools, talked, used his brain, and probably used fire. Some of his attributes the anthropologists know from skeletal remains unearthed, often partial and fragmentary, and from the things, like tools, that are in the record of the rocks near him. We are sure that he loved and fought, but so did the animals from which he sprang.

There were dead ends of human evolution, such as the Neanderthals, but there are many open questions in man's ancestry, such as whether the Cro-Magnons, who produced the wonderful cave artists of France, were in the hereditary tree of men now living.

How did the races arise? This question is being seized upon by those who oppose integration and favor segregation of persons of different skin color, a problem in other parts of the world as well as America.

In investigations into the long and exciting past of the human race and the scientific and cultural questions they illuminate, the ability to tell how long ago things existed is extremely useful. The potassium-argon method is the latest and it supplements the other tools for the students of the past.

Radiocarbon dating stems from the research by Dr. W. F. Libby using the fact that cosmic rays in the upper atmosphere transmute the nitrogen of the air into a carbon of atomic weight 14 instead of the usual carbon weight 12. This radiocarbon washed down in rain to earth enters living things, which thus have within them a clock that starts radioactively ticking at a known rate and can be used to tell age.

Thus radiocarbon dates the relatively recent past, up to approximately 30,000 years ago. The fact that the direction of the magnetic field of the earth changes with time is the basis of another archaeological dating method generally applicable to relatively recent dates, as are tree rings, ther-

luminescence in baked clay and several other methods.

Potassium-Argon Method

The potassium-argon method, used so successfully on ancient man, works best upon older rocks although it has been possible to obtain ages of high precision on some rocks younger than 100,000 years.

The basis of the method is the decay of potassium atomic weight 40 into argon gas at the known rate of a half-life of 1250 million years. The argon of the air must be removed from the outer layer of the rocks being dated in order to obtain accuracy. For events of the last two million years, dates are obtained on volcanic rocks that are interbedded with either fossils, tools or glacial deposits. Fossils, tools or the glacial deposits are not dated directly, but there are dated potassium-bearing minerals or rocks that have cooled from the molten state at the time of the event being investigated.

If the volcanic rock buries the fossil, a date on the rock will date the fossil. The determination of the age of such a rock requires the precise measurement of its argon and potassium content. The potassium determination is done by flame-photometric analysis. The argon measurement is achieved by fusion of the sample in a high vacuum apparatus, the argon sample so released being compared with another argon sample of known size.

It is merely a matter of arithmetic to compute an "age," given the above two figures.

The minute quantities of argon gas accumulate in volcanic rock and since the rate of the argon formation is known, the age of the lava and the material included in it can be thus determined.

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ARCHAEOLOGY

Fate of Egyptian Temples Still Being Decided

► THE FATE of the ancient Egyptian temples threatened by the floodwaters to be created by the new Aswan Dam hangs in the balance.

The bold engineering plan to jack up the two temples at the edge of the Nile, putting them out of reach of the waters that will soon cover the valley, is still nearly \$30 million away from even beginning.

Serious work to save the ancient temples at Abu Simel cannot begin until the funds are guaranteed. The signing of the contract between the United Arab Republic and an engineering firm, scheduled for January 1963, has been postponed to late March.

The rescue operation to be performed on these two temples of the Pharaoh Rameses II should take about five years. Since the Aswan Dam is to be completed in 1968, the decision on the fate of the temples cannot be put off much longer.

The United Nations Educational, Scientific and Cultural Organization, sponsor of the project, has said that the funds for the operation have to be raised on a voluntary basis. Member nations have contributed \$27 million so far. The United Arab Republic has allocated \$11.5 million. If the rest of

the funds cannot be raised, another plan may have to be devised.

The current plan, a result of international collaboration, calls for cutting the temples out of the cliffs into which they were carved and raising them to safety with hydraulic jacks. The top of the cliff will be cut off to lighten the load—a total of 400,000 tons, the equivalent of eight Washington monuments.

Preliminary tunneling and exploratory work is now under way, but there is no guarantee that the age-old temples will outlast this decade.

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ARCHAEOLOGY

Ancient Dynasty Capital Excavated in China

► REMAINS of a Chinese capital that flourished during one of the most powerful and prosperous periods in Chinese history is now being excavated.

The excavation is being carried out by the Chinese Academy of Sciences' Institute of Archaeology.

The capital of the Tang Dynasty, 618-902 A.D., a period also known as the golden age of literature and art, now lies underneath the present city of Sian and its suburbs. Its boundaries stretch more than 36,000 feet.

The main streets of the capital, the extent of the chief buildings of the Imperial Palace, and the position of the well-known west market and 12 city gates have been traced. The layout agrees approximately with historical records and literary descriptions available. The streets leading to the city gates are wide. The largest going north to south is more than 450 feet wide and that going from east to west is more than 360 feet wide. The area outside the Imperial city and the palace proper was divided into 108 rectangular blocks.

The excavation of the Tang capital site has been going on since 1957 and is still continuing.

The vicinity of Sian was the site of two capitals of the Western Chou dynasty, 1200 to 800 B.C., and extensive excavations on some settlements of the dynasty have been carried out in the past few years.

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ARCHAEOLOGY

Wild Life in Troy—Bones Tell Story

► WILD LIFE in ancient Troy is being studied—really wild life.

Hundreds of baskets of animal bones, weighing two tons, have been excavated by the University of Cincinnati archaeologists. They will shed light on the kinds of animals and the ways to kill or domesticate them used in ancient Troy.

Archaeologists Dr. John L. Caskey, University of Cincinnati, and Dr. Nils-Gustaf Gejvall, University of Stockholm, expect to figure out the date when horses were first used in Greece.

The animal bone research will be conducted at the University of Stockholm, Sweden, under a grant from the National Science Foundation.

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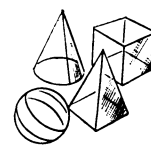


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