ANTHROQUEST

Research Related to Human Origins, Behavior and Survival.

Number 43 | *The Leakey Foundation News* | Spring 1991

Speaking of Neandertals

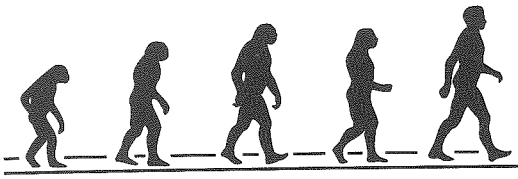
The specimen hasn't changed, but the eyes of the beholder have!

A more recent reconstruction of a Neandertal, taken from Coon 1939, shows a human-like Neandertal, shaved and dressed in a natty hat, coat and tie.

The beast within!

In 1888, when this early reconstruction of a Neandertal was drawn, scientists were impressed by the brutish, apelike and savage appearance of Neandertals.

See feature story on page 5.



STAFF

Leslie Anne Fox — *Executive Director*
Karla Savage, Ph.D. — *Program & Grants Officer*
Tanya Erdmann — *Administrative Assistant*
Pat Shipman, Ph.D. — *Guest Editor*
Lori Martin — *Art Director*

The L.S. B. Leakey Foundation was established in 1968 by a group of eminent scientists and informed lay people who recognized a critical need to strengthen financial support for new multidisciplinary research into human origins, our evolving nature and environmental future. It was named in honor of the man who has become known as the "the Darwin of pre-history," Dr. Louis S. B. Leakey.

The Foundation sponsors

- International research programs related to the biological and cultural development of humankind.
- Long-term primate studies which may help us understand how we evolved as a species.
- Scientific conferences, publications and educational programs designed to disseminate knowledge about our changing views of humanity's place in nature.
- Advanced training and education of students in all of these fields.

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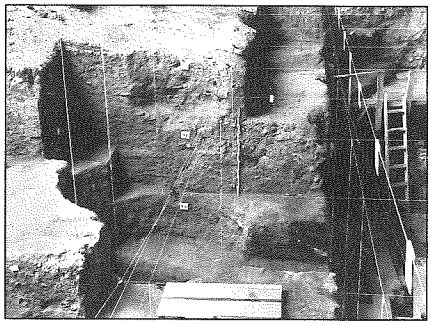
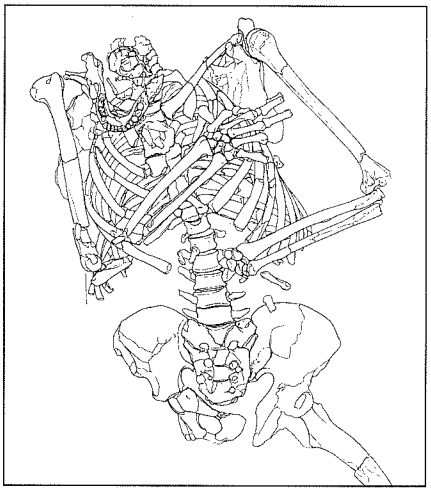
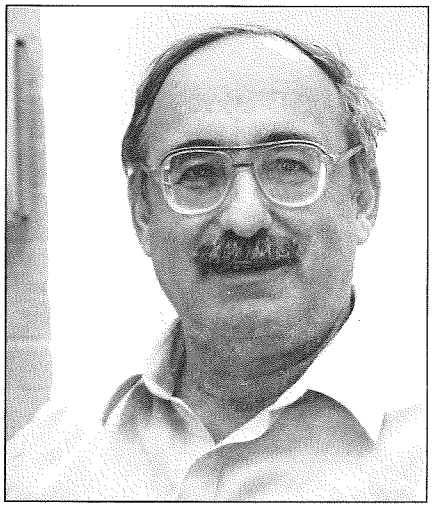
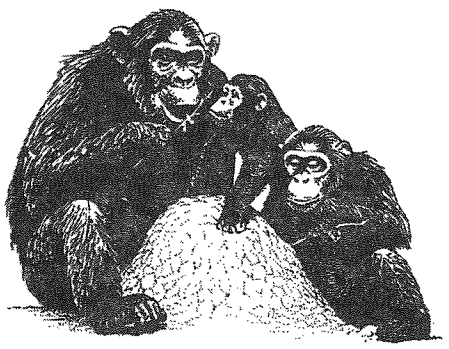
In This Issue







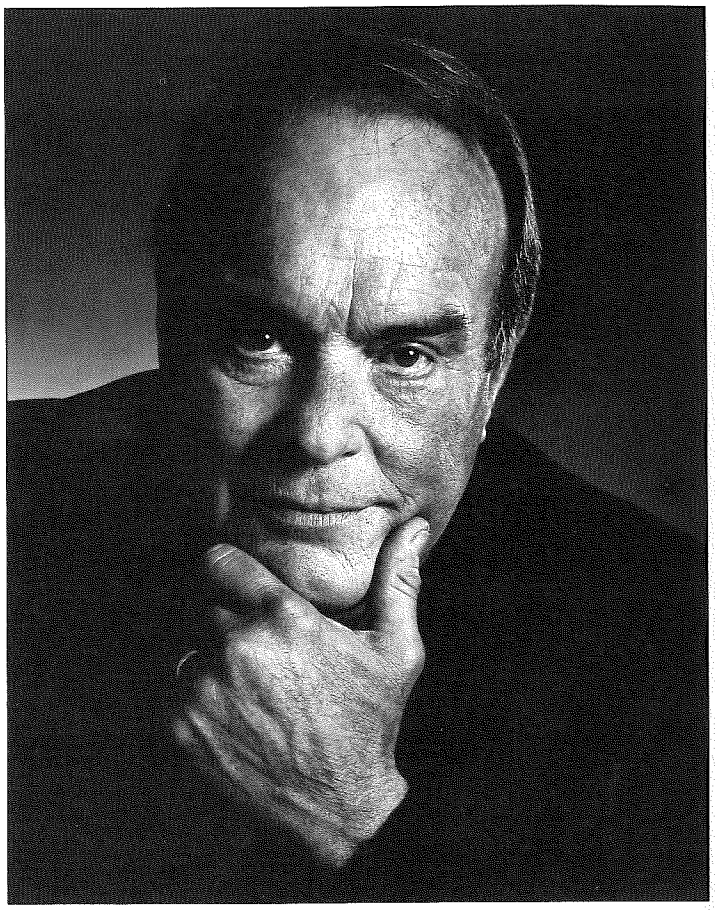


President's Message

The trustees, scientists, and members of the Leakey Foundation have always been explorers in countries far from home. Louis Leakey awakened the world to the importance of Africa in human origins research. Since the time of his great discoveries, other scientists have followed in his giant footsteps, venturing further afield to find evidence of our earliest beginnings. In fact, Leakey Foundation grant recipients have worked in over 100 counties throughout Asia, Europe, North, Central, and South America, as well as in Africa.

In general, the world has proven to be a benevolent place for this peripatetic crew, even when a local uprising, a wild animal or an exotic disease interrupts either travel or exploration. Occasionally, as in the past two months, we are jolted into the realization that although the world may be smaller it is not necessarily friendlier. The wide disparities in our cultures become especially noticeable when the world explodes into war. Increasingly, the juxtaposition of technological progress and the failure of civilization to abolish war forces us to confront the age old questions. Where are we headed as a species? What fate awaits us in a world where attempts at unity through disarmament treaties, the United Nations, Geneva conventions and the like can so easily be thwarted?

A few of our scientific expeditions and pleasure trips were temporarily on hold. Soon, we hope to put the awful reminders of our destructive capabilities behind us. What does the history of early man tell us that will shed light on these problems? Differences in culture and disputes over territory were no less common for our ancestors than they are for us. Are the same forces at work? The jury is still out on the issue of man's innate aggressiveness, his hunting or warlike behavior. Are such traits explainable in today's world? Are we living with past remnants of some atavistic need? Or conversely, have we developed the motivation to control, and therefore limit, the destructive uses of our own creative intelligence?

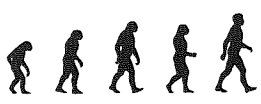


Photographed by Yousuf Karsh

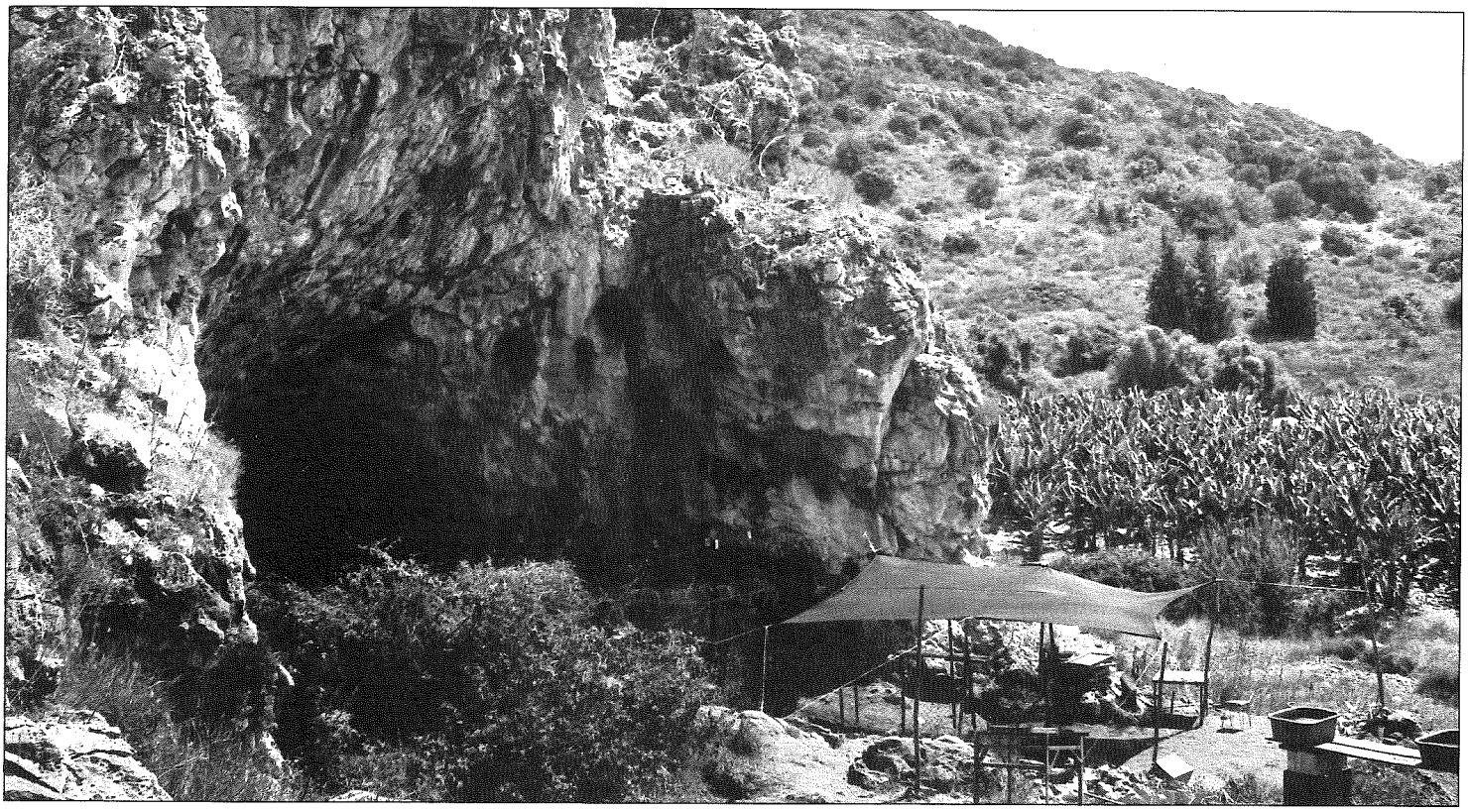
What has changed in man, if anything, since our ancestor defended his territory 100,000 years ago? The questions seem far simpler than the answers--but we search history because it is our only touchstone, and perhaps our only guide to survival.

Thank You,

Mason Phelps



Speaking of Neandertals



Kebara Cave*.... Even to the uninitiated, the name sounds mysterious, exotic, exciting. To anthropologists, Kebara is a well-known site, one of the most important sources of solid information about the once-dim and confused picture of the lives of Neandertals and modern man in the Near East. Major funding for this project has come from the Swig Foundation of San Francisco, California.*

The Questions

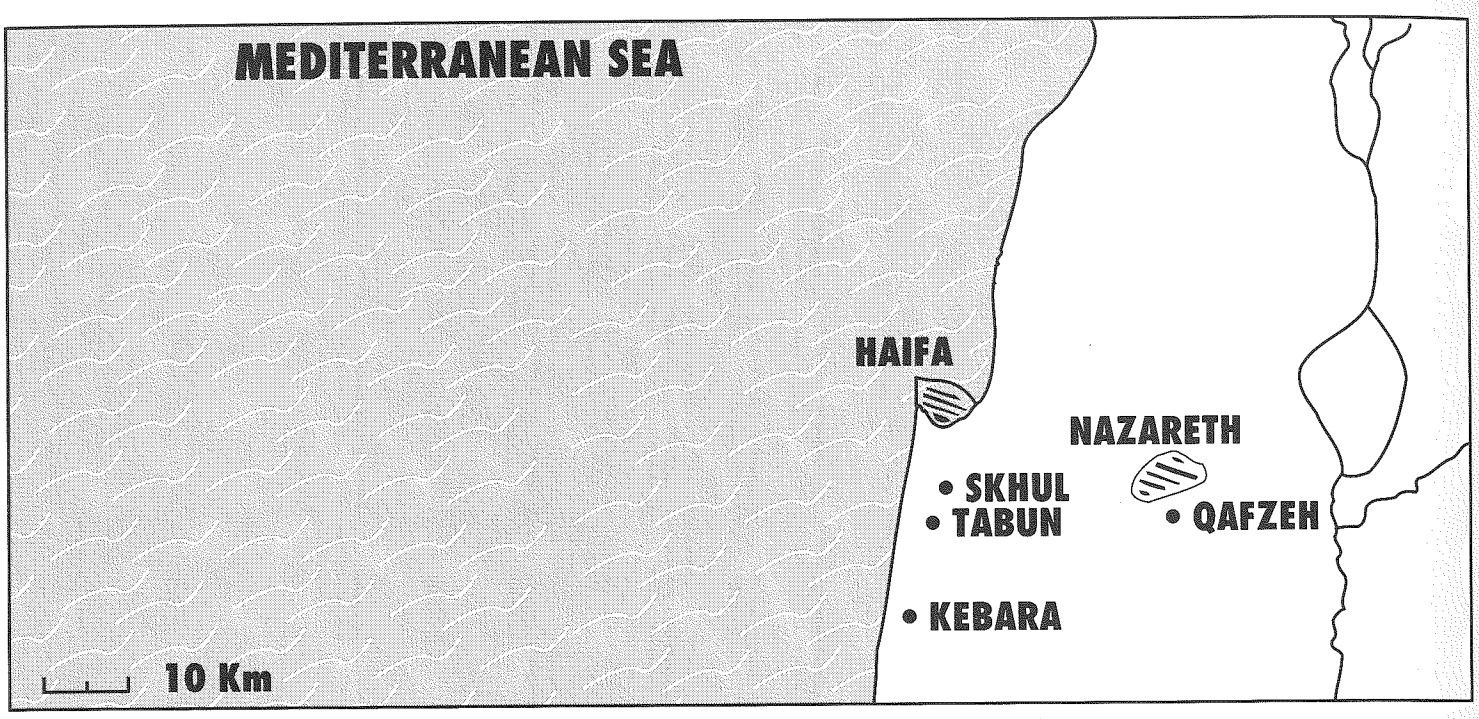
Since the discovery of the first Neandertals, in 1856, many questions have surrounded these enigmatic fossils. Two points have been especially contentious.

First, scientists and laymen alike have wondered who Neandertals were. Where did they come from, evolutionarily, and where did they go to? Were they the ancestors or the evolutionary "cousins" of modern humans?

Second, recent interest has focused on more complex issues. How did they live and move? Did their human-sized brains have the capacity for speech and social organization as we know them?

The Research Projects

Without a doubt, excavations at Kebara, and the nearby caves of Skhul, Tabun and Qafzeh near Mount Carmel, in Israel, have done much to provide the answers to these persistent questions. Though excavations in these caves started in the 1930's, it has been the combination of this early research with more recent excavations and analyses using new techniques that has proven so successful. Since the 1980's, the Leakey Foundation has been instrumental in providing vital funding to the international team of scientists focusing on the Kebara Cave materials. Directors of the Kebara Cave project include a new member of the Leakey Foundation's Scientific Executive Committee, Dr. Ofer Bar-Yosef of Harvard University, who is profiled on page 12. Other directors of the team include Leakey Foundation grant recipients Baruch Arensburg and Yoel Rak, both of Tel-Aviv University, and Eitan Tchernov of Hebrew University.



Important fossil sites in the Middle East. (*Map courtesy of John Shea, Harvard University.*)

And what extraordinary finds the project has made at Kebara! There are numerous hearths and irregular layers of whitish ash. Animal bones showing butchery marks from stone tools have been found in accumulations thought to be ancient, distinct refuse areas, just next to the hearth.

Kebara has also yielded many clues to the lifestyle of these ancient hominids. Some areas of the cave are littered with discarded artifacts that attest to their makers' mastery of the manufacturing process known as the Levallois technique. Analysis of the wear patterns on their edges, carried out by John Shea with Leakey Foundation funding, shows a predominance of woodworking tools. He concludes that wooden implements, long since deteriorated and lost, must have been an important part of their tool-kit. Shea also found evidence of stone-tipped spears, presumably used to kill animals; on other types of tools, he found traces indicating activities such as butchery and bone-working. See article in AnthroQuest #41. John Speth, studying the animal bones from Kebara, often found butchery marks, confirming Shea's conclusion that these animals were processed by Neandertals. In contrast, gnawing marks created by carnivores were rarely found on these bones.

Although fossilized hominid bones are among the rarest treasures sought by paleoanthropologists, Kebara has yielded fragments of many individuals, both adults and children. More surprising, recent excavations uncovered the largely complete skeletons of two Neandertals — an infant between 7 and 9 months of age, found in 1965, and, in 1983, an adult male, who was deliberately buried.

The story of the Neandertals and of the origin of modern humans has many chapters yet to be read. But the Kebara cave excavations have yielded valuable clues to the answers to many questions.

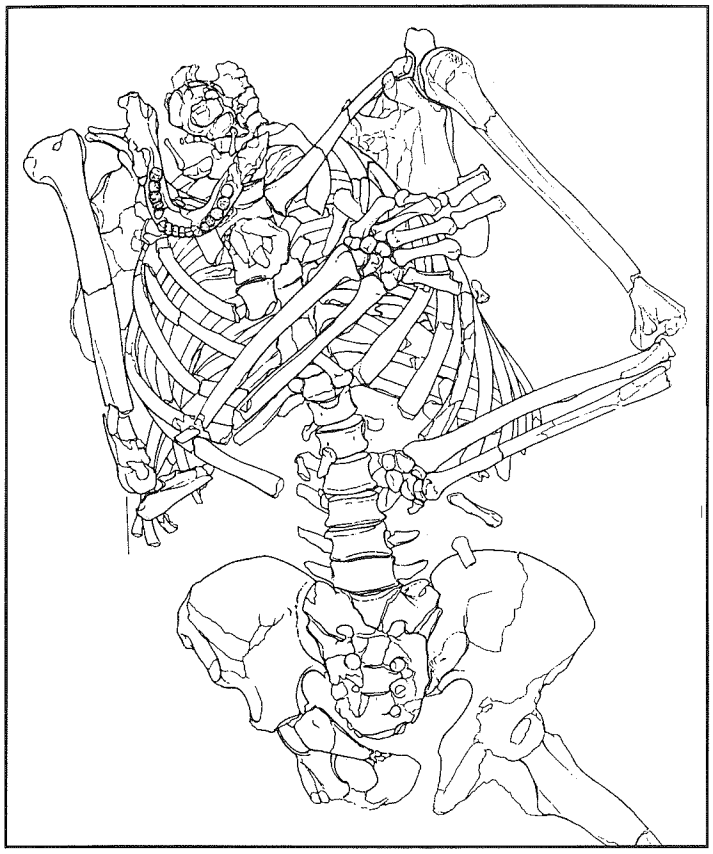
The Answers: Who were the 'Neandertals'?

Though the initial excavations focused on the archaeological remains, it is the skeletal remains from the Mount Carmel caves that have held the biggest surprises. Based on the record from western Europe, where many excellent Neandertal skeletons have been recovered, the received wisdom was that Neandertals appeared at about 100,000 years ago and inhabited Ice Age Europe until about 35,000 years, when modern humans appeared abruptly, apparently bringing with them a radically different set of artifacts.

Not so in the Levant! Although both modern humans and Neandertals are known from the Mt. Carmel caves, the story they suggest is very different. There is no apparent distinction between the tools used and made by Neandertals and modern humans in this region: all shared the same technology.

What's more, the sequence of hominids is different in the Levant than elsewhere. Using thermoluminescence (TL), a technique that reveals when flint tools were heated , a group headed by Frenchwoman Helene Valladas dated the Neandertal presence in Kebara cave to between 60,000 and 48,000 years ago. The intention was to compare these results to layers

at nearby Qafzeh Cave, which had yielded remains of anatomically modern humans. An early estimate based on Eitan Tchernov's correlation of various rodent species among the sites had suggested that Qafzeh was older than 85,000 years, but this technique does not give exact ages. But, when TL was tried on the Qafzeh flints, a date of 92,000 years (with an error of 5,000 years) was indicated.



The partial skeleton of an adult, male Neandertal from Kebara.

Could the more modern human skeletons actually pre-date the Neandertals by more than 32,000 years? This would blow the theory that Neandertals were the ancestors of modern humans sky-high. Anticipating controversy, the team tried a third method of dating, electron spin resonance or ESR; it yielded dates indistinguishable from those reached by the TL analyses.

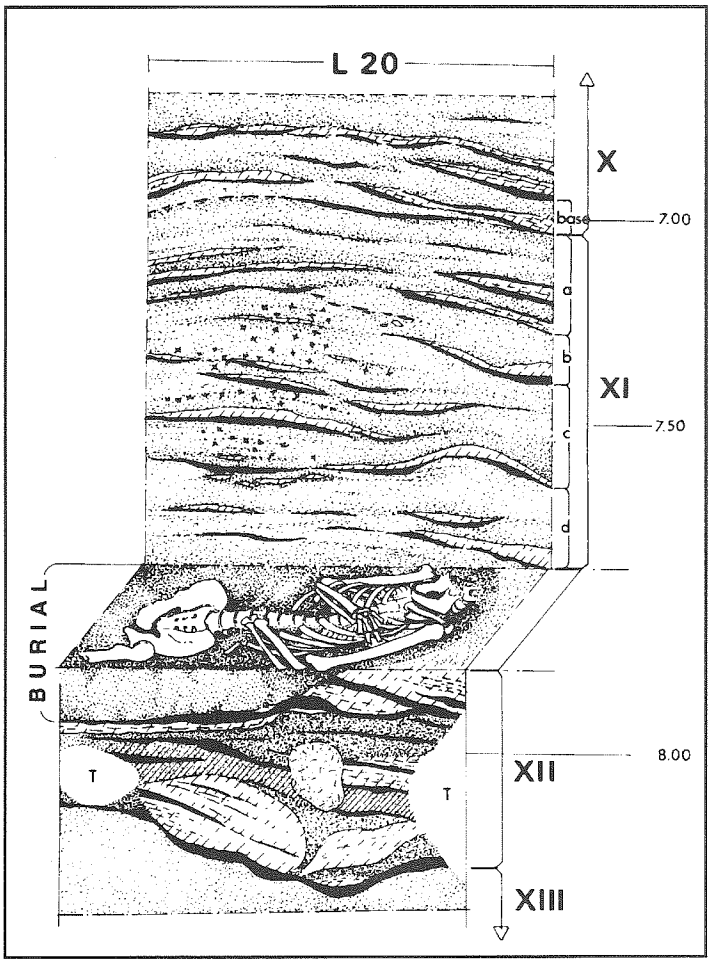
Both TL and ESR are relatively new methods of dating remains that require some further technical development before they are as reliable and widely accepted as, say, radiocarbon or potassium-argon dating. However, the team's confidence in their results is heightened by the fact that the methods concurred and yet have totally different potential sources of error.

The Kebara team's work indicates that, in the Near East, modern humans preceded Neandertals, by a wide margin. Unless more and still older Neandertal remains are found, they will continue to believe that Neandertals developed originally in Europe and migrated eastward when glacial conditions settled over much of Europe. Modern humans must then have come from somewhere else — perhaps Africa? The search continues.

How did Neandertals live?

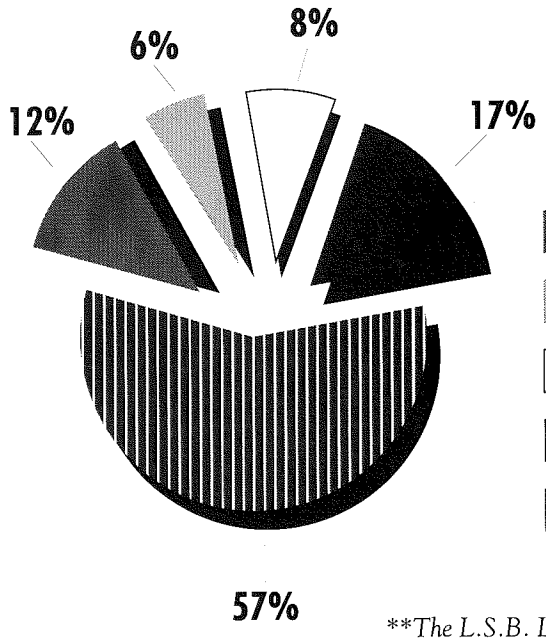
Neandertals are well-known because of their thoughtful (from the point of view of anthropologists) habit of burying their dead. This practice alone speaks volumes about their close social ties. Interestingly, both children and adults of both sexes are buried, so not only the important or wealthy were honored after death. Too, the unusual number of skeletons showing healed but once-severe injuries suggests that Neandertal society could and did care for those who couldn't possibly have contributed to the group by hunting or gathering.

(This article continued on page 13.)



The Neandertal skeleton at Kebara Cave was deliberately buried in a grave.

GRANTS



Fall & Winter 1990/1991

Total Grants awarded for Fall & Winter Granting Sessions 1990/1991 - $250,400

- Primatology
- Cultural Anthropology
- Education/Conferences
- Baldwin Fellowships
- Paleoanthropology

***The L.S.B. Leakey Foundation awards grants during three granting sessions: Fall, Winter and Spring.*

CULTURAL ANTHROPOLOGY

Hagen, James (U Michigan) $5,000
Variation in Subsistence Strategies among Foraging Groups in Seram, Indonesia

Pickering, Michael (La Trobe U) $2,500
Aboriginal Land-Use Patterns in a Semi-Tropical Environment, Australia

Stiles, Daniel (British Inst. in Eastern Africa) $3,000
Hunter-Gatherers in Madagascar: History and Ecology

Townsend, Wendy (U Florida) $4,500
Determining Land Requirements of Native Amazonians: the Siriono of Bolivia

PALEOANTHROPOLOGY

Bakken, Deborah (U Illinois) $2,500
Taphonomy of Middle Pleistocene Hominid Sites in China

de Bonis, Louis (U de Poitiers) $4,000
The Origin of Hominidae: Late Miocene Primates and Environment in Northern Greece

Brandt, Steven (U Florida) $1,800
Radiocarbon Dating of Guli Waabayo and Rifle Range Site, Somalia

Clark, Desmond and Dennis Etler, F. Clark Howell, (UC-Berkeley) $7,500
Paleoanthropological Research of New Middle Quaternary Sites in China

Curry, Patricia U Kentucky) $1,000
Maritime Foragers of the Chilean Fjords: Changes Over Time

Dean, Christopher (U College-London) $5,000
Tooth Root Growth in Early Hominids, South Africa

Ekart, Douglas (U Oregon) $4,725
Geologic Setting and Geochemistry of Pasalar Hominoid Site, Turkey

Fleagle, John (SUNY, StonyBrook) $12,000
Paleoanthropology in Southern Ethiopia

Gagnon, Mario (Duke U) $2,994
Fayum Paleoecology, Mammal Communities, and the Evolution of Anthropoid Primates

Gebo, Daniel (N Illinois U) $6,700
Positional Behavior and Habitat Use in Sympatric Cercopithecoid Monkeys, Kibale Forest, Uganda

Goren-Inbar, Naama (Israel Prehistoric Society) $10,000
Hominid Adaptation and Paleoenvironments at the Site of Gesher Benot Ya'Aqov, Israel

Grine, Frederick (SUNY-Stony Brook) $5,000
Exploration for Plio-Pleistocene Hominid Sites in South Africa

Gu, Yumin (Academia Sinica, IVPP) $3,000
Taxonomy, Evolution, and Dispersal of Fossil Macaques in East Asia

Haynes, Gary (U Nevada-Reno) $4,500
Paleoenvironments and Archaeology of Zimbabwe's Kalahari Sands Region: Initial Sampling

Grants Awarded

de Heinzelin, Jean (Koninklijk Mus) $3,500
Geology of the Upper Semliki Basin, Zaire

Jablonski, Nina (U Western Australia) $4,500
Survey and Comparative Study of the Plio-Pleistocene Monkeys of Yuunan Province, China

Kaufulu, Zefe (U Malawi & Dept of Antiq) $10,000
Geo-Archaeological Investigations of Late Cenozoic Beds North of North Rukuru River, Northwest Malawi Rift

Kibunjia, Mazalendo (Rutgers U) $8,000
Technology and Culture Change in the Pliocene West of Lake Turkana, Kenya

Kimbel, William (IHO) $15,000
Paleoanthropological and Geochronological Research at the Hadar Site, Ethiopia

McBrearty, Sally (Brandeis U) $5,000
Paleoanthropology of the Simbi Site, Western Kenya

Nadel, Dani (Israel Prehistoric Society) $3,500
The Excavation of a Submerged Kebaran Site in the Jordan Valley, Israel

Phillips, James (U Illinois-Chicago) $5,000
Late Pleistocene Hominids in Southern Sinai

Pickford, Martin (Mus Nat'l d'Histoire Nature) $2,000
Angola Paleontology Expedition: Year 2 of 5

Rak, Yoel & Erella Hovers (Israel Prehistoric Soc) $10,000
Human Adaptations at the Neanderthal Site at Amud Cave, Israel

Smith, Fred (Northern Illinois U) $1,500
Descriptive and Comparative Analysis of the Stetten 3 Humerus (Germany)

Stewart, Kathlyn (U Toronto) $2,000
Fish Remains from Gogo Falls, Kenya

PRIMATOLOGY

Bynum, Eva (Yale U) $500
Behavior Ecology of Macaques in the Zone of Morphological Intergradation between Macaca tonkeana and Macaca hecki in Indonesia

Drews, Carlos (U Cambridge) $4,450
Aggression and Manipulation of Relationships Among Male Baboons, Mikumi National Park, Tanzania

Hemingway, Claire (Duke U) $4,510
Female Feeding Priority in Propithecus diadema edwardsi (Lemur), Madagascar

Perry, Susan (U Michigan) $4,995
Social Intelligence in Cebus capucinus, Lomas Barbudal Reserve, Costa Rica

Stanford, Craig (U Michigan-Ann Arbor) $6,500
Behavioral Ecology of the Gombe Red Colobus: Effects of Chimpanzee Predation. Tanzania

White, Francis (Duke U) $9,976
The Fission-Fusion Social Organization of Pygmy Chimpanzee: Ecological and Social Correlates. Lomako Forest, Zaire

EDUCATION & CONFERENCES

Ham, Rebecca (U Stirling) $10,000
Leakey Trust Scholarship, Primate Studies at University of Stirling

Meikle, Eric (IHO) $3,100
Stones & Bones Curriculum Program: New Molds for Better Casts

Vrba, Elisabeth (Yale U) $2,500
Paleoclimate and Evolution: A Conference on Human Origins

Zhuan, Dong (Indiana U) $5,000
Archaeology Survey in China and Graduate Training at Indiana University

BALDWIN FELLOWSHIPS

Kamenya, Shadrack (Dept Antiq,Tanzania) $7,700
Final year of an MA program in paleoanthropology at U Colorado, Boulder.

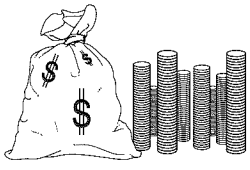
Mabulla, Audax (U Dar-Es-Salaam) $1,450
PhD training in paleoanthropology at U Florida.

Mbae, Nubi Bernard (Nat'l Mus of Kenya) $8,000
3rd year of 3-year fellowship for PhD training in African archaeology and human evolutionary ecology at U Illinois

Mudenda, Sibanama (Livingstone Mus, Zambia) $8,000
3rd year of 3-year fellowship for graduate training in African Prehistory at U Indiana.

Orao, Obed (U Nairobi) $9,000
2nd year of 2-year fellowship for graduate training in paleoanthropology at Rutgers U.

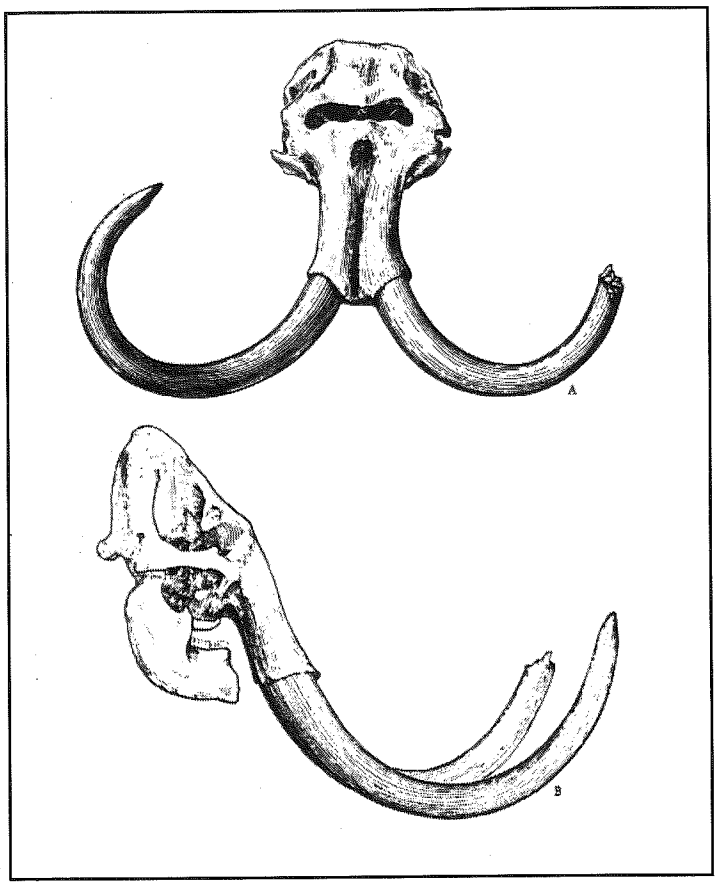
Saanane, Charles (Dept Antiq, Tanzania) $9,000
2nd year of a 2-year fellowship for graduate training in paleoanthropology at Rutgers University.



GRANTS

*With this issue, we introduce a new column, "**Fragments, Flakes and Sherds,**" in which we will report briefly on some of the interesting findings of ongoing studies. The column will explore some of the preliminary analyses or provisional hypotheses of research projects hot off of our scientists' printers and well before they are ready to go to publication in scholarly journals.*

This issue's column features three projects representing major areas of research funded by the Leakey Foundation.



Elephant Stew for Dinner Again?

For 3 years, grant recipient Naama Goren-Inbar has been excavating at Gesher Benot Ya'aqov, dated to about 0.5 million years and the second oldest site in Israel. Gesher Benot Ya'aqov is located in the Dead Sea Rift Zone, which is a northward extension of the same geologic feature that forms the Great Rift Valley of eastern Africa. Like the African Rift, which preserved such important sites as Hadar, Koobi Fora, and Olduvai Gorge, the Israeli portion of the rift is proving a fertile ground for fossil-hunting.

Goren-Inbar writes that the last field season produced an exciting discovery. Delicate excavation revealed a living floor dotted with stone artifacts — especially cleavers and handaxes made of basalt — and bones. Among the finds was an intact but upside-down elephant skull. Wedged beneath it was a wooden log — which may have been used as a lever to lift or move the skull, a very heavy object when the flesh was still on it. Beneath the skull lay a huge basalt core — weighing more than 20 kg (44 pounds) — and a boulder.

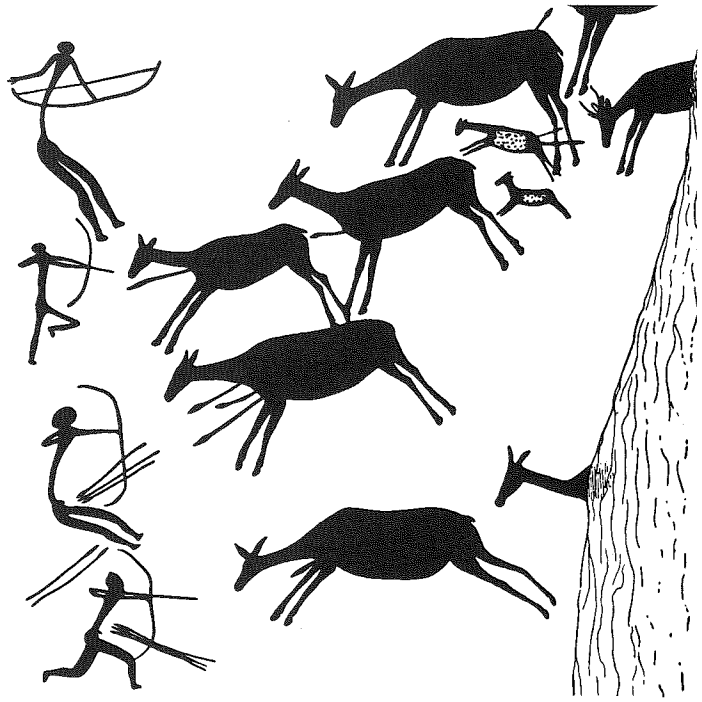
Goren-Inbar believes that the boulder, skull, log, and core are all in their original position, since the objects are all large and heavy and there was no indication that post-depositional processes affected these items. She speculates about the significance of these enigmatic objects.

"The log could have served as a lever to lift, or change, the position of the heavy skull. The skull's position, as discovered, would have facilitated access to the elephant's brain. The underlying basalt core and unmodified boulder could have served as a hard support surface to hold the skull in a muddy area.

In short," she summarizes, "the objects in association could be interpreted as a primitive apparatus to allow hominids to turn the skull over and pound it in order to open the cranial compartment and extract the brain for food."

Do these unusual finds provide a vivid glimpse of a gastronomic moment from the past? Only more work will tell.

Throughout the 1980's the Leakey Foundation has supported Dr. Goren-Inbar's excavations at the Acheulian and Mousterian sites of Birkhat-Ram, Biquat Quneitra, and now at Benot Ya'Aqov. Recently published is Dr. Goren-Inbar's book "Quneitra: A Mousterian Site on the Golan Heights" (The Institute of Archaeology, the Hebrew University of Jerusalem, Israel). **Amount funded: $34,250.**



Balancing the Needs of Wildlife and People

With funding from the Leakey Foundation and other sources, Hillard Kaplan has been studying four distinct groups of native peoples in and around Manu National Park, Peru. All groups subsist on hunting, fishing, gathering and simple horticulture. However, some of these groups have yet to establish peaceful contact with westerners, whereas others are more integrated into western economy. Kaplan and his collaborators were gathering basic information on the health and subsistence of these groups so that thoughtful and effective plans could be developed that would balance conservation of the wildlife with the needs and desires of the local people.

Among Kaplan's more fascinating results in collaboration with his graduate student, Michael Alvard, were comparisons of hunting success among the Piro, who hunt with shotguns outside the park, and the Machiguenga, who hunt with bow and arrow inside the park. It was no surprise to find that shotgun hunting is about 5 to 10 times more effective than bow hunting, in terms of the amount of meat acquired per hour of hunting. But the revelation came when Kaplan's data showed that both communities had the same per capita consumption of meat. "Both groups hunt until they acquire the same target level of meat," Kaplan explains, "The shotgun hunters simply work fewer hours to obtain it."

The important implication for planners is that increased hunting efficiency does not equal higher predation pressure on the wildlife. The crucial issue is one of population density, not traditional versus modern hunting techniques.

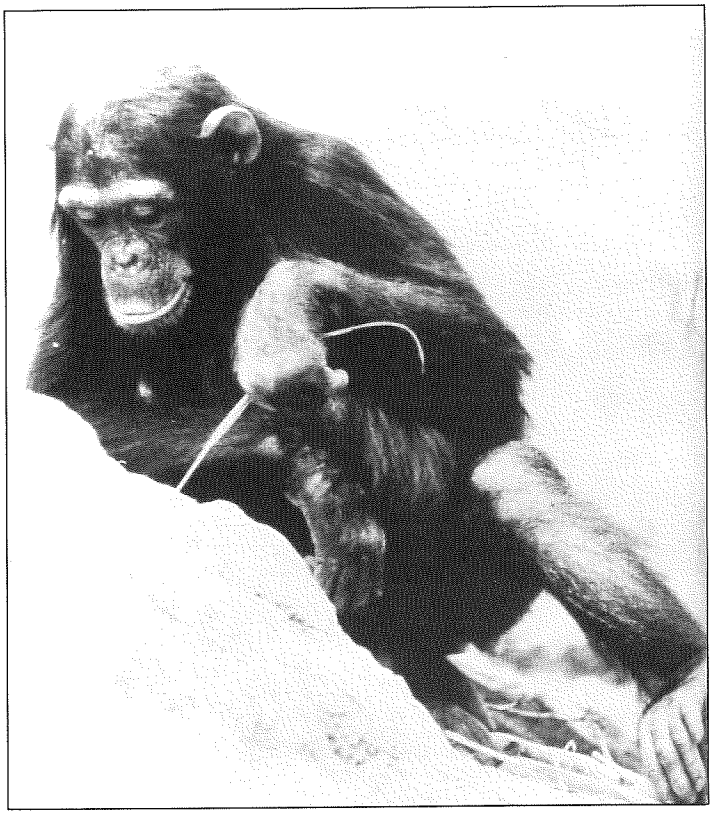
Kaplan's work also revealed some shocking differences in health statistics between these groups. The Piro, living outside the park, have some access to vaccinations and standard medical care —whereas the Machiguenga, who are isolated inside the park receive almost no care. As a result, infant mortality rates are more than double among the Machiguenga and more than half of their children do not survive to age 15.

Kaplan has recommended that the Machiguenga receive medical assistance: "It is a moral imperative to assure their basic right as Peruvians to equal treatment." However, he acknowledges that better health care will carry with it a sinister cost: faster population growth that will, in turn, endanger the habitat and wildlife. His team is working to establish realistic, long-term planning goals for the park that will allow the native people to pursue their goals without negative impact on the ecology.

Studies of the hunter-gatherer peoples of Manu National Park have been supported by the Leakey Foundation beginning with the work of Kim Hill and Hillard Kaplan in the 1980's and, most recently, the work of Ph.D. candidate Michael Alvard. The 1987-1988 Fellowship for the Study of Foraging Peoples awarded to Dr. Kaplan was made possible through the generous support of the Flintridge Foundation. ***Total amount funded: $35,520***

(Fragments, Flakes & Sherds continued on next page.)

Fragments, Flakes & Sherds (Cont.)



Closer Than You Think

Christophe Boesch and his wife, Hedwige, have been investigating yet another way in which wild chimpanzees resemble humans, with help from the Leakey Foundation. In 1979, the Boesches began a long-term study of chimp behavior in the Taï National Park, Ivory Coast, focusing on hunting strategies. Since hunting and scavenging have been hypothesized to be major aspects of the early hominid niche, the Boesches wanted to find out just how and what our closest living relatives, the chimps, hunt.

They found some intriguing and important differences in chimp hunting behavior, based on ecology. Their analysis compared three groups: the forest chimps they studied at Taï; a group living in heavily wooded areas in the Mahale Mountains National Park, Tanzania, studied by Toshisada Nishida and colleagues; and savannah-dwelling chimps studied by Jane Goodall's team at Gombe National Park, Tanzania. Thus the Taï, Mahale and Gombe chimps represent an ecological gradient, from forest to woodland to savannah.

The most striking contrasts were between the forest and savannah chimps, the Boesches found. In many ways, forest chimps showed behaviors that more closely mimicked human traits than those of savannah or woodland chimps.

For example, forest chimps more consistently targetted particular types of prey (especially other primates), almost always hunted in cooperative groups, and more regularly shared the meat obtained from hunting with others. Dr. Boesch feels that these special traits are dictated by the forest environment.

"Why should wild chimps hunt in such different ways?" he asks. "In Gombe, chimps do not seem to be any more successful if they hunt in larger groups. In Taï, however, we found that the chance of success increased both with the number of hunters and how well they were organized. The forests seems to force hunters to act together, and to coordinate their actions."

These studies are providing a surprising new model of early hominid behavior and the forces that shaped our evolution. Instead of concentrating on the savannah, Dr. Boesch maintains, perhaps we should look to more forested areas as the environments in which our ancestors evolved their characteristic traits.

"Until we know more about the environments in which our ancestors hunted and the type of prey they sought, we can only guess at the strategies they employed," he says. "Group hunting, cooperation, and the sharing of food could have evolved during the period when hominids dwelt in the forests, and not, as we used to think, on the plains."

The ground breaking discoveries made by Christophe and Hedwige Boesch of cooperative hunting behavior and learned tool use among chimps have been supported by the Leakey Foundation since 1986. Funding was made possible through the Fellowship for Great Ape Research and Conservation, and the generous support of the Homeland Foundation, Mr. Robert Brownlee, and Mr. and Mrs. Kenneth Leventhal. For more information: watch the Taï chimps in the BBC Attenborough Series, "The Trials of Life" (a longer documentary is scheduled for 1992); or read recent articles in BBC Wildlife, Vol. 8, #10 and New Scientist, May 19, 1990. ***Amount funded: $59,339.***

(Speaking of Neandertals, continued from page 7.)

Their stocky, hyper-muscular build, large faces and buttressed brow-ridges have long made Neandertals seem a caricature of the stupid cave-man, but the evidence suggests otherwise. Their brains were as large as — or larger than — our own; their tools were sophisticated and carefully-made; and their social ties were obviously strong.

In part, it was the "savage" physical appearance of Neandertals that long fostered the myth that they were physically inept, with a stooping posture and shuffling gait. Careful anatomical analyses of Neandertal remains by scientists such as Erik Trinkaus, a Leakey Foundation grant recipient, have shown that their gait was fully modern and that — far from being klutzy, stumbling brutes — their lives demanded rigorous and skilled physical activity on a day-to-day basis.

Could Neandertals Talk?

One of the most-debated questions about Neandertals has long been: did they have language?

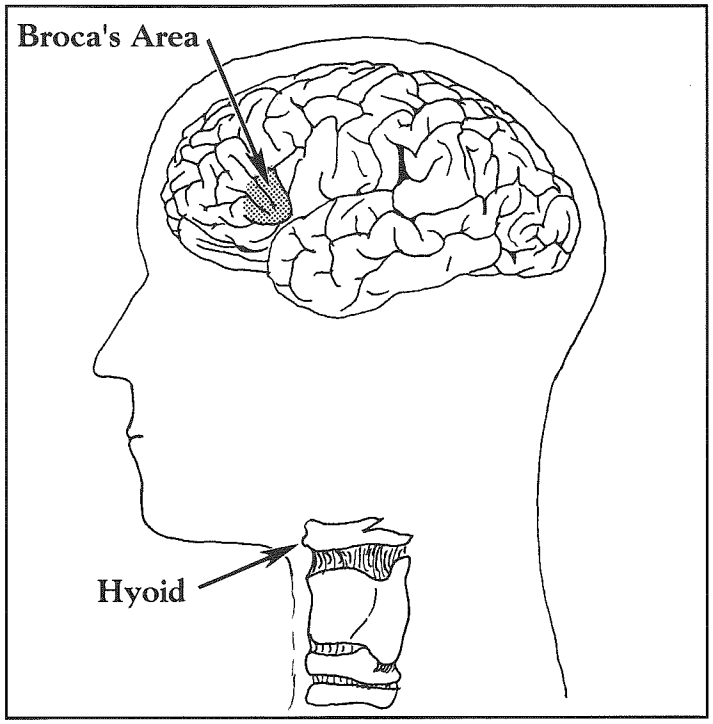
The notion that speech and sophisticated communication is a purely human trait is an old one. Most recently, the development of language has been offered as the trigger for the tremendous behavioral advance that is seen in modern humans as opposed to Neandertals. Where anatomically modern humans first appeared in Europe, there is a remarkable flowering of art — cave paintings, carvings, and personal adornment — so wondrous that it still stuns observers with its power and beauty.

What accounted for this sudden burst of creativity? The ability to talk, to develop an oral tradition, to communicate ideas, fantasies, knowledge, past events and future plans through speech seems logically to represent a major evolutionary step. Since few anatomical differences between modern humans and Neandertals offer plausible explanations for what is seen in the archaeological record, the hypothesis that language provided the crucial distinction has gained ground in recent years.

Some anthropologists have challenged this concept by exploring the extent to which apes have the mental capacity for language (if not the anatomical capability to produce the fine distinctions in sound that make up speech) by teaching them to sign or select symbols from an array — with controversial results. Is what the apes produce true language or simply clever tricks, unwittingly encouraged by optimistic researchers? The debate continues unresolved.

Others have attacked the problem more directly, by looking for anatomical evidence of linguistic abilities. The difficulty is, of course, that most of the apparatus with which humans speak is soft tissue that does not fossilize. Only two bones are involved: the jaw or mandible, which in Neandertals is robust and often preserved, and the hyoid, a delicate bone that anchors the muscles of the tongue deep within the throat. (If you put your fingers just above your Adam's apple and swallow, you can feel the hyoid bone move.) Hyoids are so small and fragile that they are usually missing, even from quite recent skeletons.

One clue lies in the structure of the brain, in particular in the bump known as Broca's area that controls the muscles for speech in humans. While fossilized brains are rare, Broca's area also leaves a corresponding hollow on the inside of the skull just at the left temple, which can be seen in well-preserved skulls.



Broca's area in the brain controls the muscles for producing articulate speech, including those which attach to the hyoid bone in the throat. The Neandertal skeleton from Kebara Cave is the first known fossil hyoid—and it looks very modern.

The two foremost American experts on human brain evolution — Dean Falk of the State University of New York at Albany and Ralph Holloway of Columbia University — usually disagree, but even they agree that Broca's area is present in a skull from East Turkana known as 1470. Philip Tobias, a Leakey Foundation grant recipient and renowned brain expert from South Africa, concurs. The 1470 skull, often attributed to *Homo habilis*, is older than 1.8 million years. So, if having the brains to speak is the issue, apparently *Homo* has had it from the beginning.

But others argued that the ability simply to control the muscle movements isn't enough: the structures of the tongue, palate, and larynx (voice-box) must be able to assume the right shapes. Computer modeling of the soft tissues important for speech, based on Neandertal skulls and mandibles, suggested that the larynx and hyoid bone were unusually high in Neandertals, as in newborn infant humans. As a result, Neandertals simply couldn't position their vocal tracts to produce the vowel sounds a, i, and u, according to work done by Ed Crelin, Jeff Laitman and Phillip Lieberman.

"Dd ths mke spch mpossble?" some wits quipped, "Not t ll." Others disagreed with their models on various technical grounds.

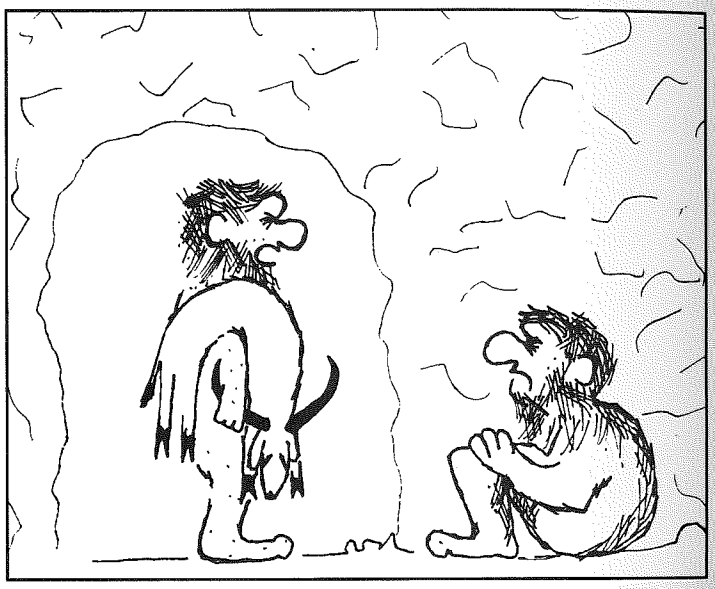
There the matter rested until the Neandertal skeleton at Kebara cave was excavated. Amazingly, this specimen preserved the first and only hyoid bone known from a fossil hominid of appreciable antiquity. What was it like? Anthropologists held their breaths, waiting for the answer.

When the Kebara team had finished their anatomical analyses, which were directed by Baruch Arensburg, they published their results in the prestigious scientific journal *Nature*, though the story was picked up by many newspapers and magazines. The Kebara hyoid was virtually indistinguishable from those of modern humans, in size or shape, despite the fact that the same skeleton had a very large and robust jaw. The Neandertal hyoid almost certainly had a modern position in the neck — contrary to the computer modeling — and gives every indication that Neandertals had all of the capabilities for speech that modern humans do.

If the hyoid is modern, why is the jaw so different? The robustness of the mandible apparently reflected vigorous chewing of foodstuffs and, perhaps, the use of the mouth as a third "hand" in various tasks. It is well-known that the front teeth of Neandertals shows peculiar and heavy wear — comparable to those of Eskimo women who chew hides and soften leather with their teeth — and also sometimes show striations running side-to-side, as if meat or leather were held between clenched teeth and then cut off, occasionally a bit too close for comfort.

While solving one problem fairly definitively — Neandertals probably could talk — the Kebara remains pose another. For the moment, this is one answer that is still beyond the abilities of anthropologists to answer.

Neandertal Conversation...



Cantalope? I thought you said "Antelope"!

Is it Neanderthal or Neandertal?

Confused? You have a right to be!

While "Neandertal" is the currently-accepted spelling, the story of the evolution of the name is complicated. When the first Neandertal skeleton was found in 1856, it was accidentally excavated in a quarry in Germany known as the Neander Thal or Valley. The fossil soon acquired the name of the place.

But Old German spelling was at odds with pronunciation, for the "h" in thal was silent. This inconsistency was resolved by changing the spelling of many German words to omit the silent "h" at the turn of the century.

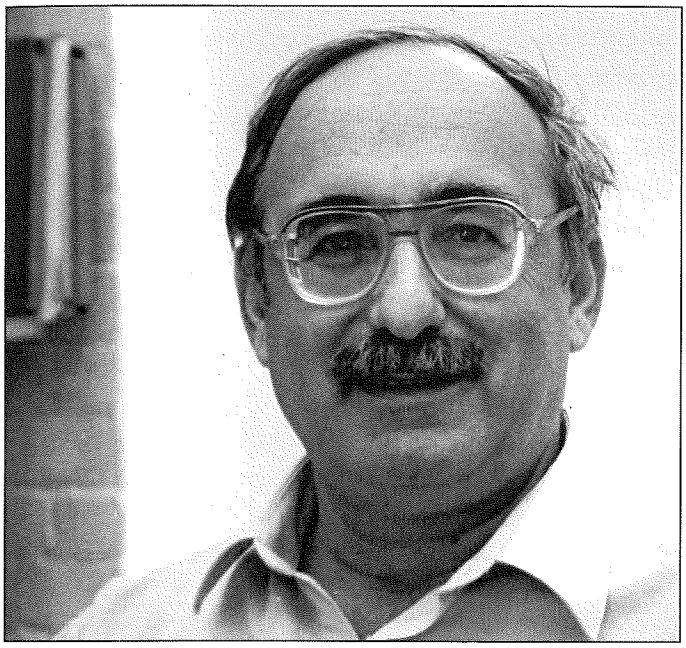
Unfortunately, Anglophones moved to adopt this change about as rapidly as the glaciers retreated after the last Ice Age. In 1961, when the movement to change the spelling in English was first gaining ground, W.W. Howells wrote wryly:

"It is English-speaking writers who have retained the 'h, — unfortunately, since unlike French and German, English has a genuine 'th' sound for beginning anthropology students to employ in mispronouncing Neanderthal."

Many textbooks and popular treatments still continue to use the "h" in Neandertal, misleading innocent readers as to the correct pronunciation of the word.

PROFILE

Spotlight on Ofer Bar-Yosef



As one of the new members of the Leakey Foundation's Science and Grants Committee, Dr. Ofer Bar-Yosef brings unparalleled expertise to the archaeology of the Near East.

A professor of Anthropology at Harvard University and Curator of Paleolithic Archaeology in the Peabody Museum, Dr. Bar-Yosef was formerly at Hebrew University, in his homeland, Israel. Bar-Yosef is known internationally for his research at some of the earliest and most important sites in the Near Eastern region known as the Levant, including Ubeidiya and Kebara Cave. In the early 1970's, Ubeidiya, was one of the first major projects outside of Africa supported by the Leakey Foundation, with over $25,000 in grants. At 1.4 million years, Ubeidiya is the oldest site in the region. Its stone tools and hominid and other fossils document a major step in the migration of hominids out of Africa.

Kebara is renowned for the burial of a partial skeleton of an adult Neandertal, found by Bar-Yosef and co-workers in 1983. This important specimen showed anthropologists for the first time what some body parts of Neandertals looked like, with astonishing results (see lead story). From 1985 to the present, the Leakey Foundation has also provided support for research at Kebara Cave with more than $56,000 in grants, $10,000 of which was generously donated by the Swig Foundation of San Francisco.

Q: *Dr. Bar-Yosef, what is your family background?*

A: I was born in Jerusalem in 1937, the first of four sons. My parents are native Palestinians, born when it was still a province of the Ottoman Empire. My father's grandfather had come from Morocco around the mid-nineteenth century and settled in Jerusalem. My mother's parents came from Riga (then part of Tsarist Russia) with a group that founded Hadera, a coastal town north of Tel-Aviv.

Q: *When did you first become interested in archaeology?*

A: During my childhood I played with, among other things, fossils and potsherds, collected by my father who had been a student of the American School of Archaeology in Jerusalem. He decided to take a tenure-track position in the Treasury Department of the British Mandate Government instead of joining the Megiddo excavations as a draftsman, which shifted his professional career to economics and central banking. However, the few archaeology books and the small pottery collection in our home were instrumental in my basic education as a future archaeologist.

When I was eleven years old, together with several close friends from our neighborhood, I conducted my first excavation (without a permit!) of a Byzantine water system.

Q: *After high school, did you go straight to college to study archaeology?*

A: No. At the age of seventeen I decided to become a kibbutz member and a year later joined the Israel Defense Force with a group of future kibbutzniks. Among them was the late Yigael Shiloh with whom I was to study and teach in years to come. My general interest in the prehistoric eras turned into a real enthusiasm in 1957 when I joined, as a soldier-volunteer, the excavations at Kebara Cave (in layers dated to 17,000-14,000 Before Present) conducted by the late Moshe Stekelis. Throughout this short season, during the daily coffee break, Stekelis lectured for half and hour on Paleolithic Archaeology. It was therefore obvious that in the summer of 1959, upon returning to Jerusalem, I went to see him and asked to participate as a volunteer in the forthcoming season in Nahal Oren Terrace,a Neolithic-Natufian site (19,000-8,000 Before Present) in Mt. Carmel.

His words were: "Fine! Start packing!" (and since then I sometimes have the feeling that I constantly pack and unpack).

Q: *When and where did you do your undergraduate training?*

A: In the fall of 1959, I began my regular studies as an undergraduate in Archaeology and Geography at Hebrew University. During the following years, I participated in the excavations at Ubeidiya (1960-66), Nahal Oren (1960), and Kebara (1964-65) and jointly with Moshe Stekelis conducted the excavations of an Epi-Paleolithic site (dated 18,000-17,000 years B.P.) near Ein Gev in the Jordan Valley (1963-64).

Q: *Aside from Professor Stekelis, did you make any other contacts that were important for your future career during these early years?*

A: Yes. During these years, I was fortunate to work in the field with Eitan Tchernov (now a professor of zoology at Hebrew University) and Baruch Arensburg (now a professor of Anatomy and Anthropology in Tel-Aviv University). Thus it was only natural that when we felt that it was time to change the current methods of excavations, we initiated our own project in Hayonim Cave, a site with deposits from the Natufian (12,000-11,000 years B.P.), Upper Paleolithic (32,000-30,000 years B.P.) and Middle Paleolithic (before 40,000 years B.P.).

Q: *What was different about your approach to that project?*

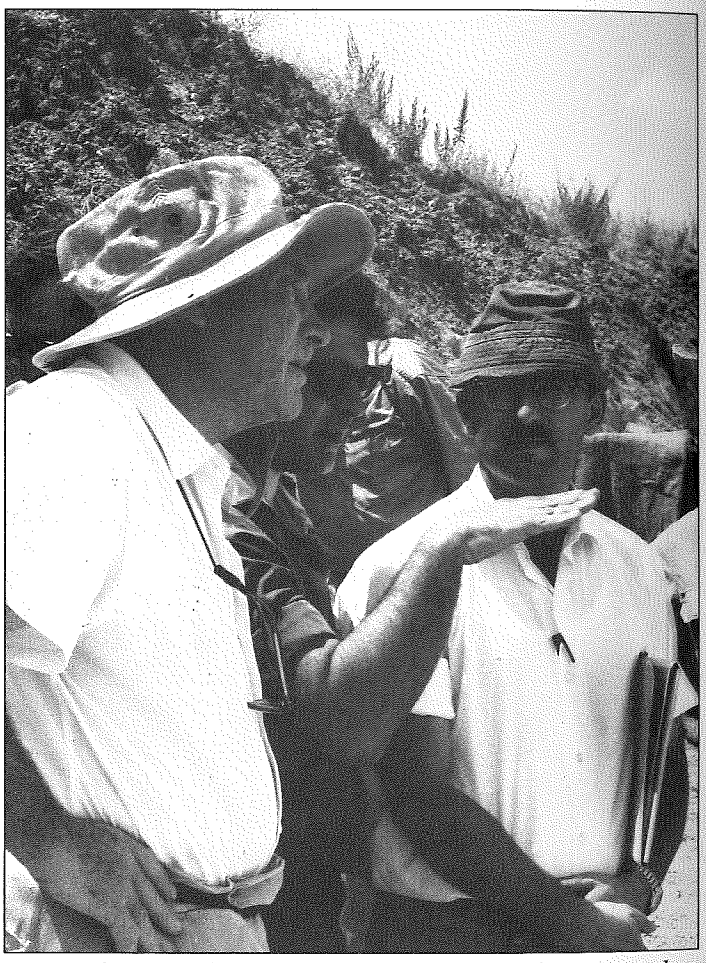
A: Our main goals at the time were to achieve a better paleoenvironmental resolution by retrieving micro-vertebrates (such as rodents or lizards) through fine mesh wet-sieving and a greater accuracy in uncovering and recording both architectural and burial remains of the Natufian and earlier strata. These excavations continued until 1979 and provided a wealth of data as well as an opportunity to train graduate students in the intricate work of digging a cave site.

Q: *During graduate work and in your professional life, you have spent considerable time abroad, working with others, visiting their sites, observing and exchanging ideas. What influences have been important to you?*

A: While working on my Ph.D. (between 1966 and 1970) on the local Epi-Paleolithic assemblages, I spent half a year at the University of Bordeaux with the late Francois Bordes, improving my understanding of knapping (stone-working) techniques and typological analysis, and then a few months in London at the Institute of Archaeology.

Following the sudden death of Moshe Stekelis in March 1967, I was invited by the Israel Academy of Sciences and Humanities, together with Eitan Tchernov, to carry on the Ubeidiya excavations, which we did until 1974. Among our supervisors were Louis and Mary Leakey. At Mary Leakey's invitation, I visited East Africa and had to opportunity to examine the Olduvai assemblages from Bed I through Bed IV and spent three lovely and extremely useful weeks walking up and down the various gullies of Olduvai Gorge and learning its stratigraphy. Later, upon the invitation of the late Glynn Isaac, I traveled to East Turkana with Yoel Rak and Naama Goren, both undergraduates at the time. We ended up walking as our Landrover broke down southwest of Allia Bay. Richard Leakey flew us to Ileret "International Airport" where Glynn met us and we were lucky to spend ten days with him, working, visiting sites, and later moving back to his excavations at Koobi Fora.

Q: *During the late 1960's and 1970's, the research focus on the African continent was on the very earliest part of the record: human origins. What was going on in Israel during those years?*



From left to right: Louis Leakey, Eitan Tchernov and Ofer Bar Yosef at Ubeidiya in 1970.

A: Those were active years for Paleolithic archaeology in Israel; many Neandertal or early modern human sites were excavated or re-excavated. The prehistoric caves of the Mt. Carmel became famous

during the 1930's as a result of the large-scale excavations carried out by the British archaeologist Dorothy Garrod. During the 1960's and 1970's, Arthur Jelenik re-excavated Tabun Cave, where a burial of a Neandertal woman had been previously found. Tabun cave contains the longest Late Acheulian-Mousterian depositional sequence in the Old World and is considered critical to understanding the cultural succession and the chronological relationships among the various human fossils. Bernard Vandermeersch re-excavated Qafzeh Cave, which had yielded a cemetary containing anatomically modern humans. His expedition unearthed additional skeletal remains, some of which ere exposed in their original burials. The resemblance of these adult and juvenile specimens to the Cro-Magnons of the European Upper Paleolithic (early modern humans) led him to follow F.C. Howell and classify the Qafzeh fossils as "Proto-Cro-Magnons."

During these years Israeli teams, of which I was a part, worked on Ubeidiya and parts of Hayonim Cave. The oldest layers of Hayonim Cave are more than 60,000 years old and still await our studies in the 1990's.

While some of these projects addressed questions of cultural stratigraphy and chronology, others were targeted toward the understanding of human adaptations, mainly in the arid zone.

This work also revealed the first indication of an apparent chronological problem, centered around the Neandertals from Tabun and Amud caves and the modern-looking hominids from Skhul and Qafzeh caves. It was generally believed that the modern-looking hominids from Skhul and Qafzeh were later (more recent) than the Neandertal remains, but faunal studies by the late G. Haas, of Hebrew University, and Eitan Tchernov, suggested otherwise.

In 1980 we felt that the time was right to reassess the chronology of the Near Eastern hominids by re-excavating several sites. It was clear that a project of such magnitude could be handled only by a large interdisciplinary team, so Bernard Vandermeersch and I decided to assemble a team of French and Israeli researchers.

Q: *This interdisciplinary study led you and your colleagues to arrive at some spectacular conclusions. Can you state these simply for us?*

A: My friendship and cooperation with Bernard Vandermeersch (professor at the University of Bordeaux), built through years of joint work in the laboratory and the field, were expressed in a short paper in 1981 suggesting that the Qafzeh hominids were actually 80,000-100,000 years old and not 40,000-50,000, as was the current estimate. These dates implied that the Qafzeh humans were older than the Neandertals at Tabun, Amud, and other sites in the region, and yet Neandertals had been suggested to be ancestral to modern humans. The excavations at Kebara, the newly dated Neanderthal and the TL dates far the Qafzeh hominids confirmed our original proposition.

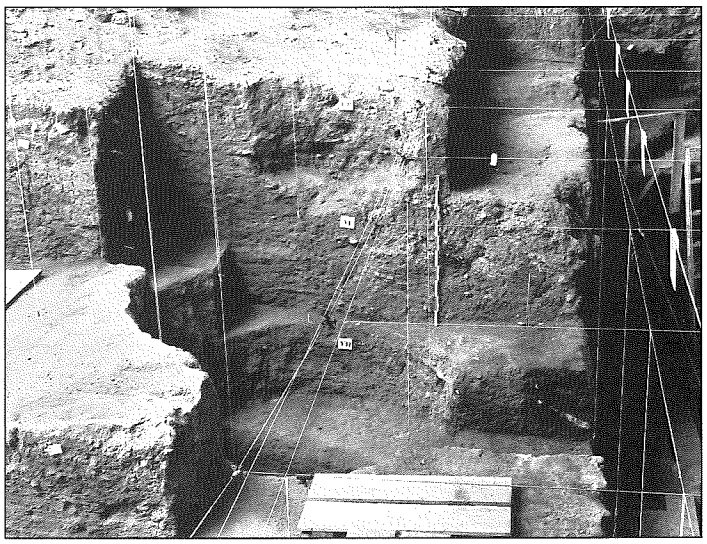
Q: *In other words, your new evidence undermined the prevailing theory by showing that the "descendents" came before the "ancestors." Wasn't this a very controversial finding?*

A: Yes. This immediately heated up the old debate on the origins of modern humans, first in the circle of Levantine prehistory, and then world-wide. This topic will undoubtedly stay at the forefront of paleoanthropological research for a number of years.

Q: *How else did you test your hypothesis that the modern humans arrived in the Levant first?*

A: Bernard Vandermeersch and I organized the new excavations at Kebara cave. This seemed a natural choice as a target for systematic excavation. First, its proximity to Tabun Cave (13 km) was considered an advantage. Second, analyses could be carried out on material unearthed by earlier excavations (1931, 1951-1965) at Kebara. The Neandertal infant discovered in 1964 and the good state of preservation of the bones and charcoal found in the cave also influenced the decision to begin the project at Kebara.

The Neandertal layers at Kebara, including the new adult skeleton we uncovered in 1983, have now been dated to between 60,000 and 48,000 years ago. This confirms that the Kebara Neandertals were later than the modern humans at Qafzeh.



Excavations at Kebara Cave.

Q: *What else did you find at Kebara?*

A: We also found signs of intensive human occupation: many hearths, irregular distributions of white ashes,

abundant stone tools, and visible clusters of numerous animal bones, some showing cutmarks left by stone tools. Remains of large game, in decreasing order of abundance, include gazelle, fallow deer, red deer, roe deer, horse, wild boar, wild cattle, and wild goat. These species were scavenged if not hunted and butchered by humans. The lithic assemblage is rich in Levallois points and flakes and the entire industry appears to resemble that from the layer known as Tabun B.

Q: *Do you think that Neandertals and modern humans co-existed in the Levant, living in the same areas at the same time?*

A: No. Geologically speaking, I would say "yes," but practically speaking, the answer is "no." They were of course contemporary, but your question is difficult to answer because we don't know if these were two different species or two different groups within a species. I am not a physical anthropologist, though many of my best friends are, but even they do not agree on this point.

I would favor the scenario that Neandertal populations of European origin were penetrating into the Levant from the west. Being contemporaneous with the modern humans we find in the Levant, the Neandertals encountered them, but what happened then is not clear. Maybe they pushed the modern humans out, maybe they were fighting with them, maybe they were even interbreeding with each other. If you admit the possibility that they were different groups within a species, then the physical variability we see in the fossil record from this region is telling us a story that may indicate interbreeding.

Q: *Do you see two different cultural traditions in the archaeological record that you can link to these two physical types?*

A: No. This may shock you, but I don't think the archeological record can be related to the fossils until you get to much later, perhaps the late Pleistocene. There is no set relationship or simple equivalence between the hominids and the artifacts. Of course, hominids made the artifacts — they were daily tools —but the tools don't necessarily tell you who made them. To assume that there is such a relationship is to assume exactly what we have to prove.

It is often said that tools reflect adaptive strategies. But if you look at the forms and shapes of the artifacts, there is no difference among those from lower, middle and higher latitudes in ways that we can see, so how can they reflect adaptive strategies related to the environment? You can make a good story if you push the evidence, but that is not science.

Q: *Large field projects are difficult to organize and quarrels over procedures or publication often break out. How have you avoided these problems in your work?*

A: At Kebara, we tried a new form of organization of the expedition. Officially, it is headed by the "Ten Directors" (including Baruch Arensburg, A. Belfer-Cohen, Paul Goldberg, H. Laville, L. Meignen, Yoel Rak, Eitan Tchernov, and Anne-Marie Tillier) while two of us serve as coordinators. After nine seasons of excavations (since 1982) we are still friends and have no major disagreements. We have learned that when geologists bioanthropologists, paleontologists, and archaeologists share the same field experience, we gain a better understanding of the site and its contents.

Q: *Although you are perhaps best-known for your research on the older sites in Israel, you have also made major contributions to studies of more recent, Neolithic sites. Could you summarize these?*

A: While teaching Levantine prehistory courses, I encountered some of the basic problems in Neolithic archaeology in Israel and the Sinai. Approaching these with the methods of Paleolithic archaeology, I first proposed a systematic subdivision based on arrowhead typology using types, most of which had been previously defined by others. This work was later substantiated through the work of A. Gopher.

I also delved into the old time search for the origins of farming communities, the archaeological markers of warfare, the emergence of marked territoriality, and the origins of pastoral societies. Digging with A. Gopher in Netiv Hagdud, an early Neolithic village in the Jordan Valley (1983-84) and in the Nahal Hemar Cave (1983) led me to the re-examination of the Jericho site reports. As a result, I was able to offer an alternative explanation for the Jericho Neolithic walls which I believe were erected in order to prevent flooding of the early village. If this interpretation is correct, organized warfare can be traced only to the mid-sixth millennium B.C.E. (Before the Christian Era). If warfare is not an original ingredient of the agricultural revolution, then we can hope that the track of wars which the Near East, as a region, has trod for such a long time will reach a peaceful stage as an end result of the current industrial revolution.

This profile was adapted and expanded, with permission, from the December 1988 issue of SYMBOLS, a publication of the Peabody Museum and the Department of Anthropology of Harvard University.

Guest editor for this issue of **Anthroquest** *is Pat Shipman, a paleoanthropologist trained at New York University. Shipman is perhaps best known in the scientific community for her work on the scavenging hypothesis, a theory suggesting that our earliest ancestors obtained most of their meat food from carcasses killed by other species rather than by hunting. To the more general public, she is perhaps best known for her popular articles on human evolution, which have appeared in many magazines including Discover, Natural History, The Sciences, Harvard Magazine, New Scientist, and Marriott Portfolio.*

The essay below originally appeared in the Chronicle of Higher Education on September 26, 1990. It caused quite a stir from her colleagues, many of whom shared her sentiments, to Robert Ketchum, Chairman of the Committee of Space, Science and Technology for the U.S. Congress, who invited her to Washington to discuss the problems of funding in science today.

We reprint this article, with the kind permission of the Chronicle for Higher Education, because it speaks so eloquently of the crisis in funding for anthropological projects. Now more than ever, the Leakey Foundation has a crucial role to play in keeping this important research going. With your help, we will provide the funding for the field and laboratory projects that anthropology desperately needs.

We Need to Give a Chance to Small, Unfashionable Science

Most people think that, like the Titanic, American science is too big, too glossy, too full of the latest high-tech gizmos to ever sink. But from where I sit, which is closer to the hold than most observers' positions, the water seems to be rising fast. While literally millions of dollars are being spent on massive, equipment-rich projects, other "small" sciences are in real danger of drowning for lack of funds.

I was trained in a field, anthropology, that is often regarded as small science. The average grant is less than $50,000 a year, including indirect costs, and virtually all are under $150,000 a year. The field is small science in other ways, too. Work is done by the individual researcher, who rarely has the luxury of a paid student, a technician, or a postdoctoral fellow to help out. Only a small part of the researcher's salary, if any, is covered by grants. When I can get a grant at all, what I spend in a year for supplies is what colleagues in molecular biology spend in a week. It is difficult to get up-to-date equipment, even items such as X-ray units considered mundane necessities in other fields. There simply isn't enough money. But I didn't understand how bad things were until I watched my last grant proposal sink beneath the waves over and over, despite rewrites and insights, until I had no more heart to write another.

Although I've received 22 grants from the National Science Foundation and a host of private foundations during the last 15 years, money is now much harder to get. Support for anthropology has gone from modest to minuscule.

"There's no real problem," I used to think while responding sympathetically to my peers' groans over another rejected grant. "Good science will always get funded." I learned this magic formula from my mentors in graduate school and thought that if I repeated it often enough and believed it devoutly enough, I would be protected from disaster. But plenty of good science is not receiving support these days.

Since 1954, when the National Science Foundation spent $35,000 on its first two grants to anthropology, the total budget for the foundation's Program in Anthropology has risen to about $7.2 million annually. That amount supports all research in cultural anthropology, archaeology, and physical anthropology. By comparison, in 1989, Great Britain — a much smaller country with far fewer researchers — allocated about $10.2-million for archaeology alone.

The long-term trends are grim. In the last 10 years, the number of grant applications submitted annually to the N.S.F.'s anthropology program has risen, as have the indirect costs of conducting research. But the total budget for the program has remained approximately constant in real dollars. Consequently, the percentage of applications receiving support has

dropped. For example, 32% of applications submitted for archaeology research in 1980 were approved, compared with only 23% in 1990. What's more, the average dollar amount of the grants has dwindled, during a period when virtually all the costs of actually conducting the research have risen. John Yellen, director of the foundation's anthropology program, said recently with a sigh, "What seemed a large but reasonable grant for us to fund ten years ago now looks out of sight."

Grants for many type of research have been hard hit, particularly grants for fieldwork. Field projects by their nature are often exploratory, costly, and sometimes physically dangerous. This makes such grant proposals easy to turn down. The tragedy is that fieldwork is essential to the continued growth and health of the discipline as a whole, ultimately providing its life-blood — the new objects and data that can be subjected to analysis. Observations, fossils, and artifacts collected in the field provide answers to important questions. Other equally important questions simply will never arise without the surprises that come from pitting one's theories against the hard realities of the world revealed through fieldwork.

I do not know where the next generation of field researchers will come from, because the odds against starting up a major project are so great now. I do know that, without field researchers, anthropology will stagnate into a family feud and eventually will perish from sheer triviality.

I suspect that the increasing number of proposals being submitted, combined with the failure of the N.S.F.'s anthropology budget to keep pace, has opened the door to abuses of the peer- review system. Each proposal is sent to a handful of reviewers knowledgeable about the specific type of project that is proposed; they send comments and ratings (excellent, very good, good, fair, poor) back to the foundation. These reviews, and the proposals are ranked by a panel of anthropologists, who meet under the guidance of the program director.

Some deliciously subtle ways exist for a reviewer to sabotage a grant proposal, thereby blocking or stalling a particular line of research. They range from simply giving a vaguely lukewarm review, to claiming falsely that the applicant has overlooked important work in the field, to planting poisonous questions about methodology that the review panel will then assume have not been addressed in the proposal. The temptation to engage in such unethical behavior is greater if everyone is feeling the pinch.

Such tactics are especially effective when relatively few grants applications can be funded. With the rise in the number of applications, program directors and members of review panels sometimes are too overloaded to read each proposal carefully. Some panelists even claim they barely have time to read the reviews. Trusting the reviewers is the basis of the entire peer-review system, since each panel member can't know each obscure branch of each subdiscipline well enough to judge a project's worth for themselves. Under these conditions, the review process becomes one of paring down the proposals to a manageable number for ranking, rather than deciding how many are good enough to receive support.

When budgets are tight, program directors may also assume an inappropriate amount of power to push a field in a given direction. In 1988, a graduate student I know submitted a proposal for a doctoral-dissertation improvement grant (not to the N.S.F.'s division of anthropology), and received an "excellent" rating from each reviewer. But the program director refused to award the grant unless the student submitted an appendix (amounting to a new proposal) discussing how he would use specific techniques not mentioned in his original proposal. The program director alone, without support from any reviewer or panelist, decided that these techniques were crucial.

Is it the program director's prerogative to push his or her field in a given direction? It obviously is, in practice. The program director feels the awful responsibility of trying to insure that his or her discipline stays on course when it is endangered by inadequate funding. But is one person's view of "on course" enough? I don't think so.

The dilemma for program directors is: with too little money to go around, should they spread it around, like food supplies in a famine, giving everyone enough for a taste but not enough to maintain health? Or should they support fewer projects more fully, condemning others to oblivion?

The choice of which grant applications to accept, besides influencing the direction of the field, also may affect an applicant's ability to get a job, a renewed contract, a promotion, or even tenure. During times when jobs, like grant money, are scarce, loss of any of these things because of a rejected grant can be a crippling blow.

The insidious reality is that, as a lower percentage of grants are funded, the costs of grant-writing rise. Writing a good grant proposal takes me one to two months of concentrated effort; few can work faster than this and many — especially novices — work slower. One graduate student I know has written six

different versions of a grant proposal to support work on her doctoral dissertation. Given the odds, one of her proposals will probably be accepted. But by then she will have spent six months writing applications and one year waiting before her work can proceed. It is true that grant writing forces students to master the literature, think the project through clearly, and practice a crucial professional skill. But putting so much work into a long-drawn-out process with a high potential for failure is a demoralizing and exorbitant waste of energy.

The most fundamental solution to the problem is to throw money at it. I would love to see a box printed on federal income-tax forms, saying "Tick here if you want one dollar of your return to go to support basic science research." As the population grows and life gets more complicated, proportionately more money will have to go into research if science and scientists are to survive in this country. "Holding the line" — maintaining a constant budget — is the same as condemning most of our sciences to death.

Another solution is to guard against spending all of our money for megabucks projects with catchy titles that appeal to legislators. Small, unfashionable science, as well as big, sexy science, is important. Sometimes great ideas and staggering discoveries come from the little guys with funny ideas, pottering away in the corner by themselves. We need to give them a chance. The problem of the shrinking budget is affecting more sciences than anthropology. A recent article in the New York Times noted that the proportion of applications supported by the National Institutes of Health had dropped from 42.3% in 1980 to 24.1% in 1990. One of the major private foundations providing sabbatical money for researchers funded only about 10% of its applications this year.

Aside from losing lots of good ideas and potential discoveries, we stand at risk of losing lots of people, too. I love my field and I think that the scientific quest for new information is the most exciting endeavor I know. I never thought I'd quit, but the grant system has defeated me. From here on out, my contribution will be to translate those discoveries to the public, who pay for it, so they can understand what we have found out. I just hope there's still something to explain.

Pat Shipman was an assistant dean for academic affairs and an associate professor at the Johns Hopkins University School of Medicine until July 1, 1990, when she resigned her position to become a science writer.

EVENTS

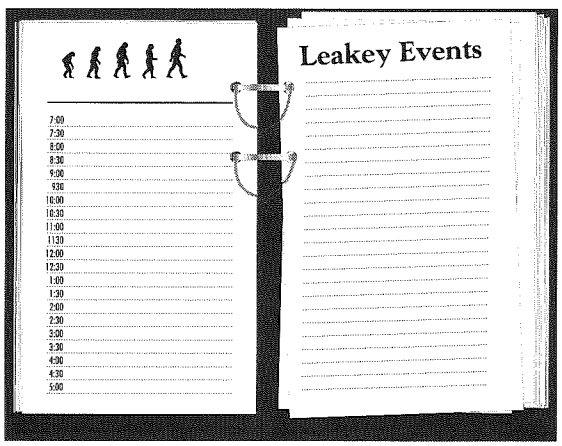
May 30, 1991 - The California Academy of Sciences, Golden Gate Park, San Francisco, CA. 7:30 p.m. "Love, Death, and Sex Among the Gorillas", a lecture and slide show by Alexander Harcourt and Kelly Stewart Harcourt, both from UC Davis.

October 12, 1991 - An all-day symposium will be held in Cambridge, Massachusetts on **October 12, 1991** at Harvard University. Featured speakers will include Irven DeVore, Chairman of the Department of Anthropology at Harvard; David Pilbeam, Director of the Peabody Museum; Drs. Ofer Bar-Yosef and Richard Wrangham from the Harvard and Peabody Museum faculty. The symposium is being presented in conjunction with the Leakey Foundation's annual meeting and will honor the work of the first recipient of the Leakey Prize, yet to be selected. A dinner will follow the event.

November 7, 1991 - The American Museum of Natural History, New York, New York.

November 12, 1991 - The California Academy of Sciences, San Francisco, California.

The 1991 Allen O'Brien Memorial Lecture will be delivered twice and will feature noted paleontologists Drs. Meave Leakey and Alan Walker. Their talks will focus on "Recent Fossil Finds at West Lake Turkana, Kenya." This exciting duo will be reporting on one of the richest fossil areas worked in the last decade.



SYMPOSIUM

Rutgers University Co-Hosts Leakey Foundation Symposium

A bright, sunny day in late October, 1990, saw the Nicholass Music Center on the Douglass Campus of Rutgers University full to the brim. Students, professionals and interested members of the public turned out by the hundreds to listen to a distinguished panel of speakers — led by Dr. Mary Leakey — talking about "The Human Career: Our Biological and Cultural Origins."

For those who were unable to attend, Dr. Leakey's presentation was taped and formed the basis of an hour-long broadcast on the National Public Radio show, The National Agenda.

Beautifully organized by Karin and Jack Harris, the symposium offered the crowd of over 800 a unique chance to hear many of the scientists who have done so much to advance our understanding of human evolution in recent years. The symposium was supported jointly by the Leakey Foundation and the Victoria Fellowship in Contemporary Issues program of Rutgers University.

Dr. Mary Leakey - Reflections on the Research at Olduvai Gorge.

Dr. Leakey gave a fascinating retrospective of her decades of work on human origins with her late husband, Louis Leakey. In 1931, at a time when the scientific consensus was that human origins began in Asia, Louis and Mary set out for East Africa — Louis' boyhood home — and eventually proved the world wrong. Their story shows how perseverance, hard work, intelligence and openness to new ideas led to extraordinary success.

The stone tools the Leakeys found in the early days were much cruder than those from Europe or Asia and left their peers unconvinced. Undaunted, they persisted, working at Olduvai on weekends and holidays when they could scrape together enough spare money to make the trip from Nairobi. Lack of funding was a major handicap, Dr. Leakey recalled. Then, one day in 1959, she discovered the famous *Zinjanthropus* skull — nicknamed Nutcracker Man and now called by the scientific term, *Australopithecus boisei* — that turned their skeptics around.

The startling new skull refocused the spotlight of anthropological research firmly on East Africa. Olduvai Gorge, in particular, yielded a rich sequence of archaeological and fossil sites that document the presence and evolution of hominids from 1.8 to about 1.1 million years ago.

Through years of hard work by the Leakeys and their team, the Gorge produced stone tools by the ton and showed us the types of tools that were produced when our ancestors were first learning how to work stone. The animal fossils fill shelf after shelf of museum space and speak eloquently of the habitats and environments in which early hominids lived. The hominids themselves, though much rarer than the antelopes, giraffes, and other animals, have not been neglected. Aside from the "Zinj" skulls, Olduvai surrendered fossils of *Australopithecus africanus*, *Homo habilis*, and *Homo erectus*.

The abundance of materials excavated so painstakingly by the Leakeys have served as the subjects of many books, monographs, and scholarly and popular articles. More than any other site, Olduvai Gorge has played a telling role in the story of human evolution.

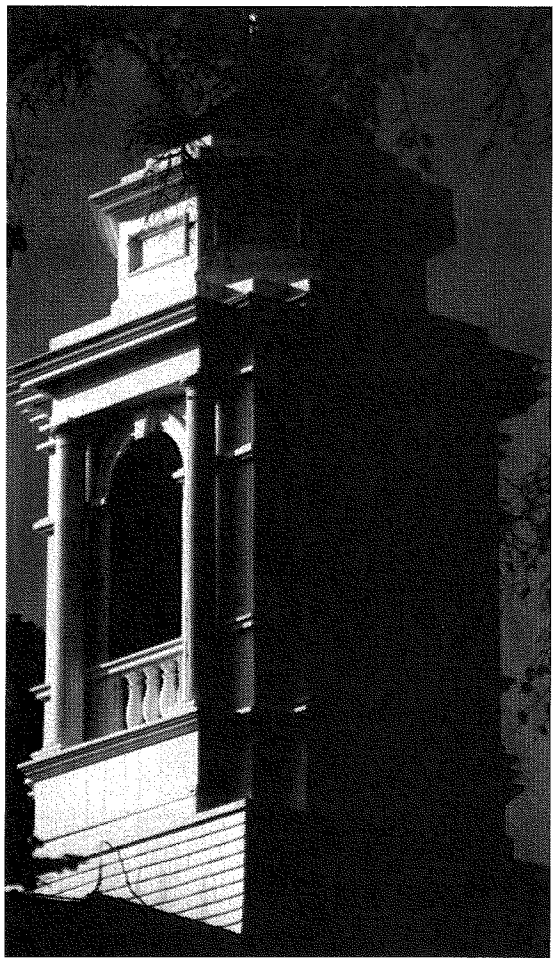
Mary Leakey at Rutgers

What motivated the Leakeys to work so long and hard in the face of skepticism, rugged field conditions, and lack of funds?

"Funamentally, it's curiosity," Leakey explained. "I want to know why we are and what we've become today."

Not content with the insights her work at Olduvai had provided, Dr. Leakey led an expedition to Laetoli, another Tanzanian site not far away, in 1979. She wanted to look in older beds — at Laetoli, dated to about 3.5 million years — to push our knowledge of our ancestors still farther back in time. It was at Laetoli that her team made what was probably the most evocative find of the decade: the footprints of a pair of hominids.

One set is larger — perhaps those of a male? — and the other smaller. Some think the smaller individual might have been a female; the footprints are deeper than might be expected, so perhaps she was carrying a child. The pair of footprints track across the plains, side by side, companionably. Then, poignantly, the larger individual stops, turns to the left and pauses — looking back over his shoulder? checking for a lion? We shall never know his motivation. The tracks resume and the pair trudge onwards on their journey in the past.



Rutgers University, New Brunswick

Dr. Alan Walker - Recent *Homo erectus* find.

Dr. Walker spoke of the intriguing new information that has been gleaned from his recent studies of *Homo erectus*. Dr. Walker and Richard Leakey, with a skilled team from the National Museums of Kenya, were responsible for the discovery of the most complete skeleton of an early hominid yet found, an adolescent, male Homo erectus from the site of Nariokotome in northern Kenya.

Because of its unusual completeness, this spectacular find provided many surprises for anthropologists. Although only 10-12 years old at the time of his death, this *Homo erectus* boy was already about 5'4" tall and would have reached an adult height of well over 6' if he had lived. Since *Homo erectus* had always been assumed to be rather short and stocky, the boy's long and lanky stature was unexpected. Dr. Walker suggested that the Sudanese basketball player, Manute Bol, might be a better model for the Narikotome boy than Pele, the famous soccer player. In fact, now that complete bones are available, a re-assessment of many *Homo erectus* specimens shows that many individuals of this species were tall, Dr. Walker said.

The boy's pelvis permitted Dr. Walker to estimate the size of an adult female pelvis. The very small size of the birth canal showed that *Homo erectus* had already developed the uniquely human trait of giving birth to neurologically premature babies. Human babies are able to maintain a very rapid rate of brain growth for a full year after birth, whereas babies of all other primates slow down their rate of brain growth markedly after birth. *Homo erectus* had already learned our evolutionary "trick," which depends upon a superior and reliable source of food for *Homo erectus* mothers in order to meet the baby's nutritional demands, which are heightened by their accelerated brain growth. Thus *Homo erectus* used the same mechanism as *Homo sapiens* in order to be a very large-brained species without enlarging the pelvis (and birth canal) so much that it compromised bipedal walking. Dr. Walker provided an engrossing look at the way in which biological information can be gleaned from the fossil record.

Dr. Allan Wilson - The Eve Theory

Dr. Wilson spoke after the evening banquet, explaining his controversial "Eve" theory. Dr. Wilson is an expert in studying mitochondrial DNA, a form of genetic information which is inherited only through females. Because the mitochondrial DNA of an individual receives no contribution from the father, the only changes that occur are due to mutations that accumulate over time. Thus, mitochondrial DNA can be used to trace a lineage back through an individual's mother, her mother's mother, and so on.

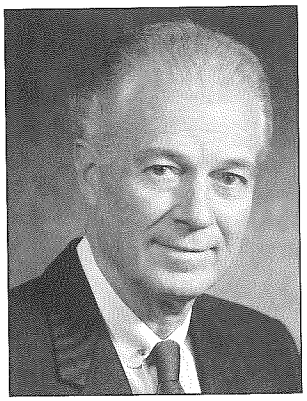
By looking at differences in mitochondrial DNA in living humans from different races, Dr. Wilson and his team have concluded that all modern humans are descended from a single mother — or possible a group of women who shared identical mitochondrial DNA. It is this common, maternal ancestor which the press have dubbed "Eve," although Dr. Wilson explained that the term may be misleading since there is no way to tell if it was a single woman or perhaps even several hundred or thousand women who shared a common genotype.

Dr. Wilson's research also indicates that Eve — or the Eve population — probably originated in Africa. While an African origin agrees well with the fossil record of human evolution, Dr. Wilson's estimate of the antiquity of this population — 100,000 years ago — has caused considerable debate. Wilson's Eve is much more recent than *Homo erectus*, a species that is known first from Africa, at about 1.6 million years ago. By about 1 million years ago, *Homo erectus* had spread throughout the Old World, as far as southeast Asia and Europe.

Does Wilson's evidence mean that *Homo erectus*, a species so hauntingly similar to ourselves in all parts of its anatomy, died out everywhere except Africa? Could *Homo erectus* in China, Java, the Near East and Europe all have vanished into extinction?

Possibly. Dr. Wilson's work certainly suggests that there was a surprisingly recent "bottleneck" in human evolutionary history. This is the term used to describe episodes in which all members of a species die off except for a small population that then multiplies and spreads out once again. He intends to pursue his work further, enlarging the sample sizes, refining his techniques, improving his calculations of the antiquity of this bottleneck — and indulging in friendly arguments with his paleontological colleagues!

In addition to these talks, the symposium offered many thought-provoking and entertaining lectures by other distinguished paleoanthropologists: Drs. Wendy Ashmore, Robert Blumenschine, J. Desmond Clark, Meg Conkey, Robin Fox, Jack Harris, F. Clark Howell, Carmel Schrire, Lionel Tiger and a joint presentation of work conducted by Drs. Jeanne Sept, Susan Cachel, and Dieter Steklis. Their topics were wide-ranging and covered the globe from China, to Africa, Europe, and South America. Archaeological sites and evidence discussed varied in age from a few million, to a few thousand, to a few days old. From the beauties of European cave art, to the colonial forts of South Africa, from the arrangement of buildings in Mayan cities to the intriguing pseudo-sites created by wild chimpanzees, the symposium offered something for every listener.



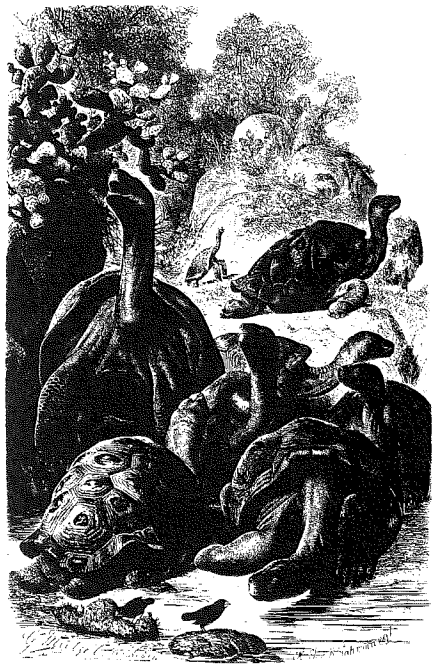
NATIONAL GEOGRAPHIC

In Memorium:

Dr. Melvin M. Payne, Chairman Emeritus of the National Geographic Society's Board of Trustees, died on Oct.6, 1990 at age 79.

During his lifetime, Dr. Payne greatly expanded the international influence of the National Geographic Society. While Chairman of the Society's Committee for Research and Exploration over 50 million dollars was disbursed to 2,500 grantees. He was a supporter of many sciences, including anthropology and primatology. He served as a member of the Leakey Foundation Board of Trustees for many years. He was a personal friend of Louis and Mary Leakey. A multi-faceted man, his inspiration, leadership and insight will be missed by friends and colleagues around the globe.

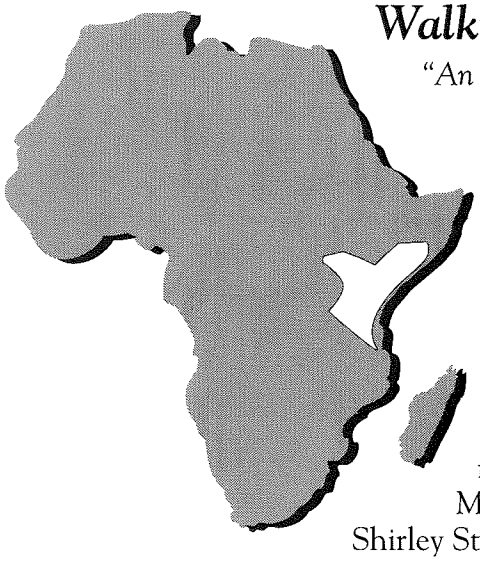
TRAVEL



Elefantenschildkröte.

The Enchanted Galapagos Islands

Visit the land which inspired Charles Darwin to pursue his naturalistic studies resulting in the theory of evolution. Join California Academy of Scientists, Dr. Terry Gosliner and Dr. Tom Daniel as they guide members in an in-depth exploration of this "living laboratory". The two week sailing trip - longer than most - will include areas normally closed to non-scientists and will include an opportunity for an overnight hike to Alcedo Volcano, home of one of the largest colonies of giant tortoises. Blue-footed boobies prancing in courtship behavior, curious fur seals, 240,000 nesting pairs of red-footed boobies, brilliantly colored marine iguanas, playful sea lions, magnificent frigate birds with brilliant red throat sacs inflated - all set in a strangely beautiful volcanic landscape. **August 31 - September 18, 1991.** Call the Academy Travel Department for a detailed itinerary: (415) 750-7222



Walking in the Footsteps of Early Man

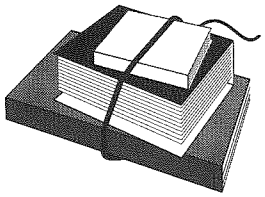
"An Anthropological tour hosted by Drs. Mary & Richard Leakey"

Whether you're an inveterate safari traveler, or considering your first venture into this remarkable part of the world, I invite you to join us as we follow a special course, the migratory patterns of early man, during our expedition to Kenya and Tanzania, **August 21 to September 5, 1991.**

Only the affiliations of the Leakey Foundation can make possible many of the activities that distinguish our expedition. With Richard Leakey as our guide, we reconstruct the daily life of early man as we explore active digs at Lake Turkana and Koobi Fora. Mary Leakey is our personal docent at Kolo, south of Tarangire National Park, as we view the Kondoa Irangi rock art paintings from final state of the Stone Age. During our stay at Mount Kenya Safari Club, we meet Leakey Foundation grant recipient Shirley Strum and learn of her research with open-country baboons. Other sites for game viewing will be included as well.

Due to space limitations, this trip is first being offered to the Trustees and Patrons ($1,000 annual donors) of the Leakey Foundation. Call the Leakey Foundation office for more information: (415) 834-3636.

REVIEWS



Members may enjoy reading the following books. They are not available through the Leakey Foundation but can be ordered through your local bookstore or library.

An Accessible Overview of Primate Evolution

Primate Evolution *by Glenn Conroy, 1990. W.W. Norton, New York Paperback $34.95*

Wondering where to turn for good information about primate evolution? Glenn Conroy's new book is an excellent place to start. Of the several works on the subject that have been published lately, **Primate Evolution** is likely to be the most appealing to the non-specialist.

Conroy, who has worked for many years on primate and human evolution, provides a clear, accessible introduction to the subject. His book begins at the beginning, with a definition of the Primates as an order. It also offers concise reviews of evolutionary theory, how specimens are classified, what can be learned from studying the morphology or shape of the bones, how fossils are dated, and how they are interpreted.

The fossil record is discussed, starting with a treatment of the various theories about the origin of the primates. Then, chapter by chapter, the information we have gleaned from the fossil record is summarized in chronological order, ending with the evolution of humans. The illustrations are good and the coverage of topics broad. For the student or the interested amateur, Conroy's book is a fine introduction and points the way to more technical references for those wanting to pursue the subject further.

Dr. Pat Shipman, Editor

A Personal Look at Human Evolution

The Hominid Gang *by Delta Willis, 1989. Viking Penguin, New York. Hardbound or paperback $21.95*

Soon to be available in paperback, Willis' book is an intriguing and personal view of the ideas and researchers in human evolution. Journalist Willis was brought up in Arkansas, where the teaching of human evolution was banned when she was a girl. As an adult, she set out to find out what the evidence is and where the problems lie, and takes us along on her journey.

Part of the charm of this book is that it explains the intellectual issues through the people involved. She lets us eavesdrop at some historic moments, like a discussion of hominid fossils between Richard Leakey and Stephen Jay Gould, the evolutionary theorist. We look over her shoulder as she tries her hand at paleoanthropology, prospecting for fossils in Kenya's deserts and excavating alongside of Kamoya Kimeu, Richard Leakey's right-hand man and head of the world-renowned team of fossil finders from which the title is taken.

Willis shows us the glamour and the unglamourous, the charming and the rancorous in human evolution. The book is a good read and a painless introduction to many of the thorny problems and intricate ideas in the field.

Dr. Pat Shipman, Editor

New Evidence on the Darkest Mystery in Paleoanthropology

Piltdown: A Scientific Forgery *and* ***The Piltdown Papers****, both by Frank Spencer, 1990. Oxford University Press. Hardbound $24.95 and $59.95 respectively.*

The Piltdown finds are probably the best-known example of scientific fraud, especially in the natural sciences. Since the doctored remains of a modern human skull and an orangutan jaw were recognized in 1953, a "cottage industry" has grown up to explain the hoax and point the finger at a succession of possible culprits.

It is generally accepted that Charles Dawson, the amateur antiquarian and naturalist who "found" the remains in 1912, was party to the fraud, but also that he may not have been entirely capable of the detailed modifications required to convince most of the anthropological community.

Who then might have benefitted most from the plot? Such is the question Frank Spencer asks in **A Scientific Forgery**. After reviewing the whole story and placing it in the context of paleoanthropology in early 20th century England, he offers a new suspect: Sir Arthur Keith, perhaps the premier Anglophone human paleontologist of the first third of the century. **The Piltdown Papers** reprints letters, illustrations and other documentary materials relevant to the forgery, providing a source for further armchair sleuthing or history of science research.

Discussion of Spencer's case will go on at least until the next author finds a similarly non-smoking gun (or a truly smoky one shows up), but together these two books obviate the need for further detailed research. The narrative volume is well-written and will be of broad interest —it is highly recommended — while the documents are drier but valuable for anthropological and historical collections.

Review by Eric Delson
Reprinted with permission from Choice magazine.

More on the Eve Hypothesis

The Search for Eve *by Michael H. Brown, Harper and Row, 1990. Hardbound $22.95*

This book is a serious attempt at scientific reportage on one of the more controversial hypotheses in human evolution: that modern people originated in Africa about 100,000 years ago, spreading outward to replace all contemporaries, such as the Neandertals. The newest approach to this problem involves the contribution of molecular genetics to what was previously a fossil-based field, and Brown does a generally good job of introducing readers both to the disciplines and to their protagonists, integrating their diverse approaches and terminologies engagingly (if less scientifically than scientists would wish).

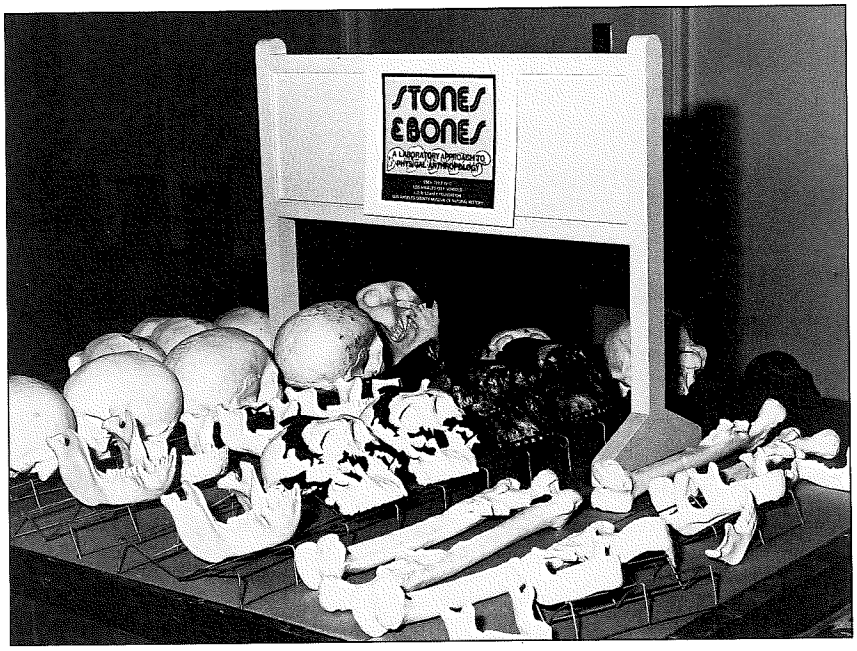
Genetic studies have suggested that most Africans are distinguishable from members of most other geographic groups (and some Africans) in a way that implied that the common ancestor of all of them had lived in Africa. Descendants of this early modern human population (of which one female was in ways an "Eve") had split into mainly African and mainly extra-African subunits. At the same time, studies of fossils suggested the same idea to paleoanthropologists, who agreed on the time frame of 100,000 years ago.

Brown contrasts this view to one that sees independent evolution of modern people from older, more archaic populations in several geographic regions, a view that has also attracted some geneticist supporters.

This controversy is placed in the context of a general survey of human evolution, amid numerous quotes from leading figures on both sides, and the book serves as a well-balanced introduction to this fascinating subject.

Review by Eric Delson
Reprinted with permission from Choice magazine.

Awards



Educating Our Children

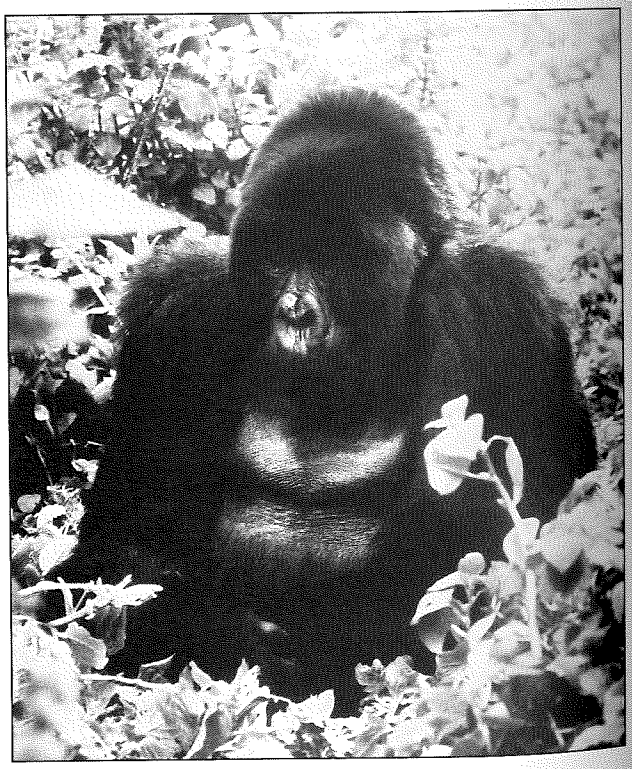
Stones & Bones Receives $50,000 Grant From Donner Foundation

The award winning secondary school curriculum, ***Stones and Bones***, has received a $50,000 grant from the Donner Foundation for revising, updating, and disseminating the program to school districts throughout the world. The curriculum is being used in 80 school districts nationally and internationally. The grant will allow the program to include anthropology professors around the country in training high school teachers to use this hands-on curriculum. The Leakey Foundation granted additonal funds to remake the casts of important fossils in the laboratory units.

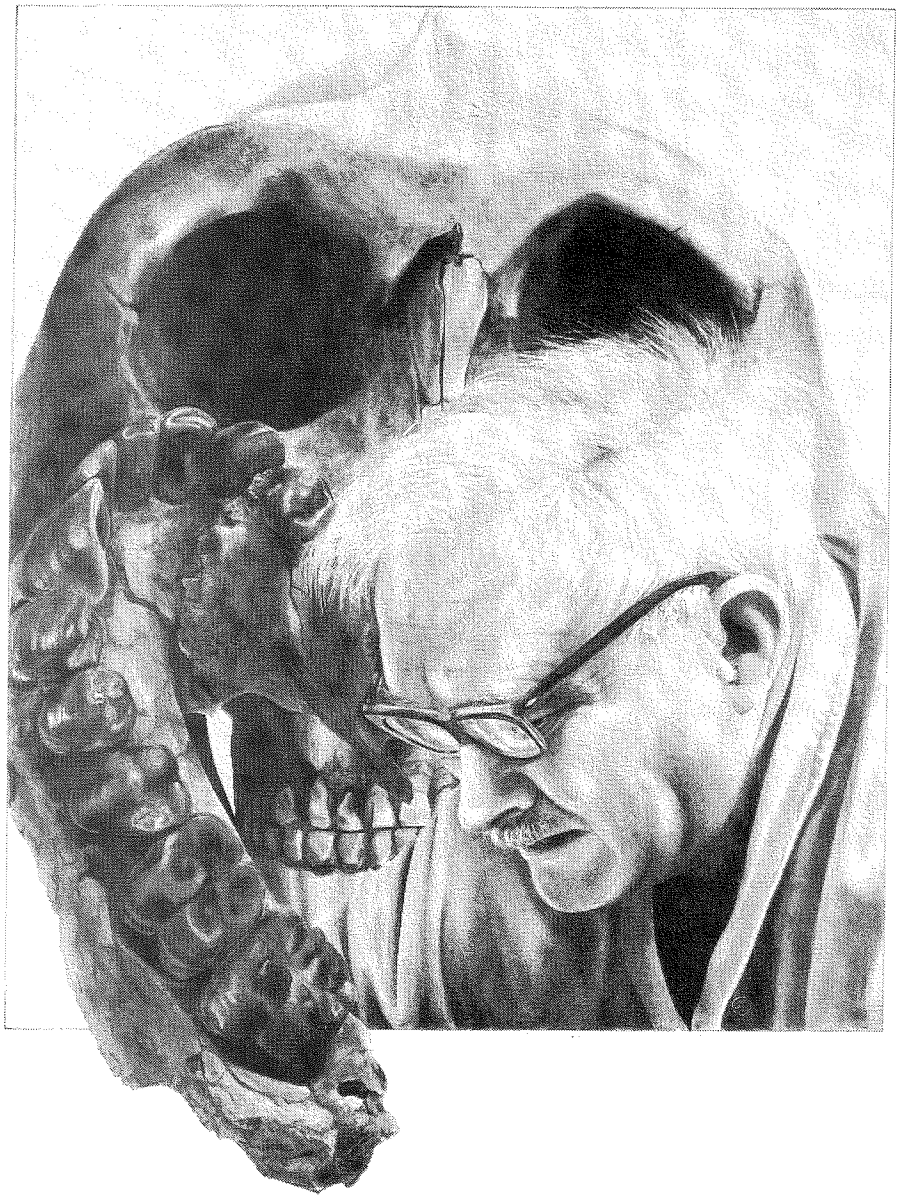
Saving Our Nearest Relatives

Homeland Foundation Gives $30,000 To Great Ape Fellowship

We are pleased to announce receipt of a two year grant from the Homeland Foundation to fund the **Great Ape Research and Conservation Fellowship**. This grant of $30,000 will be available over a period of two years and will fund one or more researchers for long-term field work on great apes whose habitats are threatened.



First Prize To Be Awarded In Fall of 1991



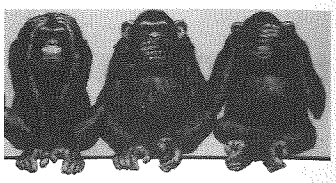
Nominations are now in for the first year's award of the **Leakey Prize for Multidisciplinary Research on Ape and Human Evolution**. The selection committee will be considering nominations over the next few months, and announcement of the award recipient will be made during the early Fall. The awards presentation ceremony will take place at Harvard University in Cambridge, Massachusetts on October 11, 1991.

The prize shall consist of a cash award of $25,000 and a commemorative medal. It is intended to honor a scientist for achievement that transcends the boundaries of his/her discipline and helps to link widely differing branches of the study of evolution.

SCIENTISTS Under The Microscope

Directing the use of the Foundation's Grant Endowment is the job of the the members of the Scientific Executive Committee (SEC) and its wider constituency, the Scientific Advisory Council (SAC).

This year we are pleased to be able to call upon the expertise of the following new members:



SEC

Dr. Ofer Bar-Yosef For an in-depth look see interview on page 15.

Dr. Eric Delson is a professor in the Department of Anthropology and the Graduate program in Evolutionary Biology at Lehman College, City University of New York. He is also a Research Associate in the Department of Vertebrate Paleontology of the American Museum of Natural History and was editor of the *Journal of Human Evolution* from 1986-1989. Dr. Delson's primatological research has focused on old world monkeys. He was co-curator of the scientific sessions which accompanied the exhibition "Ancestors: Four Million Years of Humanity", and co-editor of the *Encyclopedia of Human Evolution and Prehistory* with Drs. Tattersall and Van Couvering.

Dr. Richard G. Klein is a Professor of Anthropology at the University of Chicago. He is interested in the interrelation of cultural, biological, and environmental change in human evolution and his primary research areas have been South Africa and Spain. Dr. Klein is on the Editorial and Review Board for the *Journal of Archaeological Science, Quaternary Research, Journal of Field Archaeology, Journal of Human Evolution, Paleoecology of Africa.* His own publications include *The Human Career: Human Biological and Cultural Origins*, 1989.

Dr. Carel P. van Schaik was born in Rotterdam and received his degrees from Utrecht University. He is currently a visiting Associate Professor in the Department of Biological Anthropology and Anatomy at Duke University in North Carolina. Much of his research in primatology has focused on orangutans or macaques in Indonesia. He has published extensively on the interrelationships between primate behavior and different ecological variables. Dr. van Schaik remains affiliated with Utrecht University where he continues to supervise graduate students.

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Dr. Alexander Halliday Harcourt is a primatologist specializing in the behavior of gorillas. He has studied great apes in Zaire, Rwanda, Uganda and most recently in Nigeria. In addition to primate social behavior, Dr. Harcourt is concerned with the conservation status of the great apes and their natural environments. He is Chair of the Digit Fund and is currently a visiting lecture at the University of California, Davis.

Dr. Richard Potts received his Ph.D. from Harvard where he also worked as a Curatorial Assistant in the Human Osteology Laboratory of the Peabody Museum. He has been affiliated with the Yale Peabody Museum of Natural History, the National Museums of Kenya and is currently Associate Curator of the Department of Anthropology in the National Museum of Natural History at the Smithsonian Institution. Dr. Potts' primary areas of research into human origins include paleoecology, hominid behavior, and taphonomy.

Dr. Ian Tattersall was born in Britain and is now a permanent U.S. resident. His research has focused on the evolution of human and nonhuman primates with particular emphasis on classifying primates and understanding their relationships. His studies of the behavior and ecology of lemurs have been invaluable to the further studies of comparative primate biology. In 1988 he co-edited the *Encyclopedia of Human Evolution and Prehistory* with Drs. Delson and Van Couvering. Dr. Tattersall is currently the Chair of the Department of Anthropology at the American Museum of Natural History in New York where he was curator of many exhibitions, including "Ancestors: Four Million Years of Humanity", which toured nationally.

Welcoming New Fellows

The Leakey Foundation welcomes the following new members to the Society of Fellows. Each Patron makes an annual contribution of $1,000. Fellows contribute $500 each year to the Foundation's Research and Education Program.

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The Leakey Staff...

From L to R: Leslie Fox, Rob Maichel, Karla Savage, Tanya Erdmann

Leslie Anne Fox, Executive Director, began work in non-profit development in 1981 with the Sierra Club. She has directed alumni and constituent giving programs at both Harvard and Stanford Universities and is an alumna of Brown (B.A.) and Stanford (M.A.).

Karla Savage, Program & Grants Officer, earned her Ph.D. in African Prehistory at the University of California, Berkeley. Her experience includes publication and computer consulting at Lawrence Berkeley National Laboratory and grants administration at the University of California Research Expeditions Program.

Tanya Erdmann, Administrative Assistant, earned her M.A. in Anthropology from California State University, Hayward. She provided staff support in the Office of the President at Cal State Hayward and successfully coordinated the exhibit "Bones of Contention" at their museum.

Rob Maichel is the Foundation Accountant and represents Berg, Lackman & Co. of San Francisco. Rob has been in public accounting for ten years, mostly in banking and finance.

Michael C. Berg, C.P.A. for the Leakey Foundation, has been named San Francisco's *Volunteer of The Year* for 1991 for his work with several AIDS organizations. Congratulations, Michael!

To all Members and Fellows of the Leakey Foundation: *Due to the high cost of printing and postage, only current members of the Leakey Foundation will continue to receive AnthroQuest.*

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