

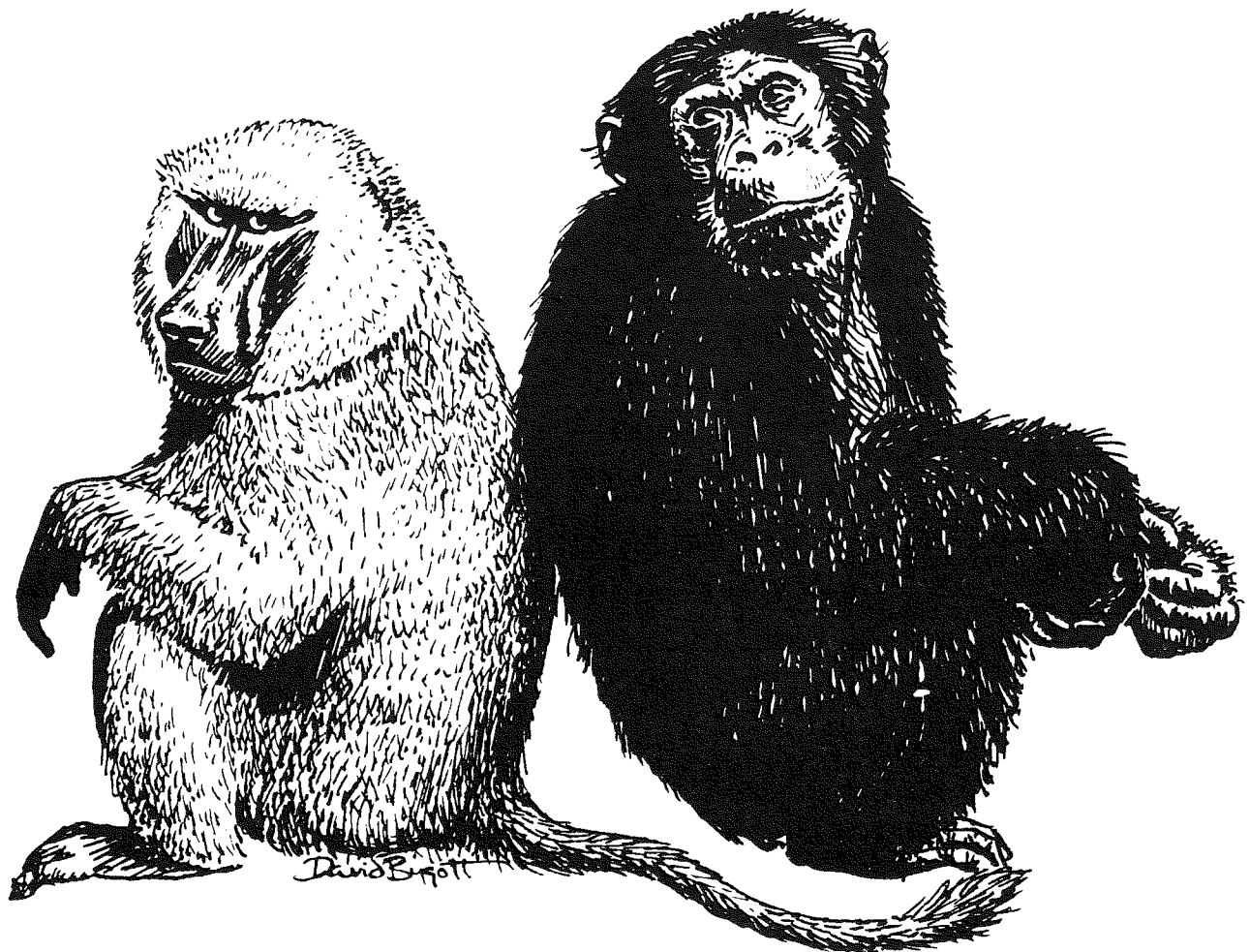
# ANTHROQUEST

*Research Related to Human Origins, Behavior and Survival.*

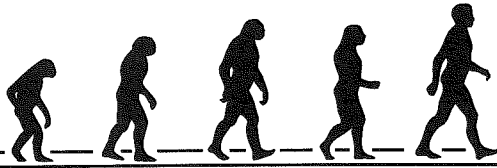
Number 45

*The Leakey Foundation News*

Spring 1992



*Take A Closer Look . . .*



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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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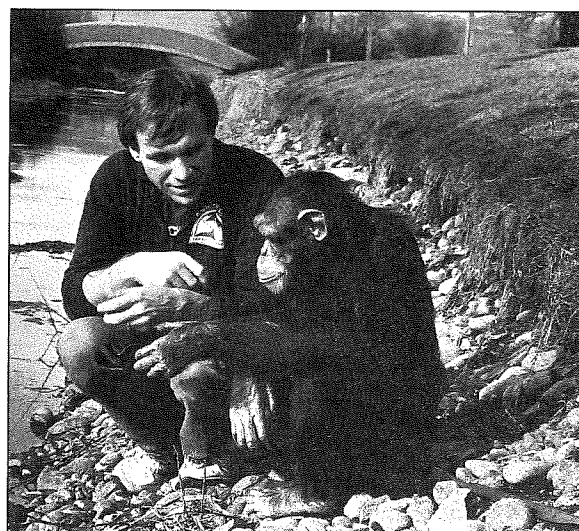
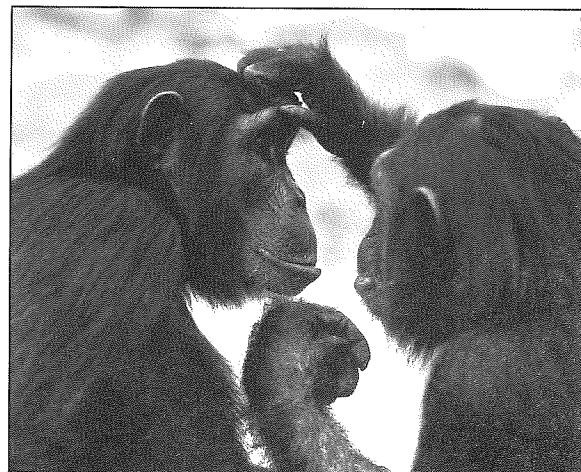
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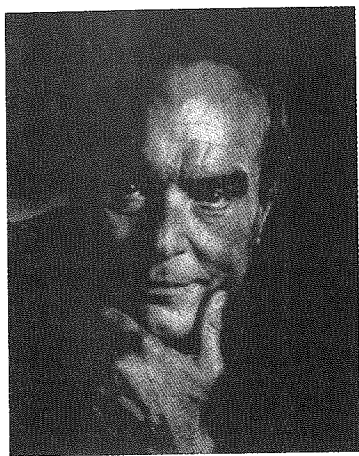
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# President's Message

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Prominent in the overall search for new clues relating to our origins is the field of primatology. Many leading researchers in this important work are funded by Leakey Foundation grants and in this issue of *AnthroQuest* we report on some of the major areas of progress made

in the study of our nearest relatives.

These, and similar endeavors, are not without some risk. Advancing primate studies often involves taking a firm stand on conservation. For example, natural habitats for great apes, in Africa and Asia, are territories frequently under pressure from population growth and development. By their very presence, scientists involved in long term studies provide strong arguments in favor of protection. Their work demands undisturbed sites, their interest fosters understanding in local populations.

We read about the problems of logging in national forest parks, but less well known is the plight of the primates, hunted for food or captured for sale as pets or for experimentation. Political confusion and regional conflicts don't make the job any easier but researchers everywhere are finding diplomacy and discovery go hand in hand as they struggle to keep their research goals in focus and their subjects undisturbed.

It was Louis Leakey who had the foresight to encourage a few chosen young women to undertake long term research in primate patterns of behavior — Jane Goodall, Dian Fossey, and Birute Galdikas. They are the legendary pioneers who went on to open the eyes of the world to the fascinating lives of chimpanzees, mountain gorillas, and orang-utans.

Expanding on this pioneer work, our Great Ape Fellowships have impacted the field in a positive way. Today's primatologists are gathering a wealth of information, adding to our store of knowledge about possible bridges of behavior between early hominids and links to more recent times. You will meet many of our Great Ape Fellows in the following pages.

Meanwhile, on the Grant Program front, each season more requests come over the transom and each must be carefully considered. With basic day-to-day living costs and equipment prices rising, the budgets for most new projects are higher than ever.

Moreover, researchers increasingly donate time and money to the national parks and museums in which their work takes place. Thus, while our basic funding remains constant, without your continued contributions the number of individual researchers we can support will decrease.

The popular Allen O'Brien Lecture series, last fall, featured Dr. Alan Walker and Dr. Meave Leakey who shed light on far-reaching interpretations gleaned from findings by these two renowned paleontologists.

The Foundation takes great pride in the widespread international recognition attached to the Leakey Prize awarded, for the first time, this past year to Dr. Phillip Tobias for his outstanding role in multidisciplinary anthropology. His strong presence in the cause of human rights adds further luster and dimension to his many talents.

Appreciation is due to those special members who apply their know-how and experience to problems and priorities affecting all aspects of our programs, including how best to use finite funds.

Don't forget, we have a perennial target to expand our ranks; each new subscriber strengthens our performance and purpose, which includes a firm commitment to educational sharing.

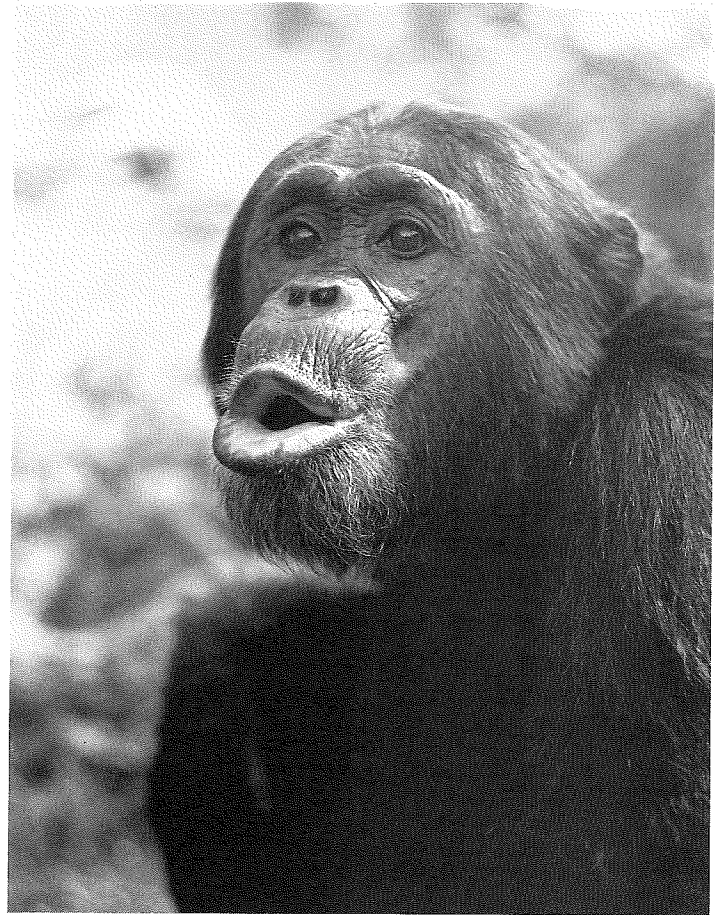
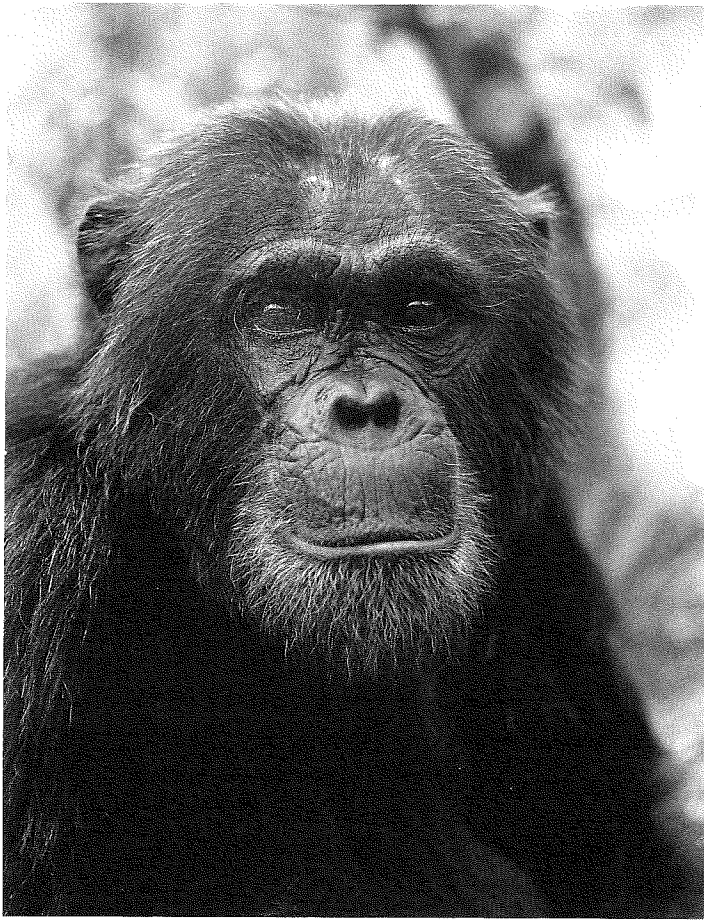
Mankind, currently the supreme product of evolution, is so smart he tinkers with vital processes on a global scale at the expense of Earth's ecosystems. Surely, before it's too late, we should get a sharper picture of that ancient time span when nature herself wrote the script for our own emergence on stage. Finally, just as we seek new facts for added measure and meaning to our own distant beginnings, so too we must search for better human values to help us manage our destiny.

Thank you, as always, for your support.

Mason Phelps, President



# Taking Care of Our Cousins



Photos by Geza Teleki, Committee for Conservation and Care of Chimpanzees, Washington, DC.

## **The world of the chimpanzee is socially complex, familiar to humans in many aspects—and in danger of vanishing before our eyes**

\*\* Washoe, an adult female, lolls under the eye of a remote video camera, looking at the pictures in a magazine. Suddenly there is a rumpus: young Loulis runs into the room, snatches away the magazine, and runs out again. Washoe does not retaliate, but exclaims to herself (in American Sign Language), “Dirty, dirty!”

\*\* Undisturbed by an observer, a group of chimpanzees gather regularly to crack oil-palm nuts, a favorite food. Most of the group is familiar with the use of two stones as hammer and anvil, and the adults are adept at it. One day an elderly female named Kai makes an innovation: she wedges a third stone under the anvil, producing a more level surface.

\*\* Young Dar, who has been taught American Sign Language, uses it when playing alone to say “Peek-a-boo!” to his teddy bear.

\*\* Gigi, an adult female who has not given birth, has nevertheless raised four youngsters successfully, adopting them after the death of their mothers.

These vignettes point to a few facets of the intelligence and emotional capacity of humankind’s closest living relatives, the chimpanzees. Washoe and Dar live in a primate study center in Washington state, Kai in a forest preserve in Bossou, Guinea, West Africa, and Gigi in the Gombe Stream Research Center next to Lake Tanganyika, Tanzania, yet each has much to contribute to our understanding of the nonhuman primate world. Moreover, since the chimpanzee and the human lines diverged only about six million years ago—only yesterday, in evolutionary terms—these fellow apes offer leads for the investigation of our own origins.

In December 1991, the Chicago Academy of Sciences hosted a scientific symposium titled "Understanding Chimpanzees: Diversity and Survival." With sponsorship from the Wenner-Gren Foundation, WBEZ Radio, and the L. S. B. Leakey Foundation, the symposium brought together about 250 of the eminent workers in chimpanzee research, as well as psychologists, anthropologists, and conservationists.

Over the past decade or so of studying chimpanzee behavior, researchers have come to agree that one of the main features of the field is its sheer variety. "The time is long since past that any primatologist can talk about *the* chimpanzee," says William McGrew, of the University of Stirling. Although the forest habitat has shrunk drastically in the last hundred years, chimpanzees in the wild still occupy a wide geographical slice of Africa, from the mixed woodlands and shrubs of Gombe in the east to the tropical rainforest of Ivory Coast in the west. And with many changes in habitat all the way across the continent, the chimpanzees' feeding habits, defense against predators, social structure, and patterns of reproduction change too.



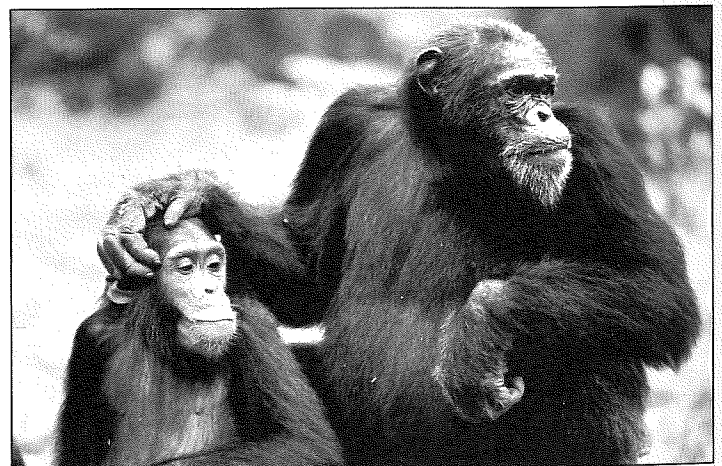
A female bonobo takes to the trees in the Lomako Forest, Zaire. Photo by Randall Susman.

To add further variety to the picture, the so-called common chimpanzee, *Pan troglodytes*, has a sister species: the bonobo, *Pan paniscus*. Sometimes called the pygmy chimpanzee, the bonobo is not really a miniature chimp: on average, females in both species weigh about 33 kilograms, and males about 44 kilograms. The bonobo, recognized as a separate species only in 1933, is particularly difficult to observe in the wild, since it lives only in the rainforests of central Zaire and is even more shy than the chimpanzee, taking quickly to the dense, green, safety net of the trees when alarmed.

## The forest as cultural milieu

For the scientist who studies chimpanzees or bonobos with an eye to tracing features of our ancestors, one item of absorbing interest is the use of objects as tools by nonhuman primates. Jane Goodall was the first to record such an event: in November 1960 she observed chimpanzee David Greybeard stripping the leaves from a twig and then poking it into a termite mound to fish for nutritious insects. In 1973, Goodall listed 10 known populations of tool-using chimpanzees in Africa; McGrew is now about to publish a list of 32. Both the kinds of objects used (leaves, stems, twigs, rocks) and the uses to which they are put (sponge, napkin, fly whisk, missile, club, or fishing wand used for ants, termites, resin, and honey) continue to grow in number.

Chimps and bonobos do not use tools in exactly the same way, according to Ellen Ingmanson, of the Kyoto University Primate Research Institute. During her field work in Wamba, Zaire, she observed bonobos often using tools toward social ends: an invitation to play, for example, or a mock-fierce tug-of-war. Ingmanson has never seen bonobos use tools to obtain food; in contrast, chimpanzees use a great many of their tools in connection with feeding. The specific patterns of tool use can vary strikingly from one population to another. For instance, the chimpanzees of eastern Africa have never been observed to crack nuts, whereas those of western Africa are skilled nut-crackers. In these populations even young chimpanzees practice the motions involved diligently, although they lack sufficient strength to break the tough shells until they are four or five years old. To researchers observing how youngsters acquire these skills, and noting the distinct technique in each population, it seems clear that these are learned patterns of behavior being transmitted among members of a group—in other words, chimpanzee *culture*.



Like humans, chimpanzees have a long period of childhood & adolescence. Gombe Stream Reserve, Tanzania. Photo by Hugo van Lawick.

If the idea of attributing culture to animals other than ourselves is startling at first, it becomes less so when we consider the chimpanzee's long period of childhood and adolescence, the close ties with the mother and siblings formed during the first few years of infantile dependency, and the importance of social cues within the group for individual safety and friendly interaction. All of this adds up to tremendous opportunities for—and perhaps evolutionary pressure toward—learning, the type of non-rote learning that produces a culture.

## Calling all Noahs

But what is a good environment these days, given that the forest habitat is shrinking under the combined pressure of logging, burning for charcoal, and clearing for human settlements? The artificial environment of a primate study center or a zoo, however carefully created to make its inhabitants feel at home, can never provide a full solution. "A zoo is not a place for conservation," Les Schobert, general curator of the North Carolina Zoological Park, states simply. However, he adds, "One of the primary missions of a responsible zoo must be to promote conservation in the wild."

Gay Reinartz, of the Zoological Society of Milwaukee County, points out that breeding the animals in captivity, even if it is possible thereby to increase the annual growth rate of a population, "ultimately has little conservation value unless it can be tied back in somehow with preserving the original habitat."

Unhappily, chimpanzees and bonobos in the wild are endangered not only by the pressures on their habitat but also by more direct threats. Geza Teleki, chairman of the Committee for the Conservation and Care of Chimpanzees, estimates that there are 4,000 to 5,000 chimpanzees in captivity outside of Africa—some in zoos, some in medical research centers, others trained to perform in circuses or animal acts or simply kept as pets. (The corresponding figure for bonobos is much lower, reflecting their smaller population and its relative inaccessibility.) In many parts of Africa where meat is scarce, chimpanzees (or bonobos) are also hunted as a source of protein.

With a wild-caught chimpanzee fetching about \$400 in some countries (for a poacher, the equivalent of a year's income), and perhaps \$20,000 on the international market, it is not difficult to see why the trade persists. But poaching threatens the very core of the chimpanzee community, because it is aimed specifically at mothers and infants. Most often, the mother is killed while defending her young; the demand overseas is primarily for immature chimpanzees. But whatever the fate of these youngsters (and far more die in transit than reach their intended market), the wanton removal of breeding females from the wild populations casts its own grim shadow. According to the computer models of Margery Oldfield, of Trinity University, the disproportionate poaching of females could lead, in less than a century, to a chimpanzee population in the wild that numbers 1,800 to 2,000 but consists entirely of males—and is therefore effectively extinct.

*(This article continues on page 16.)*



*Roger Fouts and Tatu practice the American Sign Language at Washington State Primate Center. Photo courtesy of Chicago Academy of Sciences.*

Although the chimpanzee's natural habitat must have made such learning possible in the first place, extremely useful studies have also been undertaken with chimpanzees in various captive settings. Sue Savage-Rumbaugh, of Georgia State University and Yerkes Regional Primate Center, Emory University, has given much thought to the role of the environment in promoting learning, as she investigates the language abilities of a young male bonobo named Kanzi. "There are real differences between the captive and the wild environment," says Savage-Rumbaugh, "but I think the crucial element is not the trees or the space, but rather the groups—the long-term stable relationships that exist in the wild. If it's anything else, it's that you've got to work to survive in the wild—you have to think and react to many different circumstances." Kanzi's researchers make a point of presenting him frequently with unexpected events to keep exercising his mind, which thrives on challenge. "In a good environment," says Savage-Rumbaugh, "what comes across first about chimpanzees and bonobos is their extraordinary intelligence and creativity."



# PROFILE

## Barbara Boardman Smuts



*Dr. Barbara Smuts is a member of the Leakey Foundation's Science and Grants Committee and Associate Professor of Anthropology and Psychology at the University of Michigan, Ann Arbor. She is best known for her research on social relationships in baboons, some of which was funded by the Leakey Foundation. In 1988, she received the American Psychological Association's Distinguished Scientific Award for an Early Career Contribution to Psychology. The award citation noted "her exquisitely sensitive, skillful observations, which masterfully integrated quantitative and qualitative methods, [and] have led to primate field data of extraordinary quality...."*

*Beverly McLeod, a social psychologist and writer, talked with Dr. Smuts about her work and career.*

*Barbara Smuts watches Sherlock, an adult male baboon, eating herbs. © Barbara Smuts/Anthrophoto.*

Rising before dawn for a hearty breakfast, Barbara Smuts drove away from her rented, turn-of-the-century, rambling farmhouse each morning to begin her day's work. For nearly two years in the late 1970s and early 1980s she lived on this cattle ranch on a plateau of the Great Rift Valley, near the small town of Gilgil, 100 km northwest of Nairobi, Kenya.

But her work had nothing to do with the cattle she passed on the way to a rocky escarpment, some distance from the farmhouse. As the first rays of sunlight illuminated the cliffs, she could make out the dark forms of baboons nestled against one another, still dozing where they had been when she left them the night before. Watching the baboons awaken was her favorite part of the day, Smuts says. "Just like people, they're a little out of it the first thing in the morning."

Like the North American prairies, European steppes, and South American pampas, the savannahs of East Africa are ideal for grazing animals. In Kenya, these open grasslands, punctuated by thickets of brush and trees, usually support wild herds of impala, zebra, eland, Thomson's gazelle, and the big cats who prey on them — lion, cheetah and leopard.

Gilgil ranchers long ago eliminated such predators to protect their cattle, unintentionally providing a safer habitat for the savannah baboons, who now coexist peacefully with the cattle. Though unthreatened by predators, the baboons are still wary of sleeping near the ground; they often scramble hundreds of feet up rocky outcroppings to spend the night.

If the baboons weren't perched too high in their sleeping cliffs, Smuts could sometimes climb close enough to see which individual baboons were huddled together in the chill morning air. Aside from the adolescents who preferred their own slumber party away from the adults, the small sleeping groups usually consisted of a female and her young offspring, together with one of the female's regular male companions. These sleepmates proved so consistent, says Smuts, that she could understand a great deal about baboons' social relationships simply by knowing who spent the night with whom.

Although Smuts had come to Gilgil to study female-female relationships, she became fascinated with the male-female couples that formed enduring partnerships. These cross-sex baboon "friendships" became the core of her dissertation and her 1985 book, *Sex and Friendship in Baboons* (Hawthorne, NY: Aldine).

Like comfortably married couples, friends not only shared their nights, but spent their waking hours in each other's company. The male defended his female friend and her infants, even if he was unlikely to be the father. Why were these males so altruistic? Smuts believes that friendship is a good deal for both sexes. Females benefit from having a male protector. Males, who migrate into the troop, become accepted by gaining the trust of a resident female. And, although females mate with several males, they are more likely to accept a friend as a sexual partner than a stranger.

These friendships can last for years, and provide a picture of baboon society as an intricate web of individual social relationships. Smuts was able to observe baboon behavior that hinted at complex emotions such as trust, jealousy, and revenge. "I think that baboons' social relationships are as highly differentiated as ours," she says.

Like many young primatologists, Smuts was inspired by Jane Goodall's work. At age 13, reading Goodall's first article in *National Geographic*, she set her sights on studying chimps at Gombe with Goodall. Smuts' parents, both social scientists, encouraged her interest in science and natural history. Not so encouraging was her freshman adviser at Harvard, who dissuaded her from majoring in biology by warning that it was a very quantitative field, too difficult for a woman to master.

Turning to anthropology, Smuts had the good fortune to work with Irvén DeVore (now co-chairman of the Leakey Foundation Science and Grants Committee), who supervised her study of rhesus monkeys at La Parguera in Puerto Rico for a summer. She continued studying sex differences in reproductive strategies as a graduate student (in biology!) at Stanford University, working with David Hamburg and Jane Goodall. She was also influenced by Richard Wrangham (a member



Relaxed adult male being groomed by one of his adult female friends. © Barbara Smuts/Anthrophoto.

of the Foundation's Scientific Advisory Council), who added an ecological perspective to her training.

Wrangham had studied male chimps at Gombe, and Smuts embarked on a comparative study of females, using the same detailed quantitative methods. Forced to abandon her chimp research at Gombe after she and three others were kidnapped and held for several weeks, Smuts nevertheless feels her time there was invaluable. "I saw a lot of interesting things packed into those two months. I saw several predations by chimpanzees; I witnessed a violent intercommunity encounter. Even though it was only a short time, it gave me a feeling for chimpanzees. It makes a difference when you read the literature [later]. If you've spent even two months with an animal, from then on you have a picture. I have a picture of specific individuals as well, so even now, 15 years later, when I read Jane Goodall's reports on who's doing what, it's very real to me."

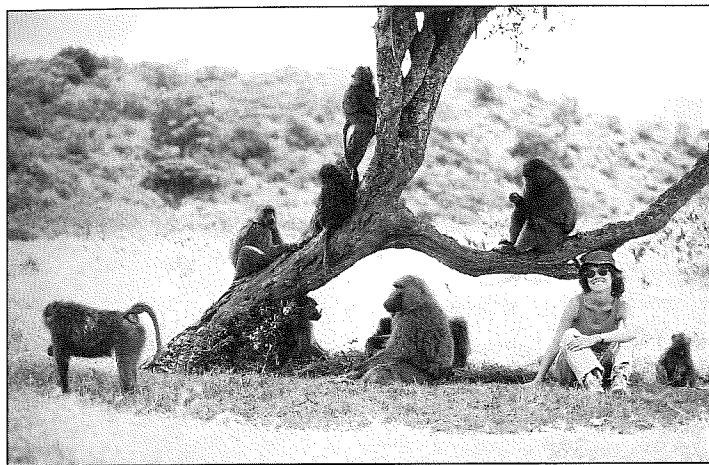
Smuts then joined another DeVore student studying baboons in Kenya's Masai Mara National Park, but found it difficult to observe the animals, who were often obscured in thickets. The researchers were also hampered by having to stay inside their vehicles because of national park regulations designed to keep tourists from being eaten by the numerous predators.

Gilgil, by comparison, was a researcher's paradise. Smuts could follow the baboons on foot, recording their behavior in minute detail as they foraged all morning: plucking grass, herbs, and the sparse fruits and flowers; digging in the ground for corms (tiny, onion-like bulbs); occasionally eating baby antelopes, hares, and eggs; and drinking water from the cattle troughs.

While the baboons dozed in the midday heat, Smuts ate her sack lunch and rested, too. "One of my favorite memories is one day when I had a cold and was feeling really tired. I lay down on the ground for just a couple of minutes to take a little cat nap. When I woke up two hours later, the troop had disappeared. The only one left was an adolescent male lying beside me, just waking up from his nap. We sat for a moment looking at each other, and then I said to him, 'I don't know where they are; do you?' He marched off for an hour in a beeline, right to them. He knew exactly where they were, even though they weren't within sight."

At dusk, the baboons, their stomachs bulging with food, would settle into their familiar groups along the sleeping cliffs. "When they wake up the next morning, before they leave the sleeping cliffs they sit around and burp," says Smuts. The baboons' amusing, human-like behavior made Smuts laugh many times a day. "I think what makes them so funny is that they seem to share so many of our concerns in the social domain, but they're more transparent than





Barbara Smuts relaxes for a moment under an acacia thorn tree, surrounded by olive baboons, some almost equal to her in size. © Barbara Smuts/Anthrophoto.

human adults. They're more like children, in whom you can see beneath the surface; you can see their concerns and their vulnerabilities," comments Smuts.

She recounts a common scene in baboon society that humans can identify with, in which "an adolescent male who's trying to make his way up the male dominance hierarchy will strut over to try and supplant another male. He approaches with the utmost confidence, because that's the only way you can make such a move. Sometimes it works. But sometimes he'll march over, and the other guy will completely ignore him. And then he's faced with this very awkward situation — what to do? Baboons seem to act very much like people in those situations. He'll suddenly notice something on the ground to become very interested in, or he'll run off and chase a female. It looks as if he's creating an excuse to extricate himself from an embarrassing situation."

Smuts believes that such behavioral similarities between baboons and humans are more than an amusing coincidence, but rather indicate the common emotional foundation shared by social primates. "What impressed me most, living with the baboons day after day, was how preoccupied they are with their social relationships, and how they behave as if emotions are important to them also. Baboons act as if they're embarrassed; they act as if they're sad; they act as if they're angry. They appear to experience the whole range of human emotions."

Smuts emphasizes the importance of translating such impressions into rigorous observations that can be evaluated by others. For example, she noticed what seemed to be temperamental differences between anxious and "cool" male baboons. When another male approached, the cool guys would con-

tinue feeding calmly, while others would appear tense and nervous. By meticulously recording each male's reactions to approaches by other males, Smuts was able to rank the baboons by their level of "coolness."

"Cool" is not the same as "macho" in the baboon world, Smuts found. In her study, while "coolness" is unrelated to the male dominance hierarchy, it is the best single predictor of mating frequency. Female baboons are more impressed by a suave approach than a macho display, it seems. "I think that my measure of coolness was one indicator of social skills. In general the cooler males were the older ones who had been in the troop longer," says Smuts, while the younger, stronger males were more dominant.

But coolness may promise success with the ladies only in a relatively benign environment like Gilgil, says Smuts. In harsher surroundings, where male life expectancy is shorter, baboons follow a different reproductive strategy with the macho males being more successful in mating. Since Gilgil males sometimes live in the troop for a decade, they have time to develop the social skills useful for forging friendships with females and alliances with other mature males.

How do strangers become friends and rivals become allies? How do baboons develop trust? Trust, observes Smuts, is an evolutionary paradox. "Evolutionary theory tells us that ultimately all individuals are competitors, that even closely related individuals don't share all their genes in common and therefore are inherently competitors — that even individuals who are cooperating toward a common goal, such as males and females in rearing offspring, nevertheless have conflicts of interest."

Theoretically, a principle known as reciprocal altruism — scratch my back today and tomorrow I'll scratch yours — provides a framework for reconciling the paradox. But Smuts wants to know how primates actually resolve the conflict day to day, how they gain and maintain each other's trust, how they balance the comfort of trust with the threat of betrayal. Tricky though the compromise may be, nonetheless "what we see among primates and many other social animals is the development of long-term cooperative relationships," she says.

Perhaps understanding this precarious but persistent balance of trust and conflict among baboons offers greater insight into human relations.

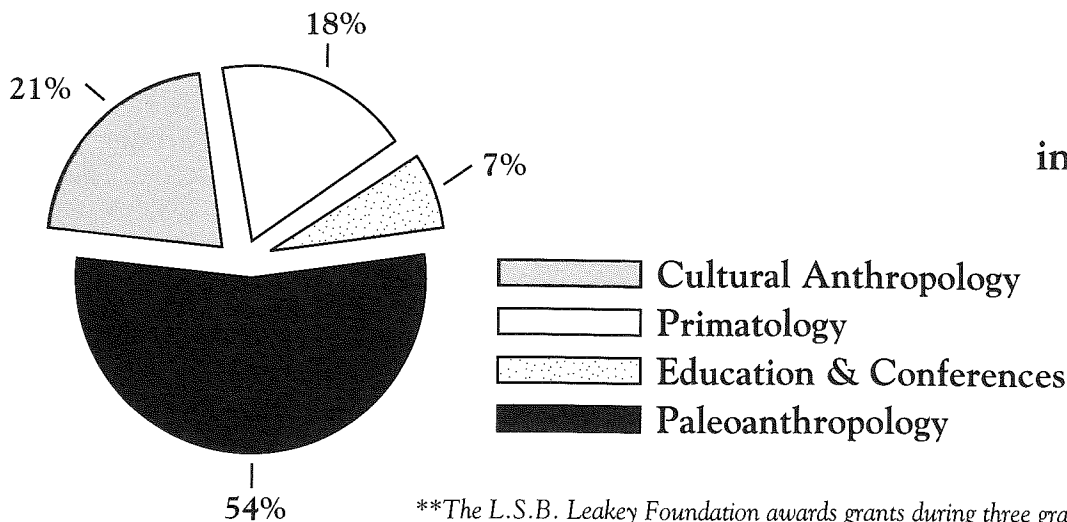
Barbara Smuts (Scientific Executive Committee) and Adrienne Zihlman, (Scientific Advisory Committee) were recently featured in the December 1991 issue of *Discover*.



# GRANTS

## Grants Awarded

**FALL 1991**  
**Total Grants Awarded**  
**in Fall Granting Session**  
**\$92,919**



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

### CULTURAL ANTHROPOLOGY

- Greaves, Russell** (U New Mexico) .....\$4,500  
 Subsistence and Technological Organization Among  
 the Pume of Venezuela
- Hill, Kim** (U Michigan-Ann Arbor) .....\$10,200  
 Social Organization of Ache and Hiwi Foragers  
 (Paraguay and Venezuela)
- Ivey, Paula** (U New Mexico) .....\$5,000  
 Resource and Labor Assistance Among Efe Forager  
 Children of Northeastern Zaire

### PALEOANTHROPOLOGY

- Bernor, Raymond** (Howard U) .....\$7,500  
 Kordos, Laszlo (Hungarian Geological Inst)  
 Multidisciplinary Field Program at Rudabanya, Hungary
- Churchill, Steven** (U New Mexico) .....\$4,540  
 A Morphometric Analysis of Human Upper Body  
 Evolution in the Eurasian Later Pleistocene
- Harris, Jack** (Rutgers U) .....\$8,500  
 Late Pliocene Paleoanthropological Studies in the  
 Gona Deposits, Ethiopia
- Kimbel, William** (IHO) .....\$9,000  
 Continued Paleoanthropological and Geochrono-  
 logical Research at the Hadar Site, Ethiopia
- Marean, Curtis** (SUNY-Stony Brook) .....\$1,000  
 Preparation and Study of a Sabertooth (*Dinofelis*) Sympatric  
 with Early Hominids
- de Maret, Pierre** (Musée Royal de l'Afrique Central).....\$7,500  
 Further Excavations of Mbi and Shum Laka  
 Rockshelters, Cameroon

- Rae, Todd** (SUNY-Stony Brook) .....\$3,000  
 Phylogenetic Analysis of Proconsulid Facial Morphology
- Svoboda, Jiri** (Czech Academy Sci) .....\$5,000  
 Dolni Vestonice and Pavlov Upper Paleolithic Settlement and  
 Cultural Relationships (Czechoslovakia, Austria)
- Umer, Mohammed** (Lab Geol Quat-CNRS) .....\$4,000  
 Holocene Paleoenvironmental and Paleoclimatic  
 Changes in Southern Ethiopia

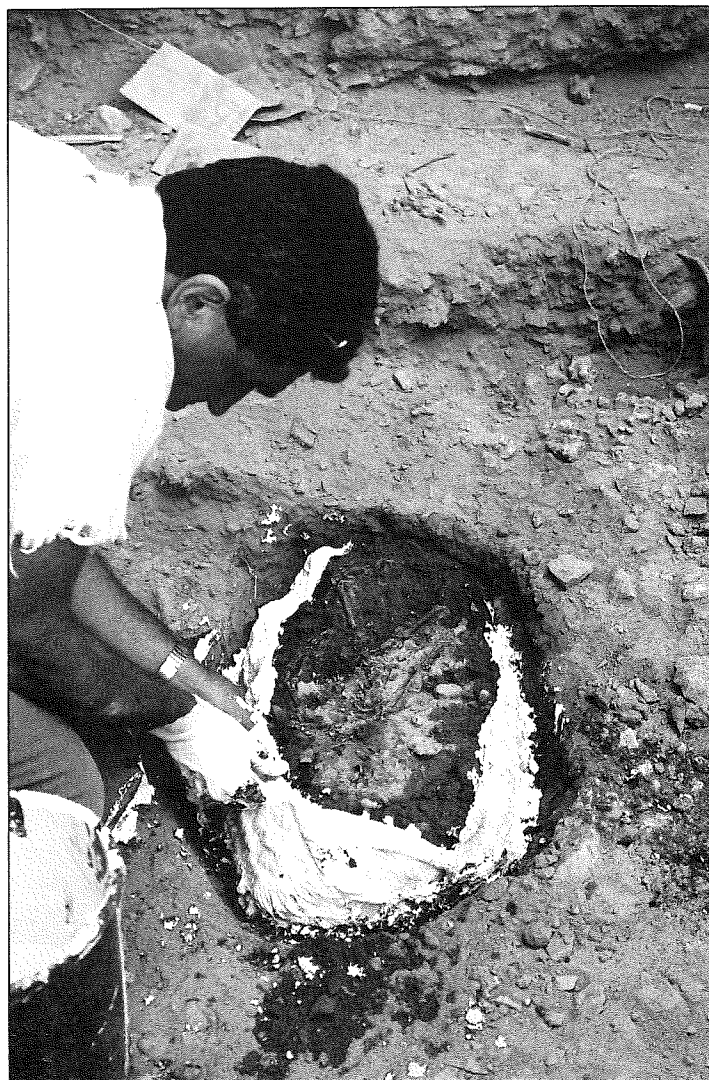
### PRIMATOLOGY

- Beyene, Shimelis** (Washington U) .....\$5,029  
 Female Mate Choice in the Awash Baboon Hybrid  
 Zone, Ethiopia
- Goldsmith, Michele** (SUNY-Stony Brook).....\$4,700  
 Ranging Behavior of Western Gorillas in the Central  
 African Republic (Dzanga-Sangha Forest Reserve)
- Kirkpatrick, Craig** (UC-Davis).....\$7,000  
 The Socioecology of the Endangered Yunnan Snub-  
 Nosed Monkey (*Rhinopithecus bieti*), China

### EDUCATION & CONFERENCES

- Kay, Richard** (Duke U) .....\$3,450
- Simons, Elywn** (Duke U),  
**Fleagle, John** (SUNY-Stony Brook)  
 Anthropoid Origins—The Fossil Evidence: Symposium  
 and Workshop, Durham, North Carolina
- Posnansky, Merrick** (UC-Los Angeles) .....\$3,000  
 African Graduate Participation in 1992 Society for  
 African Archaeology (SAfA) Conference in Los Angeles

# GRANTS



*Dr. Yoel Rak braces the bulk of loose sediment with strips of plaster in order to remove this fragile skeleton of a newborn hominid in bloc, to be excavated later under laboratory conditions. Photo courtesy of Hovers and Rak.*

## Rocking the Cradle

The international team of Erella Hovers (Hebrew University of Jerusalem), William Kimbel (Institute of Human Origins) and Yoel Rak (Tel-Aviv University) have sent us some exciting news that might be considered the most belated birth announcement ever made! During the summer of 1991, with Leakey Foundation funding, the trio led an expedition to re-excavate the Israeli site called Amud Cave — with wonderful success.

The cave was first excavated by a Japanese team in 1961 and 1964, who found a large assemblage of animal remains, stone tools of the Mousterian type commonly attributed to Neandertals, and various representatives of the Neandertal themselves. The best specimen was an almost-complete male skeleton with most of its bones still articulated, suggesting a burial. Pieces of another adult and two subadult individuals were also recovered by the Japanese anthropologists.

Because in the last few years questions about Neandertals in the Levant have been blossoming as fast as weeds in a flower bed, 1991 seemed an ideal time to re-visit Amud and gather more information. The expedition aimed to re-examine the stratigraphic sequence and geological evidence, gather samples for radioisotopic dating, and enlarge the sample of stone tools, animal bones, and (if possible) Neandertal remains, so that modern techniques of analysis could be used to answer questions about site taphonomy, hominid ecology, and Neandertal subsistence strategies.

While it might seem the proverbial piece of cake to walk into a known, productive site and get good material, that is far from the case. The thirty years intervening between the previous Japanese-run excavations and these have wrought havoc at Amud. Heavy erosion changed the face of the site considerably. Some of the loose sediments from the upper layers slumped, mixing their contents and dumping them into the deeper areas of the excavation. Although the Japanese had used a careful system of measurement based on grid points, only some of their points could be re-located and the physical datum, the single reference point from which all others are measured, could not be found. Thus, the team had to rely on mathematical calculations of where the datum must have been in order to tie their new maps into the older ones. Worse yet, it proved very difficult — sometimes impossible — to clean up the old “walls” of the excavation and match the sequence of geological beds described by the Japanese with what is visible now. After much work, sedimentologist Yuval Goren, sometimes had to start over, as if the site had never been visited before.

Despite these troubles, their hard work was well-rewarded. They were able to identify regions of burnt sediment, bones, flints and ash — probably ancient

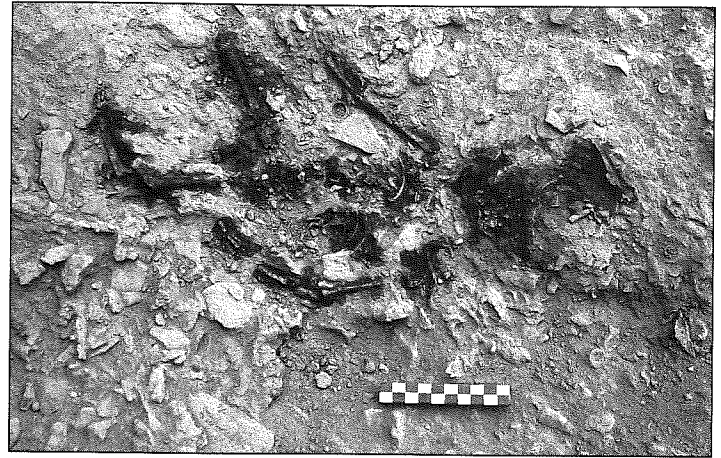
# Fragments, Flakes & Sherds

hearth — in the Mousterian layers. Many stone tools were recovered and preliminary analysis shows that they were manufactured from at least two different varieties of flint. If the sources from which the flint was gathered can be identified, this will provide hard evidence about the size of the home range over which Neandertals traveled and exploited resources. Animal bones, which are being analyzed by R. Rabinovich and Eitan Tchernov of the Hebrew University of Jerusalem, are mostly those of fallow deer and gazelle. Their limb bones are mostly fragmented, with the ends missing; more work will be needed to see if this reflects a Neandertal penchant for smashing open bones for marrow or if it is simply a less dramatic, but equally important, consequence of non-human processes like geological compaction or predator action.

Most exciting of all are the new hominid remains, which promise to reveal more about the early life of our ancestors. In area A — a continuation of the old Japanese excavations — the team discovered various arm and leg bones of a human baby aged only 6-9 months old, all contained within a single square meter. The adjacent meter yielded a partial mandible, or lower jaw, that is likely to be from the same individual.

The bones will be studied to determine if it is a young Neandertal, as the accompanying Mousterian tools suggest. Rak and Kimbel will undoubtedly also search the remains for the physical signs that are left by strong physical stress, such as malnutrition or infectious disease (see “Living with Stress in Yugoslavia” in the Spring, 1991, issue of *Anthroquest*).

In a new area of excavation to the south, known as area B, the team’s efforts were rewarded with a special prize: the tiny, complete, articulated skeleton of a human fetus or newborn. Few fossil skeletons this young are known; no others are as complete as this one. One of the first questions the team hopes to answer is whether it is a Neandertal and if so, whether such a youngster already shows any of the distinctive, Neandertal features.



*The complete skeleton of a human fetus or neonate (Amud IV) in area B. The missing right tibia and fibula had been pushed aside by a tree root, and were recovered in the sieve. Flakes and bones are scattered around the skeleton, lying horizontally at the same elevation. The round molds of earth worms are clearly seen. Scale is 10 cm. Photo courtesy of Hovers and Rak.*

And because the baby’s bones still contain collagen (one of the major components of living bone), an attempt can be made to date them directly using the carbon-14 method. Burned material from the probable hearth regions and some of the animal teeth will be dated by thermoluminescence (TL) and electron spin resonance (ESR) respectively. These dates will help pin down exactly when and for how long ancient hominids inhabited Amud Cave.

The new Amud excavation hasn’t answered any questions yet — except the most obvious one: is this site worth re-excavating? The team led by Hovers, Kimbel and Rak has provided a resounding “yes!” to that one. But as new dates, new information, and new analyses are forthcoming, it’s a sure bet that the babies from Amud will rock the cradle of our understanding of human evolution.

*The Leakey Foundation provided \$10,000 in support of this joint Israeli-American project, which was also funded in part by the Institute of Human Origins and Hebrew University*





# Fragments, Flakes & Sherds (Cont.)

## Scanning Past Horizons

"I'd like to think I can tell you what a monkey was eating, hundreds of thousands or even millions of years after it died," Mark Teaford says with a grin, "at least I can give you a better idea than ever before. Who would have thought that paleontology could help bring baboon behaviors back to life?"

Teaford has been using an improbable tool, a high-resolution, scanning electron microscope or SEM, to study the ecological diversity among extinct baboons. His "focus" is the gelada group, once represented by several species but today limited to *Theropithecus gelada*, a peculiar baboon found only in highland Ethiopia. Gelada males have a striking cape of especially long fur around their shoulders. Their noses are also much less prominent and "doggy" than those of the more familiar savannah baboons that can be seen in parks throughout most of eastern and southern Africa. Another point that distinguishes geladas from savannah baboons is their diet: geladas are specialists in grass (unlike the more omnivorous savannah baboons that also eat bulbs, fruits, eggs, small animals, and tourists' lunches).

The dietary differences among living baboons are closely reflected in their eating "machinery" — their molar or cheek teeth. Savannah baboons have fairly typical teeth for any Old World monkey. Their molars are bilophodont, or two-humped. Each tooth has four main cusps arranged in two pairs (or lophs), with each member of a pair connected to its partner by a crest. This arrangement helps them cut up and pound their varied food into appropriate-sized bits.

But geladas have teeth as much like those of a horse or some other grazing animal as evolution has been able to make them. Although unworn gelada teeth show a complicated set of bilophodont cusps and crests reminiscent of other baboons' teeth, these quickly wear down. A working tooth soon becomes a flat plane of relatively-soft dentin, decorated with ribbon-like infoldings of enamel that curve back and forth across the tooth's surface. These hard enamel ridges serve as a series of blades or rasps that cut up the grass that the gelada eats. Different foods, different food processors.

What Teaford also knows — in fact, he and collaborators pioneered this approach — is that food items also leave distinctive (if microscopic) traces on the teeth. Thus, by studying a very accurate replica of a tooth's surface under the SEM, Teaford can compare the pat-

tern of pits and scratches on the tooth to that on the tooth of an animal of known diet. He has a database of tooth wear of known animals that allows him to "plug in" the pattern of a fossil animal and retrodict (that is, predict into the past) what the fossil ate. This is tremendously helpful when the overall shape or morphology of the tooth is not particularly revealing.

Teaford decided to use this approach to look at an intriguing evolutionary problem. Although today geladas are only a single species with a very restricted habitat, they were far more common and widespread over much of the last two million years. Thousands of specimens of two extinct gelada lineages — *Theropithecus oswaldi* and *Theropithecus brumpti* — have been recovered from East and South Africa. The *oswaldi* lineage grew to enormous size; some estimates suggest big males at Ologesailie, in Kenya, were 140-150 lbs! These giants showed a strong grazing adaptation in their teeth, like modern geladas.

The other lineage, *brumpti*, was bizarre and mysterious. These geladas developed strong, bony "handlebars" on their cheekbones, especially prominent in males, and equally peculiar scooped-out hollows on either side of their lower jaws. There were also subtle differences in the teeth and limb bones that distinguished *brumptis* from *oswaldis* — but what did they mean?

Teaford started out with 135 teeth of *brumpti* and 27 of *oswaldi* that had been collected by the International Omo Research Expedition between 1967 and 1975, as well as 17 wild-shot specimens of modern geladas to expand his reference database. Unfortunately, many fossil specimens were unsuitable for his study due to chemical erosion or postmortem abrasion, shrinking his sample to 21 *brumptis* and only 7 *oswaldis*.

Characterizing the dental microwear pattern involves a tedious but meticulous procedure — counting and measuring all pits (short, wide damage features) and scratches (long, narrow damage features) within a standard area on the tooth's enamel. He started by establishing the baseline pattern — using modern geladas — and then compared the fossils to it.

His results were interesting. Modern geladas' teeth have relatively few microwear features; what he could see under the microscope were mostly fine scratches and a few large pits. The pits, he believes, are caused by the occasional piece of dirt or sand eaten inadvertently along with the grass blades.



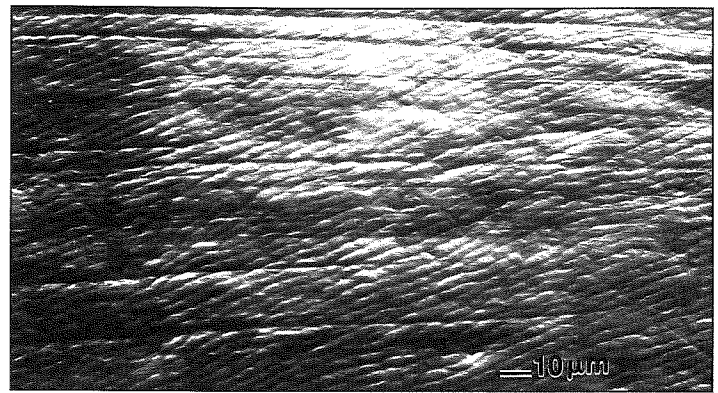
As for the fossils, their teeth tell a different story. In general, *Theropithecus oswaldi* shows a very similar pattern to modern geladas. However, *oswaldi* teeth have more scratches and smaller-sized pits, suggesting that this species may have been the consummate grazer among monkeys. Perhaps they selected either more leaves or younger, more tender grasses and leaves than do modern geladas.

The other species was different again. *Theropithecus brumpti* had more heavily worn molars, with more microwear features and a greater proportion of pits. Teaford's experience in analyzing the microwear on many primate teeth leads him to interpret the *brumpti* pattern as meaning that it consumed more fruit and had a generally more varied and abrasive diet than either modern geladas or *oswaldi*.

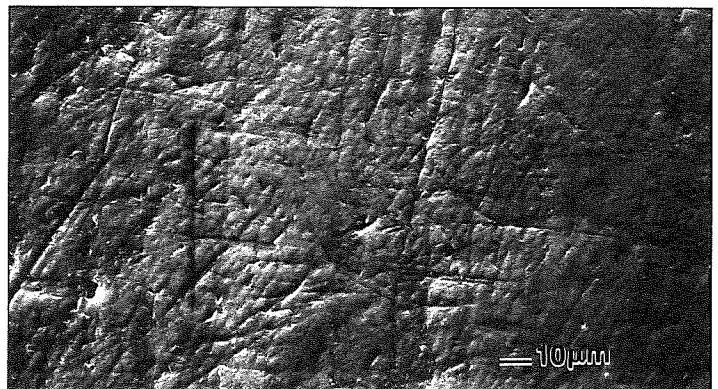
Though more work needs to be done with larger samples, Teaford's preliminary results raise some thought-provoking questions. Does this mean that geladas have not always been grass-specialists, as was once thought? When did this diversity in geladas first arise? Finally, do these dietary differences offer any clue as to why the once-numerous geladas have now shrunk to a single species while savannah baboons have flourished and prospered?

It gives us all something to chew on until Mark Teaford comes up with some new answers!

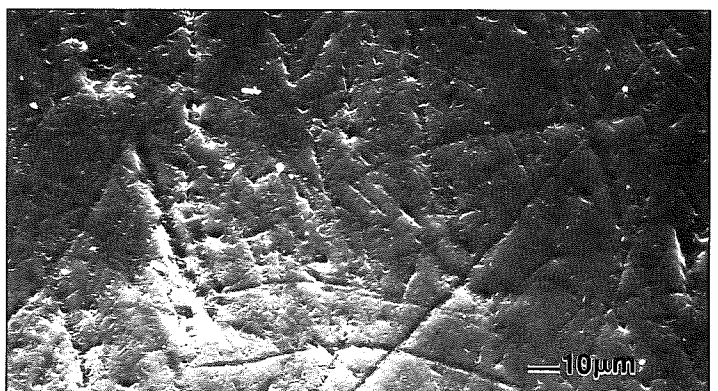
*Dr. Teaford is an anatomist at the Johns Hopkins University Medical School who has worked for many years developing techniques for studying and interpreting dental microwear. Grants from the Leakey Foundation provided \$4,000 for this project and related work on diets of living primates.*



A molar tooth of a modern gelada shows long scratches, running left to right in this photo. The polishing effect of eating grass leaves has brought out the prisms of the tooth enamel (slightly wavy grooves running diagonally toward the upper right corner).




A molar tooth of an extinct **Theropithecus oswaldi** still shows the structure of the enamel prisms, but there are more overlying microwear features. Scratches seem to be shorter but more numerous and there are many small pits, too. Very selective grazing might produce a pattern like this.



The bizarre, extinct baboon, **Theropithecus brumpti**, shows yet another microwear pattern. Its molar is more heavily worn, with many pits and scratches and there is only a hint of the underlying prism structure. Teaford suggests this pattern means that **brumptis** ate more fruit with hard pits and other, varied, abrasive foods.

Photographs courtesy of Mark Teaford



In our article on Baldwin Fellows from the last issue of AnthroQuest, #44 page 20, we wish to expand on the accomplishments of Mr. Dovi Kuevi (and spell his name correctly!).

- Dovi Kuevi (MA, C.Phil from UCLA) is the Director for National Scientific Research, Ministry of Higher Education in Togo, Director of the Archaeology Unit at the Universite du Benin and President of the Togolese Association of Scientific Research.

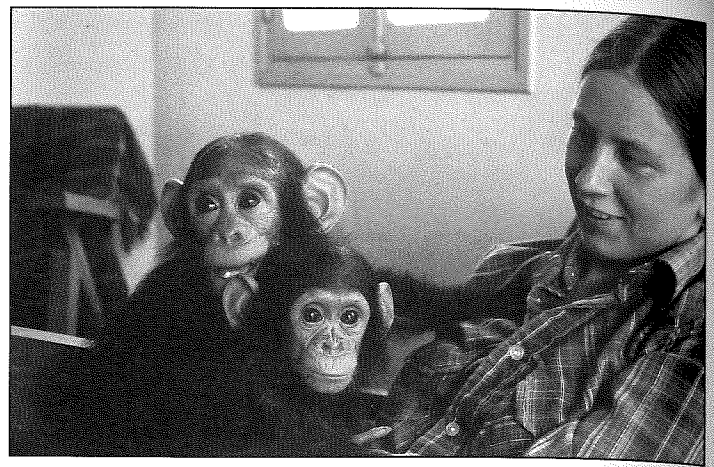
Some measures are in place that can at least slow the rate of loss. For instance, the Convention of International Trade in Endangered Species (CITES) provides for strict control of the chimpanzee trade among its 112 nations, and many countries have passed their own legislation as well. (In the United States, for example, chimpanzees in Africa are now officially listed as an endangered species; captive-bred chimps, however, are exempted from these tighter restrictions, and unfortunately this distinction creates the possibility of laundering an animal's documents of origin.) The laws on the books are not always effectively enforced. Kurt Johnson, research biologist at TRAFFIC USA (a program of the World Wildlife Fund) recommends several steps to better regulation of the chimpanzee trade: stricter enforcement of existing national legislation; accession to CITES by additional key African countries, and refusal to trade with non-CITES countries; better compliance with CITES regulations by exporting countries; and more careful scrutiny of purported CITES documents by importing countries.

Clearly, changes must take place on both sides of the chimpanzee trade. Jane Goodall emphasizes that concerned observers in the west must do more than ask other countries to stop destroying chimpanzees, bonobos, and their habitats. "We have to help the governments to provide viable alternatives, through developing some carefully controlled tourism and through involving the local populations"—in conservation efforts, as data collectors, and so on.

## Views from the field

Goodall offers some hopeful examples of local involvement: in Burundi, villagers are working on reforestation of nearby areas with indigenous trees. "They are growing the wood that they need for charcoal and for building, and also are beginning to be able to sell the wood and make a profit," Goodall says. In Congo, the oil company CONOCO is building a chimpanzee sanctuary on its concession land; and there are plans to turn the Brazzaville Zoo into a conservation center for the whole of central Africa.

In Uganda, according to Harvard's Richard Wrangham (member of our Science and Grants Committee), the chimpanzee population is now low, though the recent stabilization of the government improves the outlook for conservation. Forest blocs are interrupted by cleared land, but several blocs have been declared national parks, in which no further logging is permitted. Regrettably, even in Kibale—with



*Caroline Tutin with 2 young chimpanzees confiscated from poachers by the Gabonese authorities.*

its large research station of about 20 buildings—logging still occurs and chimpanzees are still at risk from the wire snares of poachers.

The opposite situation obtains in Gabon. Here, reports Great Ape Fellow Caroline Tutin, of the Centre International de Recherches Medicales de Franceville, chimpanzees are still relatively numerous (over 50,000 to Uganda's possible 5,000), but conservation efforts are poor. In this country, which until recently derived a large income from its oil reserves, there are no national parks. Gabon's tropical forest, roughly the size of Arizona, is now under threat from logging. But there is still the chance for "conservation before a crisis," says Tutin.

"There is a tremendous need to know throughout Africa the actual numbers of existing chimps," says Christophe Boesch, of the University of Basel. Boesch, whose field work in the Tai Forest, Ivory Coast, has twice been recognized with a Great Ape Fellowship, says that the estimate of 11,000 chimpanzees in Ivory Coast is better than had been thought, but that the habitat is poorly protected.

As for Zaire, political chaos has temporarily halted efforts at bonobo conservation. Still, Suehisa Kuroda, of Kyoto University, hopes to return to Zaire as soon as possible to implement plans to provide sanctuary for some 3,000 bonobos in an area of about 6,000 square kilometers. Great Ape Fellows Richard Malenky and Nancy Thompson-Handler, of SUNY-Stony Brook, add that the main threats to bonobos are lumbering and, especially, hunting; they await a chance to return to the Lomako Forest Pygmy Chimpanzee Project. Lastly, Zaire is host to a so-far successful experiment in "controlled tourism": the Virunga National Park, inhabited by several species of nonhuman primates, including chimpanzees. Human visitors are limited to six per day and are accompanied by trained guides.

"The chimps themselves often determine the length of a visit, leaving when they've had enough," says Annette Lanjouw, of the Tongo Chimpanzee Conservation Project, which helped to develop the tourism program. The tourism provides income to the Zaire Institute for the Conservation of Nature and employment for some of the local population. Long-term threats to the forest remain, but Lanjouw is cautiously optimistic. "Controlled tourism for conservation is a realistic and beneficial approach, provided that the emphasis is on conservation and not on exploitation," she says.

The project illustrates an important principle of conservation efforts today: in Goodall's words, "It is desperately important that the land and the local people shall benefit if these efforts are to have their support." With timely initiatives along these lines, and enough support from the scientific community and other interested humans in all walks of life, we should still be able to save the chimpanzee branch of the family tree.

—Sandra J. Ackerman

*Sandra J. Ackerman is a science writer living in New Haven, Connecticut.*

*The L.S. B. Leakey Foundation is proud to have been able to provide support to both the original Chimp Conference in 1986 and this year's powerful reunion.*

*Both conferences were due to the inspiration and superb efforts of Dr. Paul Heltne and Linda Marquardt of the Chicago Academy of Sciences. The 1986 conference resulted in a book, "Understanding Chimpanzees" (eds. Heltne & Marquardt, Harvard University Press, 1989). Plans are underway for an additional publication, and perhaps videos, to report on this year's findings. For more information, call (312) 943-6969.*

## How you can help:

The individual efforts of many people, both researchers and nonscientists, can add up to big differences in the prospects for chimpanzees and bonobos both in captivity and in the wild. Here are a few ways to translate your concern into action.

\* Let your Congressperson know you support a newly-emerging federal version of debt-for-nature programs, which would alleviate or forgive loans to Third World countries in return for a commitment to protect designated land (such as a patch of rainforest) from harmful development.

\* Write to your members of Congress, also, whenever significant foreign aid packages are being negotiated, urging officials to consider conservation measures as part of the package.

\* Ask elected officials to push for regulations addressing "the psychological well-being of primates," as mandated by the 1985 amendments to the Animal Welfare Act, and to allocate funds for enforcement.

\* Ask the curator of primates at your local zoo if he or she participates in ChimpanZoo, a research and education program for studying the behavior of captive chimpanzee populations. For information write to ChimpanZoo, c/o The Jane Goodall Institute, 2200 East Speedway Blvd., Tucson, AZ, 85719 Telephone: (602) 325-1211.



## Chimpanzee Dialects?

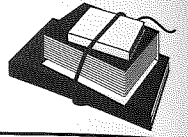
*Acoustical studies of chimpanzee vocalizations show visible differences in sound patterns between groups or populations.*

*Melissa reaches to touch Goblin, her son, at Gombe Stream Reserve, Tanzania. Photo courtesy of Hugo van Lawick.*





# 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.

## *Other Origins: The Search For The Giant Ape In Prehistory*

R.L. Ciochon, J.W. Olsen, and J. James  
Bantam Books, 1990. \$22.95 hardcover

*Gigantopithecus* was an extinct relative of the orang-utan which lived in China and Vietnam from about 1 to 0.5 million years ago and in India about 6 million years ago. It is only known from fossilized teeth and lower jaws, but some scientists have estimated that it stood up to 6' at the shoulder and weighed far more than a gorilla. The authors of this popular book (a primate paleontologist, an archeologist, and a science writer) determined to search for more complete remains of this creature in Vietnam, where it was supposed to have coexisted with the early human ancestor *Homo erectus*. Although they did not find more "Giganto" remains, they undertook extensive travel and research in Vietnam, which itself is quite an accomplishment. The book is generally well-written, with a chatty, "tell-all" tone; in some cases, the authors comment upon each other's foibles and strong points, as well as on their Vietnamese colleagues and the broader patterns of paleoanthropological research in Asia. The book really imparts the flavor of field work in this part of the world, and although it does not pretend to provide a firm grounding in human evolution, a lot of science sneaks past the recreational reader. Recommended for general readers.

—Eric Delson

## *How Monkeys See the World: Inside the Mind of Another Species*

D.L. Cheney and R.M. Seyfarth  
University of Chicago Press, 1990 \$24.95 hardcover.

This is a fascinating, complex book which successfully examines the thought processes of an animal species other than ourselves. The authors are a husband-and-wife team of what I would call "activist ethologists": they tested and manipulated the behavior of wild animals, rather than merely observing them or manipulating captives. Their main tool was the playback of tape-recordings of alarm and other vocalizations, a technique borrowed from ornithology. The subject species was the vervet, a common, African, semi-terrestrial monkey also known as the green monkey. For over a decade, the authors and their students and colleagues studied vervets in Kenya, reporting aspects of their work in professional journals. This is the first long account, and it is a technical study — yet they explain the differences between monkeys and apes, so they clearly expect a broader readership. Such readers will find it hard going but worthwhile. After a general introduction and a survey of the daily behavior of vervets, the book proceeds topically: relationships among and recognition of group members; vocalizations and their meanings; and the mentality of monkeys and its relationship to their society are major themes. The authors have developed an uncommon understanding of how vervets do think, even to the point of recognizing that they do not fully understand the actions of some of their major predators — an idea most of us assume to be "instinctive", or at least the result of countless generations of natural selection. Rather than anthropomorphizing their animals, as often happens (perhaps correctly) with great ape studies, or giving up on comprehending alien intelligence, Cheney and Seyfarth have truly gotten inside the vervet's mind. Further work in primatology and animal behavior generally may never be the same. Highly recommended.

—Eric Delson

\* Both reviews are reprinted, with permission, from *Choice*.

# Funding Great Ape Fellows Before It's Too Late



Mountain gorillas in Parc National des Virungas, Rwanda © National Geographic Society / Dian Fossey.

There's no time to lose in studying great apes. Their habitats are disappearing, their numbers are dropping, and basic information is sorely lacking. Understand these wonderful creatures now — learn what they do, what they need, and how to save them — or give up altogether.

That was the grim prognosis facing the Leakey Foundation in 1984. In a bold and innovative move, the Foundation established the annual Great Ape Research and Conservation Fellowship, a unique award that provides at least \$20,000 in field expenses for long-term research on great apes. The high priority placed on these fellowships reflects our proactive stance on the need to study, document, and conserve wild populations of these special and endangered primates.

Other funding agencies may tacitly discriminate against long-term field studies simply because of their inherent difficulties, such as the time-consuming process of locating an appropriate area, setting up a field station in a Third World nation, and habituating wild animals to observers' presence — all of which must occur before significant data can be gathered.

And yet, there are compelling reasons why the study of wild populations of great apes is of the utmost importance — now, before their numbers drop so low that they are virtually doomed to extinction. While valuable and fascinating in their own right, great apes have also offered a revealing and provocative perspective on our own behavior, ecology, and evolutionary past, simply because they are our closest living relatives. It is to the great apes that we look to understand



our potential for violence and aggression or for coexistence and cooperation; it is through their lives that we explore the diversity in lifestyle and behavior that may have demarcated our own history; it is through knowledge of their habits that we suddenly see our own, more clearly.

Although only four great apes are still extant — the gorilla (mountain and lowland), the chimpanzee, the pygmy chimpanzee or bonobo, and the orang-utan — they are astonishingly poorly known. We have only a crude idea of their actual geographical distribution and population densities, data which are changing daily as human populations encroach and political upheavals alter the areas in which they live. We do know that ape behavior varies fascinatingly in response to changes of season or habitat, increases or decreases in the size of social group, or in the presence or absence of other species. At times, no explanation for novel behaviors can be offered except the unique qualities of particular, individual apes.

Year by year, Great Ape Fellows funded by the Leakey Foundation have uncovered a host of fascinating facts about these animals that seem so hauntingly human in many ways. Domains of behavior once thought to be exclusively human — such as tool-use, sophisticated verbal communication, warfare, cannibalism, tradition, altruism and cooperation — have now been shown to be shared by great apes as well. Such findings help researchers delineate the fundamental adaptations and abilities that we hold in common with apes, by default showing us how to define our own unique adaptations more clearly.

Education is as crucial as study, points out John Fleagle, member of the Leakey Foundation's Scientific Advisory Council:

*"We can fund various people to go out and study a group of animals for a year or two years and then we can send somebody else, maybe a little while later, for a year or two years. But the long-term study, and particularly the conservation of great apes, ultimately has to depend upon having resident scientists who have an active interest in these projects, rather than a succession of people funded from outside. So training people in Third World countries where most nonhuman primates happen to live is absolutely critical. That's the only way the animals are going to survive."*



*Hedwige & Christophe Boesch take a moment for family life in the Tai Forest. Photo courtesy of Hedwige & Christophe Boesch.*

## **Who are the Great Ape Fellows and what have they done?**

Dr. Christopher Boesch was funded by the Great Ape Fellowship in 1987 and, with the additional help of private donors, again in 1989. His studies of chimpanzees in the Tai National Park, Ivory Coast, have highlighted unusual behaviors like tool-use, cooperative hunting strategies, and cooperative food-sharing (see *Fragments, Flakes and Sherds in the Spring*, 1991, *AnthroQuest*). For example, Boesch and his colleagues have documented nut-cracking among chimpanzees, a fascinating tradition of learned behavior found only among chimps in West Africa. Chimps vary their selection and usage of anvils, hammers, and workshop sites or "ateliers" in surprisingly sophisticated ways. An important factor, Boesch has shown, is the hardness of the type of nuts they have selected. While softer nuts may be attacked, often laboriously, with whatever anvils and hammers are closest to hand, chimps choose to transport harder nuts to harder, more stable anvils where they are struck with "imported" hammers. The cost of the extra expenditure of time and energy in transport is traded-off against the extra calories gained from the nuts. It is a subtle calculation for a "mere ape" to make, but one which, consciously or unconsciously, is being made.

By training field workers and working with government officials, Dr. Boesch is also fighting to expand reserves within the Ivory Coast and neighboring Liberia and to protect animals within those reserves more effectively.



*In the Dzanga-Sangha Reserve, C.A.R., Michael Fay depends on trackers to help locate the elusive lowland gorilla. Photo courtesy of Michael Fay.*

Conservation is a familiar message to **Richard Carroll**, director of the Dzanga-Sangha Reserve, and **Michael Fay**, doctoral candidate at Washington University (St. Louis), who received Great Ape Fellowships in 1985 and 1986 respectively. Frequent collaborators, the two have begun to fill in the tremendous gap in our knowledge of lowland gorillas, which will make an important contrast to and comparison with the long-term studies of mountain gorillas initiated by Dian Fossey. The information they gathered on the effects of logging, mining, encroachments of plantations, poaching, and the needs and traditions of local people (Bayaka pygmies) were crucial in setting up the Dzanga-Sangha Dense Forest Reserve in the Central African Republic. Their long-term conservation effort was subsequently supported by the World Wildlife Fund - U.S., Wildlife Conservation International, the National Geographic Society, and the Missouri Botanic Garden.

"I am about to leave for Africa once again," Fay remarked in a recent letter.

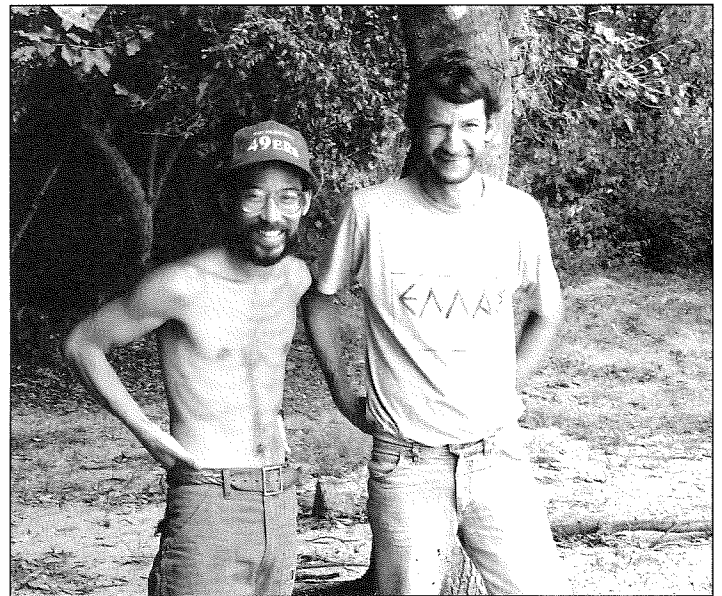
*"I will be going back to the Congo to set up a new reserve project in the north of the country that is adjacent to the Dzanga-Sangha Reserve in the C.A.R. ....I will be the director of the project...."*

*If I were to reflect on just a few years ago when I had the Great Ape Fellowship, I would say that my position now is proof that conservation is moving at a very rapid pace and that there is great need for experienced biologists in Africa. Certainly the Great Ape Fellowship provides a perfect opportunity for new people to come into the field and to make a lasting contribution to both science and conservation."*

The importance of training Third World scientists to study great apes is exemplified by **Dr. Gilbert Isabirye-Basuta**, a citizen of Uganda — the first African recipient of a Great Ape Fellowship. His research, funded in 1988, examines the feeding ecology and behavior of chimpanzees in Kibale Forest, Uganda. Unlike the open woodland area at Gombe, where Jane Goodall conducted her studies, Kibale is a true forest environment. Isabirye-Basuta is hoping to discover the impact that ecological differences have on community structure, tool-use, and the use of different types of foods. Because various monkey species that also live in Kibale have been studied by other researchers, Isabirye-Basuta's data will also be a crucial element in the understanding of this Ugandan forest ecosystem and how best to conserve it.

One of the special things that both apes and humans do is verbalize — chatter, scream, talk, mumble, sing, shriek, babble, coo, chuckle, and hum. But how is speech in humans different from the sounds and verbal signals used by apes?

The question is provocative — and important. When he became a Fellow in 1985, **Dr. John Mitani** decided to specialize in the "singing" and other vocalizations of the orang-utan and the gibbon, a lesser ape. Pioneering work comparing not only associated behavior but also the acoustical properties of vocalization, his data are crucial in exploring the differences and similarities between ape and human vocal communication. Mitani is now expanding his studies into the first comparative study of the vocal and aggressive behavior between all great ape species, as



*John Mitani visits Christophe Boesch in the Tai National Park, Ivory Coast. Photo by John Mitani.*

well as looking at differences between populations. His fellowship was the first to be jointly awarded with the New York Zoological Society; subsequent support for his pioneering research has come from the National Science Foundation and the Harry Frank Guggenheim Foundation. Among his successes is the training of Indonesian students and field assistants during his studies of different populations of orangutans in Borneo.

**Dr. Caroline Tutin**, the first Great Ape Fellow, used her funding to initiate a long-term project studying the coexistence of chimpanzees and gorillas in a restricted area of Gabon in West Africa. How much does the presence of one great ape alter the behavior of the other? Do they interact, ignore, avoid, fight, cooperate or compete? No one knows — yet.

With additional assistance from the World Wildlife Fund and the Centre International de Recherches Medicales de Franceville, Tutin has established a permanent field station (the “Station d’Etudes des Gorilles et Chimpanzes”) in the Lope Reserve in central Gabon where both Gabonese and students from other nations have the opportunity to train and study. Because both chimps and gorillas live in this West African preserve, the station offers a special opportunity to see how this sympatry — literally, “living in the same place” — affects their ecology, diet, and social organization. Tutin has also turned her attention to the crucial issue of habituation itself and how the two different species react to human presence.

The most recent fellowship (1991) has been awarded to **Drs. Nancy Thompson-Handler** and **Richard Malenky** to facilitate studies of the endangered pygmy chimpanzee, or bonobo. Bonobos are found only in a restricted area of Zaire, and have recently been identified as a number one priority for international conservation efforts. In spite of the remoteness of the site in the Lomako Forest, and the highly volatile political situation in Zaire, this couple has established a permanent field site where they plan to work towards the creation of a nationally-recognized reserve. Throughout the tropics, such long-term commitment to an area and a study population sends a strong message to the local human population and their government that the preservation of animals and their ecosystems is of great interest to the outside world. It is not only “science” that happens, but education and conservation, when funds are available to support long-term research.

No one even vaguely familiar with field conditions would mistake these researchers’ lives for the glamour, excitement and drama so neatly encapsulated in a

hour-long TV special or a Hollywood movie. Many weeks and years of work are needed before sound results are forthcoming; a quick “in-and-out” study may be more misleading than helpful and invariably short-changes the subject. Indeed, more than one field study of great apes has begun with many frustrating months: animals are heard, half-eaten food is located, and their droppings are found, yet the only thing the researcher can truly claim to have seen is the rustling of the vegetation as his or her subjects flee.

Difficult? Yes. Worthwhile? Always.

The importance of the quest for understanding is clear. It is the sometimes comic and often-endearing nature of the apes themselves — and the dreadful urgency of their plight — that draws men and women from all nations to make a passionate commitment to the study of these, our closest relatives.

*To date, about \$180,000 from the Leakey Foundation and its trustees and friends, in cooperation with the Homeland Foundation, and Wildlife Conservation International, has gone to support Great Ape Fellows. One or two Great Ape Fellowships are awarded annually. Preliminary applications are due March 1. For additional information about applying for, or donating to, a Great Ape Fellowship, please contact the Leakey Foundation Office.*



*Recent Great Ape Fellows Richard Malenky and Nancy Thompson-Handler (shown here with a baby bonobo) hope to return to Lomako Forest, Zaire, this year. Photo courtesy of Chicago Academy of Sciences.*



## A Note from the Editor -

One of our eagle-eyed readers spotted "Neanderthal" — with an h — among the grants listings in issue #43 and sent us a letter chastising us for careless copyediting.

Although Neandertal is the preferred spelling in the United States (as an article in that very issue pointed out), the grantees in question are Israeli and obviously prefer the older spelling. I didn't feel right in "correcting" the title of their research project; it is their work and they ought to be able to call it anything they like. It's nice to know that our members are reading the issues cover-to-cover!

## A New Way to Stay Up-To-Date on Primate Research

Computer-literate members with a serious interest in primates may wish to make use of the exciting new opportunity described below.

The Wisconsin Regional Primate Research Center (WRPRC) at the University of Wisconsin - Madison, U.S.A., has established a new electronic mail list server called PRIMATE-TALK. PRIMATE-TALK is an open forum for discussing primatology and related subjects and for listing job notices and meeting announcements. It is open to all electronic mail users world-wide who are interested in primates. If you want to join PRIMATE-TALK, send a message to PRIMATE-TALK-REQUEST@PRIMATE.WISC.EDU stating that you would like to sign on. If you have questions about how to obtain electronic access from various networks, you may call Larry Jacobsen, Head of Library Services at the WRPRC Library (608)-263-3512 or FAX at (608)-263-4031. You may also write to the WRPRC Library, 1220 Capitol Court, Madison, WI 53715-1299, U.S.A.

## Primitive spelling bees

Gary Larson from *THE FAR SIDE* © 1986  
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## NATIONAL GEOGRAPHIC

### TV Special: *Secret World of the Chimpanzee*

Incredible footage follows Christophe and Hedwige Boesch as they observe chimps hunting and using tools in the Tai National Park, Ivory Coast. This first segment of a National Geographic Explorer Program special, "Apes & Humans" airs Sunday, March 15, at 9:00 PM ET on TBS. Repeat performances: Monday, March 16, 12:05 AM ET, and Saturday, March 21, 10:05 AM ET.

### March NGS Magazine

Apes and Humans will be the featured article in the upcoming March edition of the National Geographic Society Magazine.



# Tales from Lake Turkana



*A loupe helps to magnify fossils as Dr. Meave Leakey studies specimens in Lothagam Camp, West Turkana, Kenya. © Alan Walker*

A sense of glamour and excitement surrounds the announcement of a new fossil find. Audiences at the recent Allen O'Brien Memorial Lecture, named for the Leakey Foundation's co-founder, gained an appreciation for the "before and after" of any such discovery—how fossils get found, and what can be gleaned from them. Meave Leakey and Alan Walker, scientists with over 40 years of field experience between them, shared their "Adventures with the Missing Link" in the lecture series, which stopped at natural history museums in New York and Los Angeles before concluding at the California Academy of Sciences in San Francisco.

First, **Meave Leakey**, Director of Paleontology at the National Museums of Kenya, gave a glimpse of how a paleontologist works in the harsh, dry landscapes surrounding Lake Turkana in northern Kenya. She recalled her first season of work at Koobi Fora, in 1969, as part of the team led by her then-future husband, Richard Leakey.

It was unexplored territory for a fossil hunter. Hominid bones turned up once or twice a week, and Koobi Fora became a paramount site for clues to human origins. "It's only now that I'm working at a site where it's really hard to find any hominids at all that I realize how lucky we were in those days," said Leakey.

Now Leakey works with a team of Kenyan fossil hunters, the renowned "Hominid Gang," at Lothagam, on the west side of Lake Turkana. She described the site as an island in the midst of a desert, where dust storms whip through camp and tear down tents.

Lothagam may provide a critical link in our understanding of human evolution. Once the site of an enormous river, Lothagam lies between two lava ridges that have been dated to 8.3 million and 3.7 million years, respectively. So the fossil-bearing sediments fall between this span of time, a period that remains a black hole in the hominid fossil record. Somewhere within this same time frame was the beginning of the hominid family, when our ancestors first took to two legs.

An American team working at Lothagam in the late 1960s found the fragmentary remains of a lower jaw from either a hominid—a member of the human family—or a hominoid, a more distantly-related, ancient ape. When Leakey first visited the site in 1980, she said, "I remember thinking, 'Thank God the Americans had worked this site so I won't have to.'" It was unbearably hot. Little did she know that nine years later she would begin her own search at the site. Apart from the heat, fossils sometimes stick out from sediments far overhead, forcing the excavator to rappel in order to retrieve the find.

Leakey, an expert on fossil monkeys, said that the fossil fauna at Lothagam contains many aquatic animals. There are crabs, snails, turtles, and at least five different kinds of crocodile. Today, only one crocodile species inhabits Lake Turkana. Other fossil predators from Lothagam include a large sabre-tooth cat and an early hyena similar to specimens unearthed in China and Greece.

When Leakey came to Lothagam in 1989, it was her first time leading an expedition, and she said she wanted to prove herself to the members of the Hominid Gang. "The best way to impress that team is to find a hominid fossil," she said, "but if you can't find a hominid fossil, find a good one and then you're alright." What she found was a skeleton with stout limb bones, a tail, and a nine-inch-long skull with badger-like teeth. The creature turned out to be a wolverine relative known from Russian fossils but never previously found in Africa. Leakey and her team have yet to find any hominids at Lothagam, but she seemed confident that their hard work will soon be rewarded.

**Alan Walker**, Professor of Cell Biology and Anatomy at Johns Hopkins University, reminded the audience that the west side of Lake Turkana has already proven its potential for major fossil finds. Walker, who works closely with both of the Leakeys, revealed the sorts of fascinating, often unexpected, insights that paleoanthropologists gain from the close



scrutiny of fossils. He focused on the celebrated skeleton of a *Homo erectus* boy from Nariokotome.

In 1984, Hominid Gang leader Kamoya Kimeu found a matchbook-size bit of skull bone at this site. "Kamoya finds fossils where there shouldn't be any fossils," said Walker, and this one came from a slope covered with lava rocks. Walker said that he and Richard Leakey were skeptical of finding other bones from this skeleton, but they looked.

The search led to a thorn tree, upslope from where Kimeu found the first fragment, that had grown through the fossil skull, shattering and scattering the face. Walker found intact ribs, so well preserved that Leakey at first couldn't believe they came from a hominid. Little by little, most of the skeleton was revealed. More teeth, ribs, vertebrae, and arm bones turned up in 1985. Two bones were found in each of the next two years, but further searching in 1988 brought no new finds.

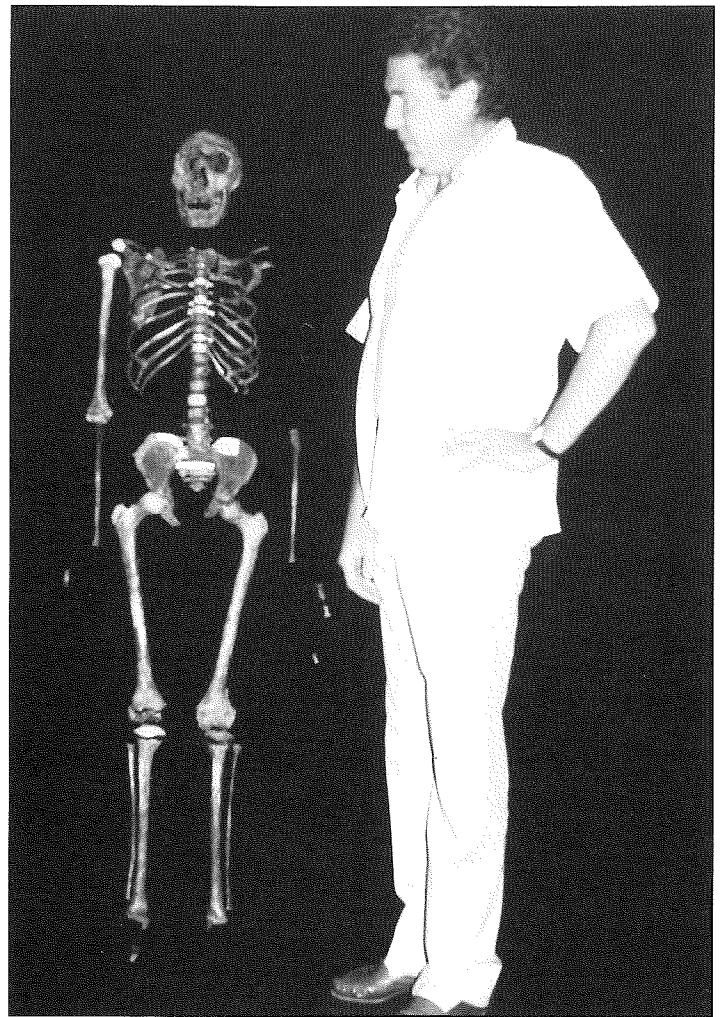
The specimen, dubbed KNM-WT 15000 and nicknamed "15K," was a rare prize: the most complete, and perhaps the earliest, remains ever found of *Homo erectus*, the immediate ancestor to our own species. Harvard University Press will publish a scientific monograph detailing what this specimen has taught paleoanthropologists about the species' anatomy.

The boy was roughly 12 years old when he died 1.6 million years ago, but he was already 5'3" tall. Walker said that had he reached maturity, the boy would have been 6'1" tall and weighed around 150 pounds.

With such a complete skeleton available for study, anthropologists can ask complicated questions about its anatomy, such as whether a compromise existed between walking and thinking. Humans, for instance, evolved wide hips to permit the birth of big-brained babies. But we still had to be able to walk, so the human solution included continuing the high fetal rate of brain growth outside the body, essentially, gestation for an extra 12 months.

Humans evolved the largest brain possible that could fit through the birth canal. An average human baby's brain weighs 400 grams at birth, grows to 1000 grams in the first year, and continues to grow until it weighs around 1300 grams. The rapid brain growth during the year after birth, makes this a critical time for development. "The most important year of our lives is the first year," said Walker. "It's all downhill after that."

From what is known about how modern humans walk, Walker said that *Homo erectus* was clearly a better biped. It had both a long neck on the femur, or thigh bone, as well as narrow hips relative to modern humans. "*Homo erectus* was more efficient at walking and running upright than we are—more efficient than any athlete," said Walker. Yet, the narrow hips limited the brain size of *Homo erectus* at birth.



Dr. Alan Walker stands next to the skeleton of a 12-year old *Homo erectus* boy, dated to 1.6 million years. Photo by Alan Walker © Kenya National Museums.

The 12-year-old *erectus* boy probably had a brain only half the weight of a modern human baby's at birth. To achieve adult brain size, *Homo erectus* like modern humans must have used the "trick" of continuing fetal brain growth after birth. Too, the average brain size in this species stayed the same for a million years. "*Homo erectus* didn't have a lot of brain, but on the other hand he wasn't a complete pinhead," said Walker.

Walker concluded with what he called a "quarter-baked idea...still soft and doughy" that *Homo erectus* did not speak. The skeleton's thoracic vertebrae are identical to a human's except for signs that the boy's spinal cord was not as thick in this region as a human's, suggesting that *Homo erectus* lacked necessary nerves and fine control of chest muscles required for speech. Although speculative, this tantalizing bit of evidence adds to other emerging genetic, linguistic, and anatomical clues that language arose only with the emergence of our own species.

Blake Edgar is a science writer and Assistant Editor of *Pacific Discovery* magazine, California Academy of Sciences.

# A Walk Through the Open Door:



Collaboration in Beijing: (left to right) Dennis Etlar, Professor Jia Lanpo, and Professor Li Tianyuan. Photo courtesy of Dennis Etlar.

Dennis Etlar—a doctoral candidate student at the University of California at Berkeley & fluent in Mandarin—is completing his dissertation on Chinese hominids. Below, he writes of some of the problems he and his Chinese colleagues hope to solve through their international collaboration.

Where did we come from? If by “we” you mean anatomically modern humans, you have asked a good question.

How and when modern humans arose is one of the hottest questions of the day in paleoanthropology, but it is a question that cannot yet be answered. While the initial dispersal of *Homo erectus* out of Africa occurred somewhere about 1 million years ago, the role of this lineage in our ancestry is debated. In hopes of finding the key to that stubborn problem, more and more paleoanthropologists are turning an inquisitive eye to the burgeoning fossil record of China.

The Chinese evidence is central to one of the major hypotheses, the multiregional theory. Espoused by scientists like Milford Wolpoff of the University of Michigan, this theory suggests that the migrating populations of *Homo erectus* settled in various geographical regions of the Old World. Distinctive suites of genetic traits began to evolve that differentiated one regional population from the other. Although some interbreeding may have occurred, populations became and stayed relatively different from one another, according to this

theory, and all evolved in concert towards anatomically-modern humans. One line of evidence supporting this interpretation is that ancient humans from Asia show a discrete set of traits that can be traced, through time, up to modern Asian populations. In others words, very early humans in Asia “look Asian,” implying that the modern human races have deep roots in our evolutionary past.

Rebecca Cann, Mark Stoneking, and the late Allan Wilson developed a new and completely different line of reasoning within the last decade, known as the Eve hypothesis. They argue that modern humans evolved first and foremost in Africa perhaps 200,000 years ago, later spreading throughout the world and replacing more ancient folk wherever they were encountered. Their evidence comes from analyses of mitochondrial DNA (mtDNA, see the report on Allan Wilson’s presentation in “Rutgers Co-Hosts Leakey Foundation Symposium” in the Summer 1991 Anthroquest). Proponents of this hypothesis think that the regional traits seen by the multiregionalists are mere chimera — and that *Homo erectus* in Asia was an evolutionary dead-end.

With the battle lines so clearly drawn, it is no wonder that any new fossil evidence from Asia, particularly China, soon becomes the focus of attention.

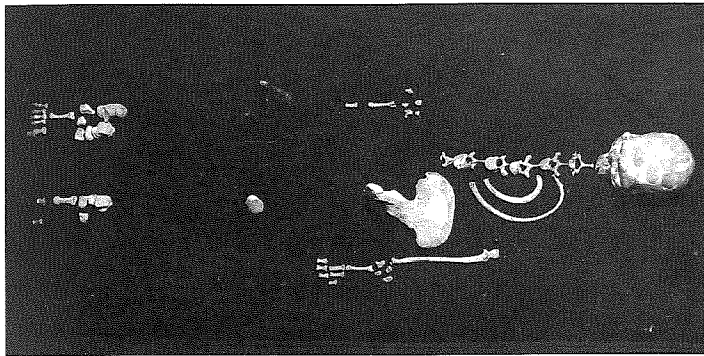
There are historical reasons, as well, for an ever-present interest in the Chinese hominids. Somehow, they have always carried the aura of the “mysterious East”, even though that is an outmoded stereotype. Public attention was captured first by the discovery of “*Sinanthropus*” — now better known as *Homo erectus pekinensis* — in the late 1920’s and 1930’s by Davidson Black and Pei Wenzhong. “Peking Man” shot back into the spotlight with the formal description of these fossils, published in classic monographs by Franz Weidenreich in the late 1930’s and early 1940’s.

The mysterious loss of the original fossils during World War II added another enigmatic chapter to the tale. It has been possible to trace the fate of the missing fossils in part. We know that the famous fossils were carefully packed and crated up by the staff of the Peking Union Medical College late in 1941, who feared that a Japanese invasion would lead to seizure of these national treasures. The fossils were placed under the care of a contingent of U.S. Marines headed for the S.S. Harrison, which would take the Marines — and the fossils — to safety in the United

# Old Bones from New China

States. But the train on which the Marines were travelling was intercepted by Japanese soldiers and the fossils have never been found again. Hefty rewards have been offered for their recovery, provoking occasional bizarre attempts to claim the money. Rumors, fuzzy photographs, and vague stories of hidden footlockers, full of ancient bones, secreted away in warehouses, attics, or storerooms have all come to naught.

After the war ended, Africa began to assume greater prominence in human origins research, especially once Louis and Mary Leakey began making spectacular finds at Olduvai. A pall was cast over Chinese paleoanthropology by political and scientific events. Chinese scientists, shaken by the loss of the heirloom fossils but undaunted, set to work once again at Zhoukoudian (the modern spelling of Choukoutien, the "Peking Man" site), and elsewhere throughout the country.



The partial skeleton from Jinniushan is approximately 250,000 years old. Photo courtesy of Dennis Etlar.

Over the years, Chinese researchers have met with remarkable success in uncovering new fossils, each one a clue that helps piece together the evolutionary puzzle of our origins. Zhoukoudian yielded important new discoveries, as did Lantian, Maba, Dali, and Hexian. But the finds that rival in importance those original specimens of *Homo erectus* are the most recent ones from Jinniushan and Yunxian.

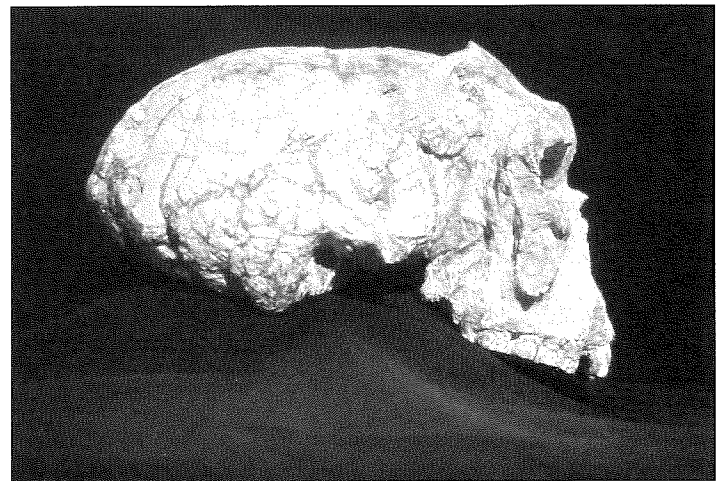
The Jinniushan hominid is dated to the late Middle Pleistocene (approximately 250,000 years ago). It is the first partial skeleton of an archaic human from China. The cranium is damaged, but can be reconstructed with some confidence. And, although many of the major limb bones are missing, there is a virtually complete set of bones from the wrist and ankle, some hand and foot bones, a complete ulna (a bone

of the forearm), a well-preserved innominate (or hip bone), and some vertebrae and ribs. This remarkable specimen is now under study by Professor Lu Zune and a group of graduate students at Peking University. The results of their research promise to shed new light on the relationship of Middle Pleistocene Chinese hominids to their kin further to the west, in Europe and Africa.

Even more spectacular than the Jinniushan hominid are the exciting new finds from Yunxian in Hubei province, dated to approximately 350,000 years ago in the Middle Pleistocene. The site has yielded up two crushed but largely complete crania — the most complete crania of such great antiquity ever recovered from the Asian mainland. Fortunately, these fossils reveal many details of the face and the base of the skull that are generally poorly preserved in other Middle Pleistocene crania.

Researcher Li Tianyuan of the Hubei Archaeological Institute is responsible for discovering and describing the Yunxian fossils. Leakey Foundation support enabled him, and Institute Director Professor Chen Zhenyu, to travel to the University of California at Berkeley to study casts of specimens of similar antiquity that are housed at the Laboratory for Human Evolutionary Studies. It is a trip that would not have been possible for a Chinese scholar only a few years ago.

To further facilitate the study of these important new remains, the Leakey Foundation funded my reciprocal visit to Hubei during the summer of 1991,



The lateral view of one of the new Yunxian skulls. White areas are reconstructed. Photo courtesy of Dennis Etlar.

to learn more about the Yunxian skulls. The specimens appear to be a unique variant of Middle Pleistocene hominid, one that combines a surprising mix of features. The bases of the skulls and the way the braincases are put together resemble *Homo erectus*, while the forehead and brow ridges call to mind archaic *Homo sapiens* specimens, such as those from Broken Hill (Kabwe, Zambia) or Petralona (Greece). The area around the nose and cheeks seem to suggest modern humans, especially those from Asia.

All in all, it seems likely that these new finds, along with those from Jinniushan, Dali, Hexian, and elsewhere in China, will add fuel to the already raging fire of controversy over whether regional continuity is more likely than the recent-African-origins hypothesis.

As the hominid fossil record becomes better known in China, more rather than fewer questions are bound to be raised. It is always easy to construct neat, simple hypotheses when there are few data to constrain them! With Leakey Foundation support, scientists from many nationalities will continue to work together to unravel the tangled skein of the human evolutionary story in east Asia.

*Leakey Foundation support for the study of these fascinating Chinese hominid fossils, in grants to Etlar and colleagues totals \$15,000.*



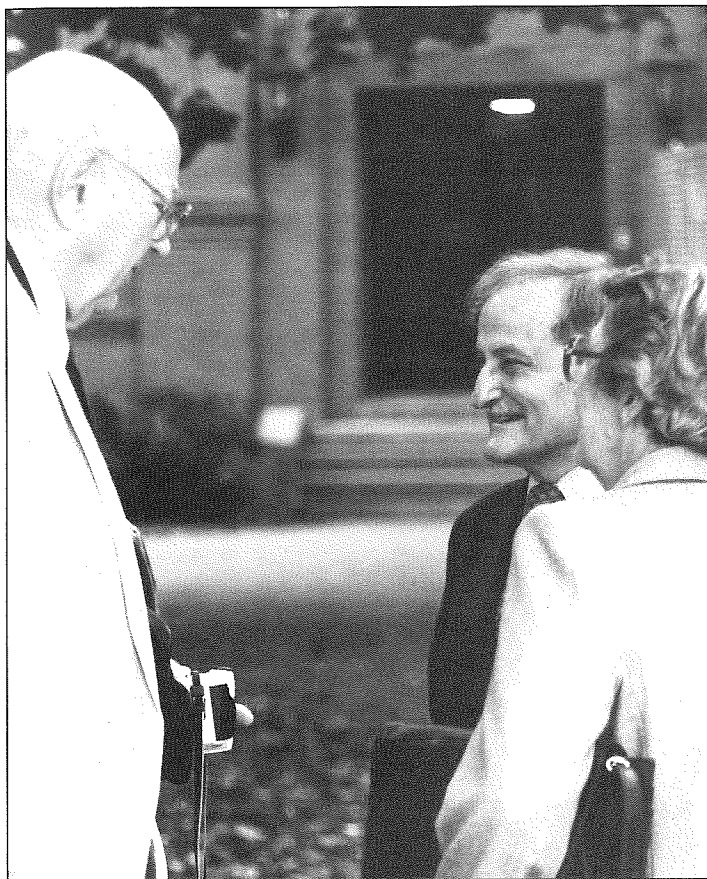
Those interested in the excavations for "Peking Man" at Zhoukoudian, and their mysterious disappearance, may want to buy a copy of *The Story of Peking Man*, published in 1990 by Oxford University Press. Written by Professor Jia Lanpo, the last surviving participant in those excavations, and a younger colleague, Huang Weuwen, this book blends reminiscences and science in a charming mix, illustrated by rare, historical photographs and documents.

\* Localities in China mentioned in preceding article.





# Special Symposium & Leakey Prize Celebration



*Trustees George Lindsay, Phillip Tobias and Mary Leakey discuss events during a break at the Leakey Foundation Annual Meeting at Harvard University.*

The awarding of the Leakey Prize to Dr. Philip Tobias and an exciting symposium marked the annual meeting in October. Co-sponsored by the Leakey Foundation, the Peabody Museum, and the Museum of Comparative Zoology, the event's success reflected the efforts of the staff, faculty and students of the Department of Anthropology at Harvard.

Trustees and scientists enjoyed fascinating "field trips" that ranged from flint-knapping and butchery demonstrations to visits to Harvard's laboratories where molecular evolution, neuroanatomy, reproductive endocrinology, primatology, nutritional biochemistry, archaeology, paleontology, and stable isotopes are examined with state-of-the-art equipment and techniques. These diverse approaches were reflected in the symposium "Four Perspectives on Human Evolution", held at the American Academy of Arts and Sciences.

Maryellen Ruvolo of Harvard offered a molecular perspective on human evolution, likening her research on the components of DNA to "examining the book of life at the level of its letters." Letters are compiled to form "words" and "sentences" which dictate the unique qualities of each species. Direct clues to the pathway of evolution are encoded in the DNA. For example, comparing the DNA of gorillas, chimpanzees, and humans shows that humans are more closely related to chimps than to gorillas. If the "molecular clock" ticks regularly—if mutations are produced at a steady rate—then the gorilla lineage split off 8 million years ago from the chimp-and-human lineage, which split again about 6 million years ago.

The primate biologist's perspective was represented by Harvard's Richard Wrangham. Wrangham emphasized the broad diversity in chimpanzee behavior (see "Taking Care of Our Cousins" for more on this topic) and the prime importance of settling disputes within chimp society. Wrangham has documented the ways in which chimps manage to "make up" after disputes: embracing, kissing, and mutual grooming. "Reconciliation, then as now, is vital for making friends and forming alliances," Wrangham observed.

The third perspective was provided by the University of Utah's Kristen Hawkes, who spoke about her work with hunter-gatherers. Her research, like Wrangham's, highlighted the importance of cooperation for the long-term survival and reproductive success of human groups. Male hunters in Paraguay routinely cooperated, bringing home more food than their immediate families needed to share with others. The generosity of the more effective hunters affected their reproductive fitness directly. "The better hunters attract the better mates and have more children by women who are not their wives," Hawkes noted.

Dr. Ofer Bar-Yosef of Harvard provided the archaeologist's perspective on human evolution, reviewing his work in Israel. He described Neandertals as able survivors, making sophisticated stone tools, hunting large animals, caring for the sick and injured, and burying their dead. (See the spring 1991 *Anthroquest*.) But new information also creates new confusion. Bar-Yosef said wryly, "In archaeology, the more you dig, the more problems you have." Since modern humans preceded Neandertals in the Levant, Neandertals are unlikely to be their (and our) ances-

tors. But who and where were the ancestors of modern humans? The answers are still elusive.

That evening, Dr. John Roberts emceed the first Leakey Prize award ceremony. President of the Board Mason Phelps presented Dr. Mary Leakey with a citation and medallion in commemoration of her and Louis Leakey's work. Dr. Tobias was presented with the first

Leakey Prize — a \$25,000 check, commemorative medallion, and citation—by Chairman of the Board, Gordon Getty, whose matching of an anonymous donation made the prize possible.



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## P.V. Tobias — as it might be through the eyes of W. S. Gilbert

He is the very acme of an ancient Anthropologist  
With knowledge anatomical, genetical and fossilist.  
He knows all kinds of hominids and species taxonomical  
He's also quite a specialist in every matter cerebral,  
In spite of his o-pin-i-on that some ideas are terrible.  
He believes that *Homo habilis* was really quite a talker,  
Though what he really may have said is something of a corker,  
But he's teeming with ideas about the origins of speaking  
And in skulls of some antiquity finds evidence he's seeking.  
So in all things anatomical, genetical, and fossilist  
He really is the acme of an ancient Anthropologist.

His study of the Kanam jaw unveiled an ancient mystery,  
Maybe the earliest murder in the whole of human history;  
Then several years at Sterkfontein he lead the ex-ca-va-ti-on  
That brought to light the *habilis* and tools — to his el-a-ti-on.  
Tobias went to Gwembe for to measure all the Tonga  
And, with his angels, fast became a local nine-days' wonder.  
As sick folk walked from far and near just simply to be measured  
Because they felt it sure must be new treatment to be treasured.  
He did the final study of the *habilis* from Old-o-way,  
Of George, Dear Boy and other skulls encountered on the way,  
So in learning anatomical, genetical and fossilist  
He is the very acme of an ancient Anthropologist.

Dear Phillip is a lover of remembering anniversaries  
And always likes to celebrate however far away it is.  
All who know him know his allergy to dog-hair insufflation  
And the way he tries to turn it off by physic inhalation!  
He's always been an advocate of rac-i-al diversity,  
And strove to spread this concept while at Wits, his university.  
He's always in the forefront of a march or con-fron-ta-ti-on,  
And has always been an advocate of free com-mu-ni-ca-ti-on.  
His list of published papers is so long that now one must say  
He's contributed enormously to what is known and learnt today.  
There can, thus, be no doubt about his learning deep and fossilist  
And that he also is the model of a Modern Anthropologist.

To honor Phillip Tobias as the first recipient of the Leakey Prize, Betty and Desmond Clark wrote this spoof of Gilbert and Sullivan's song, "He is the very model of a modern major general" from the play *H.M.S. Pinafore*. It was read to Phillip at the award ceremony, October 12, 1992, by Mrs. Barbara Isaac.

## Welcoming New Fellows & Trustees

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

### New Fellow:

Mr. Jim Carty

### We welcome back the following individuals into the Society of Fellows:

Dr. and Mrs. Gerold Grodsky

Mrs. Noreen Curry

### We welcome a new member to the Board of Trustees:

Mrs. Virginia Vanocur

### New Trustee Officers are:

Mr. George D. Kirkham, Vice-President

Mr. Barry Sterling, Vice-President



*In celebration of the upcoming 25th anniversary of the L.S. B. Leakey Foundation, a 1993 Great Ape Calendar will be produced by Workman Publishing Company.*

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