

# ANTHROQUEST

news of human origins, behavior and survival

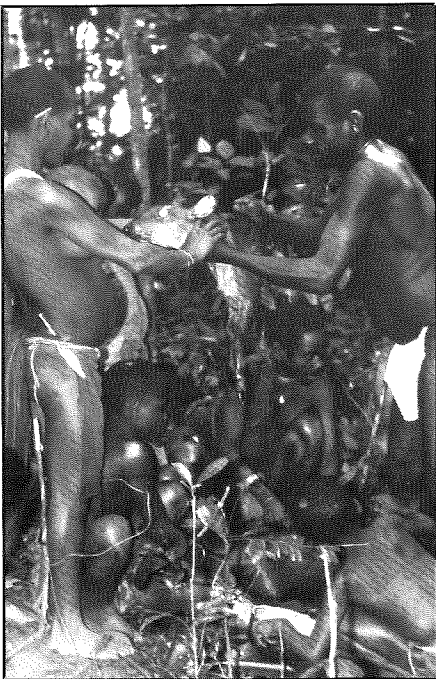
Number 34

L.S.B. Leakey Foundation News

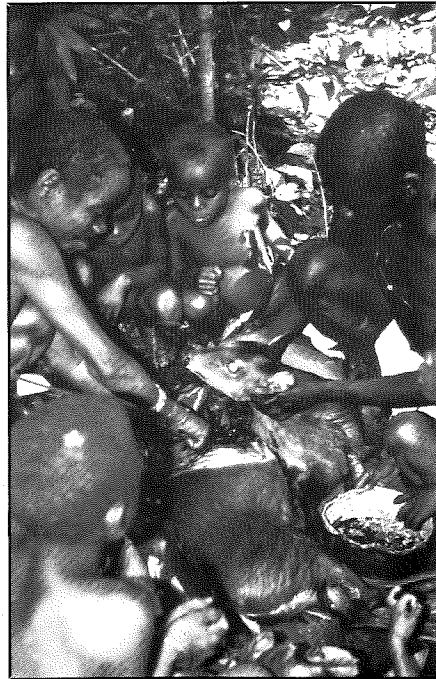
Spring 1986

## THE MBUTI PYGMIES PAST, PRESENT AND FUTURE

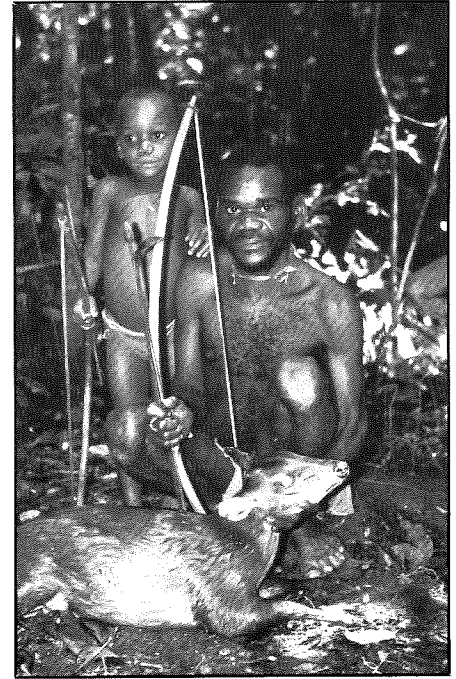
Kevin Duffy, Ph.D.



*Mbuti woman receiving share of Red Duiker antelope.*



*Mbuti pygmies dividing the meat of antelope.*



*Mbuti archer with the Red Duiker antelope he has killed.*

Most anthropologists in the English-speaking world know only what Colin Turnbull wrote about the hunter-gatherer Mbuti pygmies of Zaire's Ituri Forest, at best a partial ethnography. In the space allowed, this article briefly examines the Mbuti and Turnbull in perspective a quarter century after his field work. Along the way it also reviews the Mbuti's past, comments on

their present, and speculates on their future.

It was, coincidentally, about twenty-five years ago that I myself first visited the Mbuti, one of many such first hand experiences as I lived at that time for more than ten years in central Africa. In 1973 I made a 16mm film on the Mbuti which was broadcast nationally in the science TV series, *Nova*. In 1984 I wrote

a book on the Mbuti, *Children of the Forest*, published in New York, and soon to be published in London.

Although they are not responsible for what finally appears in print, I would like to acknowledge the separate advice and influence of Professor Hilda Kuper and Dr. Robert Bailey on parts of this article.

continued on page 16

## THE L.S.B. LEAKEY FOUNDATION

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 multi-disciplined research into human origins, our evolving nature and environmental future. It was named in honor of the man who had become known as "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 research projects which may help us to understand how we evolved as a species.

The training and education of students in these fields.

Conferences, publications of scientific papers, and educational programs designed to disseminate knowledge relevant to our changing view of humanity's place in nature.

### OFFICERS OF THE BOARD

Lawrence Barker, Jr., *President*  
Ed N. Harrison, *Vice President*  
Frances Parmley Muir, *Vice President*  
Elizabeth Palette Brady, *Secretary*  
George D. Jagels, Jr., *Treasurer*

### TRUSTEES

Gordon P. Getty, *Chairman*  
Robert M. Beck, *Vice Chairman*  
Mrs. John L. Bradley  
Mrs. John B. Callery  
Miss Fleur Cowles  
Mrs. Peter Dominick, Jr.  
Anne Earhart  
Hubert R. Hudson  
George Lindsay  
The Hon. Robinson McIlvaine  
Coleman Morton  
Edwin S. Munger  
Fred Myers  
Mrs. Allen O'Brien  
Mason Phelps  
William P. Richards, Jr.  
John D. Roberts  
Norma Schlesinger  
Mrs. George M. Seignious II  
Jeffrey R. Short, Jr.  
Mrs. Brooks Walker, Jr.  
Leighton A. Wilkie  
Ann Deming Willis  
William M. Wirthlin  
Mrs. Frank M. Woods  
Mrs. Robert K. Wrede

### LIFE TRUSTEES

Mrs. R. Hugh Caldwell, Jr.  
George D. Jagels  
Mrs. Max K. Jamison  
Dr. Mary D. Leakey

### SCIENCE AND GRANTS COMMITTEE

Dr. F. Clark Howell, *Co-Chairman*  
Dr. Richard Wrangham, *Co-Chairman*  
Dr. Bernard Campbell  
Dr. J. Desmond Clark  
Dr. Irvén DeVore  
Dr. Ekpo Eyo  
Dr. John Fleagle  
Dr. David M. Gates  
Dr. Murray Gell-Mann  
Dr. Jane Goodall  
David A. Hamburg, M.D.  
Dr. Kristen Hawkes  
Dr. A. S. Msangi  
Dr. Richard S. Musangi  
Dr. Melvin M. Payne  
Dr. David Pitbeam  
Phillip V. Tobias, M.D.  
Dr. John Van Couvering  
Dr. Bernard Vandermeersch  
Dr. David Western  
Dr. Bogodar Winid

### EMERITUS

Paul MacLean, M.D.  
Dr. Sherwood L. Washburn

Ms. Barbara Newsom, *Executive Vice President*  
Ms. Deborah J. Spies, *Director of Administration*

The L.S.B. Leakey Foundation is a public foundation. All contributions are tax-deductible as provided by law.

## THE L.S.B. LEAKEY FOUNDATION NEWS

**Editor,** Elizabeth Palette Brady  
**Associate Editor,** Elizabeth Waldron  
**Production Editor,** Jan Slater

**AnthroQuest** is published by the Foundation as a service to its members. Single copy price, \$1. L.S.B. Leakey Foundation, Foundation Center 1-7, Pasadena, CA 91125. Copyright 1986, L.S.B. Leakey Foundation. Telephone (818) 449-0507

# PRESIDENT'S MESSAGE

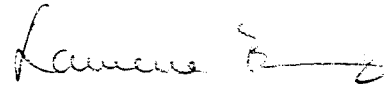
I am often asked why I am interested in the research of the Leakey Foundation. What practical use is there, for example, in the study of the bones and tools of early humans, or in speculation on the behavior of primitive and ancient peoples? It is a question of pure science — "science for science's sake" — as opposed to relevant research.

Such concerns do come up in decisions as to what kind of projects the Foundation should support. The answer is always quality research by promising and proven researchers, regardless of relevance.

What do most people think relevant means? It implies practicality, usefulness and some concept of expedience. It indicates something we have now and want more of, like medicine, good health, food, money even. Something, too, that we did not have but now find useful, like telephones, radio, television, automobiles, airplanes and personal computers.

As contrasted with such relevance, pure science is the joyful quest for knowledge. It is like the research of Nicolaus Copernicus (1473–1543), the Polish mathematician who studied the moon and the wandering stars, Tycho Brahe (1546–1601), the Danish astronomer with his fine observatory on an island north of Copenhagen and later at a castle near Prague, and Johannes Kepler (1571–1630), a German astronomer who joined the aging Brahe in Prague. Their combined work resulted in the laws relating to the sun and to the motions of the planets. It is the research of Charles Darwin, studying species of Galapagos finches, who, together with Russell Wallace, studying the complexities of beetles in southern Asia, brought us in 1858 the concept of the origin of species by means of natural selection.

So why, then, am I interested in the science of the Leakey Foundation? To me it is of utmost importance and excitement. Further, it is always relevant in the time scale of human history. And it is essential to our future and survival.



*The Leakey Foundation co-sponsored a symposium, "Diet and Human Evolution: From Foraging to Fast Foods," last February in Berkeley which drew considerable notice and an enthusiastic audience. At dinner, on the eve of the day-long program, Richard Wrangham, primatologist at the University of Michigan and co-chairman of the Foundation's Science and Grants Committee, presented as an appetizer to the day's menu the following verse:*

### THE SONG OF THE HUNGRY HOMINID

It's easy to figure that brains that get bigger  
need an extra-high-quality fuel.

For us, like the bears, gastronomic affairs  
that aren't calorie-rich are just cruel.

And it's clear from a glance at our two-legged stance  
we could walk many miles to find places

Where helpings of food were sufficiently good  
to stuff in our Pliocene faces.

Rounded molars confirm how our taste-buds would squirm  
at the thought of — yecch! — leaves in our diet.

No, it's fruit, roots and seeds that a hominid needs,  
while a good hunk of meat starts a riot!

So if you want to call us long names that appall us  
You stick to *Australopithecus* —

But your ancient savanna ancestors would wanna be known  
by a banner that shows that we canna' eat like an ape or a prosimian  
— a title that captures our new feeding manner

Would show that the foods that we need and we seek  
are the foods of a Pliocene fast-food freak

So rather than call us *Australopithecus*,

Please — think of us just as "The Calorie Seekers."

# DIAN FOSSEY REMEMBERED

**Biruté M.F. Galdikas**

**Orangutan Research and  
Conservation Project  
Tanjung Puting National Park,  
Indonesia  
and  
Department of Archeology  
Simon Fraser University,  
Vancouver, B.C.**

**D**ian was one of my heroes. I admired her tremendously for her courage, her perseverance and her total commitment to mountain gorillas, a commitment that in the end led to her untimely death at the age of 53 on December 26, 1985. Dian was hacked to death, mercifully in her sleep, probably by previously-caught poachers who wanted to regain an amulet she had taken from one of them.

Reality being what it is, most people, as they go through life, end up compromising. Dian refused to compromise. This is what made her different, "difficult" and controversial. It also made her extraordinary. She was variously called "mad," moody and unpredictable. In actuality, she was a sweet, vulnerable person who, despite her complexity, was easy to understand. The only thing that mattered to her was the mountain gorilla. There was absolutely nothing outside of gorillas: not family, not friends, not personal ambition nor dreams of personal gain. Shortly before she died, Dian told a reporter, "I have no friends. The more you learn about the dignity of the gorilla, the more you want to avoid people." I understood perfectly what she meant. Beside the gorillas, everything else was as nothing to her. Her statement that she had no friends was sincere. Dian simply did not trust humans; she believed humans treacherous and always assumed that in the end, one way or another, humans would betray her. This attitude was not surprising in view of her life with the gorillas. Her feelings towards the whole of humankind were embittered by what she saw humans doing to gorillas.

Dian's achievements in terms of studying, protecting and publicizing mountain gorillas were tremendous. Even her worst critics granted that she understood gorillas better than anyone



else on this planet. Of course, in many ways, Dian had become a gorilla. People sometimes wonder if scientists who study a particular primate species begin to resemble that species. Probably not in most cases, but Dian spent 18 years with the mountain gorillas. To say that she was emotionally involved with them is a meek understatement. Gorillas are large, slow-moving, intelligent, gentle, good-natured, affectionate creatures, noble in demeanor and sensitivity and stable in temperament. (That's what the fuss about Koko's kitten is all about; Koko's sensitivity and expressions of compassion are all too human, unexpected, at least by the public, in a mere great ape.) Gorillas are also social and gregarious. It's not surprising, living as she did alone on the mountain, that gorillas became Dian's best friends and, ultimately, her only friends. A solitary person by nature, she ate alone in her cabin even when her camp was bustling with people; over the years she became more reclusive. Unlike the situation

with Jane Goodall and the wild chimpanzees, for instance, there was no mother, no sister, no husband and later no child to prevent this process from taking place. One wild gorilla, in particular, became her special friend, Digit. Digit lacked peers in his group and he increasingly turned to Dian for friendship. Dian had habituated the gorillas to her presence by acting like one. Whenever she lectured, there was almost always someone in the audience who would ask her to do gorilla calls. Dian would oblige with great gusto. It was while she was doing such a vocalization over a decade ago that I suddenly realized that Dian's soul was already tinged and merged with the gorillas.

It was her attitude toward the gorillas that gave her problems with people. Dian never accepted the fact that most people, even those working in her camp, even her students, did not really consider gorillas the number one priority in their lives. Students frequently went out to study gorillas, to meet their monthly

quota of observation hours, when Dian would have preferred to have the students on patrol. This lackadaisical attitude toward gorilla protection infuriated and vexed Dian. The gorillas were being killed NOW; their habitat was being destroyed NOW. Action had to be taken NOW. She had no patience with what she called "comic book conservation," concepts such as bringing tourists to see the gorillas. I remember asking her what she thought of an eminent, highly regarded conservationist with all the right political connections whose main contribution to conservation was talk and organizing others. I was not prepared for Dian's reaction. She slowly turned toward me and then, without a word, spat on the floor. It was pure Dian! (Hypocrisy was never her long suit.)

Yet when I recall Dian, aside from her refusal to compromise, it is principally her warmth, graciousness and thoughtfulness that I remember. And her lovely, slow voice with a southern lilt. She had an impulsive thoughtfulness that was rare. For instance, while staying in her apartment in Ithaca, N.Y., I mentioned in passing that all my shoes pinched and my feet hurt. Much to my surprise, Dian jumped up, asked my shoe size and then immediately went off to get me some shoes. When she came back, she handed me a new pair of shoes that slipped on as though they were custom-made. I wore them for years afterward. Such behavior was typical. When I commented that afternoon to one of Dian's friends how kind she was, he just smiled and said, "Oh, she's just treating you like one of her Africans. She's always buying things for them."

Digit's brutal death by poachers in 1977 and the deaths of other gorillas to whom she had devoted her life changed everything. Outwardly all was the same but now Dian was more distracted, more prone to hysteria for no ostensible reason. In 1981 I arranged for her to give a lecture at Simon Fraser University where I was teaching. Even though she had a non-stop schedule from 7:30 A.M. to midnight, Dian was tirelessly gracious and kind. She behaved like a real trooper. But there was something different. She had been forced to come to North America for a variety of reasons not to her liking; she talked incessantly about returning to Africa and smoked continuously, despite a lung problem. I had the distinct impression that she was trying to commit suicide and mentioned to my colleagues at the time that Dian's

only wish was to go back and die on the mountain. Dian also surprised me by mentioning that she was heavily involved in black magic. Traditionally, belief in magic runs deep among the local people in her area of Rwanda. I didn't pursue the topic much because it isn't one that interested me particularly. But it was clear she believed in local black magic and was possibly a practitioner. Eventually, it dawned on me that being perceived as "powerful" in magic would be one way to intimidate and control local poachers.

Her relationship with the local people was very much an ambivalent one. She knew and liked the president of Rwanda. (I remember once mentioning meeting the then vice-president of the Republic of Indonesia. Dian glanced down at me with haughty disdain. "Birute", she said, "I don't deal with vice-presidents. I deal with presidents.") She obviously was very fond of her staff and patrol personnel. Yet she hated with a vengeance the locals who entered the park and, inadvertently sometimes, with their cattle and their snares, destroyed gorilla habitat and put the gorillas at risk. She took strong physical action against poachers. Indeed, she took the amulet from a poacher in order to intimidate him as he believed that by taking it she took his life in her hands. Apparently, she was killed in an effort to get the amulet back. Ironically, in the end, it was black magic that killed her.

Dian gave up everything for the gorillas. Her dedication to the animals she loved was total. For 18 years, selflessly and heroically, despite danger, despite discomforts, she lived and worked with the mountain gorillas. Hopefully, she did not die in vain. The Rwandan government has indicated that not only will it keep the research center she established but will enlarge and strengthen it. Perhaps her death will finally galvanize the world into saving the mountain gorillas. Perhaps in death she will achieve what eluded her in life: protection for the mountain gorillas. But, in reality, this was Dian's second death. Dian died the first time with Digit.

\* \* \*

*The L.S.B. Leakey Foundation has created a fellowship in Dian Fossey's name, the funds from which will endow great ape research.* ■

---

## GREAT APE FELLOWSHIP

---

The Leakey Foundation is pleased to announce that Wildlife Conservation International, a division of the New York Zoological Society, is joining in cosponsoring the Fellowship for Great Ape Research and Conservation. As a result, up to \$40,000 will be awarded to one or two recipients for suitable projects, and the scope of the fellowship is now broadened to place equal emphasis on the conservation of great apes.

Wildlife Conservation International, like the Leakey Foundation, places great significance on the survival of the four great apes (gorilla, chimpanzee, bonobo and orangutan). All are large, rare primates whose populations in the wild are falling rapidly, especially as a result of habitat destruction.

The first fellowship for 1986 has been awarded to John Mitani of Rockefeller University for research into the behavior and ecology of orangutans in Gunung Palung Reserve, West Kalimantan, Indonesia. This study is expected to contribute important new information on orangutans in the wild, and to foster effective conservation of the animals and their rainforest habitat.

The award is open to qualified applicants of any nationality. ■

---

## NEW FELLOWS

---

The L.S.B. Leakey Foundation is pleased and honored to welcome as new fellows: Dr. William Dreyer and Dr. Janet Roman, Pasadena, California, Richard Siegel, San Diego, California, Hazel M. Robertson, Salt Lake City, Utah, and Sally V. Beaty, Cypress, California. ■

---

# WOMEN ATHLETES: A MODEL FOR HUNTER-GATHERER FERTILITY?

Nadine Peacock  
Harbor-UCLA Medical Center, Torrance, California

---

Contemporary hunter-gatherers have extremely low birth rates in comparison with other "natural fertility" populations (those not practicing contraception). For example, among the !Kung San of southern Africa the average woman bears between three and four live infants during her lifetime, in comparison with six or seven births per woman among settled agriculturalists in Africa. A variety of explanations has been put forth for this phenomenon, including post-partum sex taboos and nutritional stress. A very convincing argument has been made by Konner and Worthman for the role of frequent and prolonged breast feeding in increased birth spacing among the !Kung. New evidence from studies of women athletes suggest that another mechanism, exercise, may be extremely important in regulating fertility.

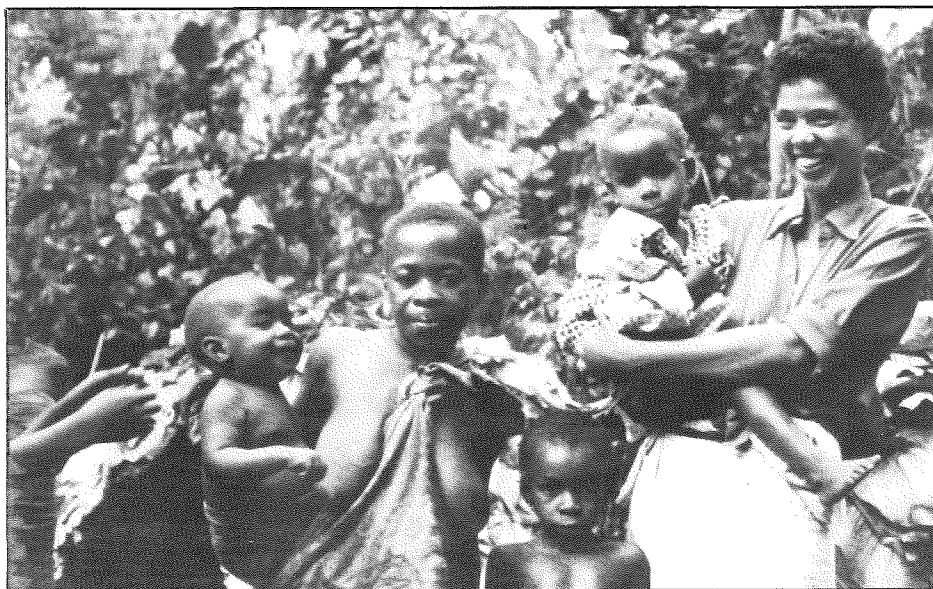
It has been known for some time that women who are physically very active often report disruptions in their menstrual cycles. High rates of amenorrhea (failure to have monthly menstrual periods) have been reported among dancers, gymnasts, swimmers and particularly long distance runners. Because these women are generally quite lean, the tendency has been to attribute menstrual disruption to loss of body fat, which Frisch and others have claimed must be above a critical level in order for normal menstrual cycles to be maintained. However, more recent studies have focused on runners who are not amenorrheic, and in particular on non-competitive "recreational" runners. These studies convincingly demonstrate that exercise itself can have rapid suppressive effects on reproductive function, independent of changes in weight or body composition. Runners ovulate less frequently than more sedentary women, and when they do ovulate they produce less of the hormone progesterone, which is important for implantation and maintenance of pregnancies. Even modest increases in weekly mileage among recreational runners have been shown to result in increased disruption of the menstrual cycle. In a

number of cases, recreational runners with fertility problems have successfully conceived once they stopped running.

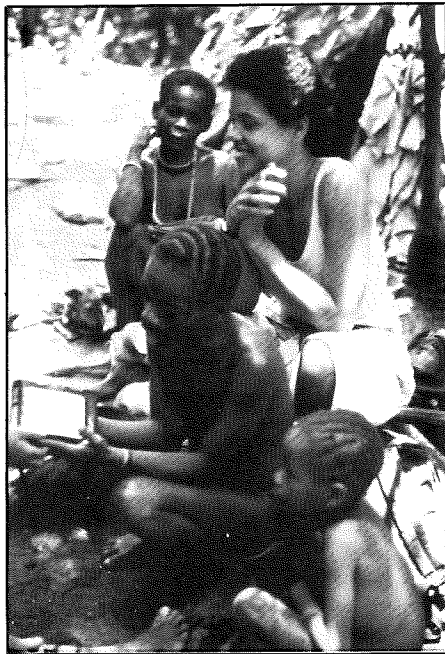
Can we extrapolate from athletic women in western societies to hunter-gatherer women pursuing their daily work routine? Such a mechanism has recently been proposed by Gillian Bentley for the !Kung San. !Kung women work roughly 40 hours per week, and much of this work involves traveling over long distances and carrying heavy loads consisting of gathered foods as well as children who are too small to keep up with their mothers on foraging trips. My research among the Efe pygmies of the Ituri Forest reveals that these women, too, travel long distances, both while foraging and on trips to and from the villages of neighboring horticulturalists with whom they maintain trading relationships. On trading trips, women routinely carry very heavy loads of food, amounting to 50 to 75 percent of body weight. Efe women also routinely carry small children, collect firewood and drinking water, and carry all household belongings when the group moves camp. Workload varies seasonally, and there is variation among women in their total work load. This

intra-individual variation is related to the number of small children a woman has, as well as the number of potential "helpers" (mainly teen and pre-teen daughters).

Peter Ellison and I have been conducting studies of hormone patterns and menstrual cycles of Efe women and women of the neighboring horticultural group, the Balese. Using a method of measuring reproductive hormones in saliva, we have found in preliminary studies that approximately fifty percent of women sampled experienced anovulatory cycles, although none were amenorrheic. The Efe as well as the Balese have extremely low fertility levels, even lower than among the !Kung, and many women never give birth. It is quite likely that a significant amount of infertility is due to venereal diseases, particularly gonorrhea. However, since gonorrhea generally causes infertility through blockage of the fallopian tubes, it is unlikely that the abnormal hormone patterns observed can be attributed to this disease. We do not yet know the relative contribution of nutritional factors, disease and exertion to the observed hormone patterns; we consider it quite likely, however,



*Nadine Peacock with !Kung San women and children.*



*Young !Kung regarding Dr. Peacock's equipment.*

that differences in work loads among women can at least partially explain variation in reproductive function, and we are currently investigating this hypothesis.

If we accept the possibility that female athletes may well provide a good model of one mechanism controlling fertility in contemporary and historic hunter-gatherer populations, we can then ask the question: "Do runners provide the best possible model?" Like runners, hunter-gatherer women tend to be lean and muscular in comparison

with non-athletic western women. However, skills involved with running have mainly to do with endurance, whereas many work activities of hunter-gatherer women involve strength as well as endurance. Konner has suggested that "pre-agricultural humans were more like decathlon athletes than either marathoners or power lifters." With the development of non-invasive techniques such as salivary hormone assays, we now have tools available to test such hypotheses; studies are needed of reproductive function in men and women involved in various forms of athletic pursuits, as well as in individuals whose work activities involve high levels of physical exertion.

## CALIFORNIA'S FIRST BARBECUE? A PALEOMAGNETIC STUDY OF THE HEARTH FEATURE AT THE CALICO ARCHEOLOGICAL SITE

Janet L. Boley

California Institute of Technology, Pasadena, California

The question of whether or not humans reached North America prior to 25,000 years ago has never been adequately answered. Several archeological sites have controversial evidence for the presence of pre-Clovis man in North America; among these is the Calico site located near Yermo in California's Mojave Desert. L.S.B. Leakey began excavations in 1964 in an alluvial fan near the shores of Pleistocene Lake Manix. Continuing excavations have unearthed more than 11,400 potential human artifacts from tool making activities. The assemblage of putative lithic tools includes scrapers, graters, choppers, hammerstones and other types of flake tools. These artifacts are highly controversial in that some believe they could have been formed through natural processes while others maintain that the artifacts are indeed genuine.

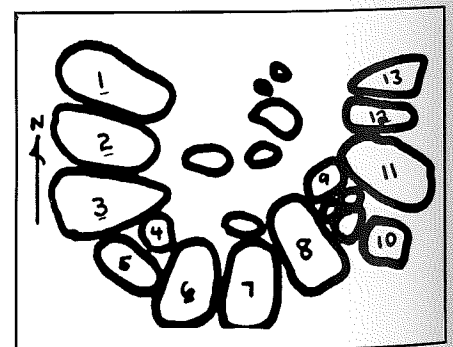
Soil-geomorphic age assessments of the artifact-bearing section of the alluvial deposits show them to be about 150,000 to 200,000 years old. Percolating ground waters left a rind of calcium carbonate cement, or caliche, on clasts

in the alluvial fan during the time the fan was active. Uranium-thorium assays on the caliche have shown that the deposits are at least 200,000 years old.

In addition to the stone tools, several stone circles which resemble fire hearths have been uncovered at the site. The hearth feature from Master Pit II is a semi-circular arrangement of cobbles measuring 0.6 meters in diameter. Paleomagnetic work could in principle determine whether the clasts have been heated to any great extent and could definitively tell whether or not the hearth feature was used as a fireplace. A particular advantage of paleomagnetic techniques over other techniques is that there is extremely little decay in the stable magnetization of the cobbles over time, thus there is no upper age constraint placed upon the effectiveness of the technique. If the cobbles had been heated the sides facing the fire would have been remagnetized in the earth's present day magnetic field while the outer sides would have retained their original random magnetic directions. Thus if there were a change in the

measured magnetic directions and if the inner directions were the same for each cobble this would imply that the cobbles had indeed been heated.

The aim of this study was to exhaustively study five of the hearth cobbles using paleomagnetic techniques. In addition, a unique control experiment was devised and undertaken by Dr. Alan Gillespie (JPL), Fred E. Budinger, Jr. and Dottie Kasper (both of the Calico site). An actual fire hearth was constructed using cobbles from the site



*Schematic diagram of the Calico hearth feature drawn by Fred E. Budinger, Jr.*

with lithologies similar to those in the actual hearth feature (freshwater siliceous limestones and andesitic and dacitic volcanics). A fire was built using sagebrush and Chinese elm for fuel. The temperatures of the cobbles were monitored with a thermal interferometer. Temperatures measured approximately 300°C on the fire side, 100°C on the outside, and 200°C on the bottom. Thus these clasts served as an important control for this project.

The cobbles from the hearth feature showed significantly random directions in their measured moments leading to the conclusion that they hadn't undergone heating remagnetization and therefore the stone circle had never been used as a fireplace.

At this writing more analysis needs to be carried out on the control cobbles; however, several conclusions can already be drawn. The cobbles, most particularly those of volcanic origin, show significant evidence of heating remagnetization in that their inner directions tend to align in the direction of the earth's present day field while their outer directions are random. The volcanic cobbles are better than the limestones because of their higher concentration of magnetic minerals. In fact, some volcanic cobbles' moments were so strong that they overloaded the magnetometer and unfortunately could not be measured. Therefore the control experiment did indeed show that the paleomagnetic techniques were a valid way to test for evidence of prior heating.

It is clear then that the hearth feature was never used as a fireplace but this doesn't rule out that it was produced by human activity. It might have been used as some type of storage area. Nevertheless, the formation of the feature through natural processes must also be considered. One possibility is that the cobbles surrounded a tree trunk and were gradually pushed outward into their current configuration as the trunk expanded. Another possibility is that the feature is of depositional origin. Whatever the case, the fire hearth feature, as well as the Calico site, remains highly controversial.

I wish to express my thanks to Fred Budinger, Jr., curator of the Calico Early Man Site for his invaluable help on this project. I also wish to thank J. L. Kirschvink for his necessary and helpful guidance. ■



*Fleur Cowles and Lady Bird Johnson at dinner.*

*Miss Cowles gave a provocative talk at the dinner honoring her last November in Beverly Hills, when the establishment of a Great Ape Fellowship in her name was announced. Excerpts follow:*

You may wonder how I, an author and painter, should have become so tightly linked to anthropology, to the Leakey Foundation, to its scientists.

The answer is in two words: LOUIS LEAKEY. I had the good fortune to know him after Jane Dart proposed me as a member of the Leakey Foundation board. It did not take long for his singleness of purpose to become an unavoidable web in which I was soon trapped. I saw him whenever he arrived in London; he never left without reminding me of his dream that a European branch would be formed in London. He finally persuaded me (no scientist, I!) to establish and preside over one. It has been a source of pride (not without its share of work) for many, many years. And a splendid education in a world new to me.

Everyone who knew Louis Leakey remembers his vision, his discipline, his stubborn (some say mulish) determination. For long, other men had sought and studied stones and bones to unveil

the mystery of human origin; hence the science is hardly new. But Louis Leakey was a great communicator with an extraordinary capacity to reach out to everyday men and women, the non-scientific public, by an amazing charisma. Today, his name and anthropology are synonymous. Today, many men and women who never expected to choose this vocation have remembered and followed his words.

When I think of the first ancestral human, the hominid, I see him in my mind's eye so clearly I could paint him. The earliest human would be small, thus small headed (and still tiny brained), with a fuzzy Afro hairstyle. He would *barely* be standing upright and certainly he'd be on the prowl for prey. In his hand I'd have to place the weapon which brought him forward from the ape, the crude stone which he discovered not only could cut plants, but also kill and dismember the first *carnivorous* food he ate — anything from a tiny leaping gazelle to the remains of a giant elephant. That stone not only helped him cut through thick hides and break bones, but also to construct his shelter. Perhaps happiest of all, its sharp edge also helped him get to the *caviar* of the carcass — the marrow inside the bones. Using it demanded a new process of thinking (the first tiny enlargement of his brain, perhaps?) which began the

process of setting him apart from other animals.

How did HE come to be US? That is a question few think about, but I do thank the anthropologists and paleontologists who have made it their life's work to give the answers to prove that we *did*, indeed, evolve from ape to that first ancestral man and to continue to trace his gradual evolution to our familiar humankind.

What daunting work! If, like me, you are no scholar, it is difficult to imagine the task of fitting a collection of precious, tiny, often broken bones into a recognizable shape related to the history of man. Each remarkable mosaic shortens the gap in deciphering human evolution.

Anthropologists, including those supported by our Leakey Foundation, study much more than stones and bones. Today, far from the snug world, many of them use the wastelands of the earth as their places of business, bending, sometimes crawling, over the dusty terrain, painstakingly excavating and analyzing the lava and ash that still cover footprints — some of them millions of years old — which one great paleontologist called “the snapshots that record a brief instance of bygone years.”

Because I am totally *untechnical* (I even fuse the lighting system just trying to change a bulb), I can only marvel over the scientific process of chemical analysis which has become the modern anthropologist's right arm: the dating process. To me, it is *magic*. For instance, the headline news of a tiny fossilized jawbone discovered in Burma which was dated as 44 million years old! Equally amazing is the more recent story of the dating of the enamel of the teeth of a fossilized Plio-Pleistocene skeleton one and a half to two and a half million years old. Examining it, scientists could tell how long early humans took to grow to maturity . . . and the *mind boggles!*

There is no sex to this profession of anthropology. Louis Leakey's wife, Mary, is the principal proof. So are all the women who have chosen to live in forest habitats with the great apes. One is a special friend of mine, Jane Goodall, whom I have known for countless years. She has spent 25 of her 51 years out there in Tanzania and because she is one of the world's charmers and such a skillful writer, the beautifully told best-selling books of her experiences have been read by hundreds of thousands and

have helped to spread the gospel of anthropology, even to help readers to see it as a possibly warm and moving profession. All those readers now know how chimpanzees develop and interact with each other, how their life cycle parallels ours in amazing and, yes, even in *charming* ways. The beguiling great ape supplies the major clues to our past. We must protect and save him.

But others, not in our field, have taken an unexpected new interest in the chimpanzee. Interestingly, the federal authorities and medical scientists have underscored its precious value. They, too, recognize its shrinking population and seek to remedy this by creating a new population of them, so worried have they become.

Because the highly intelligent chimpanzees are so startlingly human, scientists admit they are the only alternative to humans for viral research on hepatitis, cirrhosis and even the dread AIDS. I was amazed to discover that this is the only known animal that the AIDS virus *can* infect (although, fortunately, they do not develop the deadly syndrome).

How, now, do the chimpanzees face extinction? By competing with man for the same territory, by being hunted by local people (who mine and poach their areas and gather the same food — all living on the quickly vanishing ficus trees). Monkeys, orangutans and birds all eat the same leaves. Even the inevitable tourist reduces their living space. So the Leakey Foundation's decision to put a sizable amount of money toward the immediate and continued evaluation of such primates as the chimpanzee is a priority I enthusiastically endorse.

I feel it proper to ask one question: If a painting can sell for nine million dollars (as an incredibly beautiful one by Van Gogh did in August) what ought we be ready to give to help the Leakey Foundation continue to unravel our past . . . to echo the wish of the brilliant scientist, John de Cleave, who asks us to continue to “put flesh on the bare bones of pre-history?”

I'd like to close my remarks by quoting from a little book of letters to our representatives in Washington which I recently picked up, called *Dear Congressman* by Juliet Lovell. One letter, written to Congressman Blatnik, reads:

“What can we do to prevent this story from becoming a reality? It's the end of the Third World War . . . Every human being on earth has been killed off — except for one single badly wounded man . . . who is leaning up

against a tree. Finally, he, too, keels over. *Dead*. An ape sitting on the tree, watching what has happened, turns to his mate and exclaims: ‘My God! Do we have to start this whole damn thing all over again?’ ”

*The grant program, the major purpose of the L.S.B. Leakey Foundation under the guidance of the distinguished Science and Grants Committee, depends upon public support for its success. Every penny of your contribution dollar directly supports the grant awards.*

## GRANT SPOTLIGHT

Uri Baruch

\$5,000 needed

### PALYNOLOGICAL INVESTIGATION IN THE DEAD SEA

Dr. Baruch's research goal is to provide paleoecological background for the study of the earliest farming societies in the lower Jordan Valley in Israel. The project will encompass both fieldwork (obtaining soil samples) and laboratory work (identifying and counting the pollen types therein).

Erik Trinkaus

\$1,537 needed

### NEANDERTHAL HUMAN FOSSILS IN YUGOSLAVIA

Dr. Trinkaus will study and describe Neanderthal remains from the Krapina rockshelter in Yugoslavia. Among other tasks, he will resort, inventory, photograph, measure and make molds of these human fossils. The data collected will be used for new, up-to-date descriptions of the remains and in ongoing analyses of Upper Pleistocene human biology.



Israel Herskovitz \$2,800 needed

**NEOLITHIC PEOPLES  
IN THE LEVANT**

In this study of Neolithic populations, an attempt will be made to shift attention from wide evolutionary trends to more specific biological problems. Dr. Herskovitz hopes, through intensive study of new skeletal material discovered in four sites in Israel, to clarify the effect of the dramatic changes on the Neolithic population in terms of diet, climate, social structure and health which occurred during this period.

William Hornyak \$2,800 needed

**SEDIMENT  
THERMOLUMINESCENCE  
DATING OF KALAHARI  
MSA MATERIAL**

The thermoluminescent characteristics and radioactive content of samples of sediments from a Middle and Late Stone Age site in the northwest Kalahari Desert will be studied with the aim of obtaining reliable dates for the deposition of the sediments. This work is one of several efforts, the others being pursued elsewhere, to date these same levels so that comparison to other methods will be possible.

Frederick Grine \$8,400 needed

**INTERNATIONAL  
WORKSHOP  
ON ROBUST  
AUSTRALOPITHECINES**

Dr. Grine will organize a workshop of scientists currently engaged in research relevant to the origin and evolutionary history of the robust australopithecine, a topic of much debate. The workshop will strive to resolve specific problems and questions as well as highlight those areas in which further research would be most rewarding. Funds are needed to finance travel for three participants from overseas.

James Enloe \$3,000 needed

**SUBSISTENCE ORGANIZATION  
IN THE  
UPPER PALEOLITHIC  
OF WESTERN EUROPE**

This project will investigate Late Pleistocene subsistence systems, encompassing cooperative hunting, food sharing and long-term food storage. Examination will concentrate on reindeer remains from western Europe and will attempt to discern differences in hunting strategies and subsequent consumption or storage practices.

Curtis Marean \$3,000 needed

**HUNTER-GATHERER  
FAUNAL EXPLOITATION  
IN KENYA**

The Late Pleistocene, which has received only cursory archeological research treatment, will be the focus of this project. In order to understand the behavioral and biological evolution of *Homo*, it is necessary to document subsistence practices and how such practices varied through space and time. Hypotheses concerning the relationship between climatic change and animal exploitation, as well as the advent of food production, will be tested.

F. Clark Howell and  
Roderick Moore \$3,600 needed

**ASPECTS OF  
VARIATION IN  
*HOMO ERECTUS*  
AND OTHER  
MIDDLE PLEISTOCENE  
HOMINIDS**

A detailed morphological and metrical comparison between different geographic subgroups of *Homo erectus* will be made to clarify this species' characteristics and range of variation, thereby leading to a better understanding of the place of *Homo erectus* in human evolution. East and South African samples will be added to previous analyses of specimens from Europe, Asia and North Africa.

Terry Harrison \$4,000 needed

**NEW FOSSIL  
PRIMATE POSTCRANIALS  
FROM THE  
MIDDLE MIOCENE  
IN KENYA**

Maboko Island in Kenya has yielded numerous new specimens belonging to at least six species of fossil primates. A detailed comparative survey will provide important new information on the primate paleocommunity from this locale, and may clarify several key issues in the study of catarrhine evolution as well as provide important clues to the factors underlying the origins and divergence of the Cercopithecoidea and Hominoidea.

**GRANT GUIDELINES**

*The L.S.B. Leakey Foundation supports research related to human origins, behavior and survival. Priority is given to studies in the areas of human paleontology, archeology and environmental studies of the Miocene, Pliocene and Pleistocene; into the behavior of the great apes and other old world primate species; and into the ecology and adaptation of living hunter-gatherers. Eligibility is limited to applicants who are doctoral candidates or engaged in postdoctoral research. Potential applicants are encouraged to submit a Petition for Grant Application. On invitation of the Science and Grants Committee, those with projects falling within the range of priorities of the Foundation will be asked to submit a formal application. Deadlines for submission of the formal application are: March 1, June 1, Sept. 1, and Dec. 1.*

*For further information and application forms contact the Leakey Foundation, Foundation Center 1-7, Pasadena, CA 91125.*

# FIELD REPORTS

Excerpts from reports by Leakey Foundation grantees on their work in progress.

## EARLY TOOLS FROM OLDUVAI GORGE

by Carole Sussman  
Department of Anthropology  
Harvard University

November, 1985  
Arusha, Tanzania

As I sit writing this preliminary report, the sun is shining brilliantly, the jacaranda trees are in full bloom, and distant thunder heralds the oncoming rains. I have only three weeks left to finish my project — time has flown by quickly and I have accomplished much.

I arrived in Nairobi, Kenya, on September 5, 1985, and spent the next week or so getting papers in order and supplies in hand to begin microwear studies on a select sample of quartz and chert tools from Olduvai Gorge. The staff at the National Museums has been extremely friendly and helpful, providing me with my own office with running water (a real "time saver" when cleaning specimens for observation). I am particularly indebted to Richard Leakey, director, and Dr. Simuyu Wandibba, head of archeology — without their help and advice, work would not have proceeded as swiftly and smoothly as it did. Permission to examine the Olduvai artifacts was promptly granted by the director general of the Tanzania National Scientific Research Council and Mr. Mturi of the Tanzanian Department of Antiquities.

Once established, I selected samples of quartz and chert tools from a number of sites and levels at Olduvai to examine microscopically for traces of use. Various factors determined which pieces I chose to examine:

1. Geological context — artifacts which were found in fine-grained deposits or clay were chosen over those which had been lying in coarse sediments or gravels. The finer-grained the sediments, the less problem one would expect from abrasive action on the tool edges and protrusions which could obscure microwear polish.

2. Small artifacts (approximately 7cm or less) were necessary to fit on the

stage of the microscope (an Olympus BHM series).

3. Artifacts that had been retouched into standard tool forms (such as awls) were chosen along with utilized flakes and unmodified waste.

While the chances of finding any remains of fossilized organic materials adhering to the tools is *extremely* unlikely (they had been washed after excavation, handled, drawn and stored collectively), I randomly chose about 15 or 20 pieces, cleaned them with acetone (to remove finger prints) and examined them microscopically before subjecting them to standard cleaning procedures. I found no traces of discernable organic material on any of those pieces.

To date I have examined about 100 specimens of predominately quartz and some chert from Olduvai Gorge. Of these, I found one quartz flake which has what I preliminarily refer to as a type of silica polish. It is much smoother than silica polish produced after cutting grass (see *AnthroQuest* No. 32; Sussman p. 8), lacking the characteristic pits and striations but resembling a "blind test" specimen I was given where a quartz flake had been used to scrape out the pulpy substance inside tree bark. This had been hypothesized by Professor Glynn Isaac as a tool for use on a potential food source by early hominids, much in the same way as present day orangutans use their teeth to strip the insides of tree bark for food. Experiments scraping the insides of bark have been performed this past month to compare and contrast these pieces with the archeological specimen.

One question continually tugged at my mind during my museum research: Why was I not finding more traces of use/wear polish? While a definitive answer cannot be produced, I have listed some hypotheses below. Some, such as numbers three and four, are more feasible than others though all are potentially contributory.

1. None of the artifacts in the assemblage was used.

2. More conservatively, a small number of tools was used and these were not among those I chose to examine.

3. The tools were not used long enough for microwear polish to develop sufficiently as to be identifiable microscopically.

4. Curation of the artifacts obliterated the use/wear polish. Assemblages were separated by type and stored collectively in plastic bags. Larger specimens were placed together in wooden trays. The weight and subsequent pressure of many tools lying against one another and being jostled together in one bag causes abrasion of tool edges and protrusions as well as spontaneous edge damage in the form of microchipping. It is conceivable that after 20 or so years of such storage surviving traces of microwear polish may have been obliterated.

I must add here that the preceding paragraph is not meant as a criticism of Dr. Leakey's curation techniques. When these sites were excavated in the early 1960s, microwear analysis was as yet undiscovered and the cleaning of artifacts with steel brushes and bagging them all together was standard practice, as it still is today in many places.

5. After almost two million years, use/wear polish is no longer identifiable. Keeley and Toth, however, found preserved microwear points at the 1.5 million year old site of Koobi Fora.

6. Microwear polish is there but I am unable to recognize it. While this is a possible theory, it is improbable.

Upon returning to Nairobi next week, I shall be able to increase my sample size as well as examine microscopically the reference collection and provide a more detailed report of the conclusions.

The past three weeks have been spent in Tanzania working with Annie Vincent and Peter Jones. Their hospitality, knowledge and willingness to participate in my experiments (as well as their own) have made this trip a great success. Together we visited Olduvai Gorge where Peter showed us the pertinent archeological sites and we were able to collect samples of quartz and chert from the same outcrops used by early hominids for the raw material of the tools I'd been examining. A visit to the Lake Natron area provided a different sort of chert which we used experimentally for comparison with the Olduvai chert.

I have not recovered from the thrill of driving through the countryside and rolling down my window to watch giraffes feeding on the tops of acacia trees or ostriches prancing about. One day as

**Table I: Making Digging Sticks of Wood (*Cordia. sp.*) Using Chert & Steel**

Experimenters	Cutting off branch	Shaping branch tip	Debarking and stem removal	Making point	Fire hardening point	Total time	Digging stick length	Dia-meter	Length of point	Weight
A. Vincent Flake #1 Panga	7 min 36 sec	1 min 16 sec	21 min 6 min	9 min 1 min	10 min not done	48 min 8 min	118 cm 108 cm	2 cm 7 cm	7 cm 17 cm	500g 680 g
J. Moore Flake #2	3 min	1 min	26 min	14 min	not done	44 min	141 cm	2 cm	12 cm	550 g
C. Sussman Flake #3	12 min	3 min	16 min	7 min then switched to other end 2 min=9 min total	10 min	47 min	145 cm	2 cm	10 cm	500 g
Panga	2 min	49 sec	6 min	38 sec	not done	9 min	88 cm	2 cm	7 cm	325 g

\*All flakes made of Natron chert.

we were heading past Laetoli, we had the great fortune to watch three cheetahs lounging in the shade of a tree. While they kept a watchful eye on us, their superb camouflage made it quite difficult for me to distinguish them from the surrounding grass.

With raw materials in hand, we performed the following experiments in comfortable campsites which always had spectacular scenery: cutting grass (dry from lack of water), woodworking (including the manufacture of digging sticks, bark scraping, wood sawing and shaving), and animal butchery, including skin cutting and removal, meat cutting and disarticulation of bone. When making digging sticks we first used stone tools and then used a panga (long steel knife) to make the second one. The results of our experiment are given in Table I.

The wood chosen for digging sticks was *Cordia sp.* (family Boraginaceae) which is the same as that used by the Hadza women to make their digging sticks. None of us had ever made digging sticks before although Annie Vincent had watched Hadza women making them.

It was interesting to note the percentage of the total time each activity required. The ordering of activities with regard to the percentage of time required to do them remained the same for both Annie and Jim regardless of whether a flake or panga was used. Making a point on the stick using a flake was more time consuming for me than shaping the actual point, whereas when using a panga it was just the opposite. (I can honestly admit I was afraid of

gashing my fingers as the panga is quite heavy and my aim was not always perfect! I have since learned that the "secret" to using a panga properly lies in the wrist.) It also took me much longer to cut off the branch using either a flake or a panga than Annie or Jim. Still, our total times were very close. I should note that all three flakes were still functional after use ceased.

Acquisition of meat by early hominids, whether through hunting or scavenging, and the behavior associated with it is a "hot" topic in the field of paleoanthropology today. That hominids, using stone tools effectively, competed with other carnivores and acquired meat is evidenced by the cutmarks they left on animal bones, also often modified by carnivore gnawing as well. The processes involved in acquiring meat brings various questions to mind: How much time does it take to butcher, let us say, a medium-sized animal? Could it possibly be easier (and safer) for a hominid to "nip in" and carve off a chunk of meat, moving off with it to avoid competitors? Is it difficult to disarticulate and remove entire limbs? Are different types of stone tools more effective than others for particular butchery tasks?

The hunting of four male Grant's gazelles by Peter Jones this past month provided a unique opportunity for us to test some of these questions and gather valuable data on such things as carcass weights, butchery times, stone tool use, comparative tool efficiency, and a great deal of use/wear polish on quartz and chert. Using stone tools for butchery also enabled Peter to gather more infor-

mation on comparative defleshing techniques and cutmarks to supplement his research already in progress.

Unretouched flakes and bifaces of quartz from Olduvai and chert from both Lake Natron and Olduvai were used to skin and butcher all four animals. Duration of tool use, cutting edge lengths and actions performed (e.g. skin cutting, meat cutting, bone disarticulation, etc.) were kindly recorded by Jim Moore for all four butcheries and photographs were taken. Both he and Annie Vincent participated actively. Most of the actual butchery was done by Peter (the most experienced of the four of us), aided by me as I wanted to gain experience.

Although butchery itself is tiring work, we were surprised to find that skinning, dismembering and rendering the carcasses into manageable "packages" took about an hour (see Table II). If time had been of the essence (e.g. with hungry carnivores lurking about) we undoubtedly could have decreased the amount of time needed — probably by a goodly margin.

Flakes were made "on the spot" before beginning to butcher and were discarded when the cutting edges broke, became blunt or, less frequently, when we switched from meat or hide cutting to bone cutting and we wished to preserve "pure" meat or hide polish on the edges for subsequent microscopic analysis. An average of 7.5 flakes were used per butchery (fewer than I had expected) with a total of 30 flakes used for all four. While the total number of flakes produced in preparation for each butchery was not counted, there were

**Table II: Butchery Times and Information**

Butchery Number	Raw Material Used	Flake No.	Duration of Use	Actions Performed
1	Natron chert	1	8-10'	Skin cutting, hit tendon and bone.
	Natron chert	2	5'	Backleg skinning, hit tendon and bone
	Natron chert	3	7'	Foreleg skin cutting, hit bone
	Natron chert	4	4'	Skin cutting and removal
	Natron chert	5	2'	Removing foreleg meat
	Natron chert	6	8'	Fileting; scrape ribs; slice meat and through bone
	Natron chert	7	4'	Disarticulate both femurs
	Natron chert	8	5'	Fileting; scraping bone; sever tendons
	Natron chert	9	3'	Disarticulate pelvic unit — bone and meat
	Natron chert	10	6'	Disarticulate head and neck
		steel knife	7'	Slicing filet to remove tendons
	Total Time:		59-61'	
2	Olduvai quartz	1	7'35"	Slicing skin; disarticulation and removal of 1 fore and 1 hind leg
	Olduvai quartz	2	10'13"	Skinning and slicing skin
	Olduvai quartz	3	2'29"	Cutting meat; some bone hit
	Olduvai quartz	4	5'21"	Meat and bone cut; some skin cut
	Olduvai quartz	5	1'32"	Skin, meat cut, some bone scraped
	Olduvai chert	6	4'01"	Biface — disarticulate head — cutting, chopping and twisting
	Olduvai quartz	7	14'19"	Cut skin; disarticulate fore and hind leg
	Olduvai quartz	8	7'16"	Bone cutting, muscle cutting much grit present
	Olduvai quartz	9	4'21"	Sternum cut; neck removal
	Total Time:		56'27"	
3	Olduvai quartz	1	6'13"	Skin cutting and removal
	Olduvai quartz	2	3'06"	Skin cutting; hit bone
	Olduvai quartz	3	4'01"	Skin cutting; bone struck
	Olduvai quartz	biface	19'37"	Skin removal; opening sternum
	Olduvai quartz	4	13'37"	Bone and meat cut (pelvis, ribs)
Olduvai quartz	5	11'54"	Neck meat, bone	
	Total Time:		57'48"	
4	Olduvai chert	1	4'32"	Skin cutting; some bone struck
	Olduvai chert	2	40'26"	Skin cutting
	Olduvai quartz	biface	9'30"	Skinning and opening sternum
	Olduvai chert	3	7'35"	Skinning, some bone cutting
	Olduvai chert	4	9'37"	Meat, bone cutting
	Olduvai chert	5	7'17"	Meat, bone cutting
Olduvai chert	6	8'37"	Meat, bone cutting	
	Total Time:		86'14"	*I did most of the skinning here and it took me much longer than it took Peter to do the same task.

always excess flakes which were not used and, on estimation, the number of unused flakes was probably equal to or exceeded the number of flakes chosen for use. Peter had documented the same phenomenon in other butcheries in which he participated, where less than 10 percent of the flakes produced were actually used. Use of a raw material that is relatively scarce might cause the tool-maker to be more conservative in the production of flakes. The number of tools actually used in the Olduvai assemblages I have examined may have been small compared to the number manufactured and could be a factor contributing to the paucity of use/wear polish found.

As noted, it takes only a few "good" flakes to completely butcher a 140 to 160 lb. gazelle. Flakes are perfectly suited for skin cutting, meat cutting and

most disarticulation. The handaxes we used (made by Peter Jones) were extremely useful for removing the skin quickly, having mass and a long cutting edge in their favor. The flakes were more effective for slicing the skin. I found it easier to skin using flakes but that was, I feel, because I worked slowly and had more control over the flake edge. With more experience I think I would find the biface to be more efficient.

Chopping and cutting through the cartilage at the sternum was managed quite easily with a handaxe. Flakes could not provide the force needed to break through, were harder to grasp firmly and their thinner edges tended to snap and become dull. Handaxes are easy to resharpen when their edges dull and may possibly provide a source for fresh flakes (as suggested by Peter

Jones). Although they took longer, flakes proved more efficient than handaxes for removing portions of meat, such as filets, from the bones. Their edges allowed one to cut close to the bone, leaving less meat adhering.

All the flakes used for butchery will be examined in Nairobi for traces of use/wear polish using an Olympus BHM microscope on loan to me from Harvard. I will examine some of them further at Harvard using a scanning electron microscope. This portion of the research has been made possible through a grant from the Boise Fund in Oxford, England.

**LEAKEY FOUNDATION/  
ROCKFORD COLLEGE  
SCHOLARSHIP**

*Tahreni Bwanaali*

I was born in 1960 in Lamu District, an island on the north coast of Kenya. I am a Bajun by tribe and a Muslim in faith. I obtained my basic education in my home area from 1967 to 1973. From there I went to Star of the Sea Secondary School in Mombasa between 1974 and 1977, obtaining the East African Certificate of Education. I then went to Allidina Visram High School from 1978 to 1979, obtaining the East African Advanced Certificate of Education.

I was then married to Omar Bwana and began working in Nairobi Museum as a paleontology trainee. My husband also works with the National Museums of Kenya as the head of Coastal Museums and Monuments, based in Fort Jesus, Mombasa.

We have two girls, ages two and a half and one year. They are at home in Kenya being taken care of by my family and my husband.

Many thanks to my husband, Omar Bwana, Richard Leakey, and the L.S.B. Leakey Foundation, without whose help I would not have been at Rockford College today. To understand why I chose Rockford College, let me tell you a little more about myself.

After completing high school, I had always thought of going to a university or college for further studies. My career

choice was either medicine or computer science. We have very few places in my country offering these courses compared to the number of students who qualify. The competition for admission is usually very high.

Fortunately, our good friend, Richard Leakey, under whom my husband works, tried to help us find a good place outside Kenya for my studies. As a member of the Rockford College board of trustees, he suggested that Rockford would be the appropriate college for me.

Now that the college was found, was that all? No! Next came the most difficult part of all — the decision. Did I want to come to America? Was I ready to leave my husband and the children? This was a tough decision to make. I either had to have the courage to leave my family and come to America for an education, or stay at home and forget about furthering my studies.

Finally, with my husband, we came to the conclusion that “opportunities knock only once,” and, therefore, I should face the challenge. Following were the formalities of admission and clearance for my departure. I finally arrived in Rockford on August 16, 1985.

My stay at Rockford College in the city of Rockford, Illinois, is much easier because it is less populated than Mombasa. I feel that Rockford is an ideal place for my studies with fewer distractions of city life, and I receive much attention from the teachers and other members of the staff. The college’s facilities are also sufficient.

As a foreigner and new to Rockford, I found it easier to stay in the dormitory when I first arrived, since, compared to Kenya, life here is very expensive. I am glad that I don’t have to worry about obtaining my meals, transportation to and from college, and other inconveniences. I have an American roommate who is a senior now.

By the time I complete my studies here, I will not only have obtained academic knowledge, but a lot more. For example, I am learning about other cultures, foods, and even the difference in climate. All of this will broaden my knowledge.

My major is computer science, and I will be studying at Rockford College for four years. I am currently working in the college’s business office entering data on their computer terminal. This experience is very helpful.

After my dreams come true and I



*Tahreni Bwanaali.*

graduate from college, I plan to go back to Kenya and apply my skill in the right place — the National Museums of Kenya. There is a plan to expand their present computer; therefore, because of my studies of computer science, I think I would be of great help to them with this project. I might even take biology as my minor so as to make myself more efficient in using the computer in research work.

The Leakey Foundation is going to be very helpful in that it will be indirectly providing a more learned staff to the National Museums of Kenya.

## HUNTING IN CLOVIS TIMES

*George C. Frison  
Department of Anthropology  
University of Wyoming*

During the southern African winter (July and August) of 1984, I was able to participate in elephant culling operations in Hwange National Park, Zimbabwe. The purpose was to experiment with Clovis tools and weaponry on nearly dead and freshly killed elephants. If the potential and limitations of these

tools and weapons in the context of killing and butchering African elephants was determined, the results could then be applied to a context of Clovis mammoth procurement and butchering in North America (7,000 to 10,000 B.C.).

I was invited by the director of wildlife management at the park, Clem Coetzee, to participate in the 1985 elephant culling operations and continue the experimental work begun in 1984. He and Mrs. Coetzee also very generously provided food, transportation and lodging while I was there in July of 1985. The Leakey Foundation provided travel funds. This was to be the last year for any major culling effort, designed to bring the elephant numbers to well within the animal-carrying capacity of the park.

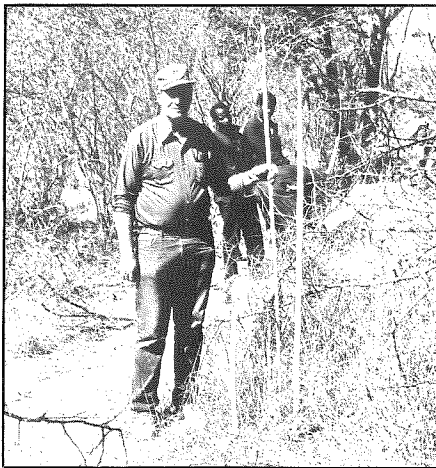
The weaponry (atlatl and dart) and butchering tools used in the experiments were made to duplicate actual Clovis specimens as nearly as possible. The flaked stone items were almost exact replicas and were manufactured by Dr. Bruce Bradley who is well known for his skill as a knapper. Raw materials were obtained from a number of High Plains lithic sources that produce the same stone types known to have been used in Clovis times, including cherts, quartzites and natural glass.

The perishable parts were made from plant materials almost certain to have been available in Clovis times. The wooden components of prehistoric weaponry have been proven experimentally to be as critical to success during use as the flaked stone components. From the archeological record, for example, we know that willow (*Salix sp.*) was commonly used in post-Paleoindian times for dart and arrow shafts. It performs satisfactorily as shaft material when used on animals up to the size of deer, elk and even bison, but does not hold up well under the added stress encountered in driving projectile points into juvenile elephants where the hide is as much as three times as thick and with an armor-like quality. The hide on a mature elephant is thicker yet.

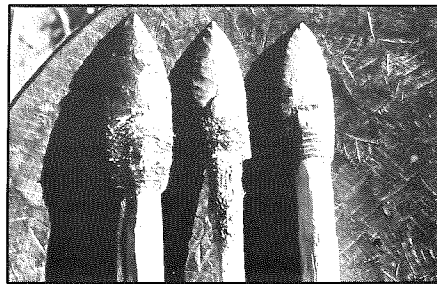
The material finally chosen for both mainshafts and foreshafts was chokeberry (*Prunus virginians*), a shrub common to the high plains. The throwing stick (atlatl) used in the actual experiments on elephants was made of another local shrub commonly called skunk brush (*Rhus trilobata*) although chokeberry would also have been satisfactory. Archaic age atlatls of skunk brush have been recovered in dry caves



*Penetration of stomach cavity using a heavy mainshaft.*



*The author with weaponry used in elephant experiments; atlatl (left), mainshaft of chokecherry (center), and mainshaft of unidentified African wood (right).*

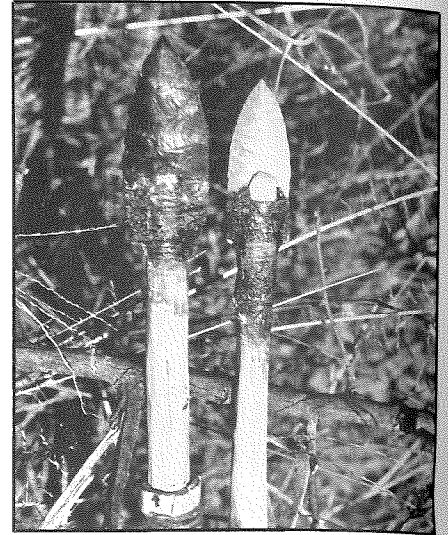


*Quartzite projectile points.*

shape. Seven types were used over the two years of experiments on elephants. Bonding the stone projectile point to the foreshaft was done with sinew and pitch; both ponderosa (*Pinus ponderosa*) and limber pine (*Pinus flexilis*) pitch were used and both proved satisfactory.

The atlatl design comprises a wooden spur excavated into the wood with a long trough extending toward the handle to facilitate proper engaging of the spur with the cup on the proximal end of the mainshaft. The assemblage is relatively small which reflects confidence in its performance. Weaponry of this nature is a very personal thing and what is optimum for one person will probably not be the same for another. There is, for example, a relationship between arm length, atlatl length and length of the foreshaft that is determined mainly by trial and error over a long period of time.

The purpose of the experiments on African elephants was to attempt to determine whether or not a human



*Foreshafts used in the elephant experiments.*

hunter using weaponry replication as nearly as possible like that of Clovis could deliver a projectile point with sufficient velocity to regularly and predictably inflict lethal wounds on elephants of all ages and both sexes. Experiments had to be limited to animals either mortally wounded or killed in the culling operations. There was no provision for experiments on live animals nor would such activities have been allowed in any of the national parks in Zimbabwe.

Proper use of the atlatl and dart requires considerable movement on the part of the hunter. In order to get the necessary velocity, body movement is required, but greatest accuracy is obtained from a standing position rather than a running one. The cooperation of two or more hunters would add to the probabilities of success. In the case of elephants, one person could keep the animal's attention while the other threw the dart. The basic principles of hunting are gained only by experience but are necessary in any human economic system based on hunting.

Butchering experiments with stone tools were carried out during the last two culls in which I participated in 1985. They served mainly to further confirm most of the results of the 1984 efforts. The tools used were large biface reduction flakes similar to those recovered in the Sheaman Clovis site in the Agate Basin in eastern Wyoming. The results of both years' butchering experiments can be summarized thus: Quartzite tools tend to hold an edge better than chert tools. The main effort in elephant butchering is cutting the hide. A quartzite biface reduction flake

in the mountain plains area.

For the weaponry experiments on elephants, it was assumed that separate mainshafts and foreshafts were used in Clovis times. Again this is based on materials recovered. It was assumed also that the stone projectile point was joined to a notched wooden foreshaft in contrast to the suggestion made several years ago that bone foreshafts were used with a single tapered end holding the projectile point. Different diameters and lengths of mainshafts and foreshafts were tried; a final selection of two mainshafts and five foreshafts was made.

Clovis projectile points demonstrate a wide range of variation in size and

tool performs adequately in this task but not with the efficiency of a metal knife. The tool must be resharpened regularly in order to cut the hide. Once the necessary cuts are made in the hide, its removal is relatively easy on a freshly killed elephant. Stripping the flesh from the carcass is not difficult and a biface reduction flake tool will cut a surprising amount of flesh without resharpening. Disarticulation of the major long bones of the elephant carcass is also comparatively easy. Cooperation of two or more butchers greatly enhances the skinning, stripping and carcass dismemberment.

Two seasons of participating in the elephant culling operation in Hwange National Park in Zimbabwe and experimenting with replicas of Clovis tool and weaponry assemblages on elephants may help in better interpreting mammoth procurement and carcass treatment during Clovis times in North America. The physiology of mammoths is relatively well known from frozen specimens preserved from the Late Pleistocene and direct comparisons can be made with the physiology of modern elephants. These comparisons indicate a remarkable degree of similarity in size, musculature and hide thickness.

I feel confident that Clovis weaponry could be used to regularly and predictably inflict crippling and/or lethal wounds on African elephants. However, a strategy of procurement based on direct confrontation of a family of elephants would not be possible. Clovis weaponry will not drop a matriarch or even younger and smaller elephants in their tracks as can be done with high-powered rifles. On the other hand, individual members of an elephant family continually wander off from the protection of the matriarch and careful stalking of such animals would eventually put the hunter in a favorable spot to inflict a wound that would eventually lead to its death. A similar procurement strategy would work also on the mature males who live their lives outside the family structure.

Clovis projectile points used with either atlatl and dart or thrusting spear will penetrate elephant hide and inflict lethal wounds on African elephants of all ages and both sexes. A hunting strategy based on cooperation of two or more hunters with one using an atlatl and dart and at least one using a thrusting spear would seem to be the optimum plan. Once the wound affects the animal enough to cause it to drift away from the herd, it is then removed from

the protection of the family and the hunters need only play the waiting game.

Raw material procurement, manufacture and maintenance of weaponry, and continual practice are more time consuming than most investigators realize but their importance in hunting societies cannot be minimized. African elephants are dangerous game and mammoths were probably also dangerous. Failure of Clovis hunters to maintain weaponry in top condition would have negatively affected not only the economic process but would have increased the danger in hunting.

Further experimentation along these same lines would appear at present to be redundant unless specific problems of interpretation arise.

#### THE UPPER PALEOLITHIC SITE OF ABRI DUFAURE

*Michael D. Petraglia  
Department of Anthropology  
University of New Mexico*

A primary goal of archeology is to reconstruct the behavior of prehistoric peoples from the patterns displayed by cultural residues. Over two decades ago, Lewis Binford (University of New Mexico) was one of the first archeologists to convincingly argue that the arrangement among artifacts reflects the behavior of a site's inhabitants. However, the eminent French prehistorian Francois Bordes reacted against the behavioral paradigm, arguing the patterns exhibited among artifacts were the result of a variety of factors, including geological disturbance. At about the same time, Michael Schiffer (University of Arizona) emphasized that before behavioral interpretations are advanced, archeologists must consider natural transformations in distorting our picture of the past.

The end result of these viewpoints and the ensuing debates was the clear understanding that archeologists must consider their sites to be part of the dynamic depositional setting. They must theoretically ponder how environ-

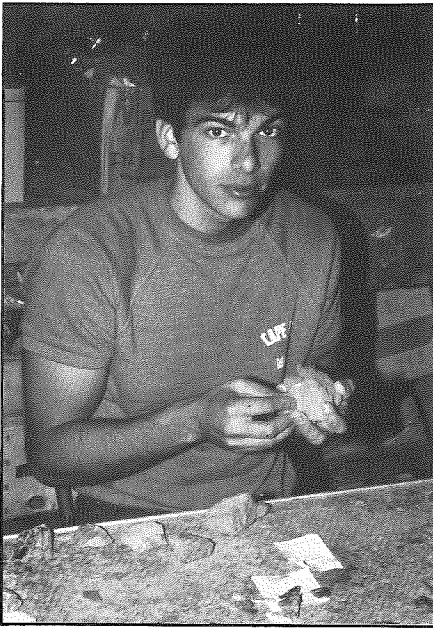
mental agents interact with the material record and devise methods designed to evaluate the degree to which environmental processes act to disturb the original human patterns.

While geologists have been traditionally employed to understand the depositional history of a site, they will not solve fundamental questions regarding the specifics of site formation. Archeologists are the only researchers interested in investigating the details of artifact associations and dislocations. Following this line of reasoning, archeologists must therefore train themselves to understand the processes which act to disturb the cultural patterns within a site's deposits.

Methodologically, there are two different ways to approach the subject of disturbance processes: one through modern actualistic or experimental studies and the second through studies specifically designed to deal with the prehistoric artifacts and patterns themselves (i.e., pattern recognition techniques). While I have been involved in both research strategies, a procedure I consider to be essential for inquiry into disturbance processes, only the work specifically supported by the Leakey Foundation will be summarized here.

During the summer of 1984 Dr. Lawrence Straus (University of New Mexico) invited me to participate in a major National Science Foundation sponsored excavation in southwestern France. The excavations at the Upper Paleolithic site of Abri Dufaure are a fine example of modern, well-controlled digging procedures. Large horizontal and vertical areas of the deposits were exposed, providing a good understanding of the historical sequence of occupation and prehistoric activity. After the provenience of each piece was carefully recorded, a variety of attributes were computer-coded in the laboratory. As a result, a great wealth of information exists which can prove to be significant for answering questions of cultural formation and transformation by natural agents.

An important concern of the Abri Dufaure excavations is the degree to which the deposits have been disturbed by natural processes. After the five-season excavation period ended, we realized a refitting study could prove to be beneficial for strengthening the arguments concerning the intact nature of the deposits. Refitting, or conjoining, is simply the reassembly of broken artifacts or of knapping products, somewhat like assembling a jigsaw puzzle.



Michael D. Petraglia.

However, refitting differs from a conventional puzzle in the sense that the end product is three dimensional in construction, and must be first sorted from other puzzles mixed into the jumble. As demonstrated at the Belgian Mesolithic site of Meer, refitting of vertically separated pieces was an effective technique for calculating the amount of disturbance a deposit has undergone.

Thanks to the financial support of the Leakey Foundation, I was able to return to France for conducting a refitting study. Three months were spent at the Abbaye D'Arthous, where Abri Dufauré's lithic materials were housed. The final results were quite gratifying, proving to be extremely illuminating to our understanding of the formation and transformation of the deposits. Numerous refits of stone items were obtained, consisting of broken artifacts pieced back together, or stone artifacts refit to reconstruct the original stone block.

Breakage of stone may occur during performance of a task, ultimately resulting in discard of the implement by the user. However, judging from the morphology of the refit artifacts, the pieces are thought to be fragmented as a result of pressure exerted from overburden, frost action or temperature variations.

Besides the refitting of broken pieces, five distinct concentrations of stone materials were recognized and delineated. The refitting of these materials has proven to reveal much about Upper Paleolithic tool working techniques and the use of raw materials. Two sets of the

reassembled cores were probably produced from locally available materials, taken to the site without much initial modification at the quarry, as evidenced in the amount of cortical material. These two sets also consisted of large, blocky flakes, with pronounced bulbs of percussions, suggesting use of direct, hard percussion, and possibly resting on an anvil or the ground surface during reduction. While four of these reduction sets represent locales of stone tool manufacture, the fifth is interpreted to be an area where the materials were cached, based on deliberate placement of the pieces in a protected spot under and surrounded by eboulis blocks, the large size and lack of modification of the pieces, and absence of smaller pieces, suggesting the items were flaked elsewhere. Mapping the pieces from these concentrations onto ground planes should be informative for determining how the prehistoric flintknappers reduced the stone and worked in the surrounding space over 11,000 years ago.

In terms of stratigraphic implications, the refitted artifacts are spatially confined vertically and horizontally. Certainly, major movements of the pieces can be ruled out entirely, the artifacts only exhibiting minor post-depositional displacements. The small-scale disturbances are thought to be the result of geological processes such as freeze-and-thaw cycles, rockfall and/or biological agents such as burrowing animals.

An important goal of the refitting project has been reached, namely that the deposits have mainly proven to be the result of human activity and not the consequence of reworking by natural agents. Since the deposits have not been substantially altered, greater insight into the human activities occurring here can be gleaned. However, the recognition that the site has been somewhat reshaped by minor disturbances is important since this fact can only make our inferences regarding the past more accurate. We are less likely to attribute, and thus misinterpret, the artifact patterns as a direct and sole consequence of human activities.

Through refitting studies, archeologists can assess whether natural disturbance processes help shape the structure of intrasite patterns. If we do not begin to understand how sites are transformed, our behavioral inferences about the past are bound to be needlessly flawed.

The earliest known record of the existence of pygmies in Africa was written in about 2250 B.C. It was a letter from the Egyptian Pharaoh Nefrikare, Pepi II, in the Sixth Dynasty of the Old Kingdom, addressed to his commander, Harkhuf, Governor of the South.

Others who wrote about African pygmies in historically ancient times included the Greeks, Homer, Herodotus and Aristotle. In the nineteenth century, European "explorers" provided written descriptions of various tribes of African pygmies. Such writers included du Chaillu (1867) and Schweinfurth (1874). Stanley reached the Mbuti pygmies in their Ituri Forest home in 1887. One of his officers, Mounteney-Jephson, also wrote a book about the expedition in which he describes the Mbuti in some detail (1890).

It was not until 1929 that an anthropological study of the Mbuti was commenced by the Rev. Paul Schebesta. Many of the multi-volumed published results of his ambitious studies, especially as they define the Ituri's various negroid and Mbuti groups and their languages, remain valid today.

An American anthropologist, Patrick Putnam, was among the next on the scene to study the Mbuti. He would live in the Ituri almost continuously for more than twenty years until his premature death from a tropical illness in the forest in 1954. He established his base on the edge of the Ituri's main road where it crosses the Epulu River, a place that, during Belgian colonial rule, appeared on published African maps as Camp Putnam, and thereafter as Epulu.

Today there is little sign of the large, mud-walled guest house or hotel that Putnam built, a place that became a sort of mecca for visitors to the Ituri, and where he would entertain guests by having the local band of Mbuti pygmies (the same band that he studied) perform their famous dances.

Colin Turnbull was one of the next anthropologists in the history of the Mbuti. He stayed at Camp Putnam with Putnam and would eventually write *The Forest People* (1961) and *Wayward Servants* (1965). Turnbull says in the acknowledgments at the beginning of *The Forest People* that it was through Putnam's "friendship and hospitality" that he first came to know the forest. Yet there is an extraordinary absence of



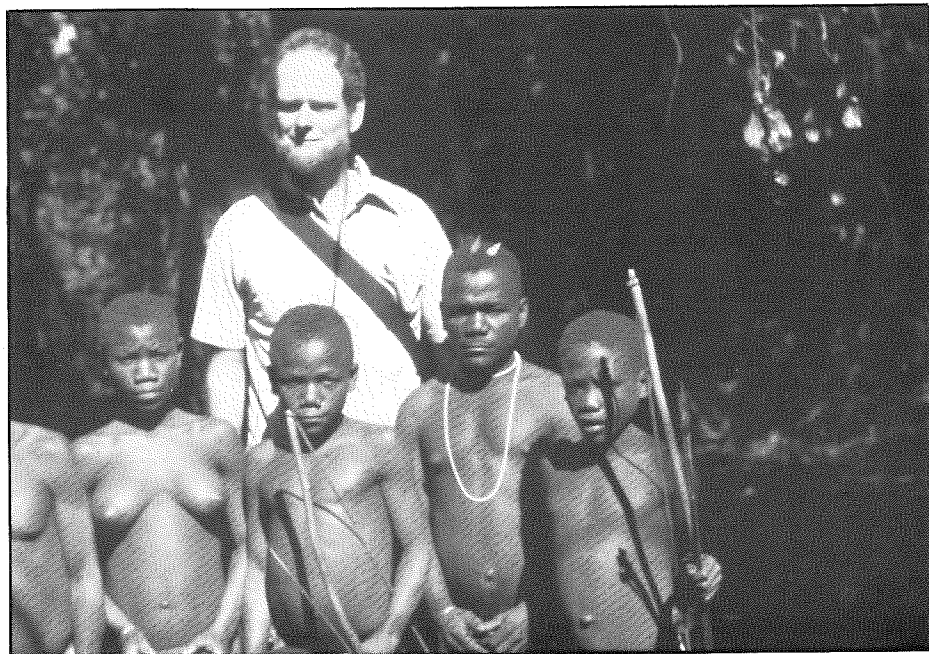
ethnographic references, in either of the volumes cited above, to the extensive knowledge (even in the form of "personal communication") which Putnam the anthropologist must have accumulated during more than *twenty years* with the "Epulu" Mbuti band, the same band on which both he and Turnbull concentrated their ethnographic research. Other anthropologists, including Schebesta, would claim that this band was particularly acculturated and not representative of other net hunting bands, much less all Mbuti hunters and gatherers. More than twenty years later Turnbull himself says that "most" anthropologists held that the Epulu band was not typical, "partly because of the presence of Patrick Putnam," and "because the government had established an animal capturing station at Epulu," an argument to which he says in 1983 "there is some truth."

\* \* \*

Many Mbuti today attempt to grow their own cultivated foods. Yet a question raised here is: What allowed – or caused – the Mbuti to live side by side with agriculturalists for hundreds (perhaps thousands) of years without becoming farmers themselves? I submit that it was a combination of the following factors:

Firstly, there is a deeply ingrained love of the nomadic forest way of life on the part of the Mbuti. In the case of the Epulu band, its members today have found a way to continue their traditional life by expanding their subsistence hunting to produce a marketable surplus, a kind of twentieth century continuum which could be described as a cultural survival strategy. This is an activity which could continue for years to come – until the game animals become scarce, or already existing hunting prohibitions are extended and enforced.

Secondly, we may begin with the fact that the Mbuti were undeniably free at any time throughout their long association with the cultivators to start up their own farms at any place they happened to be. The European-made road, after all, did not exist until recently, until after the agriculturalists had been farming in the forest for centuries. If cultivated foods were so highly prized by the Mbuti, why did they not apply the elementary practices of their farmer neighbors and grow their own? The answer is that perhaps any enterprising Mbuti who attempted to do so



*Kevin Duffy with Mbuti friends. Photo taken by a Mbuti who had never held a camera before.*

was foiled by his relatives and friends who would descend on him and expect – if not demand – their traditional egalitarian share of any "surplus" food he may have produced. Two such cases concerning would-be !Kung San farmers are described by R. Lee (1979). Here, not only were the Bushmen-farmers expected to give away their hard-won, scanty, cultivated crops, but also to kill off their valuable goats one by one to satisfy the traditional sharing expectations of their meat-hungry relatives and friends. One of the harassed men found a solution in moving out of the area and into a neighboring country. This was a move he might not have taken without danger before his world was "settled" by the European powers.

Thirdly, there was, and still is, a deep-rooted "them and us" tribal prejudice directed toward the Mbuti by their various neighbors over the centuries. This prejudice has been considerably diluted in the past few years in the larger centers like Epulu with the influx of traders and other outsiders, and officially by a proclamation from Zaire's President Mobutu saying that each Mbuti is a *citoyen* (citizen) just like everybody else. However, it is a measure of the villagers' continuing prejudice that the term *citoyen* became a derogatory one among them after the word was extended by proclamation to include the Mbuti.

A random example of the prejudicial status quo that the Mbuti "emerging"

from the forest must face is represented in Epulu by the fate of Kenge, the now middle-aged Mbuti (and ex-hotel boy to Putnam) to whom Turnbull dedicated his 1961 book, *The Forest People*. Today Kenge is sedentarily living in a shabby cluster of traditional Mbuti huts in a kind of Mbuti suburb of Epulu. It is on the "wrong side of the tracks" – the opposite side of Epulu's only street from where Turnbull had once chosen to build his relatively substantial mud-walled base in Epulu, not far from the Epulu River (complete, Kenge told me, with a garden of cultivated foods).

This little suburb, the structures of which were, at the time of my visits in 1981, comprised of rotting sticks and leaves, is a permanent Mbuti "camp." Placed well out of sight of the road, it is essentially at the same time Epulu's ghetto and slum. Under no circumstances would a villager live there. From my experience of small towns (both African and those on other continents) I have a very definite impression that Kenge and his fellow sedentary Mbuti would encounter great hostility if they endeavored to emulate and live in the relatively substantial homes of the villagers. It does not matter that for generations the Mbuti have assisted the farmers in building their homes and obviously know exactly how to reproduce such structures. The fact is that Kenge, his mother, and his wife, among other Mbuti, are living permanently in Epulu as people of low social status, and



*Kenge, his wife and mother in Epulu. The hut behind them is where he was living in 1981, as permanently as such a structure would allow.*

in shelters that are substandard.

Described in part more as a village person than a forest person by Turnbull in 1961, Kenge does not today join the local Epulu Mbuti band as an active hunter. His brief association with Turnbull more than twenty years earlier has made him something of a minor celebrity to the villagers. Yet he is kept in his place by those same villagers. His daughter may be taken as a second wife by a villager, but his son will never be permitted to marry a village girl. In the eyes of the numerically superior villagers he is a Mbuti and must maintain this status. Unless or until substantial change occurs, he and his descendants must indefinitely face a future as second class *citoyens*.

It is hardly surprising that some Mbuti continue to find pleasure in going back into the pristine forest where only they are masters. For many, such a return to the forest is a retreat from the masochistic pleasures of village life.

\* \* \*

It is not known if the pygmies associated with the ancient Egyptians were in fact the people we today call Mbuti. On the collective evidence of the nineteenth century explorers, however, we can tell that at that time the Mbuti, among other pygmies in the forests of tropical Africa, represented a hunting and gathering way of life in a subservient

relationship with negroid farmers. It was a relationship of the pygmies' own choosing. For clearly, since farmers are sedentary, the pygmies were generally free to wander off to live separately in the depths of the forest at any time.

While not conclusive evidence, the record shows that the social status of these nineteenth century pygmies seems to have been judged greatly inferior to that of the local village farmers. The European explorers of the time attest to this. The Ashango farmers offered to catch and sell a pygmy to du Chaillu, and Schweinfurth exchanged one of his dogs for a pygmy from King Munza of the Monbutto. Stanley's expedition took a teenage Mbuti girl to wait on an officer in his tent.

It was at about the time when not only non-Africans traded African slaves, but Africans traded their own kind as well. Yet it appears that pygmies were considered to have fewer rights than others, or to have no rights at all; e.g., Stanley wrote of "capturing" pygmies as though they were animals and fair game for him and his negroid expedition members to catch if they could (involving an attitude on Stanley's part which may have been either reinforced by, or learned from, the non-pygmy Africans with whom he was in contact).

Since there are not, as of this date, any archeological findings significantly advancing our knowledge of the Mbuti beyond historic times, their written his-

tory — and our knowledge of their culture — thus began a mere hundred years ago. Unless future archeological discoveries prove otherwise (and Harvard archeologists are currently studying the Ituri), there may always be those who will subscribe to the presently prevailing theory that the Mbuti were the original inhabitants of the forest (at least to the extent that they apparently existed there independently before the arrival of migrating farmers).

The probability is that at some time in the past the people we call Mbuti experienced an economically independent life, believing that their hunting and gathering technology provided them with everything their world had to offer. So why did the pygmies continue to come out of the relatively vast, unfarmed areas of the forest to be treated as something less than ordinary human beings? With the option of ignoring other peoples and remaining hidden in the forest's depths to follow their foraging way of life, the Mbuti instead chose to associate themselves with the agriculturalists. That happened prehistorically centuries ago. Bailey (1982) suggests that this relationship is even older — that it began about 2000 years B.P.

When it happened is perhaps not so important as *why* it happened. Lee points out that some Bushmen became "semisedentary" around cattle posts and deepened water holes of local Bantu in the Kalahari. He says that this represents a world-wide process among hunter gatherers, and quotes L.R. Hiatt who refers to "the magnets" of attractiveness. Missions and government stations, Lee says, constituted the magnets in Australia. For the Mbuti the magnets are the farmers' villages. There could be found cultivated foods and metal goods — luxuries which would become necessities. No Mbuti would willingly consider life without them today.

Originally the cultivated foods of the villages may not have been the primary attraction for the Mbuti. Southern Asia's banana, now among the Mbuti's favorite foods grown by the villagers, probably did not appear in central Africa until about 1200 A.D., with manioc, rice, and American corn arriving about 1800 A.D. or later. Until then, the Mbuti, with their skill at hunting and at finding wild yams, palm nuts and other vegetable foods in the forest, probably had a better diet than that of the subsistence farmers with whom they choose to associate. If archeology eventually provides evidence

that the Mbuti-farmer relationship pre-dates the arrival in the Ituri of the banana and other important vegetable foods, then it seems likely that Mbuti motivation in maintaining a relationship with the farmers may have involved a desire for greater social contact and a broadening of their own world. Formerly obliged to live in bands by their foraging way of life, the Mbuti collectively found a way to become part-time segments of larger, village communities throughout the Ituri.

The event, however gradual, in effect represented for the Mbuti an opportunity to experience a kind of colorful town life. As such it would have been more culturally contrastful than that experienced by a modern American tourist visiting England or France today. For the farmers, an opposite attraction did not exist, for there is, even today, little social attraction for a Bantu to visit the temporary hunting camps of sticks and leaves which the Mbuti put together in a single day. The relatively complex social structure of the farmers, their increasing ability to systematically produce tasty vegetable foods from the soil (and to make pottery and iron tools) may well have ultimately placed the Mbuti in an inferior socio-economic position.

Although they were still skilled at obtaining game meat, wild honey and uncultivated vegetable foods from the forest, these items have come to represent the least important part of the total calories consumed by the Mbuti. For example, a recent study of subsistence strategies among a group of non-net hunting Efe Mbuti found that 43.5 percent of their total caloric consumption was acquired by exchanging labor (mostly by Efe women) for food from the gardens of the Lese farmers. Twenty seven percent came from palm nuts, foraging in abandoned village gardens and stealing. Successful net hunters, with their greater surpluses of game meat, are today in a better position to barter or sell meat for the cultivated vegetable foods which all Mbuti have come to consider necessary for an adequate diet. The net hunters' women, who, as beaters, must spend much of their working day in the net hunting process, can thus obtain the cultivated vegetable foods they want without laboring for them in the villagers' gardens.

\* \* \*



*Ghetto in Epulu where Kenge lives. Note four separate homes/huts and secondary forest growth following slash and burn agricultural activities of village farmers.*

“The historical approach explicitly challenges the concept of an ethnographic present in which time appears to begin with the arrival of the anthropologist in the field, and end with his or her departure.” (Kuper, 1985)

Of the millions of pieces of information gathered in the name of anthropology, and of the Mbuti in particular, there has been no single combination of any of these to give a clear picture of all the people we call Mbuti.

Misleading words in the literature of modern anthropology must surely include those which appear on the cover of the paperback edition of Colin Turnbull's 1961 book, *The Forest People*, the subtitle of which is *A Study of the Pygmies of the Congo*. More than twenty years after its first edition, some professors of anthropology still prescribe this book to their students, seemingly unaware or uncaring that, in 1983, even Turnbull himself appears to come close to admitting that it is a romance rather than anthropology. “Even if,” he says, “the whole thing had been a fabrication, this would have been significant, for good novels often succeed by filling the gaps in the lives of our readers.” Quoted on the book's cover, however, Harry Shapiro, chairman of the Department of Anthropology, American Museum of Natural History, says that the work is a “. . . rigorous study. . .”

The book's subtitle is intended to

give the impression that, whatever was studied, it was representative of all the pygmies of the Congo, now Zaire. (Or that there was only one kind of pygmy in the Congo?)

Turnbull's writings on the Mbuti are based mostly on a study he made more than twenty years ago on a single band of net hunting Mbuti — the Epulu band of Patrick Putnam. To the best of my knowledge he has never made a prolonged study of any other Mbuti band, anywhere. About half of the Ituri forest pygmies have a different language and hunting technology from this particular Epulu band. Schebesta made it clear that there were differences among the Mbuti from place to place in the forest (1933), as did Harako (1976). Like Schebesta, Harako does not think that the Epulu band was typical in Mbuti society. In 1983 Turnbull suggests that differences between his description of net hunting and the descriptions given by Harako and Tanno “might be explained” by their “working at the eastern extremity of the net hunting area, where there would be greater likelihood of influence from the archers.” These so-called archers (the non-net hunting Mbuti known as Efe) represent a possible half of the total Ituri Forest “pygmy” population, and speak a Sudanic language, as opposed to the net hunting Mbuti who speak a Bantu language.

Another inappropriate title is that of



*Mbuti hunters with elephant.*

Turnbull's 1965 book, *Wayward Servants: The Two Worlds of the African Pygmies* (1965). This book is not on Africa's pygmies. Essentially based on Turnbull's stay among Patrick Putnam's (Epulu) band, it could have been more accurately entitled, *The Two Worlds of a Mbuti Band*.

Writing in 1983 (ten years after he had last been in the forest), Turnbull says that "the Japanese ethnologists and John Hart . . . indicate that the net hunt is much less efficient than it used to be." And that the Mbuti's hunting technology ". . . is somehow being lost."

Available data does not substantiate this. Hart's figures indicate that the net hunters he studied (during twenty-two hunts in a two-month period in 1974) caught "the equivalent of four or five antelopes per hunt, plus occasional small game." In 1981 I personally observed — and photographed — the Epulu band bring in ten antelopes in two days, and was informed that this was not unusual. Tanno reported that the group of net hunters he studied in 1973-1974 caught an average of 8.4 animals per day in fifteen hunts with an average duration of 7.28 hours per hunt (1976). Turnbull apparently did not collect such statistics during his study of the Epulu band during what he alternatively described as "the colonial days" and "the old days." He cites the average time the hunters spent net hunting — seven hours per day, five days out of seven — but did not give the number of animals

caught. In 1983 he says ". . . that plainly by the mid-seventies the Mbuti . . . have for whatever reason departed from their traditional way of living."

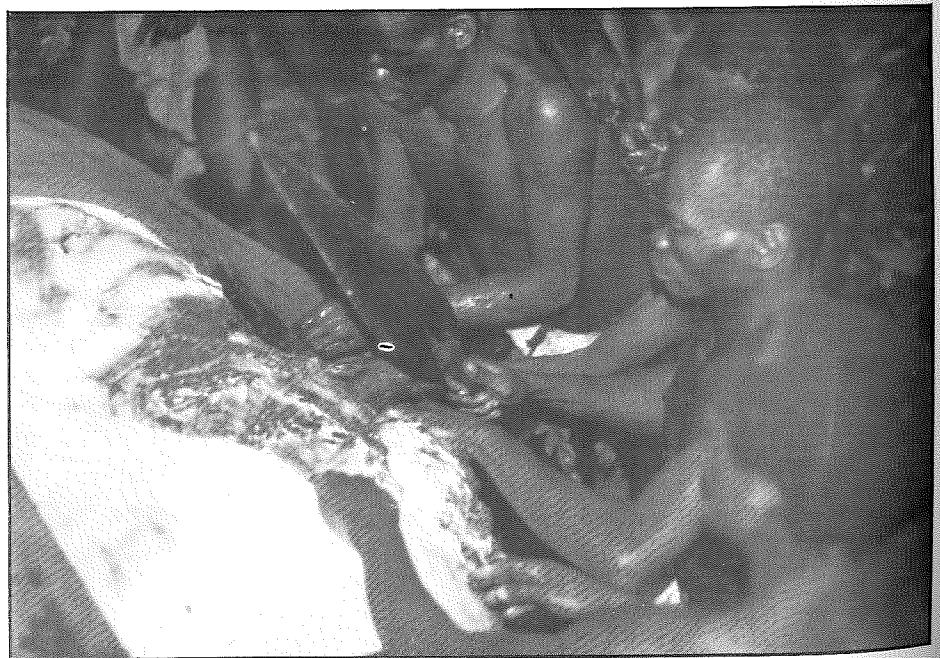
Departed from what? At what point in time was the Mbuti's "traditional way of living" actually occurring? Before or after they became associated with farmers? Was it in the time of the ancient Egyptians, or of Stanley, or Schebesta, or Turnbull? Is the reference here to a

single band of net hunting Mbuti, or to a band of Efe "archers?" Or can Turnbull speak for all the pygmies of Zaire? Were the Mbuti still enjoying a "traditional way of living" during my visits to the Ituri in 1981?

Change is always occurring. Who can say that a given "way of living," known or unknown, recent or prehistoric, could be more *traditional* than others?

However he reasons, Turnbull's notion that the Mbuti are losing their hunting technology is quite unfounded on fact. The very band he studied in Epulu is a case in point. It is probable that this same band is not substantially more or less acculturated than it was in his ethnographic present of twenty-five years ago. Turnbull's closest Mbuti companion during his study of the Epulu band was a youth named Kenge. According to Turnbull this young man was "very sophisticated" (for a hunter-gatherer?).

Kenge's father had died years earlier "when he was just a boy," and "his mother had returned to the village." He became bugler at the Animal Station (government offices) "where almost every hour the air was shattered with attempts at military bugle calls." Putnam "encouraged him to become a jack-of-all-trades. . . He even learned the work of hotel boy, such as pressing clothes for Putnam's guests. He wore shorts and shirt, meticulously scrubbed and pressed with the Camp Putnam flatiron. . ." Kenge received a regular



*Hunters cutting up elephant.*

cash salary from Turnbull to whom he eventually "made himself indispensable." (Turnbull, 1961).

During my ethnographic presence in 1981, however, there was at least one important difference with the Epulu band. Its net hunting had become *more productive* because a competitive, more impersonal open market had developed for any antelopes caught beyond those needed for domestic use; i.e., the Mbuti would receive more from some professional meat traders than they would have from their village "owners" under the ancient patron-client relationship. Culturally more important, however, is the fact that such net hunting is keeping many bands intact in the forest, well away from the destructive forces of the roadside communities.

Some years after Turnbull's last visit to the Ituri, Hart says that "... market hunting may actually enhance the communal structure of the Mbuti's band life" (1978). My personal field experience of the net hunt in 1981 says that Hart is correct in his observation — for as long as there are animals to hunt in the Ituri.

The net hunters have found that an extra antelope or two caught at the net each day can make them more wealthy than many farmers. Some bands are now actively hunting in the deep forest as they have for generations. In the "old days" they would periodically visit the villages to beg, barter or steal — and be treated as inferior beings. Nowadays they can stay in the forest for long periods and the modern meat traders come to them, often building huts in the Mbuti hunting camps. In a limited way the old Mbuti-villager relationship has been reversed.

With the "traditional living" of the more adaptable net hunters in mind, the penultimate, common sense question which can be asked on the Mbuti is not *can they survive* but *for how long can they survive?* The ultimate anthropological question must be: *At what point in their adaptation process will the active Mbuti net hunters cease to be "traditional?"* (If the Epulu band adapted to using guns instead of nets, could they still be considered hunter-gatherers?)

The technology of net hunting is not particularly complex. If anything is endangered here (besides the fauna), it is the complex social interactions among the Mbuti that make net hunting possible.

The technique of making nets in



*Young Mbuti hunter with rat.*

Africa was mastered at least 6000 known years ago (Inskip, 1978). A development which is older than net hunting, and much more fragile, is what makes net hunting itself possible. Four hundred thousand years ago *Homo erectus* carried out successful, cooperative hunts for elephants on the Iberian peninsula (Wenke, 1984). Then, as now among the net hunting Mbuti, a coordination of diverse, social activities was a requirement for such a hunt. Social and economic change, as represented by the emergence of the individual in the twentieth century, can destroy, almost overnight, the egalitarian social structure of the Mbuti hunter-gatherers that,

for them, may have made net hunting work so well. If Mbuti cooperative hunting technology is eventually lost or abandoned, it may be more for this reason than any other.

My overview of the Mbuti suggests to me that the Efe Mbuti, the archers, are closest to what may have been the original hunters and gatherers of the Ituri. Because they are, as band communities, less productive as hunters, they are the least likely to survive in a world of agriculturalists.

\* \* \*

"At some future time period, not very distant as measured by centuries, the civilized races of men will almost certainly exterminate, and replace, the savage races throughout the world." (Darwin, 1871)

Realistically, the Mbuti, as hunter-gatherers, have no long term future. No known society has ever been a closed society. From the twentieth century onward such an idea is virtually impossible. Even if Zaire's central government set aside tracts of forest for exclusive Mbuti use (as the American government granted "reservations" to the American Indians), the inexorable intrusion of outside influences would constantly and drastically change the Mbuti way of living, as such influences changed or destroyed so many other cultures before them.

Although generally accepted as the Ituri's original inhabitants, the Mbuti have no legal rights over the forest, including its logging and its gold and other mineral rights. At the present time, illicit gold prospectors and elephant hunters can be encountered anywhere in the forest. Ironically, it is the Mbuti who guide both these law violators and the government authorities who enter the forest to catch them.

Game animals that were once sufficient for the Mbuti's own needs will eventually become insufficient to meet the ever-increasing needs of village and urban markets. Government hunting regulations must be enforced to avoid extinction of animal species. This, as certainly as any other cause, places a foreseeable end to the "traditional" activities of the still-surviving, nomadic Mbuti (such as the Efulu band). This raises an inevitable question: What will happen to the Mbuti of the future?

A child born to prehistoric Mbuti hunter-gatherers shared the same biological and emotional pattern of existence as a child of today's "space age." He was conceived and he was born. He loved, learned, struggled, grew old and died.

Yet expectations today are fundamentally different. A child born now to a Mbuti family may no longer be destined to become a respected specialist, a skilled provider of food and an "expert" on the environment of the Ituri forest. Instead he may find himself thrust into a mixed society which, unlike that of the Mbuti, has experienced generations of organized politics and commerce. There the egalitarian population of the

traditional Mbuti world will have been replaced with wealthy and poor people, with haves and have-nots. (Welcome, dear Mbuti, to the great rat race!). In this different world, most Mbuti will probably become (subsistence) farmers or work for others as the lowliest of unskilled laborers. In time, to the Mbuti, their hunting and gathering ways may become a cherished memory and later not even that, as they are absorbed into a larger, more aggressive society.

If we think of the American Indians' buffalo as the antelopes of the Mbuti, we can see where the ways of the past and some of the stark requirements of the present become incompatible. The Mbuti may one day produce a prophet to lead them back to "the good old days," perhaps accompanied by religious dance and song. By then it will be too late, just as it was for those American Indians who nostalgically sought to bring back the pre-European days through their "Ghost Dances."

#### BIBLIOGRAPHY

- Bailey, R. 1982. Development in the Ituri Forest of Zaire. *Cultural Survival Quarterly*. Vol.6, no.2.
- Bailey, R. and Peacock, N. 1984. Efe Pygmies of Northeast Zaire: Subsistence Strategies in the Ituri Forest. In *Uncertainty in the Food Supply*. Eds. I. de Garine and G. A. Harrison. Cambridge University Press.
- Breasted, J. H. 1905. *A History of Egypt*. 2nd. edition.
- Burnet, J. 1908. *Early Greek Philosophy*. London.
- Darwin, C. 1871. *The Descent of Man*.
- du Chaillu, P. B. 1867. *A Journey to Ashango-Land*.
- Duffy, Kevin. 1960. *Black Elephant Hunter*. London.
- Duffy, Kevin, 1975. *Pygmies of the Rainforest*. 52 min. film.\*
- Duffy, Kevin. 1978. *BaMiki BaNdula: Children of the Forest*. Documentary as broadcast in the Nova scientific series. 60 min. film.\*
- Duffy, Kevin. 1984. *Children of the Forest*. Half-hour version of 1978 film. This and 1975 film distributed by Pyramid Films, P.O. Box 1048, Santa Monica, California 90406.\*
- Duffy, Kevin. 1984. *Children of the Forest*. Book published by Dodd Mead, New York. Also published in London, 1986, by Robert Hale Ltd.
- Evans-Pritchard, E. E. 1950. The Marett Lecture. In *Social Anthropology and Other Essays*, 1962.
- Harako, R. 1976. A Study of Ecological Anthropology of the Mbuti Pygmies. *Kyoto University African Studies*. Vol. 10.
- Hart, J. 1978. From Subsistence to Market: A Case Study of the Mbuti Net Hunters. *Human Ecology*. Vol.6, no.3.
- Inskip, R. R. 1978. The Bushmen in Prehistory. In *The Bushmen*. Ed. Phillip Tobias.
- Kuper, H. In press. *The Swazi: A South African Kingdom*.
- Lee, R. 1979. *The !Kung San*.
- Mooney, J. 1896. *The Ghost Dance Religion and the Sioux Outbreak of 1890*. Washington.
- Monteney-Jephson, A. J. 1890. *Emin Pasha and the Rebellion at the Equator*.
- Putnam, Anne. 1955. *Eight Years with Congo Pygmies*.
- Sahlins, M. 1972. *Stone Age Economics*.
- Schebesta, P. 1933. *Among Congo Pygmies*.
- Schebesta, P. 1936. *My Pygmy and Negro Hosts*.
- Schebesta, P. 1937. *Revisiting my Pygmy Hosts*.
- Schweinfurth, G. 1874. *The Heart of Africa*.
- Stanley, H. M. 1878. *Through the Dark Continent*.
- Stanley, H. M. 1913. *In Darkest Africa*. Vol.1.
- Tanno, T. 1976. The Mbuti Net Hunters in the Ituri Forest. *Kyoto University African Studies*. Vol.10.
- Thompson, L. A. and Ferguson, J. 1969. *Africa in Classical Antiquity*.
- Turnbull, C. M. 1961. *The Forest People: A Study of the Pygmies of the Congo*.
- Turnbull, C. M. 1965. *Wayward Servants: The Two Worlds of the African Pygmies*.
- Turnbull, C. M. 1983. *The Mbuti Pygmies: Change and Adaptation*.
- Wenke, R. J. 1984. *Patterns in Prehistory*. Oxford University Press.

\*Copies of these films are at many United States universities and colleges.

*Photos on pages 1 and 20 from Children of the Forest, courtesy Dodd Mead.*

*Photos and text copyright Kevin Duffy.*

# CALENDAR

## DR. JANE GOODALL — 1986 TOUR SCHEDULE

April 20	Lecture	8:00 p.m.	The Living Desert, Palm Springs, California
April 22	Seminar	9:15 a.m.	Polytechnic School, Pasadena, California
April 23	Seminar	9:30 a.m.	San Jose State University, California
	Lecture	8:00 p.m.	
April 28	Lecture	8:00 p.m.	University of Utah and the Hogle Zoological Gardens, Salt Lake City
April 30	Lecture	8:00 p.m.	Colorado College and the Cheyenne Mountain Museum & Zoological Society, Colorado Springs
May 2	Lecture	7:30 p.m.	Lincoln Park Zoological Society, Chicago, Illinois
May 5	Lecture	7:30 p.m.	Indianapolis Zoological Society, Indiana
May 6	Lecture	7:00 p.m.	University of Minnesota, Minneapolis
May 7	Lecture	7:30 p.m.	University of Alabama, Birmingham
May 8	Seminar	noon	
May 12	Lecture	7:00 p.m.	Dallas Zoo, Texas
May 13	Lecture	7:30 p.m.	Georgia State University, Atlanta
May 15	Lecture	8:00 p.m.	WHRO Public TV & Radio, Norfolk, Virginia
May 23	Seminar	afternoon	North Carolina School of Science and Mathematics, Durham

## JOIN THE SEARCH



Every dollar of your tax-deductible membership supports Leakey Foundation Grants to international scientific research programs.

### ALL MEMBERS RECEIVE

- ★ Subscription to ANTHROQUEST
- ★ Invitations to special "Members Only" events
- ★ Advance announcements to all symposia and lecture programs
- ★ Opportunity to travel and join on-site expeditions with scientists
- ★ Choice of premiums for most categories of membership

### ANNUAL MEMBERSHIP CATEGORIES

Active Member	\$ 15:
Contributing Member	\$ 25:
Supporting Member	\$ 50:
Sponsor	\$ 100:
Patron	\$ 250:
Annual Fellow	\$ 500:
Research Grant Benefactor	\$ 5,000:
Life Fellow	\$ 10,000:

### PREMIUMS

Foundation pen
Totebag or <b>In The Shadow of Man</b> , J. Goodall
Totebag and Notepad or <b>Gorillas In The Mist</b> , D. Fossey
Men's tie or <b>Disclosing The Past</b> , M. Leakey
Men's tie; totebag; and <b>Nomads of Niger</b> , C. Beckwith
Men's tie; totebag; and <b>Africa's Vanishing Art</b> , M. Leakey
Men's tie; totebag; and <b>Africa Adorned</b> , A. Fisher
The Leakey Award

New Member ( ) Renewal ( ) Premium(s) Chosen: \_\_\_\_\_

Please enroll me as a \_\_\_\_\_ Member. I enclose my check for \$ \_\_\_\_\_

Charge to my ( ) Mastercard or ( ) Visa Number \_\_\_\_\_ Expiration date \_\_\_\_\_

Authorized signature \_\_\_\_\_

Name \_\_\_\_\_

Address \_\_\_\_\_ Phone ( ) \_\_\_\_\_

City \_\_\_\_\_ State \_\_\_\_\_ Zip \_\_\_\_\_

Send a Gift Membership to: \_\_\_\_\_

Address \_\_\_\_\_ City \_\_\_\_\_ State \_\_\_\_\_ Zip \_\_\_\_\_

Please make checks payable to the L.S.B. LEAKEY FOUNDATION, Foundation Center 1-7, Pasadena, California 91125.

## FELLOWSHIP FOR THE STUDY OF FORAGING PEOPLES

Hunter-gatherer peoples are rapidly disappearing in the face of worldwide demographic and industrial expansion. Opportunities to understand a way of life that represents most of human existence are being lost at an alarming rate.

In recognition of the high priority that must be given to studies of hunter-gatherers, the L.S.B. Leakey Foundation has created a new research fellowship to be called the Fellowship for the Study of Foraging Peoples. Specifically designed to support highly qualified scientists for one to two years in studies of contemporary hunter-gatherers, the grant of up to \$20,000 will be awarded from time to time. Priority at this time will be given to those scientists desiring to perform surveys of the current status of small scale foraging societies throughout the world. This will provide the scientific community with information necessary to plan the most effective studies in the future, and also to make informed decisions concerning the needs of the many foraging peoples. Future fellowships may be awarded for studies of specific societies targeted for intensive research.

Through the creation of the Fellowship for the Study of Foraging Peoples, the Leakey Foundation is not only augmenting its own support of studies of hunter-gatherers, it is leading other organizations throughout the world to

raise their levels of commitment to studying and assisting these peoples. Such a commitment is imperative at a time when hunter-gatherers are under more pressure than ever before in human history.

Studies of foraging peoples are important to understanding human evolution because for at least four million years our hominid ancestors relied upon foraging for plant and animal foods to meet their subsistence needs. It is only in the past 12,000 years that humans began to practice agriculture, and as recently as 2,000 years ago fully half the world's population lived largely or entirely by hunting and gathering. It is clear that the development and persistence of hunting and gathering has been by far the longest and most critical way of life in the emergence of our species. Intensive study of the few remaining hunter-gatherer societies is our best hope for understanding a way of life that prevailed for 99 percent of hominid evolutionary history. Through study of these rapidly disappearing societies we can hope to know the constraints imposed by a nomadic foraging existence, constraints that helped to shape such distinctive human features as complex language, large brain size and sexual division of labor.

Contemporary foraging peoples live in conditions that most closely resemble the environments of greatest evolutionary adaptedness for our species. They typically reside in small, face-to-face groups which lack the political hierarchies and complex religious, social and

economic institutions that characterize other societies. In such small scale societies researchers can more easily study such fundamental features as gender role, division of labor, child rearing and biocultural adaptation to the environment.

Very few, if any, societies still exist where the primary means of subsistence is based upon hunting and gathering nondomesticated plants and animals. Those few that might remain are confined to remote and isolated areas of the world that are intractable to agricultural and industrial development. Yet ever more efficient extractive techniques and increasing pressure on other habitats now make the most remote forest and desert areas subject to logging, mining, irrigation and large scale commercial projects.

The greatest threat to small scale societies is the pressure exerted on their lands by continuing rapid population growth; competition for land drives the growing numbers of pastoralists and agriculturalists into areas that had previously been considered unsuitable for exploitation. Alarming, even in the rare cases where adequate nutrition, sanitation and health care accompany the arrival of developmental forces, the foraging way of life can disappear almost overnight. It is imperative that there be no further delay in making a firm commitment to studies of these unique and rapidly disappearing peoples from whom we stand to learn so much.



**ANTHROQUEST**

news of human origins, behavior, and survival

FOUNDATION CENTER 1-7  
PASADENA, CA 91125

ADDRESS CORRECTION REQUESTED

NONPROFIT ORG.  
U.S. POSTAGE PAID  
PASADENA, CA  
PERMIT NO. 712