the L.S.B. Leakey Foundation news

NUMBER 11 SUMMER 1978

CAPACITY CROWD IN SAN DIEGO

San Diego Symposium: Panel Discussion during power shortage. (foreground to background): Dr. David A. Hamburg, Dr. Shirley Strum, Dr. Bernard Campbell, Dr. Mary D. Leakey.

Despite flooded highways and temporary power failures, five international experts drew a capacity audience of 1,100 which filled San Diego's Town and Country Conference Center, March 4.

During the power blackout, speakers Mary Leakey, Carl Sagan, Bernard Campbell, Shirley Strum and David Hamburg held a candle-lit panel discussion and answered impromptu questions from the attentive, courteous crowd. A meeting with the scientists and members of the press prompted Kathlyn Russell, of the San Diego Times-Advocate, to comment: "It was awe-inspiring suddenly to be in the same room with some of the most fertile minds of our generation . . . and to realize that the speakers were intensely cognizant of a far wider span of human or hominid existence than most persons ever dream of."

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BALDWIN MEMORIAL FELLOWSHIPS AWARDED

Franklin Mosher Baldwin Fellowships have been awarded to Dr. Fidel T. Masao, Stephen Kariuki Mbutu, Sally McBrearty and Francis B. Musonda. These annual awards enable African archeologists to come to the United States for graduate studies and permit American specialists to undertake research in Africa.

Dr. Masao, Director of the National Museum of Tanzania, has for many years been involved in sampling eight Later Stone/Iron Age sites in the Kondoa, Singida and Iramba regions of Central Tanzania. Inasmuch as all of these have been rock shelter/painting sites, Dr. Masao intends to obtain a representative sample for comparative purposes of one of the few open air sites in this area. His data may assist in substantiating a tentative definition of the KWA MWANGO industry. The $3,000 fellowship will enable Dr. Masao and his team to conduct the first of three seasons of archeological excavations in the Kondoa region.

Stephen Kariuki Mbutu is a Kenyan student whose undergraduate experience in prehistoric archeology included participation in the University of Massachusetts archeological expedition to Kenya. Mr. Mbutu has recently been admitted to a master's program in paleoanthropology at Iowa State University and his $3,000 fellowship will help defray the costs of his first year of graduate studies.

Sally McBrearty is presently a predoctoral candidate in anthropology at the University of Illinois at Urbana-Champaign. Her dissertation research, partially funded by a $3,000 fellowship, involves archeological investigations at the Muguruk River site in western Kenya in order to clarify the nature of the Sangoan-Middle Stone Age interface. The Sangoan industry has been thought to come between the Acheulian and the Mesolithic. So far no strata confirming this intermediate status have been adequately documented. Ms. McBrearty observed Sangoan Lupemban artifacts at the Muguruk site where L. S. B. Leakey

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LECTURE SERIES SETS NEW RECORD

Attendance figures for the 1977-78 lectures sponsored by the Leakey Foundation reached a new high of 45,000 according to Trustee Joan Travis who chairs the lecture programs. This impressive figure represents audiences from individual tours as well as lecture series by noted scientists and specialists. Museums, zoos and campuses around the country provided the settings for one of the broadest and most stimulating series of programs ever presented by the Foundation. Many lectures were sold out well in advance. In addition to the familiar California universities and colleges, Texas A&M, University of Oklahoma, Johns Hopkins University, Cornell, The Citadel in So. Carolina and Sweet Briar College in Virginia were among the many educa-

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LONDON MEETING

The Executive Committee of the London Leakey Foundation Chapter met in early April at the home of President Fleur Cowles. Membership privileges and rates were discussed and plans for publicizing the Chapter's work were reviewed.

Trustees were reminded that the St. John's College Studentship is being advertised for October 1978. This award, sponsored by the Leakey Foundation, honors the memory of Dr. Louis S. B. Leakey and is open to postgraduate students of either sex throughout the world who plan to pursue graduate degrees in anthropology or primate studies. The studentship offers an annual stipend of $6,000 for a three year period.

Trustees of the European Board of Trustees of the L. S. B. Leakey Foundation include: Fleur Cowles, President; Dr. Bernard Campbell, Chairman; Lady Collins; Professor Yves Coppens (Paris);

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the L.S.B. Leakey Foundation

The L.S.B. Leakey Foundation was established in 1968 by a group of eminent scientists and informed laymen who recognized a critical need to strengthen financial support for new multi-disciplined research into man's origins, his evolving nature and his 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 mankind.
- 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 man's changing view of his place in nature.

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

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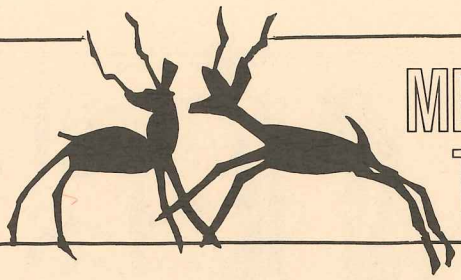

MEMO FROM THE PRESIDENT

CABLE FROM THE PRESIDENT

OUTJO, NAMIBIA

IN ONE COUNTRY AFTER ANOTHER IN WEST AND EAST AFRICA I HAVE OBSERVED THE PSYCHOLOGICAL LIFT, AND THE SURGE OF PRIDE RELEASED BY INDEPENDENCE. HERE, ON THE BRINK OF INDEPENDENCE UNDER MAJORITY RULE, I FIND AMONG THE DIVERS PEOPLES, CONSTITUTING JUST UNDER A MILLION POPULATION IN A VAST COUNTRY OF ONE MILLION SQUARE KILOMETERS, A QUICKENED INTEREST IN THE ROOTS OF NAMIBIA.

ALTHOUGH TOOLS SPEAK OF HUMAN HABITATION AT LEAST FROM THE EARLY STONE AGE ONWARD, THE OLDEST DATED SKELETON, EXCAVATED LESS THAN A YEAR AGO, IS ONLY 1,740 YEARS OLD. THE DAMARAS ARE KEENLY INTERESTED IN THIS SKELETON BECAUSE IT MAY EXPLODE THE FALLACY THAT THE DAMARA WERE RECENTLY BROUGHT INTO THIS COUNTRY AS "SLAVES."

CONSCIOUSNESS OF THE PREHISTORY OF THIS ARID AND BEAUTIFUL LAND IS PALPABLE. IT IS ALSO EVIDENT AMONG THE OVAMBOS HERE IN OUTJO, THE BASTERS IN REHOBOTH, THE GERMANS, THE HERREROS, AND THE OTHER SEVEN ETHNIC GROUPS.

AMONG THOSE SEEKING LEAKEY SUPPORT IS A BLACK TEACHER WHO WANTS TO JOIN A GERMAN-SPEAKING NAMIBIAN (PHD BERKELEY) IN UNFOLDING NAMIBIA'S ARCHEOLOGICAL STORY. IF ALL GOES WELL IN NAMIBIA, THE LEAKEY FOUNDATION WILL HAVE HELPED TO LAY THE BASIS OF AN ARCHEOLOGICAL INSTITUTE DIRECTED BY NAMIBIANS AND AIMED AT THE SCIENTIFIC ENRICHMENT OF US ALL.

Ned Munger

BALDWIN FELLOWSHIPS

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and Archdeacon Owens originally reported a "Levalloisian" industry overlapping two Tumbrian horizons (1945). Analysis of her excavated materials will be carried out at the International Louis Leakey Memorial Institute of African Prehistory in Nairobi.

Recently accepted into a doctoral program at the Department of Anthropology, University of California at Berkeley, Francis B. Musonda's dissertation research will be based on prehistoric economies and typological compositions of industries in Central Zambia. Mr. Musonda has held the position of Keeper of Prehistory at the National Museum of Zambia. His archeological research at several central Zambian sites is designed to study the transition from a hunter-gatherer economy to that of a food-producing one. In support of his graduate studies, Mr. Musonda will receive a fellowship of $4,000.

CALENDAR UPDATE

July 12 – Dr. Roger Fouts, Hall of Associates, Caltech Athenaeum, Pasadena, "TEACHING SIGN LANGUAGE TO CHIMPANZEES"

MiraCosta College Lectures

July 6 – Dr. Gail Kennedy, "EVOLUTIONARY PATHWAYS TO THE HUMAN CONDITION"

July 13 – Dr. Roger Fouts, "LANGUAGE–ORIGINS AND ACQUISITIONS"

July 20 – Dr. Brian M. Fagan, "LOUIS LEAKEY AND THE ORIGINS OF HUMANITY"

July 27 – Dr. Robert Rinehart, "CAN WE, WILL WE, SHOULD WE MODIFY OUR INHERITANCE?"

For further information call MiraCosta College (714) 757-2121 or (714) 436-5151.

Save the date!

SAN FRANCISCO SYMPOSIUM – December 2 and 3 – "ART AND ARTIFACTS"

ASSOCIATES WELCOME KAYE JAMISON AT THE MEETING

Chairman Kaye Jamison, now fully recovered from open heart surgery, was welcomed back by the Leakey Associates at their June meeting in the home of Mrs. Charles Kern of Toluca Lake.

Highlights of the meeting were concerned with reports from members who described some of the special activities of the volunteer group. In addition to the detailed planning of receptions and dinners in honor of visiting lecturers, the Associates are also assisting with the casting of fossil replicas for the Paleo Study Project, now under way in 12 senior high schools, 2 parochial schools, and 2 private schools.

The Paleo project is now underway at participating Los Angeles City Schools. Students have the opportunity to examine and compare these excellent replicas of our early ancestors.

San Diego Zoological Society

Dr. Mary Leakey paused briefly, during her southland trip, to visit the San Diego Zoo where she was introduced to one of their new arrivals. The baby orang pictured here is one of twins.

LECTURE SERIES
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tional institutions cooperating. Of special note was Biruté G. Brindamour's lecture at the Denver Museum of Natural History, marking that institution's third year of participation with the Leakey Lectures.

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Dr. Dian Fossey and Digit.

ON THE LOSS OF DIGIT...

Digit was a young male silverback gorilla living in the Virunga Mountains of Rwanda. When Dian Fossey first encountered him in September of 1967 he was only two and a half years old and his coat was still black. Of all the gorillas studied by the Karisoke Research Centre primatologist, Digit became the most famous. It was he who was featured on the official Rwanda tourist poster, holding a piece of wood and urging travelers to "COME AND VISIT ME IN RWANDA."

Dr. Fossey has often stated that "fictionalized portrayals of gorilla savagery towards humans are grossly exaggerated." Digit helped shatter that image in the widely shown National Geographic film when he gently took Dian's notebook and pen, examined them, and then rolled over to go to sleep at her side. Watching Digit, we could believe that the mountain gorillas really did have a "shy and gentle nature."

On December 31, 1977, Digit was killed by poachers. Sebunyana-Zirimwabagabo, a Hutu, had offered to pay the equivalent of $20 to any poacher for the head and hands of a silverback gorilla, which he hoped to sell as souvenirs to visiting tourists.

The gorilla are an endangered species. Within Dr. Fossey's study area, less than 200 of these great primates remain. Countless other gorillas outside of the study areas have been captured or killed by poachers. For the past decade, Dr. Fossey has struggled to provide protection for the remaining gorillas. In 1970 she stated in an article printed in the National Geographic Magazine, "the mountain gorilla faces grave danger of extinction, primarily because of the encroachments of native man upon its habitat—and neglect by civilized man, who does not conscientiously protect even the limited areas now allotted for the gorilla's survival."

Poachers have often invaded the study area around Karisoke. Originally they hunted a small red antelope called the duiker and occasionally caught a gorilla in their snares by accident. In recent years, poaching has escalated and although Dr. Fossey's small team has made a valiant attempt to discourage these forays, their efforts have generally been futile.

The gorilla is dying out as a species. They need our help and protection *now.* As a tribute to the memory of her forest friend and for the security of the remaining gorillas, Dr. Fossey has established the "DIGIT FUND." Monies will provide training and maintenance of workers to patrol the study area and to thwart further poaching, without disrupting the harmony of the mountain gorillas's existence. Workers will also perform additional census work on the Rwandan side of the Virungas to locate the whereabouts and ranges of the surviving population so that stronger efforts may be made to protect them. *Won't you help?* All contributions, earmarked "DIGIT FUND," c/o L. S. B. Leakey Foundation, Foundation Center 206-85, Pasadena, California 91125, will be sent immediately to Dr. Fossey.

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Profile

Fleur Cowles

Fleur Cowles is a legend in her own time. The dark glasses she constantly wears (on medical advice) have become her trademark. They are also a mask which hides an essentially reserved and private person who intensely dislikes the sensational press which surrounds public figures. Her paintings, known throughout the world, are so distinctive that they hardly need a signature. She has, at various times, been a journalist, editor, diplomat, writer, artist, and benefactor. Not the least of her manifold talents and achievements is that of friendship. Fleur has been the friend of world renowned political figures (including Lady Bird Johnson, Roosevelt, Churchill, Eisenhower, Baruch, Kissinger, Eva Perón, Madame Chaing Kai-shek, Nasser, Truman, Queen Elizabeth II, and the Queen Mother), fellow artists (Picasso, Dali, Tamayo, Braque and Donati), actors and writers (Marilyn Monroe, Isaak Dinesen, Cary Grant, James Stewart, Hal Prince) and eminent scientists (Peter Scott, Louis Leakey, Jane Goodall).

She has one basic rule about her friends: they know she can be trusted with confidences. That is why her book of memoirs, *Friends and Memories*, entertaining though it is, has giant gaps. "It's a book of anecdotes," Fleur says. "I love to tell stories. It leaves *everything* out. I never discuss confidences."

In the early 1950's while married to Mike Cowles, the publisher of *Look Magazine,* Fleur made publishing history by creating *Flair,* a magazine dedicated to the arts. Although short-lived, its wit, audacity and innovative techniques made such an impression that even today copies of the thirteen issues published are highly prized. Fleur was also the Associate Editor of *Look Magazine* and, before that, a special consultant to the Famine Emergency Committee. Fleur was appointed Ambassador to the coronation of Queen Elizabeth II by President Dwight D. Eisenhower who also sent her, as an "unofficial diplomat," on special assignments to meet with top political figures in Greece, England, Egypt, Cyprus and Brazil.

Although she subsequently married an Englishman (she and Tom Montague Meyer have just celebrated their twenty-second wedding anniversary) and has lived in England for so long, Fleur remains firmly American. "I owe so much to the life I left in the United States, I will always remain an American. But I wasn't the average anonymous American who came over (to England); I had a very interesting time with English friends and just carried on." Justifiably famed for their intimate Wednesday dinner parties, the Meyers continue to cement their old friendships and make new ones. In addition to their lovely, historic set of chambers, the Albany in Piccadilly, they retire to Sussex over the weekends where Fleur paints—and to their restored Spanish castle in Trujillo for all holidays.

Fleur began to paint in 1959 and has had 25 one-woman shows throughout the world since then. Her work is included in major collections all over the world. She always paints in a particular spot—on a certain couch in a corner in her sitting room at the Sussex home. Often she is surrounded by friends. "I don't mind the presence of my guests (who are always there) as I like joining in the conversation," she says.

Besides painting, she has written several books including *Bloody Precedent* (about Juan and Eva Perón, which she is currently revising for a new edition), *The Hidden World of Hadhramoutt*, and *The Case of Salvador Dali*. Three books have been written around her painting: *Tiger Flower, Lion and Blue*, and the recently issued, *Romany Free.* Fleur has also designed a range of dinner and gift ware of Limoges porcelain.

Fleur's deep involvement in wildlife conservation, so apparent from her paintings, is reflected in her active participation as an International Trustee of the World Wildlife Fund. She recently organized an *Animals in Art* exhibition which has been mounted in 43 major museums in 12 countries around the world to highlight endangered animals.

"I am terrifically happy to work." says Fleur, "because I love work, and I am quite ill at ease when I am doing nothing. It's not a compulsion, because I enjoy it so much. I can never say no. I believe in discipline, and I have an organized, orderly existence. In four days a week in London I do everything from my desk (or in an airplane)—with two secretaries. A great correspondence goes on from here (we even have a mailbag left at the door). It's an awesome sight as most letters require a personal exchange."

"We spend the last three days of the week at our fifteenth century farm in Sussex where, after discussing the garden and menus, I sit down to paint."

Greatly stimulated by a suggestion of Rupert Allan, Fleur became a Fellow of the Foundation in the early '70's before becoming a Trustee. Shortly after, she had the delightful experience of getting to know Louis Leakey and he often visited her in London, where they made plans and set up a European branch of the Leakey Foundation before his death. Since that time Fleur's energies and interest in the Foundation have been unflagging. Not only was she responsible (with Dr. Bernard Campbell) for last September's highly successful Leakey Conference in London, but she graciously made her London residence in the Albany available for annual meetings of the Board of Trustees and the Science and Grants Committee. September, 1977, also marked the inauguration of Louis Leakey's dream: a London-based European Chapter of the Leakey Foundation. Fittingly, Fleur has been elected its first President.

Fleur once said, "Mine is a typical American success story," but Fleur is far from typical. She is a unique and warm individual, capable of deep and lasting friendships and timely contributions to the goal of preserving our environment and wildlife. The Leakey Foundation is honored by her committed and heartfelt contribution to the cause of supporting research into man's origins, behavior and survival.

NEW FELLOWS

The Leakey Foundation is proud to welcome 8 new Fellows to its membership roster.

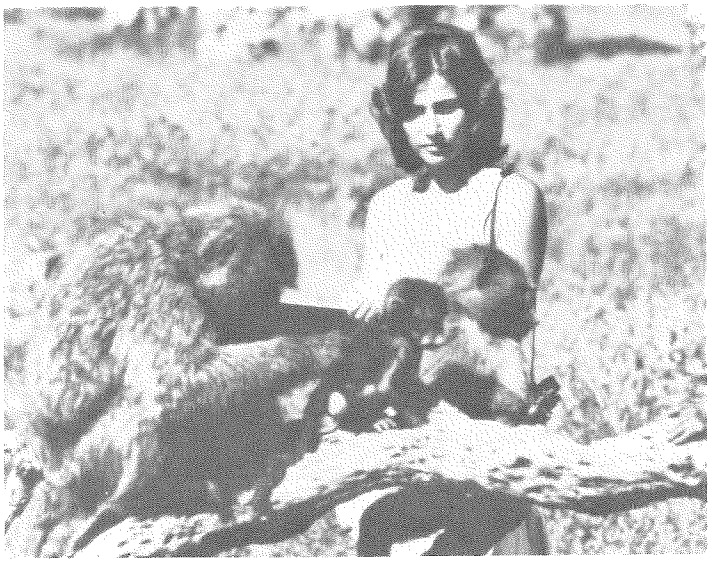
They are: Mrs. Ben C. Brewer, Montgomery, Alabama; Mr. F. Patrick Burns, Los Angeles, Ca.; Mr. John C. Elliot, San Marino, Ca.; Dr. and Mrs. Robert N. Hamburger, La Jolla, Ca.; Adm. and Mrs. L. H. Hunte, San Diego, Ca.; Mr. and Mrs. Ed Johnson, Walnut, Ca.; Joyce Fayar V. Leyland, Saratoga, Ca.; and Mrs. C. Hudson Lynch, New York City, N.Y.

Fellows of the Foundation now total 288 members.

BOOKS IN THE NEWS

G. P. Putnam's Sons Publishers have recently released a new biographical account of *Jane Goodall* written by Eleanor Coerr for children. Generously illustrated, the easy style and large print make an enjoyable account of Jane's early interest in animals and her subsequent career as a pioneering primatologist. The book, issued as a special library edition, is not available in bookstores but will be at local libraries soon.

SYMPOSIUM HIGHLIGHTS



Dr. Shirley Strum

THE BABOONS OF GILGIL

As the search for early man has intensified, so has our interest in the behavior of the early men whose bones and artifacts we are discovering. As man is a primate, the study of other primates has been of special importance, especially baboons because of their savannah existence, chimpanzees because of their closer evolutionary relationship to man, and other types of animals that have developed related behaviors (e.g., carnivores that engage in social hunting).

However, the idea of finding one animal model for early man is misleading. While animal species display behaviors that are shared with other species, they are each also unique. Much of the interest in our own evolution should center on just those features which make man unique, but this uniqueness can only be understood fully in the context of what features are shared by man and other species. The behavior of other primates provides us with such a perspective, allowing us to ask reasonable questions and make more accurate interpretations of human behavior. From living species we can also find out how various components (ecological, social and psychological) can interact to produce a type of behavior, and then speculate on how these influences might have interacted to produce the pattern that ultimately became unique to humans. By studying other primates, we can gain insights into the process as well as the product of human evolution.

Because hunting has played such a special role in human evolution, the new information on baboon predatory behavior at Gilgil is of some significance.

Predatory behavior is simply any meat-getting, meat-eating activity. Capture can be accidental or systematic; hunting is a type of systematic predation. For years man was thought to be the only primate to hunt. Then came the reports of chimpanzees hunting that created quite a stir. In 1971, information on a troop of baboons (the Pumphouse Gang), near the town of Gilgil, Kenya, indicated that although baboons were thought to be infrequent meat-eaters, they were actually frequent predators. Bob Harding reported 47 cases of predation by baboons on antelopes, hares and birds in one year; a higher rate than ever before reported and much higher than that of chimpanzees. Most of the catches were accidental finds of concealed prey, although in several cases detours through bushy areas scared up prey. This activity was not frequent or systematic. There was not coordination in capturing prey and no sharing of the meat.

When I began my studies in 1972, this type of pattern was evident. However, I had the good fortune to document a series of changes in the predatory behavior of these baboons. There were major changes in capture technique, in who participated in predation, of how the meat was distributed within the troop, and in the response of the prey to the baboon predators. Previously, predation had been predominantly an adult male activity, but during this period females began getting more meat on their own and acquiring meat from prey captured by others. Some females were more active predators than some of the adult males. Infants began to eat meat for the first time, usually introduced to the opportunity by association with their mother who had a carcass, or by association with an adult male "friend". Infants never captured prey for themselves (probably because of the size similarity between the two). Juveniles also began to eat meat, much in the manner of infants, but soon after their first taste they would try to capture prey for themselves. There developed what could be called the baboon equivalent of sharing. Although baboons ordinarily never share food, meat was shared in two ways: either an animal would move over and leave some meat for another to feed on, or two animals would feed simultaneously from the same carcass. This occurred between males and females and between mothers and infants. All the sharing that was observed reflected existing social ties within the troop.

With a change-over in the primary predatory male and the influence of his behavior on the rest of the males, capture techniques changed. Actual hunting behavior developed, with more elaborate techniques, and an increase in the amount of time and distance involved in the hunt. At first, other males would watch and then selfishly join in near a successful capture. When an accidental relay chase resulted in success, the males seemed to learn and afterwards would chase prey, not out into the open field but towards nearby hunting baboons. Soon the behavior of one male would act as a signal and other males would move out on their individual hunts simultaneously, giving the impression of coordination. Initially, there was a peaceful relationship between prey and baboons, but once elaborate hunting developed, the Thompson's Gazelle herds that were frequently hunted developed wariness and a flight distance to the baboons. This made it harder for baboon hunters to get close enough to the prey to actually chase it down.

Interesting differences existed between male and female behavior. Only adult males hunted away from the troop in a sophisticated manner, although some females were very interested in meat. However, when a male found himself in a situation of conflict between predatory behavior and sexual or social behavior, he gave predatory behavior the lowest priority. Surprisingly, females were just the opposite.

A continuum in predatory behavior between man and other primates can now be identified, where before we had assumed a large gap. We can use this new information on baboon predatory behavior to interpret human evolution, but first a few points need clarifying. What humans and nonhuman primates do when they are predatory seems to be different, although both are along the same continuum of behavior. The human pattern is based on hunting large game using tools, cooperation, language-based strategy, extensive sharing, and division of labor between the sexes. The nonhuman primate pattern, even at its most complex, is limited to small prey items, no tool use, limited cooperation, and limited sharing. However, early man was a primate and thus didn't begin his evolutionary journey with a blank slate. As primates, early humans already had certain characteristics in anatomy, behavior, and social organization. I think we can also assume that early humans had behavior at least as complex as that of living baboons. If this is correct, then baboons can be used to illustrate how the important determinants of predatory behavior operate for a primate species. The information can also be used as an example—not a model—of how behavior might change within the complex social setting of a primate group.

From the baboon information, we can conclude several things about the evolution of behavior. First, the opportunity has to exist at several levels including ecological, social and individual. It seems reasonable to suggest that changes in human predatory behavior most likely involved at least this many variables and it

would be foolish to think that any one alone would be sufficient to explain the important changes that occurred. This is important because people tend to concentrate on the ecological factors and ignore the social and psychological ones.

Innovation and learning are important in behavioral evolution. For the baboons, many of the new developments involved using behavior that was already present but now became employed in a new context. However, because there is variation in personality and behavior between individual primates, innovation is possible. Once a new behavior occurs, others acquire it through learning and the learning is based on existing social networks. But there are limits to the elaboration of behaviors even when an animal has the potential to perform the behavior (e.g., females who are interested in meat but won't leave the troop to hunt).

It is usually argued that the advent of hunting during human evolution required a division of labor with males leaving the troop and females remaining behind to take care of infants. The Pumphouse baboons suggest that there may be something more basic to the process of male and female primate integration into a group that didn't originate with human hunting but may have been elaborated by it. However, if early hominids were like Pumphouse males, there would be a problem in getting the males to leave to go hunting when there was a receptive female. There would have to be some change during human evolution to allow males to set a different priority on hunting. If human females were continually receptive, males might not be in conflict about leaving to hunt; their sexual behavior wouldn't be tied to the female reproductive cycle. Perhaps this is the reason for the loss of estrus by human females.

Several additional points can be made. We can see the importance of the individual as the source of innovation in a group. And, if Pumphouse can serve as an example, evolutionary change can be quite rapid. Because behavior is only appropriate under a complex set of conditions, changes in those conditions will cause the behavior to die out as rapidly as it developed. Therefore, we should expect reversals, or oscillations, in behavior patterns to be the rule rather than the exception during human evolution. This is a very different notion of evolutionary change than the slow, gradual and irreversible process usually posited.

It will never be possible to know just how early hominids behaved but our guesses are more educated because of this additional information from the Pumphouse baboons. Perhaps the earliest predatory pattern for emerging hominids was similar to that of living baboons or chimpanzees. This could have originated many times, among groups in different populations. But at some point (or at several points) there was an additional transition in human hunting behavior to include the capture of large animals.

What baboons and human hunters do is different: to hunt just one large animal requires solutions to specific problems, solutions that (based on our current evidence) are outside the reach of nonhuman primates.

I don't think we should construct artificial barriers in the evolutionary continuum to assure a unique position for man, but neither should we assume that because there is a similarity and a continuum that baboons (or chimps) are just the same as early human beings. I think the information on other primates can be useful in many ways, not the least of which is its ability to highlight the important areas of human originality.

Dr. Bernard Campbell

PERSPECTIVES ON THE FAMILY OF MAN

The evolution of man, like any other evolutionary process, was a product of the interaction of hominid genes and hominid environment. It follows that a good understanding of the environment in which the Hominidae evolved is an essential step in the understanding of Hominid evolution. Although it has not received headline reporting, our increasing knowledge of ancient environments is one of the most important developments in paleoanthropology during the past ten years.

As Darwin predicted, the story began in Africa. We know that the earliest apes were confined to Africa from their first appearance about forty million years ago until the African land mass came into contact with the Eurasian land mass. Thereafter, animals moved intermittently between the three continents and apes appeared throughout the tropical regions of the Old World, from Spain to China and South East Asia. These Dryopithecine apes diverged and adapted to the different climatic conditions which were developing in different parts of their extensive range.

As the Tethys sea (which had separated Africa and Asia) shrank in area and dried up, extensive climatic changes occurred resulting in lower rainfall and a replacement of forest by grassland. By the late Miocene (c. 8 million years BP) the forest-living apes were becoming extinct and only those which had adapted to the dryer more open woodland and grassland areas survived. These included three important genera: *Gigantopithecus, Sivapithecus* and *Ramapithecus.*

All showed signs of a thickening of the dental enamel, a new wear pattern on the molars, a more heavily buttressed masticatory apparatus and some enlargement of the molars—a series of adaptations designed to increase the grinding power of the teeth. *Ramapithecus* was alone in carrying also a considerable reduction in the size of the canines, and a notably less prognathous jaw. Altogether its teeth were developing many features seen in the later *Australopithecus africanus.*

Whether *Ramapithecus* was in fact ancestral to *Australopithecus* is not yet known, since we only possess jaws and teeth. To be more certain we need bones of the rest of the skeleton, especially the pelvis. However, it conforms well to the ancestor which one might predict in terms of its dental morphology and environmental context. Evidence of this form is found from Hungary (Rudabanya), Greece (Athens), Turkey (Pasalar and Candr), east to Pakistan and India (Siwalik Hills) and south to Kenya (Fort Ternan).

Between eight and four million years BP the fossil record is sparse and we only have two teeth, a jaw fragment and an elbow joint from East Africa. A number of fossils from Laetolil in Tanzania dated about 3.6 million years are the first good sample from the *Australopithecus* phase of human evolution. From this time onward, apart from the period 2.9 to 2.2 million years BP, the fossil record is surprisingly complete.

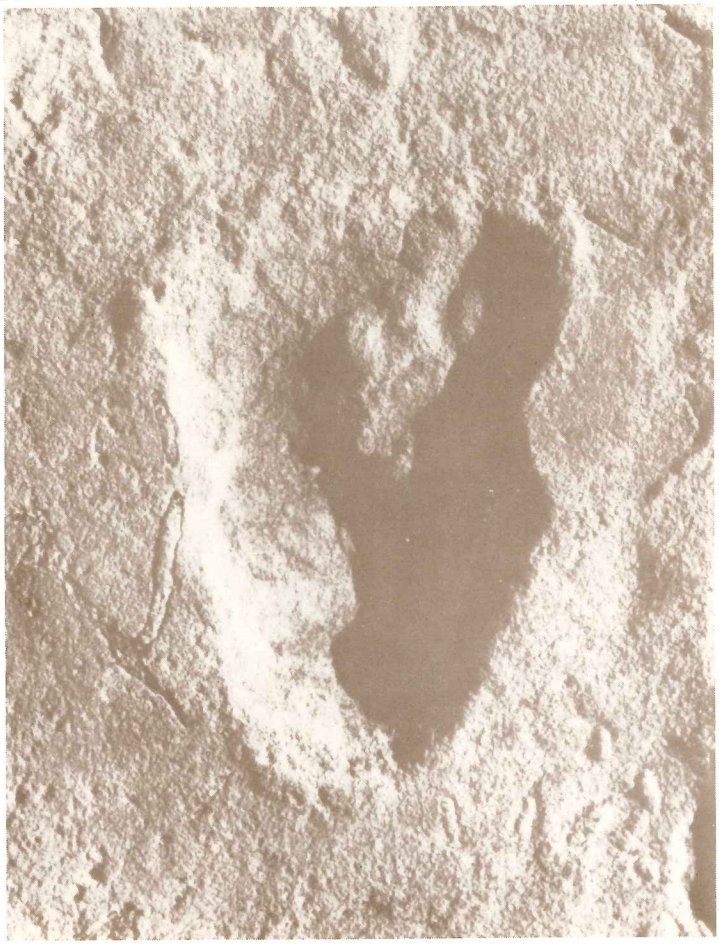
Three million years BP is a most important landmark in human evolution: bipedalism appears fully evolved at Hadar in N.E. Ethiopia. We have no evidence at present of its evolution.

From two million years BP we have evidence of early man *(Homo)* in both Africa and in Eurasia. The earliest Eurasian fossils come from Java (c. 1.9 millions years BP). Later finds come from China (1.7 million years BP) and archeological evidence suggests that man was in France by 1.8 million years BP. Thereafter, the hominid lineage underwent its second great environmental transition—this time into cold northern biomes. While the earlier transition depended on slow biological adaptation, this second one depended upon much more rapid cultural adaptation.

The development of various facilities to moderate energy expenditure and the control of fire made it possible for man to survive in this very stressful time.

Language must have evolved rapidly at this time with the enlarging brain. It is the most important biological development of the last two million years, which made possible the rapid evolution of culture and technology through its effect on communication and cognition.

Humankind is a product of environmental adaptation through both biology and culture.



SHORT AND WIDE, this footprint, one of a trail of five, may have been left by man's oldest known direct ancestor 3.5 million years ago near what is now Laetolil, Tanzania, East Africa. About six inches long and 4.4 inches wide, the foot supported an individual possibly four feet tall, taking steps no longer than the length of its feet. The discovery of the fossil footprints was reported by Dr. Mary Leakey, who has been working with the support of the National Geographic Society.

Dr. Mary D. Leake

FOOTPRINTS

RUGGED LANDSCAPE of Laetolil in Tanzania, East Africa, stretche now-hardened volcanic ash where footprints have been found that ma million years ago.

From Carolina to California, Mary Leakey lectured to packed houses. Slide by slide and word by word she took her audiences on a journey through time, pausing to clarify and describe the relics of the past, and leave them with a new mystery—five steps in the ashes at Laetolil—who made them, where did he come from, and indeed, which way did he go? Dr. Leakey, after another season in Africa, armed with "paintbrushes and dental picks," will undoubtedly return with some answers (or her equally enlightening, "I have no idea").

Dr. Leakey prefaced her lectures with a brief history of Olduvai, as many of her audiences were hearing her story for the first time.

"Olduvai Gorge was discovered in 1911 by the German Professor Kattwinckle, an entomologist collecting butterflies on the Serengeti Plain. The story is that he nearly fell into the Gorge (butterfly hunters generally look up as compared to fossil hunters who mostly look down). We do not know if he found many butterflies but he did find the remains of a small three-toed horse. On his return to Germany, he was able to interest the Kaiser in becoming a subscriber to the first expedition to Olduvai in 1913. It was considered successful and a second was planned, however, the war intervened and nothing was done until 1932 when Louis Leakey and a group of scientists visited the site. With them was Professor Reck who had been with the original group and had named the strata beds; his terminology is still used today."

The Gorge has yielded a wealth of fossils and stone tools with the greatest number being found at the base of the Gorge in basalt lava flow. While Bed I is characterized by a permanent saline lake and occupation sites of early man under fairly stable conditions, Bed II is more complex as volcanic faulting changed lake shore dwelling to living by streams and rivers. From this strata, after a search of over 30 years, the Leakeys made scientific history in 1959, with the discovery of "Zinj," *Australopithecus boisei.* Two other creatures were found in this bed, *Homo habilis* and at the top of the bed *Homo erectus*—a type of early man found not only in Africa but in the Far East as well.

Throughout the many years of work at the Gorge, Dr. Mary Leakey has assembled a large collection of stone tools used by the early inhabitants. A continuum has been established starting with a tool kit of seven recognizable shapes found in Bed I to eleven in Bed IV. She reminds her listeners, assisted by a liberal use of slides, that these tools were not of random design but made with a hammer stone from a preconceived model in the maker's mind.

Although it is not the richest source of hominid bones, the wealth of other objects found make Olduvai the world's most informative early man site.

The last few years have produced even more remarkable discoveries at the nearby site of Laetolil, an area which, at first, had yielded little.

Laetolil lies 30 miles south of Olduvai Gorge. It is approxi-

From the Maasai: Olduvai - Place of the wild sisal

IN THE ASHES

behind Dr. Mary Leakey and Dr. Melvin Payne as they examine the prove to be those of modern man's earliest direct ancestor, left 3.5

mately 1.5 million years older than Olduvai and represents a different type of site, having no large lake or streams. Pollen records indicate that the climate was once much wetter than it is today.

The beds at Laetolil are 400 ft. thick with fossil fauna and flora being found in the top 100 ft. (only mollusca are found at the lower level).

Laetolil was first visited by Mary and Louis Leakey in 1935 and again in 1959; neither visit yielded anything of importance. However, in 1974, Mary returned and discovered a hominid premolar. Dating was done by Dr. Garniss Curtis at Berkeley indicating an age of 2.4 million years making it previous to Olduvai dates. No hominid limb bones or skull sections have been found. Dr. Leakey feels that these hominids had a very short life expectancy, most of the teeth indicating an age of 8 to 10 years. (These teeth are very similar to those found at the Hadar site in Ethiopia). Subsequent investigations at Laetolil have revealed a wealth of animal tracks. They include those of elephants, black and white rhino, many types of antelopes, three varieties of giraffe, a sabertooth cat, and many other species, all of which are extinct. Fossil bones representing all these animals as well as a number of hominid mandibles and teeth have been found.

Laetolil - For the native lily that grows abundantly

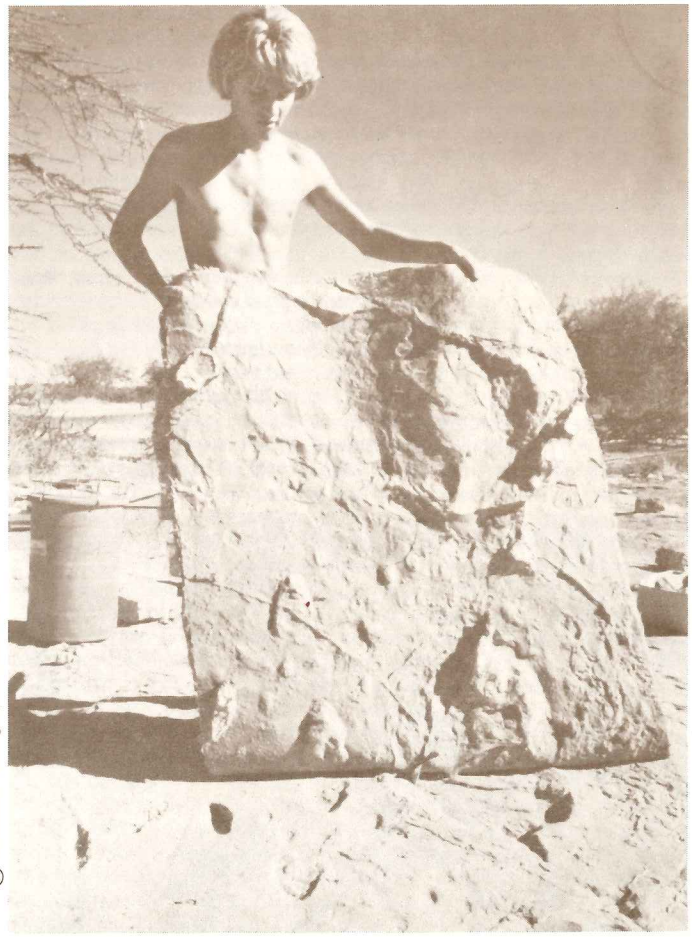
The most exciting of Mary Leakey's recent discoveries at Laetolil are two different sets of footprints. The tracks are preserved in a bed of volcanic ash 15 cm thick, formed by a series of eruptions from a nearby volcano. They are about 5 meters below a coarse volcanic ash, rich in biotite, which has been dated at 3.59 million years. One set, a trail of 6 oblong prints, with a digit or false thumb projecting from one side, closely associated with smaller, roughly circular prints, appears to have been made by a knuckle-walking primate. The animal is estimated to have been smaller than a female chimpanzee. The oblong hind prints average 17 cm in length and 10 cm in width. The stride length averages 41 cm, measured from heel to heel. Dr. Leakey stated in her lecture that, upon arrival in this country, the picture of these tracks was shown to primatologists and to a footprint expert and no one was able to identify them. They seem to be similar to the living great apes but the shape differs as the false thumb is not in the same position.

This find is significant since, unlike man, present-day apes have no known fossil antecedents, because, as forest-dwelling animals, their remains are unlikely to be preserved.

The other set is a trail of five prints from the same stratum which may prove to be hominid. The prints are exceedingly broad in relation to length. The width of the print represents 73% of its length compared to Neanderthal man at 65% and modern man at 30-40%.

With the exception of two prints exposed by erosion the tracks are still filled with overlying matrix and until this has been carefully removed, it is impossible to identify them with complete certainty.

At the conclusion of a lecture Dr. Leakey was asked to explain the difference between *Homo sapiens* and *Homo erectus.* She said, "All of us here are *Homo sapiens.* I would be very happy to see a *Homo erectus* among the audience." Audiences throughout the country would be equally happy to welcome Mary Leakey back again next season.



LATEX CAST of footprints that may have been left by modern man's earliest direct ancestor 3.5 million years ago is lifted from the now-hardened volcanic ash of Laetolil in Tanzania, East Africa. Lifting the cast is Peter Jones, assistant of Dr. Mary Leakey.

Rod Brindamour, courtesy National Geographic Society

Nick, wild orangutan

Orangutans, Asia's sole living species of great ape, are found only in Borneo and northern Sumatra. During the past six years my husband, Rod Brindamour, and I have been studying wild orangutan adaptation, behavior and ecology in the Tanjung Puting Reserve of Kalimantan Tengah (Central Indonesian Borneo). In addition to the wild orangutan research, we established the Tanjung Puting Rehabilitation Center, where captive orangutans could be released and rehabilitated to life in the forest.

By almost any measure, the African apes—chimpanzees and gorillas—represent humankind's closest living relatives. In fact, chimpanzees share 99% of their genetic material with humans. Were similarity in genes the sole criteria, this would be enough to warrant labelling chimpanzees and humans "sibling species." However, differences in morphology mitigate this and taxonomists have generally placed humans and chimpanzees not only in different genera but also in different families.

Once humans were defined as the only animal to regularly make tools to a set pattern. Today humans are defined somewhat tortuously as the only species which makes tools to make other tools.

The idea that only humans are capable of using language was so firmly entrenched that, rather than grant that chimpanzees and gorillas are capable of learning systems of symbolic communication, some scientists preferred to argue about whether sign language, as used by thousands of deaf-mute humans, actually constitutes a language. The debate among anthropologists, linguists, and semanticists rages on. Meanwhile, Washoe (a female chimpanzee) has two hundred signs in her vocabulary; has invented new signs for herself; uses rudimentary grammar and even signed to her infant before it died shortly after birth. Koko (a female gorilla) now has a vocabulary exceeding three hundred signs. It becomes apparent as we learn more about gorillas and especially about chimpanzees that they represent better than ever models for the behavior of early hominids.

But what about orangutans? Immunological comparisons of serum proteins indicate that these Asian great apes represent (after the African apes) humankind's third closest living relatives. Orangutans in their tropical rain forest habitats revealed a pattern of adaptation which was so different from that of other monkeys and apes as to seem aberrant. Wild orangutans were observed to lead very slow, solitary lives in the depths of the tropical rain forests; lives characterized predominantly by eating, moving slowly to another food source and then eating again.

This seemingly simple pattern of life exhibited by wild orangutans pinpoints an apparent enigma and a paradox. The performances of captive and released orangutans at rehabilitation stations in terms of tool use parallels that of captive chimpanzees. For instance, tool use at the Tanjung Puting Rehabilitation Center is virtually a daily occurrence. Orangutans may score even better on intelligence tests in laboratories than chimpanzees. Even the language capabilities of orangutans seem comparable to that of chimpanzees. Yet wild orangutans do not exhibit tool using or tool making behaviors that even remotely resemble the sophisticated technological complexes found among some wild chimpanzee populations. Their social organization has been labelled rudimentary and directly compared with that of prosimians. No wild orangutan has even been observed to make tools, hunt for mammalian prey, share food with adult conspecifics or display any of these interesting behaviors sometimes exhibited by chimpanzees and postulated for early humans. In fact, despite the orangutan's relative affinity to humans, a worse model for early hominids than wild orangutans could not possibly be imagined.

Biruté

THE INTELLIGENCE

First, humans are gregarious, a feature they share with most other species in the suborder Anthropoidea. Human and chimpanzee populations are ordered in such a way that contact between individuals is a frequent occurrence and almost all individuals spend much of their lives as members of social groups. This is not the case with wild adult orangutans. With the exception of dependent offspring accompanying their mothers, adult orangutans of both sexes are predominantly solitary. Adult males and females generally associate together only during sexual consortiship (approximately seven days maximum).

Second, humans and chimpanzees are characterized by relatively slight morphological differences between the sexes. Orangutans are among the most sexually dimorphic of all primates. Mature males weigh twice as much as mature females and possess cheekpads and bulbous throat pouches that are lacking in the smaller sex.

Third, early hominids were probably terrestrial. Orangutans are the most arboreal of the great apes and, unlike the African apes, lack any morphological specializations to ground locomotion.

Fourth, while early hominids presumably hunted or at least scavenged for part of their subsistence, orangutans are predominantly frugivorous although they do consume large amounts of leaves and bark as well. In Tanjung Puting their animal protein intake was strictly limited to insects.

Fifth, early hominids were probably characterized by individuals cooperating with one another in hunting and other activities with division of labor occurring between the sexes. Not only are mature orangutans asocial in large part, but mature males do not even tolerate the sight of one another.

Rod Brindamour, courtesy National Geographic Society

Taking rehabs to fruiting area

Galdikas-Brindamour

OF ORANGUTANS

Rod Brindamour, courtesy National Geographic Society

Birute and Cempaka in the rain

Finally, hominids were presumably tool users and tool makers while, with the exception of nesting/covering behaviors and agonistic displays, wild orangutans have been observed to use tools only sporadically and incidentally.

It is no wonder that the question perpetually asked about all great ape species seems most apt for orangutans. It comes as no surprise that the orangutan, one of humankind's closest living relatives, is strikingly intelligent. But if great apes in general, and orangutans specifically, are so intelligent, use tools frequently and can be taught sign language in captivity, why do they not use these capabilities in the wild?

A recurrent theme among students of primate behavior has been that primates can only be understood as social creatures, as members of groups. Further, it has been stressed that primate learning is above all else learning in a social context. Orangutans who are solitary seem to stand as an exception to this. Yet the Tanjung Puting data reveals that orangutans do not exist in a social vacuum. Social relations, as they occur and recur, are highly structured. Even adult males, who are overwhelmingly solitary and whose participation in social associations is limited almost entirely to sexual consortships with receptive adult or adolescent females, live socially ordered existences. Adult female reaction to other adult females was quite variable. Depending on the range of responses from aggression to "friendly" association, orangutan females seemed to have both "friends" and "enemies." Continuing observations of the changing relationships among immature females who were known to have different mothers indicated that associations established among age mates in adolescence (or earlier) were as important, if not more so, than direct genealogical ties in determining female associations in adulthood.

I think that the commonly asked question, often posed by many students of primate behavior: "what processes have favored the evolution of mental capabilities that apparently are not used?" will turn out to be a non-question in the case of the great apes. As a more detailed and sophisticated understanding of pongid adaptations in the wild is built up through long term field studies, it becomes increasingly clear that the great apes are utilizing their "intellectual" capacities but in ways which were not always initially obvious.

For instance, observations at Tanjung Puting have indicated that orangutans were indisputably remembering the locations of specific trees in the forest, regardless of the productive state of those trees, over long periods of time. My husband and I have observed that orangutans were organizing their foraging in rather efficient patterns. We hypothesized that discovery of fruit in a tree of one species might be followed by a systematic check of trees of the same species. Further, since orangutans were observed to pick obviously unripe fruit without consuming it, it seemed as though they were monitoring the state of the fruit's ripeness.

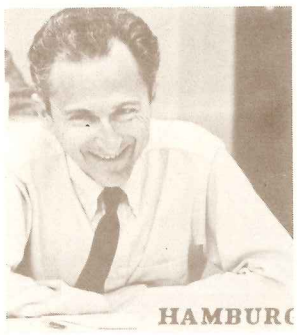
The aspect of great ape "unused capacities" in the wild probably puzzled over most frequently is the purported lack of pongid tool use in the natural state as compared to captive situations. The only instances of tool use reliably reported from wild orangutans invariably involved agonistic displays and nesting/covering behaviors. Like other pongids, Tanjung Puting orangutans made tree nests (very rarely ground nests) by manipulating branches and vegetation. Alone among the great ape species, orangutans also regularly used overhead platforms similar to nests or fans of several branches as covers during rainstorms. As has been reported from other areas, Tanjung Puting wild orangutans also broke off and dropped, sometimes waved or clumsily threw live or dead branches as part of agonistic displays directed aginst humans and others. There is no doubt that the pushing of snags (branchless dead trees) served to enhance the directionality of the male orangutans' "long calls" and to hail its onset.

At Tanjung Puting termites occasionally assumed importance in the diet but, unlike the situation in Africa, there were no terrestrial primate competitors for this resource. Further, orangutans seemed to have no difficulty in exploiting termites year round with non-tool using techniques.

Thus, there is an indication that orangutans in their day to day life at Tanjung Puting are utilizing far more of their capacities than might be suspected from a superficial account of their adaptations. This is not to say that all orangutan capabilities are utilized every day or even every week. There is no need to postulate this in an evolutionary sense. Certainly most humans have the capacity to learn algebra or to read and write; yet in many societies virtually none do.

Rod Brindamour, courtesy National Geographic Society

Rio at Birute's feet—asleep



During the recent highly successful Leakey Foundation San Diego Symposium, Dr. David A. Hamburg underscored the fact that students are responsible for much of the research work currently being done in anthropology and other scientific fields. To illustrate the high caliber of students today, and the breadth of the field of anthropology, Dr. Hamburg cited humorous examples from a mock exam turned in to him by one of his students. It is our pleasure to share this "exam" in its entirety with our readers.

QUALIFYING EXAMINATION: Ph.D. ANTHROPOLOGY

Instructions: Read each question carefully. Answer all questions.
Time limit - 4 hours. Begin immediately.

HISTORY – Describe the history of the papacy from its origins to the present day, concentrating especially but not exclusively, on its social, political, economic, religious, and philosophical impact on Europe, Asia, America, and Africa. Be brief, concise, and specific.

MEDICINE – You have been provided with a razor blade, a piece of gauze, and a bottle of Scotch. Remove your appendix. Do not suture until your work has been inspected. You have fifteen minutes.

PUBLIC SPEAKING – 2,500 riot-crazed aborigines are storming the classroom. Calm them. You may use any ancient language except Latin or Greek.

BIOLOGY – Create life. Estimate the differences in subsequent human culture if this form of life had developed 500 million years earlier, with special attention to its probable effect on the English parliamentary system. Prove your thesis.

MUSIC – Write a piano concerto. Orchestrate and perform it with flute and drum. You will find a piano under your seat.

PSYCHOLOGY – Based on your knowledge of their works, evaluate the emotional stability, degree of adjustment, and repressed frustrations of each of the following: Alexander of Aphrodisias, Rameses II, Gregory of Nices, Hammurabi. Support your evaluation with quotations from each man's work, making the appropriate references. It is not necessary to translate.

SOCIOLOGY – Estimate the sociological problems which might accompany the end of the world. Construct an experiment to test your theory.

MANAGEMENT SCIENCE – Define management. Define science. How do they relate? Why? Create a generalized algorithm to optimize all managerial decisions. Assuming an 1130 CPU supporting 50 terminals, each terminal to activate your algorithm; design the communications interface and all necessary control programs.

ENGINEERING – The disassembled parts of a high-powered rifle have been placed in a box in your desk. You will also find an instruction manual printed in Swahili. In ten minutes a hungry Bengal tiger will be admitted to the room. Take whatever action you feel appropriate. Be prepared to justify your decisions.

ECONOMICS – Develop a realistic plan for refinancing the national debt. Trace the possible effects of your plan in the following areas: Cabism, the Domatist controversy, the wave theory of light. Outline a method for preventing those effects. Criticize this method from all possible points of view, as demonstrated in your answer to the last question.

POLITICAL SCIENCE – There is a red telephone on the desk behind you. Start World War III. Report at length on its socio-political effects, if any.

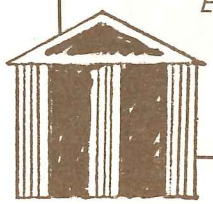
EPISTEMOLOGY – Take a position for or against truth. Prove the validity of your position.

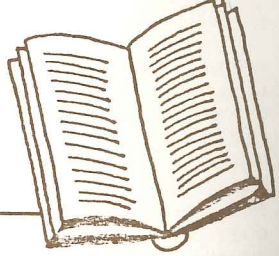
PHYSICS – Explain the nature of matter. Include in your answer an evaluation of the impact of the development of mathematics on science.

PHILOSOPHY – Sketch the development of human thought; estimate its significance. Compare with the development of any other kind of thought.

GENERAL KNOWLEDGE – Describe in detail. Be objective and specific.

EXTRA CREDIT – Define the Universe. Give three examples.

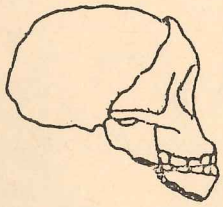




Grant Spotlight

The Grant program 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. Members and donors are invited to designate their gifts in support of specific research projects.

Some of the following grants have already received full funding and are so marked. Others marked "AMOUNT NEEDED" are still in need of additional funds. Won't you take this opportunity to direct your contribution to the grant project of your choice?



Mr. Yoel Z. Rak **$3,000 needed**

The Facial Architecture of the Australopithecines

A past participant in excavations at 'Ubeidiya under the supervision of Professor O. Bar-Yosef, and trained at the Hebrew University and Tel Aviv University in Israel, Mr. Rak is currently a predoctoral candidate at the University of California at Berkeley. His project will focus on the differences between the facial morphology and architecture of the robust and the gracile australopithecines. Mr. Rak will visit museum collections in South and East Africa to measure fossil skulls, utilizing a non-traditional method of measurement in which the face is viewed as a topographical object. With this data and the aid of a computerized topographical scanner at U.C. Medical Center in San Francisco, Mr. Rak will examine the faces of extant primates. On the basis of the relationship between the surface topography and the underlying architecture of the faces of both modern and ancient man and apes, it should be possible to make inferences as to the nature of the architecture of the australopithecine face. Mr. Yak has also received a grant in support of this important research from the Boise Fund.

Mr. Geoffrey G. Pope **$2,000 funded**

Paleoanthropological Investigations of Neogene and Quaternary Deposits in Thailand

Mr. Pope is a predoctoral candidate in Anthropology at the University of California at Berkeley, and has participated in the Lake Rezaiyeh Archeological Expedition to Iran. He has made a preliminary inspection and limited sampling of various fossiliferous sediments in Thailand which are of suitable lithology and age to yield fossil remains of Neogene and Quaternary Hominidae. The central anthropological issue of whether hominids emerged in Africa or Asia is necessarily unsolved in the absence of data from Asia comparable to African time sequences. Due to its central geographic position, Thailand is of particular importance in the migration of men and animals between insular and mainland Southeast Asia. Its potential for yielding the remains of Plio-Pleistocene hominids is high inasmuch as it is situated between South China and Indonesia, two areas in which fossil hominids and pongids have been found. The existence of extensive fluviolacustrine deposits and the development of karstic topography (including caves and fissures) within Thailand indicate that Mr. Pope's investigations will greatly increase our understanding of hominid evolution in Asia.

Fossil materials recovered during the initial survey have been returned to Berkeley for preparation and study. Pope and his team concentrated on the Chiangmai area in which karst caves abound, and were able to locate both vertebrate and archeological materials. Contingent upon acquiring additional funding, the team hopes to return to the area for continuing fieldwork in December.

Mr. Geoffrey Pope with guide and field assistants 100 kilometers from the border of Chiang Mai.

Dr. David G. Gantt **$1,900 needed**

Enamel Prism Patterns and Thickness of Enamel in Hominoids

Dr. Gantt, currently Assistant Professor of Anthropology at Florida State University, is studying the possible relationships between enamel histology, function (diet) and the evolutionary history of hominoids.

Preliminary analysis of fossil and extant hominoid teeth indicate the potential importance of the enamel prism pattern and the thickness of enamel as features of high taxonomic relevance. Specimens will be studied with the scanning electron microscope to determine prism patterns. Patterns thus obtained should establish the usefulness of this characteristic in assessing a phyletic relationship, as well as establishing the usefulness of these features in assessing isolated teeth, especially fossil remains.

Previous studies have documented the importance of these features in a number of anthropoids, and based on the information obtained from this investigation a much larger study will be conducted and extended to other primate species.

Dr. Timothy White **$3,500 needed**

Aerial Photographic Survey of Laetolil

Dr. White, Visiting Lecturer in Anthropology at the University of California at Berkeley, will make an aerial photographic survey of Laetolil, Tanzania, this summer. Working in connection with Dr. Richard L. Hay, Professor of Geology at Berkeley, Dr. White's photo mosaic will be ready for use during the 1978 summer field season.

Geological and paleontological investigations at the Pliocene site of Laetolil have been under way since 1975 under the direction of Dr. Mary D. Leakey. Her investigations have resulted in the recovery of rich fossil vertebrate fauna and the identification of a series of fossilized footprints. Included in the Laetolil collection are the earliest known hominid remains dated at over 3.75 million years.

Dr. White, who received his doctoral degree from the University of Michigan, has participated in the Koobi Fora Research project, Kenya, and has completed an exhaustive survey of fossil hominids and faunal materials from East Africa and Indonesian sites. He will work under the direction of Dr. Mary Leakey in her continuing stratigraphical and paleontological study of the Laetolil site.

GRANT SPOTLIGHT continued

Dr. Peter Andrews **$3,000 needed**

Investigations of the Ecology, Bone Preservation and Environments on Modern Carbonatite Volcanoes in East Africa

Senior Scientific Officer at the British Museum (Natural History) since 1974, Dr. Andrews has undertaken excavations in Turkey, continuous gibbon locomotor studies, research on the Miocene hominoid *Ramapithecus wickeri,* and ecological studies in Tanzania. In collaboration with Dr. Elizabeth Evans and Dr. Martin Pickford, Dr. Andrews is currently engaged in expanding a project begun by the late Dr. W. W. Bishop. Fieldwork, scheduled to begin later this year, will comprise an examination of the geology, bone preservation, and present distribution of living animals in the immediate vicinity of active and recently extinct carbonatite volcanoes in Tanzania. By relating present bone distribution on the ground to the living fauna and the substrate, it is hoped that a better understanding may be reached of how and why the bones came to be preserved in such an environment. Selection of these sites was influenced by the presence of Miocene fossil fauna at Fort Ternan, Rusinga Island and Wapak, all near similar ancient volcanoes.

Using methods developed by Dr. Evans and Dr. A. K. Behrensmeyer, initial fieldwork will be done during the dry season in 1978, and it will be repeated during the following wet season, utilizing the same sampling areas and procedures. This will enable some assessment to be made of seasonal variation in the plant and animal communities.

CHALLENGE GIFT TO ASSIST JOHANSON

Mr. and Mrs. Charles C. Holt III, of Palm Beach, Florida, have recently offered a generous challenge gift in the amount of $5,000 to assist Dr. Donald C. Johanson's continuing laboratory analysis of fossils recovered from the Afar Triangle, Ethiopia.

Discoveries of new fossils are publicized and expedition leaders hailed, but frequently there is very little mention of the vast quantity of work which must go on in the laboratories *after* the fossils have been unearthed. This timely pledge encourages financial support of vital studies which are essential to complete the post-field evaluations.

Dated at 3.5 million years, the hominid remains recovered by Johanson and his team are the most complete suite of associated fossil bones of such antiquity.

Left to right: top, Mrs. Max K. Jamison, Wendy Campbell, Barbara Pelosi, Larry Barker; middle, Mrs. Arnold Travis, Jane & Justin Dart, Fleur Cowles, Maggie Jagels; bottom, Dr. Richard S. Musangi, Dr. Ekpo Eyo, Mrs. Lawrence Barker, Jr.

EUREKA SYMPOSIUM

Biruté Galdikas Brindamour, Dr. Bernard Campbell, Professor Glynn Isaac, Robert Ardrey and Thomas Gray participated in a two-day symposium entitled, HUMAN ORIGINS, held in Eureka, California, in late March. Presented by the Humboldt State University and the College of the Redwoods in cooperation with the L.S.B. Leakey Foundation, the conference drew a crowd of over 800.

College of the Redwoods Associate Dean of Instruction and Coordinator of the successful event, Dr. Andrew Vangelotos noted, "The workshops were completely packed. We had very good response."

Delighted to discover that scientists are not aloof or unapproachable, students participated eagerly in frequent question periods where topics covered many facets of human evolution from the development of bipedalism to early human connections between art and death. Leakey Foundation representatives attending the symposium were encouraged by the size of the audience and the enthusiastic support of the community, and hope to continue such programs in this northern California center.

Your membership dollars at work.

Unlike large, privately endowed organizations, the Leakey Foundation's annual grant budget is directly supported by regular gifts from generous members who take an active interest in sustaining our international program of research and education into man's origin, behavior and survival.

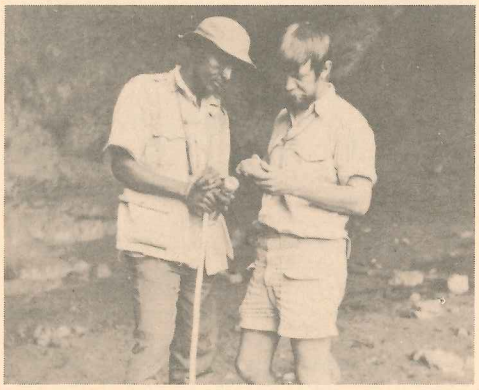
Man has lived as a part of nature—as a hunter and gatherer—for over 99% of the approximately two million years of his existence on earth, and only now is he beginning to undergo fundamental physiological and psychological adjustments in response to living in densely populated communities. For this reason the Leakey Foundation believes that understanding man's past is not only a key to understanding our present, but to ensuring our future.

Amy Lowen, T.I.L.L.M.I.A.P. laboratory, Kenya.

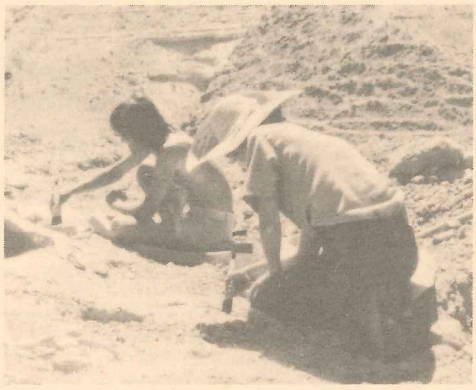
Heather and Bruce Westlund, University of California, Riverside Animal Behavior Research Unit, Mikumi National Park, 1977.

Linda Donley and Roni woman and child, Kenya.

Lars Smith, Yaida Valley, Tanzania.



John Ole Salenyi and Dr. John R. F. Bower at Mt. Elgon cave, Tanzania.



Lake Rezaiyeh Expedition team members at work in northern Iran.

The Leakey Foundation is proud to announce a magnificent new matching pledge from a Foundation Trustee who wishes to remain anonymous. This Benefactor will match all new or renewing membership contributions received from June through December of this year, up to a total of $50,000.

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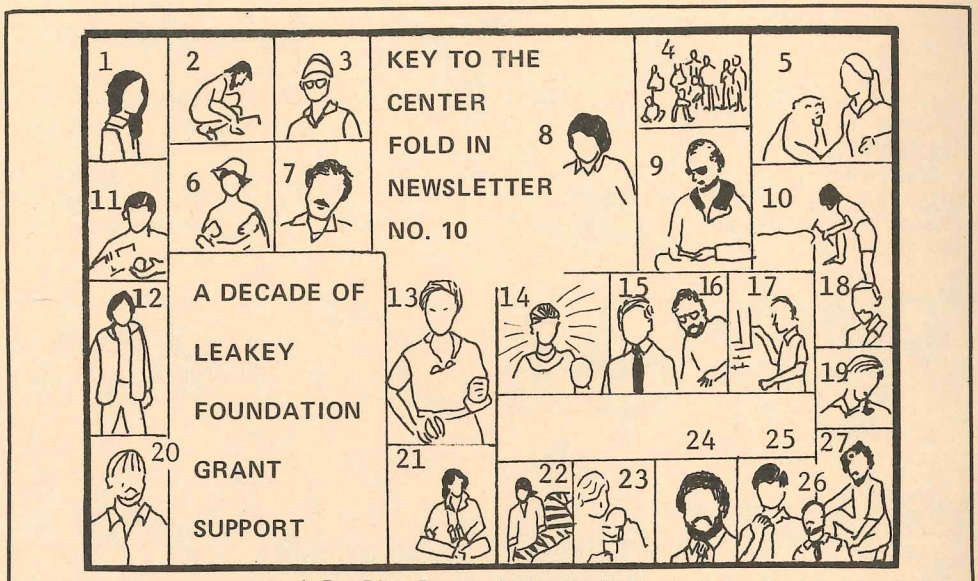
SAN DIEGO - continued from page 1

Large contingents of Leakey Foundation Trustees and Fellows came from San Francisco and Los Angeles. Some of the registrants came from out of state—as far away as Pennsylvania, Washington, D.C., Illinois, Alaska, Nevada, Arkansas and New Mexico. San Diegan Sheldon Campbell echoed the enthusiasm of many when he said, "That was the longest, greatest day of concentrated learning I've ever experienced in my life."

Foundation Trustee Barbara Newsom Pelosi chaired the outstanding program which was cosponsored by the San Diego Natural History Museum, the Zoological Society of San Diego, the San Diego Museum of Man, and the University of California, San Diego, University Extension.

Following the excitement of the Symposium, some 150 Leakey members and their guests honored their distinguished visitors at dinner, in the Little America Westgate Hotel. Carl Sagan was the speaker for the evening; Mrs. Frank Montgomery Woods was dinner chairman; Mrs. Rod A. McLennan was co-chairman.

San Diego Dinner Committee members included Dr. Burt Aginsky, Dr. Ethel Aginsky, Dr. and Mrs. Victor Mazzanti, Rear Admiral and Mrs. L. H. Hunte, Mrs. Peggy Baumer, Mrs. Jacob Bronowski, Sheldon Campbell, Mrs. Helen Copley, Mrs. Gloria Getty, Gordon Getty, Ed Harrison, Mrs. Thomas Hamilton, Mrs. John Kelly, Patrick Kruer, Mrs. Max Jamison, Gordon Luce, Rita Mills McCoy, Mrs. John Mabee, Barbara Newsom Pelosi, Burt Raynes, Richard Silberman, Robert Wilkie, Peter Willox and the Honorable Pete Wilson, Mayor of San Diego.



1. Dr. Dian Fossey, 2. Dr. J.W.K. Harris, 3. Dr. Ofer Bar-Yosef, 4. Mr. Michael Mehlman, 5. Dr. Jane Goodall, 6. Ms. Birute Galdikas-Brindamour, 7. Dr. F. Clark Howell, 8. Dr. Mary D. Leakey, 9. Dr. Bernard Campbell, 10. Dr. Patricia Helfman, 11. Dr. Donald C. Johanson, 12. Dr. Judith Van Couvering, 13. Dr. Louis S.B. Leakey, 14. Ms. Elizabeth Meyerhoff, 15. Dr. Garniss Curtis, 16. Dr. John Onyango-Abuje, 17. Dr. R.E. Taylor, 18. Dr. Desmond Clark, 19. Mr. Richard E. Leakey, 20. Dr. John R.F. Bower, 21. Dr. Shirley Strum, 22. Dr. Diane Gifford, 23. Dr. Vilém Bishof, 24. Mr. Tepilit Ole Saitoti, 25. Dr. David Pilbeam, 26. Dr. Glynn Ll. Isaac, 27. Dr. Andrew Hill.

LONDON - continued from page 1

Professor Glyn E. Daniel FSA; Bernard E. B. Fagg MBA, FSA, FMA; Sir Vivian E. Fuchs; Dr. Jane Goodall; Vanne Goodall; Professor Geoffrey Ainsworth Harrison; Jaquetta Hawkes OBE, FSA; Professor Jean de Heinzelin de Braucourt (Brussels); Professor Robert Hinde FRS; Professor G.H.R. von Koenigswald (Frankfurt); the Rt. Hon. Marquis of Linlithgow MC; Dr. Desmond Morris; Dr. Kenneth P. Oakley FBA; Professor Phillip V. Tobias (Johannesburg); Dr. Bogodar Winid (Warsaw).

SAFARI PLANNED

The Foundation is planning a 21 day archeological safari including two weeks in southern Africa and one week in Tanzania.

Dr. Munger reports that he has arranged for the Leakey entourage to visit the famous White Lady of the Brandberg cave painting in Namibia, Olduvai Gorge in Tanzania and other fabled sites in the company of leading scientists. Optional visits will be available in the Seychelles, Kenya, Egypt, and Brazil before or after the main tour.

For information including an illustrated brochure, please notify the Leakey office. Only a limited number of reservations will be accepted with priority given to Fellows. The trip is being organized under the leadership of Trustee Kay Woods.

the L.S.B. Leakey foundation news

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