the L.S.B. Leakey foundation news

NUMBER 20 FALL 1981

AGGRESSION, EVOLUTION AND HUMAN SURVIVAL

by Irven DeVore

Departments of Anthropology and Biology, Harvard University

Konrad Lorenz, Nobel Laureate and a giant of modern biology, came to this reluctant conclusion in *On Aggression*: wherever he looked in the animal kingdom, whether at birds, reptiles, mammals or insects, he found aggressive competition. Aggression, he reasoned, must be a *sine qua non* of life; the structures and behaviors of aggression are necessary if only the "fittest are to survive, mate successfully, and carry on the species." Animal aggression, however, was most often expressed by bluff and ritualized combat; mortal wounds were rare. Since aggression is also inevitable in the human species, our best hope lay in finding more constructive ways to channel and release our aggressive impulse.

This conclusion, like all of Lorenz's work, includes many creative insights, but today we realize that his argument rested on several faulty assumptions. First, of course, biologists no longer believe that individuals are behaving "for the good of the species." Furthermore, even if this were the case, Lorenz was using a narrow and discredited definition of "fitness" – a definition that equates fitness with strength and superior fighting ability. While biologists believe that the evolution of any species by natural selection depends upon competition within that species, they do not believe that success in such competition is measured by either strength or longevity; rather, the ultimate test of fitness is reproductive success. More precisely, when we assess the fitness of an individual (or a gene or a behavior), we now look beyond the individual animal to also consider the effects on the fitness of that individual's kin. Kin selection, or "inclusive fitness," considers both the consequences of any behavior upon one's own reproduction, and also the consequences for the reproductive success of one's kin – that is, individuals with whom one shares genes by common descent.

Adult male Savanna Baboon – threat stance Anthro-Photo

From this point of view, one may ask whether the inclusive fitness of an individual will or will not be best advanced by an act of aggression; but, in any case, one should not assume that aggression is contributing to the fitness or success of a whole species. On the contrary, consider the enormous energy investment an individual must make in order to be aggressive: energy must be diverted to building muscles, claws, tusks or horns, leading to a high cost and resulting in delayed maturation – and all this *before* expending energy in the act of aggression itself. If we could somehow redesign the evolutionary process, we would probably conclude that a species would be far better off if it could simply dispense with these huge costs and invest the energy in more beneficial pursuits, e.g., in better quality care for the immature members of the group. In the real world, the "aggressive complex" or morphology and aggressive behavior, which promotes successful reproduction for oneself and one's relatives, will probably *lower* the fitness of the group, population, or species.

continued on page 14

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 human 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.

OFFICERS OF THE BOARD

Edwin S. Munger, *President*
Lawrence Barker, Jr., *Vice President*
Mrs. Arnold Travis, *Vice President*
Mrs. John B. Callery, *Secretary*
Coleman Morton, *Treasurer*

BOARD OF TRUSTEES

Gordon Getty, *Chairman*
Robert M. Beck, *Vice Chairman*
Mrs. John L. Bradley
Mrs. Elizabeth Brady
Mrs. R. Hugh Caldwell, Jr.
Miss Fleur Cowles
Mrs. Justin W. Dart
Mrs. Robert Donner
Paul T. Guinn
Ed N. Harrison
Hubert R. Hudson
Mrs. Max K. Jamison
George D. Jagels
Mrs. Richard Muir
Fred Myers
Barbara Newsom
Mason Phelps
Mrs. Elmer Schlesinger
Mrs. George M. Seignious II
Jeffrey R. Short, Jr.
Leighton A. Wilkie
Mrs. Frank M. Woods

SCIENCE AND GRANTS COMMITTEE

Dr. F. Clark Howell, *Chairman*
Dr. Bernard Campbell
Dr. J. Desmond Clark
Harold J. Coolidge
Dr. Irven DeVore
Dr. Ekpo Eyo
Dr. Murray Gell-Mann
Dr. Jane Goodall
David A. Hamburg, M.D.
Dr. A. S. Msangi
Dr. Edwin S. Munger
Dr. Richard S. Musangi
Dr. Melvin M. Payne
Dr. Frederick Seitz
Phillip V. Tobias, M.D., Ph.D., D.Sc.
Dr. John Van Couvering
Dr. Bernard Vandermeersch
Dr. David Western
Dr. Bogodar Winid
Dr. Richard Wrangham
Emeritus:
Paul MacLean, M.D.
Dr. Sherwood Washburn

Mrs. Mary Pechanec, *Executive Director*

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 P. Brady
Associate Editor . . . . . Elizabeth Waldron
Production Editor . . . . . Jan Slater

The L.S.B. LEAKEY FOUNDATION NEWS is published by the Foundation as a service to its members. Single copy price, $1. L.S.B. Leakey Foundation, Foundation Center, 13–83, Pasadena, CA 91125.

Copyright 1981, L.S.B. Leakey Foundation.

PRESIDENT'S MEMO

Your Foundation is characterized by its small professional staff stuffed into two shoebox offices and by the large number of volunteers who give from four to forty hours a week to programs of the Foundation.

We are pleased that the idea originated by Trustee Diana Callery for a series of Leakey posters has proved to be financially and artistically successful. All but five of the one hundred signed and numbered posters, individually autographed by the trimates – Jane Goodall, Dian Fossey, and Biruté Galdikas – have been taken. Added supplies of unsigned posters are left for sale or as benefits for members.

Businessman–Trustee Lawrence Barker, Jr. continues to give a great deal of his time to the Foundation in between his travels. I asked him to summarize his thoughts about the Leakey Foundation, and here they are:

It is hard to believe that the Leakey Foundation is already thirteen years old. It was founded by uncommon individuals who, as risk takers, enthusiastically backed the search for human origins.

Many thought that we would not last long as a foundation. There were lean years, but we have not been deterred by doubters. Some of them have been right in that we have been led into blind alleys which provided no easy discoveries, but the failures have been far outweighed by our successes in supporting pioneering scientists in cultural and paleoanthropology, and primatology, with supporting disciplines such as geology. Our steady support of scientists young and old, neophytes and veterans, is repeatedly justified.

Frankly, it has not been easy to obtain funds from large grant-making foundations and corporations who sometimes avoid the risk of backing newcomers with new ideas. But we have found a number of uncommon givers. They are mainly individual men and women, but also a few foundations and corporations, who have answered the call of adventure. They commonly know the scientists, read their books, listen to their lectures, and find the scientists open to their lay ideas. A number have even visited individual scientists at their research sites around the world or in their labs.

Those who back the Leakey Foundation on an annual basis number in the hundreds rather than the thousands; but each year we add a few more enthusiastic supporters. In 1980 we were able to fund $330,000 in grant requests from scientists, up from $204,000 in 1975.

If you wish to join with us and participate through lectures, symposia, and contributions, we urge you to write to us and tell us of your special interests. This is not a private foundation for the handful. We would like to share our uncommon Foundation with more uncommon individuals.

Businessmen such as Lawrence Barker, George Jagels, Robert Beck, Mason Phelps, Leighton Wilkie, Hubert Hudson, Coleman Morton, Ed Harrison, Gordon Getty and Jeffrey Short, not to mention uncommon businesswomen such as Kay Woods and the Steinbrights of the Arcadia Foundation, share a sense of vision and excitement in expanding the frontiers in the search for the origins of our species, and the roots of our behavior. My happy refrain is always: all gifts go directly to the scientists because our small overhead is covered.

Ned Munger

NIGERIA SPEAKS, OCT. 25

Leakey Foundation members will be invited to attend a special lecture and private viewing of the art treasures of ancient Nigeria on Sunday evening, October 25, from five to eight o'clock. This magnificent collection of 100 masterpieces of Nigerian art, some of which are two thousands years old, has received wide acclaim during its current tour of major U.S. museums. Treasures include Benin bronzes, soapstone, copper, ivory and terra cotta sculptures. Dr. Ekpo Eyo, guest curator of the exhibit, who will be our guide for the evening, is a Leakey Foundation Trustee and Director of Antiquities for the Nigerian National Museum. The exhibition will be on view at the California Museum of Science and Industry until January 10, 1982.

Invitations to attend the lecture, private viewing and cocktail buffet will be mailed to all Leakey Foundation members in late September. Charter flights for San Francisco Bay Area members may be scheduled pending demand. □

YES, VIRGINIA, THERE IS A DIFFERENCE

Sex Differences in Human Brain Asymmetry and in Psychology

by Jerre Levy

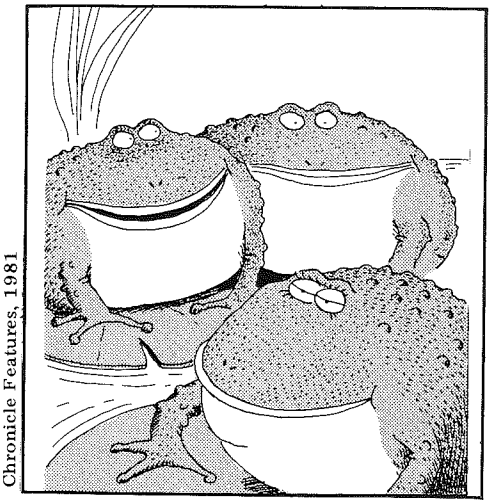
Department of Behavioral Sciences, the University of Chicago

Sex differences in behavior and psychological function are prevalent throughout the animal kingdom. Male rats are superior to female rats in learning complex mazes, but females are superior to males in learning to move from one compartment to another in a shuttle box to avoid electric shock. Juvenile male monkeys engage in more rough and tumble play than females. In many species of songbirds, only the male sings. For almost any species in which two sexes exist, sex differences in behavior are observed.

"Men manifest superiorities in tasks involving the understanding of spatial relationships and mathematical reasoning."

In our own species, too, there is overwhelming evidence of behavioral differences between the two sexes. Girls speak earlier than boys; little boys are more physically aggressive than girls. Disorders of reading are four times as prevalent in boys as girls, and adult women read more and more rapidly than men. Indeed, in almost all indices of verbal fluency – rate of word production, naming of colors, writing, reading, spelling, and clerical skills – the average female surpasses the average male. Boys and men, however, manifest superiorities in tasks involving the understanding of spatial relationships and mathematical reasoning. They display greater competency in mentally folding two-dimensional representations into their three-dimensional forms, in making and reading maps, in performance on paper-and-pencil mazes, in imagining how scenes would look when viewed from different perspectives, and in extracting simple forms from a complex surrounding framework. This latter skill has been called "field independency" and is reflected in the superior male capacity to identify a simple shape embedded in a complex shape and to set a rod to the absolute vertical when surrounded by a tilted form.

The female cognitive style has been called "field dependency," but could just as accurately be called "context sensitivity," and perhaps this would be the more correct description, given a superiority of females for incidental learning. When men and women view films and are told they will have to provide a synopsis, the two sexes perform equally well, but when subsequently asked to provide descriptions of details in the film that are not critical for the story line, women are consistently superior. They pick up, in other words, contextual details that men miss or ignore. The advantage of males on maps and mazes and in seeing simple forms in a complex surround may partially be due to the richness of sensory information incorporated by women that makes the identification of simple relational invariants difficult.



Chronicle Features, 1981

"Vive la difference." Gary Larson

The masculine psychological characteristics would be expected to put men at an advantage in understanding the physical world where a few laws and principles, a few sets of relational invariants, are sufficient to predict a great part of physical reality. Conversely, the psychological characteristics of women, entailing the perception, memory, and integration of complex multi-dimensional experiences with a wealth of contextual variations, would be expected to put them at an advantage in understanding the social world. Women, in cultures all over the world, have been found to be superior to men in understanding the social and emotional meaning of facial expressions, and this may be one reflection of their social skills.

". . . women are consistently superior in picking up contextual details that men miss or ignore."

There is little scientific disagreement regarding the fact that men and women differ psychologically, but almost no consensus regarding the causes of these differences. Until recently, it was assumed that all variations between the sexes could be explained entirely on socio-cultural grounds. The differing social expectations for men and women were held to be responsible for all sex differences in emotional, motivational, cognitive, and behavioral functions. New research on brain organization and on hormone/behavioral relationships has raised the possibility that, at least in part, psychological sex differences in people are biologically based, that the human animal, like other animals, is sexually dimorphic in important neuropsychological characteristics.

"Until recently, it was assumed that all variations between the sexes could be explained entirely on socio-cultural grounds."

It has been known for over 100 years that the two sides of the human brain are asymmetric in function, that in the vast majority of right-handers the left cerebral hemisphere is predominant for speech. During the last half century, it has also been established that the right hemisphere is specialized for a variety of nonverbal processes. Studies show that each side of the brain is predominant in a set of processes that are complementary to those on the other side.

There are, however, individual differences in the patterns of brain asymmetry with respect to the direction in which functions are lateralized. Left-handers are highly heterogeneous in cerebral asymmetry: some have the major speech centers on the left; others have the major speech centers on the right; in a substantial fraction, linguistic functions are bilaterally represented to a greater extent than is the case in most right-handers; functions within the linguistic or nonlinguistic domains are often laterally dissociated, with reading, for example, being specialized to one hemisphere and speech to the other. In most right-handers, damage of the left hemisphere leads to disorders of speech, comprehension of language, reading and writing, but in many left-handers, unilateral cerebral injury produces speech disorders, with no disability in comprehension and with reading and writing intact, or with the latter processes disrupted, but speech showing few indications of abnormality. Right-handers are also variable in patterns of brain asymmetry, and the

continued on page 12

FIELD REPORTS

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

ACHEULEAN SITES AT OLDUVAI

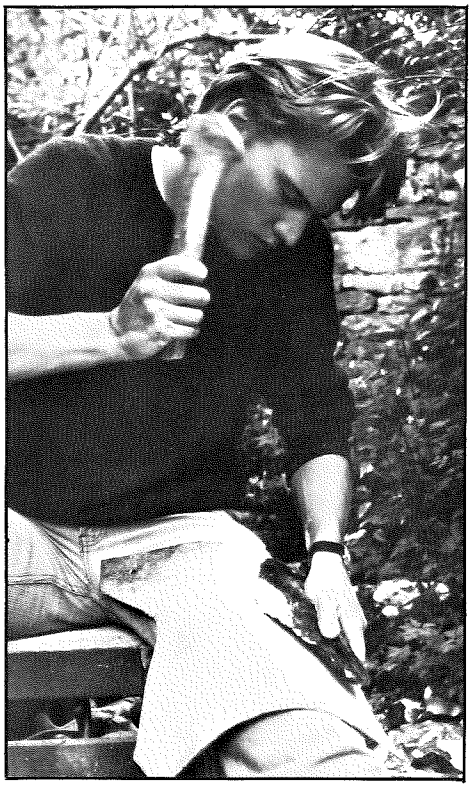
Peter R. Jones,
Oxford University, England

Since returning to Olduvai in September, 1980, I have worked extensively on two Early Acheulean sites in Bed II, both of which were found during earlier surveys of the Gorge and recorded as promising areas for excavation. My aim is to increase the Early Acheulean sample from this bed. Until recently, only one clearly Acheulean site (as defined by Mary Leakey) had been excavated in Bed II. Dr. Leakey's suggestion that the Developed Oldowan and Acheulean industries co-existed, and were separate, distinct industries, has been questioned by some archeologists. These new excavations should help to clarify this matter; they will also allow a more detailed comparison of the Bed II and Bed IV Acheulean assemblages. My recent excavations have uncovered many more specimens *in situ* and some interesting fauna.

The Acheulean Industrial Complex seems to have lasted for about 1.3 million years in Tanzania alone. The site EF HR at Olduvai has been put at about 1.5 M.Y. and a uranium series date of about 260,000 has been obtained for Acheulean assemblages at Isimila in central Tanzania. The many Acheulean assemblages spread throughout this time range are remarkable in their overall similarity; the differences that do exist could be the result of different raw materials, or environmental or cultural factors. The Bed II and Bed IV Acheulean assemblages are separated by about three quarters of a million years. The sources of the raw materials used for tool manufacture are known and there is good information available on the past environments and fauna. This is an ideal situation in which to study the Acheulean.

A major part of my approach to the tools involves replicating them in the same raw materials that were used by earlier tool makers. In this way different methods of tool manufacture, at different sites and in different materials, can be seen and compared. Further experimental work involves the use of these tools for different activities that seem appropriate to the possible life style of Acheulean people. Meat and vegetable processing experiments are underway and it is planned that these experimentally used pieces will go toward a microwear analysis program to be carried out on the Olduvai materials.

Butchery experiments that have already been published indicate that plain flakes (chips) in any kind of stone can effectively



Peter Jones making paleolithic stone tools with an antler hammer.

cut the hide, skin, and dismember carcasses of animals; some kinds of stone, for instance obsidian and quartzite, are better than others. However, the job is done more quickly and with greater ease if a large handaxe is used. Handaxes vary in size from 15 cm. at many sites to about 30 or 35 cm. at others, and generally weigh a pound or two. These tools are characteristic of the Acheulean; tools of this type, for example, are not found with Developed Oldowan assemblages. These results, with many other factors, indicate that Acheulean tool makers were regularly involved in the butchery of animals.

A big question still remains, however – were these tool makers hunters? The answer would be hard to prove, but I do not think that they were. I'm sure that they caught small animals such as lizards and tortoises, but I don't think that they actually chased and mortally wounded larger animals (buffalo, elephant and hippo). It seems to me that all of the tools from this period were processing tools rather than weapons and at certain times of the year it is possible to scavenge a great deal of meat in the Olduvai area. That leads to another experiment I must do – how much meat could be collected from a given area at different times of the year?

RECONNAISSANCE OF THE SOMALI DEMOCRATIC REPUBLIC

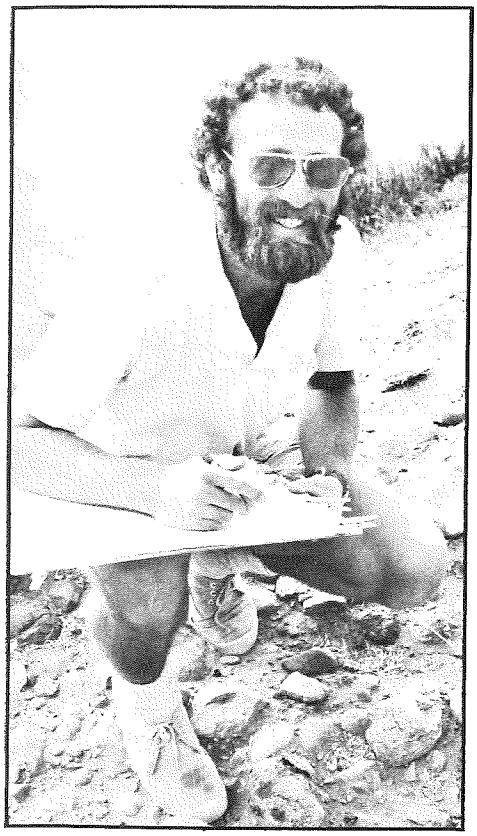
Steven A. Brandt,
Dept. of Anthropology,
University of Georgia,
Franklin Mosher Baldwin Fellow

As a result of archeological research conducted during the first half of this century, Somalia was found to contain a wealth of prehistoric data ranging from Acheulean camp sites to Neolithic rock art. Since 1960, however, paleoanthropological research in the eastern-most country of Africa has not kept pace with the rest of the continent. Much of Somalia still remains archeologically unexplored, some regions have only been superficially examined, while chronometric dates have yet to be obtained from a single prehistoric site.

At the invitation of the Somali Ministry of Culture and Higher Education I traveled to Mogadishu at the beginning of July, 1980, to attend the First International Congress of Somali Studies and to conduct a brief paleoanthropological reconnaissance of selected regions of Somalia. I am indebted to the L.S.B. Leakey Foundation and Foundation for Research into the Origins of Man whose grants made this trip possible.

I spent three weeks exploring parts of northern and southern Somalia. Much of the Somali Plateau is composed of limestones of Late Mesozoic and Early Cenozoic age. Long and narrow toggas or wadis criss-cross the plateau, forming intricate drainage systems where caves often form. A rapid survey of the region lying between Erigavo on the plateau and Las Koreh on the Gulf of Aden resulted in the discovery of a number of caves and rockshelters, many of which had Middle to Late Stone Age artifacts and faunal remains lying on the surface of potentially deep deposits. In fact, in just a two kilometer-long section of one togga, sixteen caves were spotted, including a large one with Middle Stone Age artifacts and faunal remains sealed in a breccia. Two rock art sites were also visited, one being a rockshelter with geometric designs incised on flat boulders, the other the site of "Geelkurqoran," a steep rock wall on which engravings of human hands and camels could be seen. Clearly this entire region would greatly benefit from a program of systematic exploration.

Situated approximately twenty kilometers northwest of Mogadishu are the granite inselbergs of Bur Acaba and Bur Eibe, where important test excavations of stratified rockshelter and open-air sites were conducted by Paolo Graziosi and J. Desmond Clark in 1935 and 1944 respectively. Their work resulted in the most detailed Late Quaternary culture-historic sequence as yet developed for Somalia, although it still remains chronometrically undated. A one day trip to this area



Steven Brandt

indicated that these archeological sites, which contain Middle to Late Stone Age artifacts and fauna, remain practically undisturbed from the time they were first investigated and that a more comprehensive and long term program of research would be highly warranted. This region also offers the opportunity of vitally important ethnoarcheological research as there are still groups of people who, during the dry season, supplement their diet of locally cultivated sorghum and maize by using bows and arrows as well as dogs to hunt a wide range of wild animals.

At the end of July I flew to Hargeisa where I spent two busy days exploring parts of northwestern Somalia, including a visit to a small gorge seventy kilometers northeast where successive layers of Plio-Pleistocene (Afar series) volcanics have been exposed. We arrived at the gorge less than one hour before nightfall, and as luck would have it, just as we were walking back to the Land Rover to begin a dark and trackless ride back to Hargeisa, I literally stumbled upon a basalt Early Acheulean handaxe. Although I obviously wanted to devote more time to this site, it was too dark to determine if other artifacts were in the general vicinity and I was unable to return at that time.

Although less than three weeks were actually spent in the field, the results of this brief reconnaissance clearly indicate that Somalia holds great promise for making major contributions to African paleoanthropology. The Somali people attach great importance to this kind of research as a means of better understanding their own past, but like many developing nations, they suffer from the lack of trained personnel. Collaboration with Somali scientists and the incorporation of a program to help train Somali students in paleoanthropology should be an essential part of all future research in Somalia.

EARLY HOMINOID DISCOVERY IN NEPAL

Jens Munthe
Stockton State College,
New Jersey

Nepal is almost unknown paleontologically. First opened to foreigners in 1950, this Himalayan kingdom still lacks roads in most areas. For me as a paleontologist, working in Nepal today presents problems similar to those which must have been faced by British geologists in India during the mid Nineteenth Century. I participated in the first expeditions to study Nepal's Cenozoic fossils in 1974 and 1976. These early expeditions recovered only a few Siwalik Hills fossils, mostly because of logistic problems in the rugged terrain. Thanks to the support of the Leakey Foundation, I was able to conduct an aerial reconnaissance of the Siwaliks in late 1979, when it was possible to pinpoint several paleontologically promising areas. With recently improved road access, I began detailed investigations in late 1980. Four U.S. paleontologists and a Nepali geologist spent December, 1980, and January, 1981, in the field. Work was funded by the Leakey Foundation and the National Geographic Society.

We set out from Katmandu by Land Rover for our initial camp at Tinau Khola, where a major stream has cut a gorge through the lowest foothills of the Himalayas just north of the Indian border. There we found a first upper molar of *Ramapithecus punjabicus*. Although this was the only hominoid specimen found during the 1980-81 field season, it provides quite a good deal of information and is significant in several respects.

First, the occurrence of *Ramapithecus* in south-central Nepal neatly fills the previous geographic gap in hominoid distribution between northern India and southern China. South Asian hominoid discoveries have increased dramatically in recent years, but almost all have been confined to two areas: Pakistan's Potwar Plateau and Yunnan in southern China. The Nepal discovery adds an important link in the chain of Asian hominoid biogeography.

Second, we were able to date the Tinau Khola *Ramapithecus*. The fossils with which it was associated, particularly the pig *Conohyus indicus*, suggested that we were dealing with a fauna similar in age to the Chinji fauna of Pakistan, and therefore quite old for south Asian hominoids. We paleomagnetically sampled the 2,000 meter-thick Siwaliks section at Tinau Khola and obtained clear-cut, nonambiguous results: the *Ramapithecus* site is early in magnetic Chron 10, or about eleven million years old. This came as quite a surprise, since almost all other reliably dated south Asian hominoids are about eight million years old. Even the oldest paleomagnetically dated hominoid sites in Pakistan are 1.5 million years younger than the Nepal locality. Much additional work will be necessary to evaluate this finding with respect to Asian hominoid biogeography and phylogeny.

Finally, we have tantalizing bits of evidence suggesting that the Nepal *Ramapithecus* may have occupied an unusually wet habitat. Most of the field season was spent in amassing Nepal's first reasonably representative collection of Miocene vertebrates. We now have some twenty-two species of fish, reptiles, and mammals. In contrast to most correlative faunas from India and Pakistan, the Nepal fauna is heavily skewed toward the aquatic elements. Both this and the sedimentological evidence indicate deposition in slow-moving streams, ponds, and swamps. Such an environment for *Ramapithecus* seems quite unusual, but we need paleobotanic evidence to evaluate this possibility.

Moving on from Tinau Khola, we worked out of three more camps scattered through the Himalayan foothills during the field season. Fossils are not as easy to come

Jens Munthe searching a cave in the Katmandu Valley, Nepal, for Pleistocene fossils.

by as in the Pakistan Siwaliks, but we discovered twenty fossil-producing sites and the state of preservation of fossils at some localities is excellent.

The fossils collected by the 1980-81 expedition were turned over to the Nepal Natural History Museum in March. We have now begun to document the history of Cenozoic life in Nepal. However, particularly because of questions raised by the

Tinau Khola *Ramapithecus* discovery, we must now try even harder to fit the missing pieces into the puzzle we have defined.

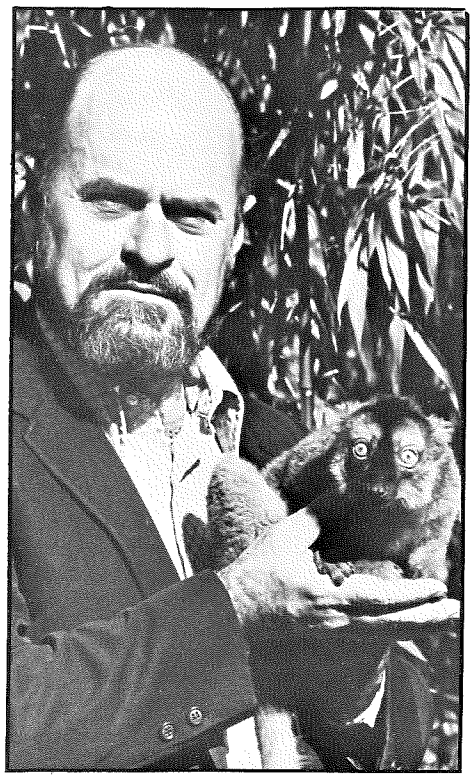
FOSSIL FIND IN NORTH INDIA

Stephen I. Rosen,
Department of Anthropology,
University of Maryland

The Indian summer of 1980 was broken by the monsoon which had been absent for almost two years. Most of the sub Himalayan waterways and lakes had become dry beds and the natives were completely dependent upon underground springs fed by high Himalayan snowcaps. The fieldworker in north India is highly dependent on the monsoon since the torrential rains and winds are the best paleoanthropologists. Wind and water erosion can cut large wounds into the Siwalik Hills, exposing fossil sites and carrying large amounts of fossil materials down to lower elevations. Thus, for the last two years we have not had the aid of the monsoon. The summer of 1980 work was hampered by the lack of past erosion and the imminent danger of the present rains and winds and complicated by the heat and extreme ultraviolet radiation.

We did come upon a primate fossil which, perhaps, may be of minor importance, but nonetheless very interesting. We found a fossil foot bone, a proximal phalange, dating approximately eight million years B.P. The initial problem is to determine the taxon of which this small bone is representative. The only primate which has supposedly been identified in the Siwaliks from this time zone is *Gigantopithecus*. The size of this bone would indicate a creature approximately one half the size of an average adult male human of our time. If *Gigantopithecus* was, in fact, as its name implies, a giant primate, then the bone was not of his body. If, as the Chinese paleoanthropologists claim, *Ramapithecus* was also a creature of some eight million years ago, then this foot bone could be ramapithecine. Our lack of knowledge of primate evolutionary biology between 14 million and 3.5 million years ago is profound.

The anatomical characteristics of this foot bone indicate a primate of late adolescence based on present human maturation features. The traits present are consistent with some form of sustained erect posture and bipedal locomotion. There is a lack of traits which would persuade one that this single bone belonged to a prehensile foot. It is not my claim to reconstruct the posture and locomotor abilities of an extinct primate on one small bone. The trait facts merely sustain opinion in that direction. We need a lot of skeletal remains before the case can be well documented or even well argued. The game is still afoot; the jury will be out for a long time.



Dr. Elwyn L. Simons, Director of the Duke University Center for the Study of Primate Biology and History, is shown here with a brown lemur outside the Center, located in Duke Forest, Durham, North Carolina.

A recent grant to the Center from the L.S.B. Leakey Associates will enable enlargement of the Duke housing facility for a large bushbaby colony begun originally at Yale in 1959. The Duke collection of 390 living lemurs, lorises, and bushbabies is currently the world's largest reservoir for captive conservation of such animals. The Center now houses eighteen different species of prosimians or submonkeys.

The annual budget of about $250,000 is jointly funded by Duke University, government grants, and gifts from private individuals and foundations, while further endowment and operating funds are currently being sought. Ongoing maintenance of the unique breeding colonies and the many associated research programs will eventually require an endowment of from $1.5 to $3 million. Researchers throughout the United States and from several European countries carry out a variety of study projects compatible with captive conservation of the non-renewable resource that these animals represent. Published research based on the Duke prosimians has included analyses of their biochemistry, genetics, karyology, hematology, physiology, reproductive biology, olfactory and vocal communication, social and maternal behavior, locomotion, growth and development, functional and evolutionary morphology. A list of these publications is available on request. Scientists interested in carrying out scholarly studies at the Center should write: Simons, Primate Center, 3705 Erwin Road, Durham, North Carolina 27705. □

When Dr. Mary D. Leakey was in the United States earlier this year, she summarized the progress at Olduvai and Laetoli for 1980.

REPORT ON LAETOLI & OLDUVAI

The greater part of 1980 has been devoted to preparation of the Laetoli material for publication.

Geology

Dr. R. L. Hay has now completed the first draft of his report on the geology.

Hominid Footprints

Dr. Louise Robbins and Dr. Michael Day studied the casts of the hominid trails in the Laetoli laboratory at Olduvai. Dr. Day took stereo photos of individual prints and Dr. Robbins measured the prints uncovered since her visit to the site in 1979. The method of presenting the report was discussed and a meeting was arranged for February, 1981, to correlate results, when Dr. Robbins would visit London.

Hominid Remains

Dr. T. D. White states that he has now completed the report on the remaining hominid specimens, nos. L.H. 15–28. Half a mandible found on the surface in 1979 and probably derived from the Olpiro Beds (L.H. 29) is being described by Dr. P. Rightmire in his review of E. African fossils attributed to *Homo erectus*.

Footprint Sites and Fauna

Miss Anne Cooksey from Albion College, Michigan, drafted for publication the site plans made by herself and Miss Hannah Jones in 1979. These plans are now in final form.

M. D. Leakey compiled a list of the faunal collection, amounting to approximately 6,500 specimens, in relation to sites and stratigraphic positions. Owing to the fragmentary and widely distributed condition of the specimens an estimate of numbers of individual animals proved impracticable. Indications of abundance or scarcity of certain taxa and their occurrence in given localities have been obtained by a count of parts identifiable to various genera. It is evident that there are differences in the proportionate representation of certain groups between the Laetolil and Upper Ndolanya Beds, particularly in the *Bovidae*.

Descriptions of the various faunal groups by paleontologists specializing in these taxa are proceeding well. A paper on the large carnivores by Dr. J. Barry of Yale University, one on the pedetids and lagomorphs by Mr. C. Davies of the University Museum, Oxford, and another on hipparions by Dr. D. A. Hooijer, Rijskmuseum fur Natuurlike Historie, Leiden, Netherlands, are now ready. Other papers nearing completion consist of: *Proboscidae*: Dr. Michel Beden, Faculté des Sciences, the

university at Poitiers, France; Rhinoceros and Chalicotheres: Dr. Claude Guérin, Dept. des Sciences de la Terre, Université Claude-Bernard-Lyon, Villeurbanne, France; Giraffes and Camel: Dr. J. M. Harris, Los Angeles County Museum; *Bovidae*: Dr. and Mrs. A. W. Gentry, British Museum of Natural History, London.

Descriptions of the molusca and birds have not been started, but Dr. G. Watson of the Smithsonian Institute has kindly undertaken to examine the small collection of avian fossils.

Fossil Wood

Samples of fossil wood collected from the Laetolil Beds at several localities have been submitted to Dr. R. Dechamps of the Musée Royal de l'Afrique Centrale, Tervuren. No determinations have been possible on account of poor preservation of structure, which has been replaced by calcite.

Insects

Termites:

The fossil termitaries in the Laetolil Beds at Locality 10 were investigated by Dr. W. Sands of the Dept. of Entomology, British Museum of Natural History. A complete fossil termite nest was found and excavated. It contained a hive chamber, foraging galleries and ventilation shafts. A fossilized queen cell was also found nearby. No fossil termites could be discovered, but samples of the hive filling have been taken to London for more refined examination than was possible in the field. The species of termite responsible has not yet been identified.

Several unusual features were noted in the fossil termitaries, in particular, much repairing and rebuilding of the original mounds. It appears that this activity may have been caused by volcanic ash covering the mounds, blocking exits and ventilation shafts, so that repairs and renewal of tunnels and chimneys were necessary in order to prevent suffocation of the communities.

Living termitaries were experimentally sealed with mud, dust and plastic sheeting by Dr. Sands. This resulted in some building and reopening of shafts, but since the experiments were carried out in the dry season, activity was minimal.

Brood Cells

Abundant insect brood cells or egg pods occur in both the Laetolil and Upper Ndolanya Beds. Samples have been examined by Dr. M. Ritchie of the Dept. of Entomology, British Museum of Natural History, London, who has submitted a preliminary report. He considers that the majority are probably of solitary bees, but some may also be of *Lepidoptera* or *Hymenoptera*.

Protection of the Hominid Footprints at Laetoli

Mr. A. A. Mturi, Director of Antiquities, Tanzania, has been in correspondence with UNESCO in connection with the construction of a building to preserve the hominid footprints at Laetoli. As a result, the UNESCO authorities sent out Dr. Fülep, Director of the Budapest Museum, to report on the situation. Dr. Fülep has submitted his report and the results are awaited.

It is understood that President Nyerere has expressed a personal interest in the preservation of this unique site.

While visiting Berkeley during February, 1980, M. D. Leakey held a consultation with Dr. R. L. Hay and Dr. E. Graf, of the Grout Pressure Co., San Francisco, to discuss means by which the footprint tuff could be permanently hardened and preserved. A series of samples has been sent to Dr. Graf for experimental treatment with various chemicals.

A sum of $26,000 has been donated through the Leakey Foundation toward the preservation of the footprints.

Olduvai Monographs

Beds III–IV volume: No progress has been made owing to delay in computer results.

Homo habilis: A meeting was held in London, during the Royal Society Symposium on the Emergence of Man, between Mr. R. Derricourt, representing the Cambridge University Press, Professor Michael Day, Professor of Anatomy at St. Thomas' Hospital, London, Professor P. V. Tobias, Director of the School of Anatomy, University of Witwatersrand, South Africa, and M. D. Leakey to discuss the publication date for the volume on *Homo habilis*. As a result of the meeting Professor Day undertook to forward his descriptions of the postcranial material to Professor Tobias by the end of September, 1980, and Professor Tobias agreed to write the concluding chapter by the end of the year.

Olduvai Fauna

Dr. C. S. Churcher has completed the description of the Olduvai equids. He kindly undertook the study in place of Dr. D. A. Hooijer, who was forced to retire by ill health. The fossil equids from Olduvai are now known to include three taxa, the extinct three-toed *Hipparion*, and forms ancestral to both the living Burchell's and the Grevy zebras. The earliest known wild ass has also been recorded from Bed II, Olduvai.

An overall study of the Olduvai bird collection in its stratigraphic context has been begun by Miss D. Matthiesen at the Florida State Museum. Funds from the L.S.B. Leakey Foundation have enabled this research to be undertaken.

Olduvai and Laetoli Collections

The Antiquities Department has completed the Laetoli Laboratory at Olduvai. This has enabled the entire collection of fossils and footprint casts to be housed in a single building. The Olduvai artifacts and the fauna from Beds III–IV remain in the former laboratory where there is now space to house them adequately. With the assistance of two students from Tanzania and one from Bedford College, London, the Olduvai and Laetoli collections have now been catalogued and stored in covered boxes. Many of the labels had been destroyed by insects; plastic labeling has now been employed and insect repellants placed in the boxes.

Lecture Program

The lectures given by M. D. Leakey in 1980 on the Laetoli hominid footprints aroused great interest. Repeat lectures were requested for 1981 by several institutions.

□

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.

Won't you take this opportunity to direct your contribution to the grant project of your choice?

Dr. Mary D. Leakey *$15,000 needed*

Olduvai and Laetoli

Dr. Leakey has requested grant assistance to enable her to continue excavation in the Lower Ndolanya Beds, Laetoli; for preparation of plans, drawings and fossil materials for publication in the Laetoli monograph; and for miscellaneous field expenses for the 1981 field seasons at Olduvai Gorge and Leotoli.

Dr. Myra Shackley *$3,000 needed*

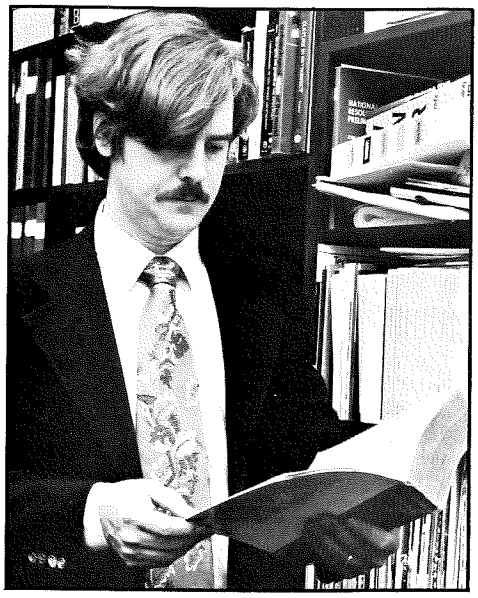
Paleolithic Archeology of the Central Namib Desert

Dr. Shackley is affiliated with the archeology department of the University of Leicester, United Kingdom. Her field research program, ongoing since 1978, is concentrated in the dune sea of the central Namib desert in Namibia, southwest Africa. Her goal is to establish a chronological and typological record of Paleolithic activities in this previously unexplored region.

Dr. Jonathon E. Ericson *$3,000 needed*

Tropic Level of Chinese *Gigantopithecus* By Biodiminution of Barium/Calcium

Dr. Ericson, Department of Anthropology, Harvard University, visited the People's Republic of China recently to discuss the possibility of mutual scientific cooperation with Chinese colleagues. While there, he was presented with five teeth from *Gigantopithecus* Cave, Liucheng,



Dr. Jonathon Ericson

Kwangsi, as a first step toward that collaboration.

His research plans require that his barium/calcium analysis of the teeth (two herbivore, two carnivore and one *Gigantopithecus*) be carried out by isotopic dilution mass spectrometry in the ultraclean facilities of Prof. Clair C. Patterson, Department of Geochemistry, California Institute of Technology.

Dr. Juliet Clutton-Brock *$2,000 needed*
Dr. Caroline Grigson

Fourth International Conference In Archeozoology – Contributions of Faunal Analysis To The Study of Man

This conference will be held in London at the Institute of Archeology, April 18–23, 1982. Papers presented will discuss the history of the relationship between animals and people and will detail aspects of human strategies for obtaining food during the prehistoric and historic periods.

The Leakey Foundation grant will cover some of the traveling expenses for the participants in the conference's first session, "Types of Early Hominid Sites as Indicated by Biological and Archeological Evidence." These participants include Peter Andrews, Diane Gifford, Andrew Hill, Glynn Isaac, Myra Shackley, Pat Shipman and Eitan Tchernov.

Dr. Jean-Michel Geneste *$4,200 needed*

Radiocarbon Dating of the Combe Saunière Paleolithic Sequence

Dr. Geneste, Director of Antiquities, requests funding for a series of carbon 14 absolute dates for the complete Upper and Middle Paleolithic sequence found at the site of Combe Saunière, a recently discovered cave and rockshelter in the northern Dordogne, France. Fifteen distinct occupation surfaces containing Middle and Upper Paleolithic industries, including the little-known Solutrean, are present at this site that spans the entire range of Wurmian (Late Quaternary) cultural development.

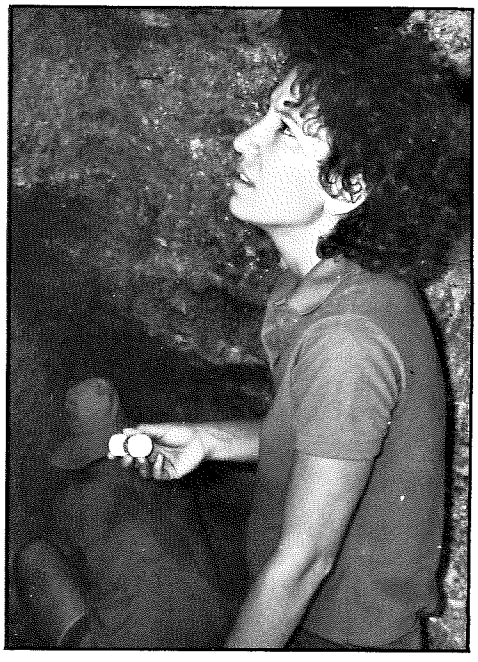
Dating of Combe Saunière will provide a long reference sequence for the later Paleolithic in western Europe as well as documenting the Solutrean sequence for further diachronic comparison with dated sequences found in Cantabrian Spain.

Dr. Patricia Masters *$5,000 needed*

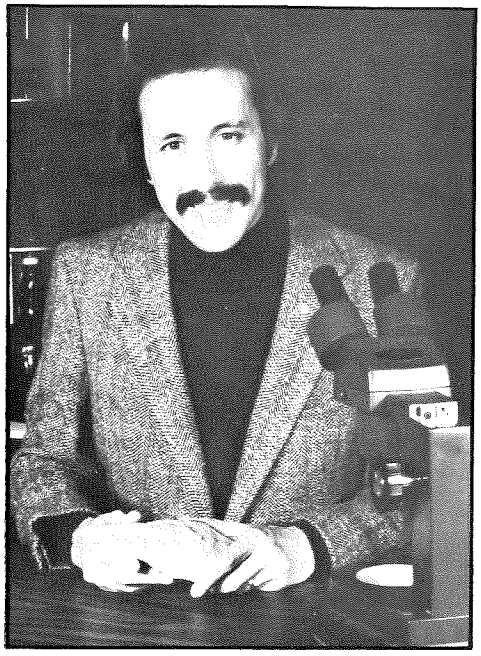
Quaternary Land-Sea Migration Bridges and Human Occupation of Submerged Coastlines

The Scripps Institution of Oceanography, San Diego, will present an international symposium Oct. 26–30, 1981, that will bring together oceanographers, archeologists, marine geologists, anthropologists and paleoclimatologists to present a coordinated series of papers on all subjects relating to the spread of human population across intercontinental marine barriers at times of low sea levels. The general evidence for human occupation of the continental shelves will also be discussed. A major focus will be the nature of the evidence for Pleistocene habitation and immigration routes for the Americas, Australia and Tasmania.

Dr. Masters, Coordinator of the Marine Archeology Program at Scripps, has requested assistance with per diem and housing expenses and publication costs.



Dr. Patricia Masters



Dr. John Olsen

Dr. John W. Olsen *$2,500 needed*

Investigations of the Late Paleolithic Occupation of Inner Mongolia

Dr. Olsen, University of Arizona, has received a special invitation from the University of Inner Mongolia and the Inner Mongolia Museum in Huhehot, People's Republic of China, to spend the summer there investigating the nature of the Upper Paleolithic occupation of Inner Mongolia and its relationship to contemporaneous archeological manifestations in other regions of north China. He plans to spend two weeks in Beijing consulting with colleagues at the Institute of Vertebrate Paleontology and Paleoanthropology and the Institute of Archeology. Later he will spend at least one month with Prof. Wang Yu-Ping at a series of Late Paleolithic sites in the region of Dayao village in the suburbs of Huhehot.

It is anticipated that a result of Dr. Olsen's visit will be a cooperative scientific research project between China and the United States exploring the Upper Paleolithic of Inner Mongolia.

Amina Said Mdahoma Mohamed *$8,000 needed*

The Smithsonian Institution Internship Program

Amina Said Mdahoma Mohamed is currently an education officer for the Lamu Museum, Kenya, an anthropological museum rich in examples of Kenyan tribal art and artifacts. She is responsible for designing and presenting educational outreach

programs about their heritage to Kenyan school children.

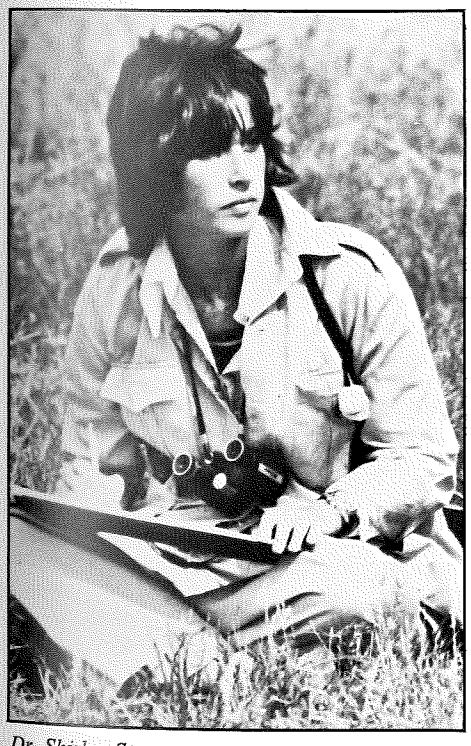
Miss Said has been accepted into the Smithsonian Institution's Internship Program in Museum Studies where she will receive intensive instruction in museum education. As part of her program, she will travel to several museums, including the Denver Museum of Natural History, for further insights and instruction. She will then return to Lamu and put to use the new knowledge she has gained. She is requesting financial assistance for travel and living expenses while in this country.

Dr. Shirley Strum *$5,000 needed*

How Does a Savanna-Living Anthropoid Change Foraging Strategies?

Dr. Strum is associated with the anthropology department at the University of California, San Diego. The focus of her current research at Gilgil, Kenya, is on the development of crop raiding by a population of olive baboons. Stages of crop utilization, its incorporation into the repertory of different groups, and the social factors contributing to changes in foraging patterns will be documented.

The situation at Gilgil in some ways parallels conditions postulated for early hominids and since baboon social organization is an adaptation to a savanna habitat, its underlying emotional and motivational elements provide an appropriate context to evaluate adaptive changes as these can occur for a savanna anthropoid. □



Dr. Shirley Strum

BALDWIN GRANTS AWARDED

Since their inception in 1977, thirty-five Baldwin Fellowships have been awarded by the Leakey Foundation for a total amount of $122,913. Fellowship recipients include students and scientists from Botswana, Ethiopia, Kenya, Malawi, Nigeria, Somalia, South Africa, Sudan, Tanzania, Togo, Uganda and Zambia, as well as from the United States. The Fellowships provide funds for the Third World that are available from very few other sources.

The following Franklin Mosher Baldwin Fellowships were recently awarded:

Dr. Abbas S. A. Mohamed Ali,

lecturer in the Department of Archeology at the University of Khartoum, received a Baldwin Fellowship of $2,500 for his research project, "Archeological Investigations on the West Bank of the Nile, North of Khartoum." He will conduct emergency archeological surveys of areas now threatened by modernization.

Berhane Asfaw,

University of California, Berkeley, was awarded $2,039, enabling him to continue graduate studies in anthropology and to attend a summer field training school in the Great Basin area. Mr. Asfaw is from Ethiopia.

Steven Brandt,

of the University of Georgia's anthropology department, received $1,789 to assist him in the ongoing development and implementation of a paleoanthropology program in Somalia.

Yusuf Juwayeyi,

a graduate student of anthropology at the University of California, Berkeley, received $900 to cover the cost of dating materials from the Late Stone Age/Iron Age found at Midima and Malowa rockshelter sites in southern Malawi.

Dovi Kuevi,

Togolese graduate student in archeology at the University of California, Los Angeles, was awarded a $4,000 Fellowship while he is in residence at the university. He will be the first Ph.D. in archeology from his country.

Lewis Matiyela,

of the Transkei National Museum, Transkei, South Africa, received $1,500 to enable him to conduct a survey and excavation of several Iron Age sites near Port St. Johns, Transkei.

Dr. Daniel Stiles,

lecturer in archeology at the University of Nairobi, was awarded $1,000 to help defray expenses for the university's archeology training program. The money will be used to assist with field training, the archeology library and the purchase of field equipment.

Bolanle Tubosun,

graduate student in archeology at the University of Ibadan, Nigeria, received $4,000 which will allow him to conduct paleoanthropological investigations in the Benue-Cross River region on the Nigeria-Cameroon border under the supervision of Professor B. W. Andah.

Dr. Simiyu Wandibba,

National Museums of Kenya, received $5,000 in support of his archeological and ethnoarcheological survey of the Bungoma District of Kenya, where little research has been previously conducted. □

NOVEMBER SEMINAR

The Leakey Foundation and the Caltech Faculty Committee on Programs will cosponsor a two-day series of lectures, IN SEARCH OF OUR ANCESTORS: PATHWAYS FROM THE PAST, November 14 and 15 in Beckman Auditorium, Pasadena.

Dr. Stephen Jay Gould, Harvard paleontologist and evolutionary biologist, and eight international experts will present illustrated lectures examining our anatomical and behavioral roots and surveying recent discoveries which have dramatically altered our views of the prehistoric past. Speakers will include Drs. Russell Ciochon, Owen Lovejoy, Donald Johanson, Glynn Isaac, Shirley Strum, F. Clark Howell, Irven DeVore and David Hamburg.

The seminar will close with a panel discussion, providing further insight from the experts and answers to selected written questions from the audience.

A Fellows dinner will be held on Saturday evening, November 14, honoring all the seminar participants. More information about the reservations and program may be secured by writing the Foundation Office, Foundation Center 13-83, Pasadena, California 91125. □

PROFILE

THE TRIMATES

Walt Fogler-Mancini

Left to right: Dian Fossey, Jane Goodall, Biruté Galdikas, and Donald Johanson.

Only a very special kind of person would choose to devote her life to the lonely and sometimes dangerous study of great apes in their natural habitats. Jane Goodall, Dian Fossey and Biruté Galdikas are such people; all three have spent years in some of the most remote parts of the world studying chimpanzees, gorillas and orangutans.

Jane Goodall, who looks more like a Brontë heroine than a veteran primatologist, is the doyenne of the group. She started her work at the Gombe Stream Reserve on the shores of Lake Tanganyika in 1960. Up to that time the only attempt to study chimpanzees in the wild had been made by Dr. Henry Nissen in French Guinea. He spent two and a half months there; Jane Goodall has devoted the last twenty years to her observations.

All three women are protégées of the late Dr. Louis Leakey who said that there are all sorts of reasons to make a careful study of the great apes in the wild. "For one thing, it may soon be too late. Man is rapidly destroying their habitats and cultivating new areas, killing the animals."

Regarding chimpanzees, Dr. Leakey went on, "Details about one of the most man-like creatures living today in its natural state may give us useful pointers as to the habits of prehistoric man himself." This was the spring-board from which primate research took off.

Jane Goodall was born in England and from her very early childhood she loved and was interested in animals. To illustrate this she tells a story about herself. To satisfy her curiosity about how hens laid their eggs she hid in the hen house for five hours, waiting, hoping and watching. By the time she emerged the police had been alerted and the whole household was in a state of high agitation.

Like Dian Fossey, she always dreamed of the day when she would go to Africa. After she left school she took various jobs, saving as much as she could from each paycheck to finance her future trip. At last, in the late 1950s, she arrived in Kenya, met Dr. Leakey and worked as his secretary at the Coryndon, now the National Museum of Natural History in Nairobi. It was at his suggestion that she started her life's work at the Gombe Stream Game Reserve.

The chimpanzees Jane Goodall studies are found only in Africa. They roam the equatorial forest belt from the west coast to just east of Lake Tanganyika. Her area covers about fifteen square miles of rugged country where at any minute she could encounter some dangerous animal, reptile or poisonous insect as well as a wandering primate.

It was two months after her arrival at Gombe before the chimpanzees began to accept her presence. After four months she saw her first deliberate fashioning and use of a tool, a specially prepared blade of grass a chimpanzee was using to probe a termite nest, fishing for a tasty snack. "He actually modified stems and grasses and made them suitable for his purpose."

Dian Fossey is a San Franciscan and is tall, with thick black hair. She met Dr. Leakey in 1963 on one of his frequent lecture trips to the United States. She was working then as an occupational therapist but had always had a tremendous inner urge to go to Africa. "I felt it from the day I was born," she says. "I love Africa and I've loved animals all my life. I had no training for this work (observing gorillas)." When she told this to Dr. Leakey he replied, "I want open minds, I don't want preconceived opinions. I just want people to go out there and look." And this is what she did – she went and looked.

The only previous study made of the mountain gorilla was the work of Dr. George Schaller who spent two years in the field before political pressures forced him to terminate his observations. Dian Fossey has spent the last thirteen years working from her camp ten thousand feet up on the slopes of the Virunga Mountains of Rwanda in central Africa.

The future of the mountain gorilla, a rare subspecies found only in these mountains, looks very bleak. These great beasts are threatened by man's encroachment and the attacks and snares of poachers, practices the government finds hard to stop. In 1977, a young male gorilla, whom Dian called Digit, was killed, his hands and head hacked off to be sold as souvenirs to tourists. Other such butchery followed. She has now established patrols to contend with the poachers in her study area, but fears that the mountain gorilla may be extinct in the wilds within a decade.

Early in her work Dian Fossey learned that these shy gorillas would accept her more readily when she acted like one of them. She had to learn to scratch and groom, beat her chest, imitate their hoots, grunts and belches. But, she claims, her patient attempts brought undreamed-of results. She has found these animals to be intelligent, gentle and sociable.

Biruté Galdikas has spent ten years working with orangutans at the Tanjung Puting Reserve in Indonesian Borneo. She is a Canadian of Lithuanian extraction, with thick brown hair and clear blue eyes, and like the other two women, she was fascinated with primates, wanting to study orangutans in their native forests.

She was a graduate student in anthropology at UCLA when she met Louis Leakey and approached him with her idea of doing long term study of these pongids. Dr. Leakey offered his moral support, challenging her to make contact with the orangutans within ten years. Fortunately, Biruté was able to accomplish this in far less time.

Orangutans are Asia's sole living species of great ape, found only in Borneo and Northern Sumatra. They too are threatened by man's encroachments. In addition to her wild orangutan research, Biruté Galdikas was entrusted by the local government with rehabilitating released captive animals to life in the forest.

She finds the orangutan to be predominantly solitary, arboreal, and the most elusive of all the great apes. Fruit plays the

basic role in their diet though they also munch on leaves and bark; insects are their only protein. Her long, careful observations have led her to conclude that orangutans organize their foraging for fruit in efficient patterns. She has seen them pick unripe fruit and not eat it, as though they were checking on the readiness of the crop of that special tree. Jane Goodall watched the chimpanzees' deliberate use of crude tools but Biruté Galdikas says her wild orangutans use tools infrequently and sporadically.

Why have these women made this their life work? Jane Goodall probably voices the feelings of the other two when she says, "It's the aching to know why. It's an inborn love of the place I'm in and the beasts I study."

It takes a strong personality to put up with the discomforts of isolated camps and the rigors of climate encountered in the different locations. Some of Dian Fossey's helpers get "astronaut blues." "If they can't endure the isolation, they get the sweats, they scream, shake or cry," she says. And Biruté Galdikas goes on, "Some people don't handle it as well. They are searching for some kind of glamor and a secret universe." Her name for the ailment is "bush fever."

Dian Fossey works at a high altitude which can induce mountain sickness. Her camp is often blanketed by a cold fog and drenched with rain, which can produce deep depression. Biruté Galdikas searches through leech-infested swamps to find her orangutans. Jane Goodall crawls on her stomach through heavy undergrowth where she could more easily land on a snake than an ape. Though none has been attacked by her "friends," all three scientists have witnessed distressing scenes of cannibalism and infanticide among the apes. A few years ago four of Jane Goodall's Stanford University students were kidnapped by guerillas from Zaire and held for ransom. But she dismisses most dangers, saying they are "no more than you'd face on a busy street."

Dian Fossey finds it hard to stand the noise of our civilization. She now "feels more comfortable with gorillas than people" but she qualified this statement by confiding that "there comes a time when I do, literally, dream about McDonald's. I dream of supermarkets and drug stores, potato chips and the Sunday morning paper."

Biruté Galdikas, whose mother still urges her to give it all up and go to law school, says, "No way!" Her home is in Borneo. She feels that being a woman might be an advantage in her area. "Indonesians don't like foreigners. But they don't mind women; they don't perceive foreign women as threatening. Women may also be better accepted by the apes. It's only the male of the species that fights, and a male ape might be more aggressive to a male human."

But the last word still belongs to Dr. Leakey. He maintained that women would be better in the wild than men because they are "tougher, more observant and more tenacious." These three protégées of his have proved him right and more than justified his wisdom in selecting them and his shrewdness in recognizing their rare abilities.

- Elizabeth Waldron

* * *

DIAN FOSSEY – THROUGH A GORILLA'S EYES

Who is that lady over there,
tall and dark with braided hair?

Who is the woman behind the tree,
writing, watching, who can she be?

Why is this lady all alone,
sheet metal cabin for a home?

Who is this lady from land afar,
traveling by foot, and not with a car?

Who is this lady imitating me?
I thought only gorillas ate wild celery.

Who is this lady, who knows from where she came?
PEANUTS, PEANUTS, she calls my name.

I come to her, I take her fruit,
play with her buckles, untie her boot.

Who is the woman who watches me,
hiding there, up in the tree?

Wow! Oh Boy! I shook her hand!
Friends with a human, now isn't that grand!

Who is that lady observing me,
I can't figure it out, who can she be?

Look, Rafiki, she's on the run,
Ridding our forest of spear and gun.

Who is that lady protecting us?
I want to know, I must, I must!

There's a National Geographic, now I see!
That woman is famous, she's Dian Fossey.

- Charles Foschini

Tenth grade biology student, Sayreville War Memorial High School, Parlin, New Jersey.

* * *

Editor's note for those who follow the lives of Jane Goodall's chimpanzees: she wrote from Dar es Salaam in June:

"The work at Gombe is going very well. I was able to see and follow Fifi with her third infant – this time a female we have called Fanny. Fifi is a superb mother and Fanny an alert, active and bright-eyed infant. Of special interest was the fact that not only was Fifi's eldest son, Freud, (a young adolescent), traveling away from his mother with big male groups but also her youngest son, Frodo, who is not yet five years old! Normally young males do not leave their mothers until they are about eight years old, except for a few hours. Obviously, Frodo had gone off with his big brother and then quite lost contact with Fifi. When I left Gombe after two weeks, Frodo had been away from Fifi for at least twelve days. For much of that time, the two brothers traveled with (among others) Fifi's brother, Figan, who is still alpha male."

Hugo Van Lawick is in the process of shooting new footage at Gombe which will be ready for showing in the United States next year. □

MEMORIAL SCHOLARSHIP FUND

Dr. Jane Goodall has announced that the Derek Bryceson Scholarship Fund in Food and Nutrition has been set up in memory of her husband. The monies will be used for scholarships for Tanzanians at Cornell University, either as Ph.D. candidates or for one or two years' special training. All candidates must have B.A. degrees. Cornell will administer the funds.

Tax deductible contributions, made out to "Cornell University, Bryceson Scholarship," may be sent to Dr. Malden C. Nesheim, Division of Nutritional Sciences, Cornell University, Savage Hall, Ithaca, New York 14853.

Toward the close of 1979, six months before his fatal illness, Derek Bryceson was appointed Chairman of the Tanzania Food and Nutrition Centre in Dar es Salaam. He had been instrumental in starting the Centre in the early 1960s when he was Minister of Health. An improved understanding of nutritional needs and problems is of overriding importance to an agricultural country. Tanzania is a poor nation and malnutrition among the children is common. While this is sometimes due to poverty, just as often it is due to ignorance of nutritional values on the part of parents and others in authority. The Derek Bryceson Scholarship is intended to improve the situation by disseminating information through further education.

Dr. Goodall wishes to take this opportunity to thank those Leakey Foundation members who have already made very generous contributions to the fund. □

continued from page 3

variations among the majority are of a more subtle nature.

Only in the last few years has evidence appeared that males and females differ in hemispheric lateralization. As techniques were developed a number of laboratories began reporting differences of asymmetry in their male and female subjects. For the most part, these techniques rely on the fact that the sensory systems have a predominant access to the opposite hemisphere. In brief, the right ear, right visual half-field, and right hand project sensory input to the left hemisphere, and the left ear, left visual half-field and left hand project sensory input to the right hemisphere.

Walt Fogler-Mancini

Dr. Jerre Levy

In the typical right-hander, words flashed to the right of fixation are more accurately and rapidly identified than words flashed to the left of fixation since, in the latter case, the verbally specialized left hemisphere only receives input indirectly via the cerebral commissures interconnecting the two halves of the brain. For similar reasons, faces flashed in the left visual field, with direct access to the right hemisphere, are better recognized than faces flashed to the right visual field which has only indirect access to the right hemisphere. In auditory studies, where one stimulus is presented to one ear and another stimulus is simultaneously presented to the other ear (the dichotic listening technique), there is a right ear advantage for discriminating words and a left ear advantage for discriminating musical chords.

For both visual and auditory laterality assessments, women generally show a smaller asymmetric advantage of one sensory half-field over the other as compared to men. Men might recognize 60% of words flashed on the right and 40% of words flashed on the left; women might recognize 55% of words on the right and 45% of words on the left. The lesser degree of perceptual asymmetry observed in women has suggested to many researchers that the female brain is less asymmetrically organized than the male brain, with specialized processes having a greater bilateral representation. This inference is supported by recent work of Jeanette McGlone of University Hospital in London, Ontario. She found that, in accordance with older neurological investigations, male patients display verbal disorders predominantly with left hemisphere damage and nonverbal disorders predominantly with right-hemisphere damage. However, the association between side of damage and nature of disorder was much weaker in female patients. In women, the ability to construct designs from colored blocks was equally disrupted with right-and left-side injury, and performance of women on a mental rotation task was not affected by which side of the brain was damaged. On a test of verbal fluency, men had a major deficit following left hemisphere injury and no deficit after right hemisphere injury; women manifested no deficit in verbal fluency whether the right or the left hemisphere was damaged. In verbal IQ, women were depressed after damage to either side of the brain, but men were affected only by left hemisphere damage.

Developmentally, there may also be differences in the sexes in the rates of maturation of the two hemispheres. David Shucard of the National Jewish Hospital and Research Center in Denver suggests that the female left hemisphere is at a maturational advantage; this may be related to the earlier emergence of speech in girls. It may be, also, that developmental asymmetries in maturation rate that are opposite in males and females are related to adult differences in the degree of hemispheric asymmetry. With earlier maturation of the left hemisphere, social/linguistic competence would gain prior access to environmental experience and reinforcement, as compared to the development of spatial understanding; the developing organization of the left hemisphere in service of communicative skills may condition the form of organization that will mature in the right hemisphere so that both sides of the brain come to integrate their special operations in an intimate and direct interhemispheric collaboration. A certain similarity in organization properties may develop so as to permit each hemisphere to understand the communications of the other, without the need for abstract retranslations that might impoverish the richness of transhemispheric communications.

"Developmentally, there may also be differences in the sexes in the rates of maturation of the two hemispheres."

With the earlier maturation of the right hemisphere, understanding of spatial schemas and spatial relationships would gain prior access to environmental exercise and reinforcement, conditioning development of the left hemisphere toward elaboration of verbal representations of relational principles. In such a case, it would be sets of relational invariants that would be intercommunicated between hemispheres; though representations of the two hemispheres may differ radically at a surface level, at a deep level, they would specify identical relationships. Interhemispheric collaboration in the strongly asymmetric brain would, then, involve the transmission of relational information that could be equally well decoded by either hemisphere in terms of its own special forms of representation. These notions are, of course, purely speculative at this time, but given the evidence of sex differences in the maturation of the two hemispheres and of sex differences in the degree of functional asymmetry of the brain, we need to acquire some understanding of whether and/or how these two aspects of sexually dimorphic brain lateralization are related. Even wrong notions are of value in stimulating a search for answers.

"Even wrong notions are of value in stimulating a search for answers."

A central issue, of course, is whether sex differences in neurological organization have any bearing – either correlative or causative – on sex differences in psychological function. It is conceivable that variations between males and females in cerebral lateralization have no relationship with gender differences' psychology and behavior. A woman with a strongly masculine cognitive style may, nonetheless, have the typically feminine form of brain asymmetry or vice-versa. If so, one would be hard-pressed to defend the proposition that patterns of brain asymmetry have anything to do with patterns of psychological organization. Conversely, if variations among women or variations among men in the degree of hemispheric asymmetry co-vary with a masculine or feminine cognitive structure and style, this would be strong evidence that the neurological and psychological dimensions are intimately related.

Although, as noted, there are average differences between males and females in a variety of psychological and behavioral traits, the differences in these traits among members of the same sex span a much larger range than the average between-sex difference. This is to say that some women are strongly field independent and some men are strongly field dependent (or context sensitive).

". . .differences in psychological and behavioral traits among members of the same sex span a much larger range than the average between-sex difference."

Several investigations by Philip K. Oltman of the Educational Testing Service in Princeton, as well as those of other researchers, have shown that men who vary in field dependency/independency vary in measures of brain asymmetry as well.

Similar relationships have been observed in women, although when field dependency becomes extreme, women may display relatively poor performance on a laterality test of face recognition, with better performance by the left hemisphere than right, in contrast to the typical asymmetry. One possible interpretation of this latter finding is that extreme field dependency develops in individuals with a strong bias to rely on left hemisphere processes in the face of any cognitive task, with a relative deficiency at engaging both hemispheres adaptively. Such an asymmetric dominance of one hemisphere over the other could conceivably emerge if there were radical differences in the rates of functional maturation of the two hemispheres during development. In such an event, the child may come to depend on those processes at a maturational advantage so that when functions on the other side of the brain begin to mature, they are relatively underutilized.

Deborah Waber of Children's Hospital Medical Center and Harvard Medical School in Boston investigated the question of whether the differences in maturational rates of boys and girls could be related to sex differences in psychological function

"Late maturers of both sexes were were found to perform relatively better on the spatial than on the verbal tests and to have a strong right ear advantage. . ."

and in brain asymmetry patterns. Boys reach puberty on the average two years later than girls, and the factors responsible for the pubertal maturation difference (genetic factors and/or prenatal hormones) might also affect cogitive style and brain asymmetry. Selected groups of children were identified who were either early maturers or late maturers compared to average children of the same age and sex, and they were compared on standardized tests of verbal and spatial ability and on perceptual asymmetries of the ears for dichotically presented words. Late maturers of both sexes were found to perform relatively better on the spatial than on the verbal tests and to have a strong right ear advantage, as compared to early maturers of both sexes who performed relatively better on the verbal than spatial tests and had a weak right ear advantage. The maturational rate effect held both for younger children (girls of ten and boys of thirteen) and for older children (girls of thirteen and boys of sixteen), and this invariance of the effect across age groups indicates that it was not the pubertal hormones themselves that were causative in producing the neuropsychological patterns. Rather, the rate of physiological maturation seems to reflect the operation of genetic and/or prenatal hormonal factors that also affect brain asymmetry and cognitive structure.

The Waber findings not only show that the lateral organization of the cerebral hemispheres is related to psychological processes, but strongly implicate biological

". . . what, if any, are the sociological implications?"

factors in their genesis and in the genesis of both neurological and psychological sex differences. Interestingly, Marian Diamond of the University of California at Berkeley has discovered sex differences in the brains of rats. Female rats have a lesser degree of asymmetry than males and in the opposite direction. If the ovaries are removed from infant females on the day of birth, they develop a cortical asymmetry pattern indistinguishable from that of males, suggesting that ovarian products in early development may be critical for some aspects of brain organization.

Clearly, much research remains to be done to specify the causes, manifestations, and psychological consequences of male/female differences in the development and nature of brain asymmetry, but the available evidence appears to be more compatible with the hypothesis that part of those differences do, in fact, arise from biological determinants than the hypothesis that they do not. If this inference should prove to be correct, what, if any, are the sociological implications?

Many writers for the popular media, in discussing recent evidence for biological factors in the origins of psychological sex differences, conclude that such evidence is irrational and not grounded in empirical fact. They would have the reader believe that because the *average* man surpasses the *average* woman in mathematical skills, then *no* woman is mathematically competent and *no* woman should be allowed to pursue a career in mathematics. Such a conclusion makes precisely as much sense as a conclusion that no boys should be taught reading and no men should be allowed to read books because the *average* boy finds reading acquisition more difficult than does the *average* girl and the *average* man reads less and less rapidly than the *average* woman.

When the overlap of two groups is as great as that of men and women, when the range of talents within sexes is so much greater than the average difference in talents between the sexes, what is irrational is the supposition that social opportunities can and ought to be allocated in accordance with group identity. It makes neither moral nor practical sense to encourage a mathematically incompetent boy to follow a career in mathematics, while encouraging a mathematically brilliant girl to devote her life entirely to motherhood and homemaking.

Even if the differences between human males and females in neuropsychological functions were entirely due to biological causes, this would provide no rationale for limiting educational and vocational opportunities in accordance with gender. The sole implication that would follow would be that inequalities of representations of men and women in various occupations would be expected even in a society that was totally free of sexist discrimination.

The diversities among people, both within and between sexes, are very likely to be partially due to biological factors and partially a consequence of a human evolution designed to assure the survival of our species as a social animal. A social system, by definition, is a system where each individual derives from others the benefits of their special abilities, while giving, in turn, to the social group the benefits of his own particular talents. We survive because so many of our needs are supplied by others, freeing us to follow our own bents, simultaneously allowing individual fulfillment and strengthening the stability and quality of the social structure. If there is a social lesson to be learned from our diversities, it is that a beneficent and stable human group offers the greatest degree of freedom and encouragement possible for each individual to find fulfillment of his humanity.

Dr. Levy spoke on this subject at the Jan. 31 – Feb. 1, 1981 symposium co-sponsored by Caltech and the Leakey Foundation. □

TEETH FOSSILS MAY LINK LUCY TO GORILLA AND MAN

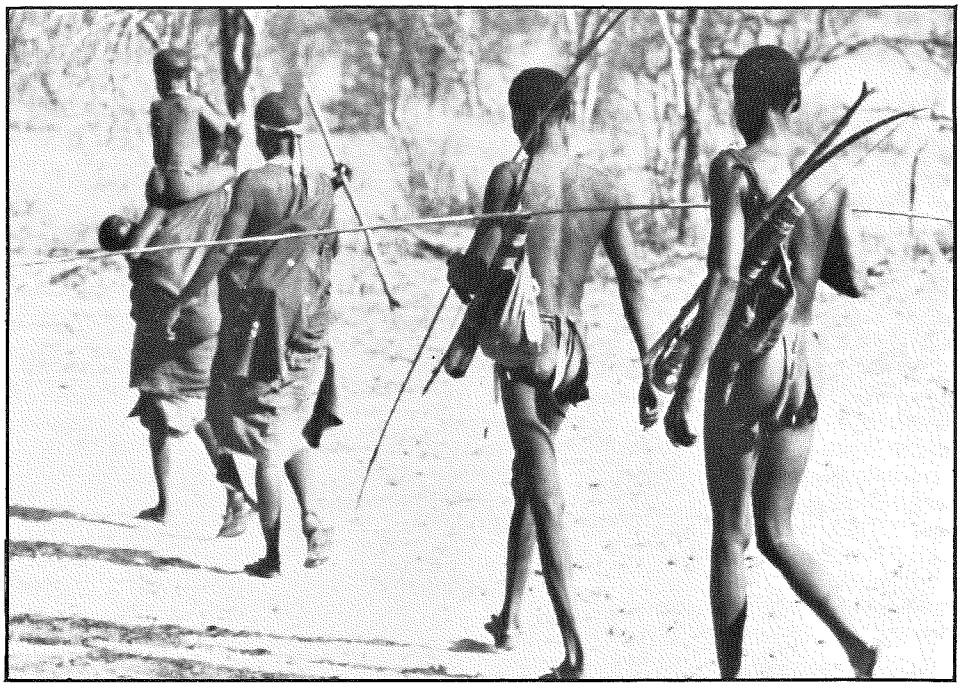
The microscopic study of the teeth fossils of *Australopithecus afarensis* (Lucy and her relatives from the Hadar region of Ethiopia) carried out by Dr. Alan Ryan indicates that the diet of these early hominids (2.9 to 3.8 million years ago) had a diet much like that of present day gorillas.

The finding by the University of Michigan researcher, who has received funds from the Leakey Foundation, was based on a comparative study of the prehistoric teeth and teeth of modern gorillas, baboons, chimpanzees and Eskimos.

In his study, Ryan made casts of the teeth fossils, many housed in the Cleveland Museum of Natural History, and observed them with a scanning electron microscope. On the surface of the teeth he found a pattern of wear lines or striations, extensive pitting and grooving and tiny chips or flakes on the outside edge of the tooth surface.

These signs indicate that *A. afarensis*, like gorillas, was probably a vegetarian who used his teeth to strip the tough outer portions off plant stems to eat the softer inner sections. While the main portion of the pre-human's diet was probably the tough plants which grew on the East African savanna, he may also have been a fruit-eater, Ryan says.

The flakes may indicate that *A. afarensis* represents an important step in the evolution toward humans since such tooth wear is found in modern aborigines. □



Anthro-Photo

San: two brothers cooperate in hunting; their wives go gathering together.

continued from page 1

We now know that ritualistic combats are only part of the aggression story. Numerous decade-long studies of animal behavior show that animal murder and infanticide are not rare events. Ironically, the human species may not be the "killer-apes" some supposed, but, in fact, among the more pacific species. Also, we now realize that ritualized aggressive encounters are better explained by models such as those Professor Maynard Smith has advanced as "evolutionarily stable strategies." For example, if two opponents can determine by some non-lethal means which one would win an all-out fight, it would be advantageous to both the *winner* and the *loser* to determine this outcome in advance, by bluff and tests of strength, without bloodshed.

We look back rather wistfully on the notion that, for altruistic reasons, animals were deliberately handicapping themselves and substituting ritual for real combat. If any further proof be needed that individuals are not acting in this species-altruistic manner, consider that the paleontological record reveals that over 99% of all known species no longer exist; most are extinct, others have evolved into a form so different that we cannot determine the ancestral form. Remember that dinosaurs ruled the seas, the land and the sky for more than a 100 million years; some may be the ancestors of the birds, but most left only their bones.

This simple but overwhelming testimony of the fossil record should give pause to those who would derive human ethical and moral systems from biology alone. On the contrary, there is every reason to believe that the very process of natural selection which brought us this far also carries with it the fatal virus of extinction. To escape this fate we must seek to understand as clearly and unemotionally as possible the operation of natural selection on all living things, including ourselves, for this is our only hope.

Excerpted from a lecture at the symposium, "The Evolution of Social Behavior: Theory and Evidence," co-sponsored by the California Institute of Technology and the Leakey Foundation, January 31 – February 1, 1981. □

ADDENDA

Dr. Eric Delson, of the American Museum of Natural History, New York, and the Department of Anthropology, Lehman College, City University of New York, provided all the information for the article in the last issue, "Chinese Scientists Visit the United States." A longer version by him appeared in *Current Anthropology*, April, 1981. Dr. Wu, mentioned on page 4, paragraph 1, of the Foundation News, should have been identified as Wu Ju-Kang.

IN BRIEF...

Daniel Stiles of the University of Nairobi is requesting $1000 to enable him to continue study of the Boni, a Kenya coast hunting-gathering group. The Boni once lived in the area east of Lake Turkana, but about 2000 years ago they migrated to the east and settled in the coastal forest of southern Somalia and Kenya. His study involves research into the human ecology, subsistence strategies, and demography of a hunting-gathering people adapted to a mixed savanna-forest ecology. Dr. Stiles is also carrying out ethnoarcheological research, and hopes in the future to excavate an ancient Boni settlement, the first one to be located.

. . .

Dr. Biruté Galdikas has been awarded the Franklin L. Burr Prize of $2,000 by the National Geographic Society in recognition of her outstanding contributions to science through her long-term study of the orangutans in Indonesia. As a recipient, she joins a long and illustrious group of researchers, including Drs. Jane Goodall and Dian Fossey.

. . .

Sally McBrearty, who received a Franklin Mosher Baldwin Fellowship for archeological work in Kenya, writes that the Muguruk site, where she has unearthed many artifacts of the Middle Stone Age, has been approved as a national monument and will be listed in the official Kenya Gazette as a protected site. Thus it will be preserved for posterity. □

BOOKS

LUCY, THE BEGINNINGS OF HUMANKIND, by Donald Johanson and Maitland Edey, Simon and Schuster, New York, 1981.

With the suspense and intrigue of a fast-paced adventure novel, filled with lively scientific detail and fine illustrations, this major book of the year unfolds the extraordinary story of Johanson's discovery of "Lucy" – the oldest, most complete, and best preserved skeleton of any erect-walking human ancestor ever found. It reveals the controversial change Lucy makes in our view of human origins, and provides a vivid, behind the scenes account of the history of paleoanthropology and the colorful characters who are and were a part of it.

Copies of LUCY are available to members from the Foundation office for $17 and to non-members for $18.75.

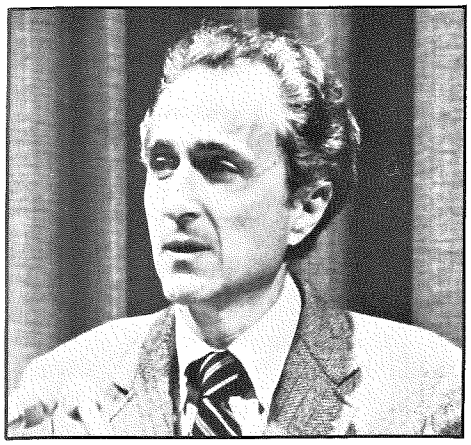
EVOLUTIONARY BIOLOGY OF THE NEW WORLD MONKEYS AND CONTINENTAL DRIFT, edited by Russell L. Ciochon and A. Brunetto Chiarelli, Plenum Press, New York, 1980.

Some bold new proposals concerning the evolution and dispersal of higher primates are made in a new book edited by Russell L. Ciochon of the University of North Carolina at Charlotte, and A. Brunetto Chiarelli of the Institute of Anthropology in Florence, Italy.

The 528-page illustrated volume contains contributions from twenty-nine scientists representing the fields of anatomy, anthropology, biochemistry, biology, geology, geophysics and paleontology.

Ciochon thinks this new book will not only do much to clarify the line of evolution leading to the New World monkeys but will also put into proper perspective the evolutionary relationships of the

Old World monkey, ape and human lines. It presents the arguments and consensus of participants in international symposia held in Turin, Italy, and Bangalore, India. The symposia and the volume's preparation were partially funded by the Leakey Foundation.



Dr. David Hamburg

THE GREAT APES, David A. Hamburg and Elizabeth R. McCown, editors, The Benjamin Cummings Publishing Company, Menlo Park, Calif., 1979.

This is the fifth volume of the series *Perspectives on Human Evolution*, sponsored by the Society for the Study of Human Evolution. The book includes twenty-two articles on recent field studies of pongids, with a preface and introductory remarks by the editors, an animal behavioral psychologist and a physical anthropologist.

Primatological studies today have brought about an important reorientation of the research of only a decade ago, particularly because of new understanding of primate behavior. This book advocates a scientific primatology that encompasses both behavioral and biological studies in an interdisciplinary approach, rather than emphasizing specialization and departmental separateness.

Much new data is presented here as a new era in primatological research is begun. The topics covered include the ecology of the pygmy chimpanzee, the reproductive behavior of the orangutan, pongid aggressive action and social dominance, behavioral reaction of captive apes, chimpanzee language acquisition, and the social structure of all pongid groups and other primates. Hamburg writes that the volume "contains more dependable information on the great apes than any single volume I have encountered."

Dr. Hamburg is a member of the Leakey Foundation Science and Grants Committee. Copies of THE GREAT APES are available from the foundation at $20 for members and $21.90 for non-members. □

* * *

YOUNG LEAKEY
HONORING FATHER,
PREHISTORIC MAN

Headline in the Tucson Daily Citizen.

What, no missing link?

* * *

1982 FELLOWS PROGRAMS

On January 1, 1982, there will be two new classes of Fellows:

* ANNUAL FELLOWS are FELLOWS who contribute $500 each year to the Foundation.
* LIFE FELLOWS are FELLOWS who have contributed $10,000 to the Foundation.

You can still become a CHARTER FELLOW OF THE FOUNDATION until December 31, 1981, by contributing $1,000 – or pledging $500 each year for two years.

To learn more about the opportunities and privileges of belonging to the SOCIETY OF FELLOWS OF THE L.S.B. LEAKEY FOUNDATION, please write to the Foundation Office: Foundation Center, 13-83, Pasadena, CA 91125.

FRIENDS OF THE FOUNDATION RECEIVE:

**Invitations to special MEMBERS ONLY EVENTS.*
**CHOICES OF PREMIUMS for many categories of membership and a 10% DISCOUNT on books and tapes.*
**Advance announcements of all symposia & lecture programs & the Leakey Newsletter.*

SEND A GIFT MEMBERSHIP TO:

_____

_____

_____ ZIP_____

PLEASE DESIGNATE MY GIFT TO SUPPORT:

_____

Research Project Title or Scientist.

NEW MEMBER ( ) RENEWAL ( )

PREMIUM CHOSEN: book ( ) tote ( ) send no premium ( )

MEMBERSHIP CATEGORIES — ALL MEMBERSHIPS ARE TAX DEDUCTIBLE

FRIENDS

Friends	$ 40 . .	***KALAHARI HUNTER-GATHERERS: STUDIES OF THE !KUNG SAN & THEIR NEIGHBORS,*** Irven DeVore & Richard B. Lee or Tote bag .
Students	$ 20 . .	All benefits except premiums.
Sponsors	$ 100 . .	Autographed copies of ***LUCY: THE BEGINNINGS OF HUMANKIND,*** Donald Johanson & Maitland Edey, or ***BY THE EVIDENCE,*** Louis Leakey or Tote bag . *Circle Selection.*
Patrons	$ 250 . .	***MISSING LINKS,*** John Reader & Tote bag.

FELLOWS

Charter Fellows (before Dec. 31, 1981)	$1,000 . .	***THE BUSHMEN,*** ed. Phillip Tobias & Tote bag.
Research Grant Benefactor	$5,000 . .	Autographed copies of ***THE MAASAI,*** Carol Beckwith & Tepilit Ole Saitote & Tote bag.

Every penny of your tax-deductible membership dollars supports LEAKEY FOUNDATION GRANTS to international scientific research programs.

PLEASE ENROLL ME AS A _____ MEMBER. I enclose my check for $ _____

Charge to my ( ) Mastercharge or ( ) Visa Number _____

Authorized signature _____ expiration date _____

NAME _____

ADDRESS _____ PHONE _____

CITY _____ STATE _____ ZIP _____

Please make checks payable to the L.S.B. LEAKEY FOUNDATION, Foundation Center 13-83, Pasadena, California 91125. *N20*

CALENDAR

DR. PAUL BERLINER
October 4, 1981 – Washington State University, Pullman, Washington

DR. SYLVIA EARLE
November 20, 1981 – Cleveland Museum of Natural History, Cleveland, Ohio

DR. DIAN FOSSEY
September 26, 1981 – International Animal Protection Institute Weekend, Ambassador Hotel, Los Angeles, California
October 10, 1981 – Buffalo Zoological Society, Buffalo, New York

DR. JANE GOODALL
January 18, 1982 – St. Mary's College, Raleigh, North Carolina
April 25, 1982 – Long Island University, Greenvale, New York

DR. THOR HEYERDAHL
October 13, 1981 – University of California, Berkeley, California

DR. DONALD JOHANSON
November 16, 1981 – San Diego Museum of Man, San Diego, California
November 17, 1981 – University of California, Berkeley, California
April 25, 1982 – Washington University, St. Louis, Missouri

MR. ALEXANDER MARSHACK
October 27, 1981 – University of Southern California and Griffith Park Observatory, Los Angeles, California

MR. ALEXANDER MARSHACK AND MR. NICHOLAS TOTH
All day lectures and workshop
October 16, 1981 – College of the Redwoods, Eureka Campus, Eureka, California
October 17, 1981 – College of the Redwoods, Fort Bragg Campus, Fort Bragg, California

MS. ELIZABETH MEYERHOFF
January 7, 1982 – Mira Costa College, Del Mar, California

DR. ROGER PAYNE
December 13, 1981 – Dartmouth Childrens Museum, South Dartmouth, Massachusetts
January 17, 1982 – American Museum of Natural History, New York, New York

MR. TEPILIT OLE SAITOTI
September 18, 1981 – Washington State University, Pullman Washington
October 6, 1981 – Kansas City Zoo, Kansas City, Missouri
November 5, 1981 – McGill University, Montreal, Canada
November 10, 1981 – Beaumont Art Museum, Beaumont, Texas
November 12, 1981 – Mira Costa College, Oceanside, California

The lecture series at Caltech will not begin until February, 1982. There will also be a mini-series in the intimate setting of Dickson Hall, UCLA, in the spring.

Further notice of these events will appear in the Winter issue of the NEWS.

Any university, foundation or other institution interested in requesting lecturers is invited to contact the Foundation office.

the L.S.B. Leakey foundation news

FOUNDATION CENTER 13-83, PASADENA, CA 91125

ADDRESS CORRECTION REQUESTED

NONPROFIT ORG.
U.S. POSTAGE PAID
L.A. CALIFORNIA
PERMIT NO. 29207

TIME VALUE — PLEASE EXPEDITE