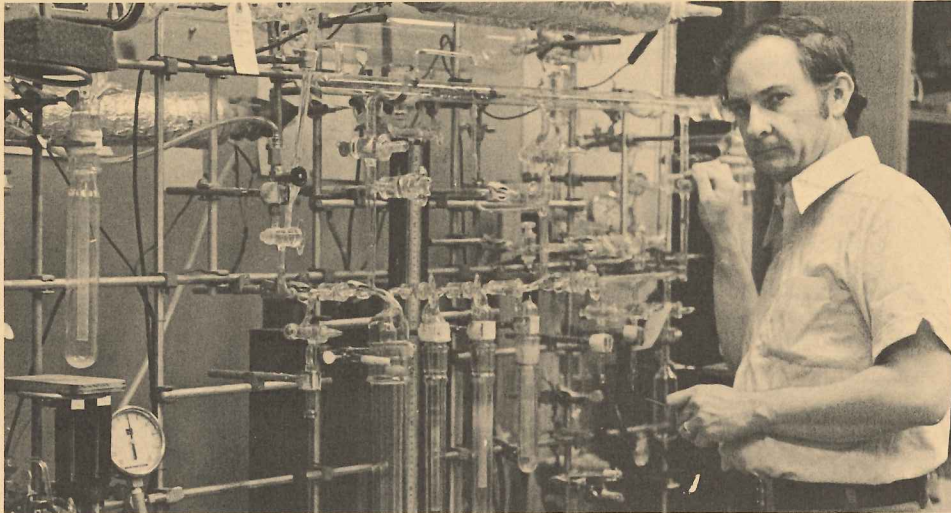


the L.S.B. Leakey foundation news

NUMBER 5 SPRING/SUMMER 1976



Dr. R.E. Taylor in his laboratory at the University of California, Riverside.

DATING STONE TOOLS DIRECTLY

by R.E. Taylor

The principle direct evidence that archeologists and paleoanthropologists have to infer the behavior of the most ancient of the hominid forms is "encoded" in the stone tools that they left behind on the surface of their camp sites and other localities. Until now, except in rare instances, there has been no way in which the tools themselves could be directly dated — only through association with materials which could be dated by, for example, the potassium-argon or fission track method.

Now, studies are underway aimed at providing a new direct dating method for stone tools, the fluorine diffusion method. Last year, with the help of a grant from the Leakey Foundation, I demonstrated the existence of fluorine diffusion profiles on a large number of different types of lithic samples derived from archeological contexts. On a suite of samples from the San Diego area of Southern California, I was able to show that there was a direct relationship between the known age of a lithic artifact and the amount of fluorine diffused on its surface for samples containing average fluorine concentrations. The first report of progress on the method was carried in an October 1975 article in *World Archaeology*. An additional report is to be published under the auspices of the Los Alamos Scientific Laboratory in Los Alamos, New Mexico.

With continuing Leakey Foundation support, I am now conducting basic

studies attempting to determine specific rate(s) and mechanism(s) involved in fluorine transport in rock materials. I am concentrating my focus on two sites — Olduvai Gorge, Tanzania and Calico, near San Bernardino, Ca. A number of analytical problems are under investigation bearing on the development of the technique using samples from Olduvai and Calico.

The fluorine affects only the outer few microns of the rock surface (a micron is one-thousandth of a millimeter and a millimeter is about 3/10 of an inch) and the measurement of the amount of penetration must be measured with accuracies of *tenths* of microns and less. The initial measurements were carried out at a California Institute of Technology facility using a proton irradiation method. This technique of measurement is now being augmented with ion microprobe studies being conducted at the Los Alamos Scientific Laboratory and x-ray photoemission spectroscopy being done at the Rockwell International Science Center in Thousand Oaks, Ca. Such analytical tools are being brought to bear on the problem of the exact nature of the "diffusion." Several possibilities can be suggested: 1) volume diffusion, 2) grain boundary diffusion, 3) chemical reaction forming a fluorine-rich surface layer, 4) infiltration along grain boundaries, 5) any combination of the above. The research now being conducted is currently working to identify which of these mechanisms are operative.

A recent discovery has been that there is

Continued on page 8

DEVELOPMENT COMMITTEE TO LAUNCH CORPORATE APPEAL PROGRAM

The Leakey Foundation's development committee under the direction of trustee Mason Phelps and co-chairman Gordon Getty is scheduled to launch a corporate appeal program for the Foundation. It will be the first in its history. Although no date has yet been set for the official introduction of the program, materials and cultivation tools are expected to be ready for presentation in the early fall.

The aim of the program is to stimulate corporate interest in the grant programs of the Foundation. A portfolio and audio-visual presentation is currently being prepared. A preliminary showing of the materials was given by Mr. Phelps at a board of trustees meeting earlier this year.

Corporations throughout the country will be called upon for contributions of \$20,000 or more each, over a two year period. It has been proposed that among the rewards for such participation, contributing organizations be invited to select a number of corporate officers for Associate Fellowships in the Leakey Foundation.

Current work is now underway to develop a compendium of current information describing the Foundation's pioneering grant programs, data on the Foundation's distinguished science and grants committee, and profiles on the Foundation's financial status, contribution policies and general activities.



SEE SUPPLEMENT
FOR SPECIAL
FELLOWS DAY REPORT

the L.S.B. leakey foundation

The L. S. B. Leakey Foundation was established in 1968 by distinguished laymen and scientists to encourage international research focusing upon man's origins, his evolving nature and his environmental future. The Foundation was named to honor Dr. Louis S. B. Leakey in recognition of his outstanding contributions to the fund of human knowledge.

The Foundation sponsors:

- Exploration and excavation of sites having a bearing upon the evolution of man.
- Behavioral and taxonomic studies of living primates as a corollary to paleontological finds, as well as to provide insight into contemporary man's behavior.
- Laboratory studies of field specimens resulting from exploration and excavation.
- Publication of scientific reports of field and laboratory findings.

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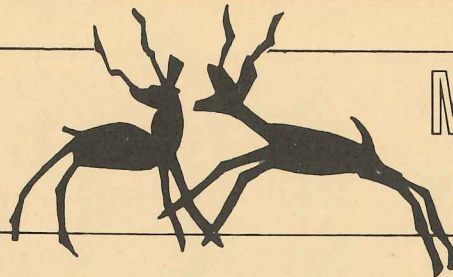
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the L.S.B. leakey foundation news

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MEMO FROM THE PRESIDENT

(Dr. Munger is currently travelling in Africa on his sixty-fifth visit to that continent. His itinerary includes stops in Swaziland, Ghana, Nigeria, Ivory Coast, Senegal, among other countries. In his absence, vice-president Robert M. Beck has written the following commentary for this guest editorial.)

It has been very gratifying to see the L.S.B. Leakey Foundation grow in stature over the five year period of the \$1 million challenge. Our Foundation is now capable of sponsoring research in many fields and in many areas of the world. We can expect to play an increasingly important role in the unfolding discovery of man's origins, in the years ahead.

Our principle aim has been to support early man exploration as a tribute to the pioneering work of Dr. Louis Leakey. However, an implicit aim has also been to illuminate man's future. Louis Leakey was intensely concerned about our environment and our prospects for survival. We have been serving this aim by sponsoring many public education programs which include lectures, seminars and publications.

Although we must be very careful to avoid confusing the identity of the Foundation by branching off in too many directions, and while it is certainly beyond the present capabilities of the Foundation to directly sponsor major environmental research, I hope that we may continue to offer, through our educational programs, timely reports on cultural anthropological projects, wildlife preservation programs and environmental conservation research.

I believe that open discussions regarding man and his world may encourage solutions which will best sustain an enduring heritage for future generations of men and women. Progress and funding go hand-in-hand in our search for self-knowledge. Therefore, I hope that new major gifts, endowments or matching pledges will soon be forthcoming to support Foundation programs in these research areas.

As Louis Leakey aptly put it, "I would regard it as a waste of my time to study the past if, in doing so, I could not help to guide the future."

Cordially,

Robert Mark Beck
 Vice President

RICHARD FOSTER FLINT, 74, A LEAKEY FOUNDATION TRUSTEE

We regret to announce that Richard Foster Flint, long time friend and member of the board of trustees of the Leakey Foundation, died June 4 at his home in New Haven, Conn. He was 74 years old.

Dr. Flint was Henry Barnard Davis Professor of Geology Emeritus at Yale University and an internationally known specialist in glacial and Quaternary geology, the geological era which includes both Pleistocene and Holocene periods. He was a former chairman of the advisory board of Yale's Geochronometric Laboratory and a former board chairman of the Arctic Institute of North America. He served as senior scientist with the Boyd Arctic Expedition in 1937. In addition, he was the author of five books on Quaternary

geology, and an honorary lifetime member of the International Union for Quaternary Research.

Dr. Flint became a trustee of the Leakey Foundation in 1969 and had been serving on the Foundation's science and grants committee since that time.

SPREAD THE WORD

Leakey Foundation membership is constantly growing. We would like to see a record number of new members added in 1976.

If you would like us to send a complimentary copy of this newsletter to an interested friend — send us the name and address. We will mail a copy posthaste.

WE'VE MOVED

L.S.B. Leakey Foundation headquarters have moved into new offices at the California Institute of Technology. Please note: our new mailing address is: L.S.B. Leakey Foundation, Foundation Center 206-85, Pasadena, Ca. 91125.

IS EARLY MAN GETTING OLDER?

Fossils recently found both in Ethiopia and Kenya would seem to indicate that the forms of early man that had evolved by 3.75 million years ago were more advanced than once thought.

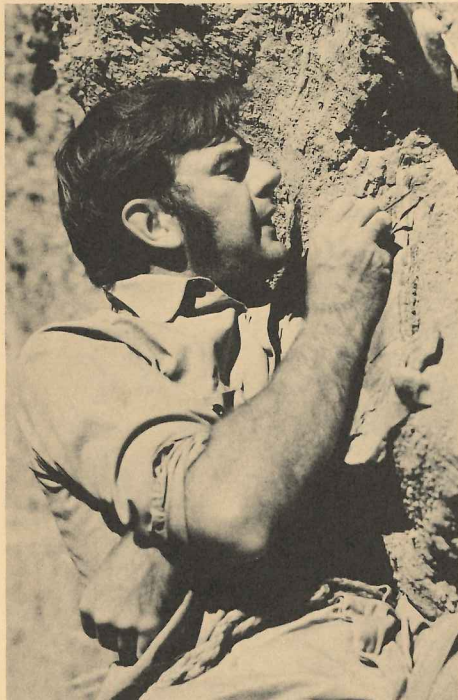
Among the finds were skulls, hand and thigh bones quite similar to those of modern man. They suggest that the individuals were members of the genus *Homo*, or "true man," and not *Australopithecus*, or "near man."

Many of the bones appear to be from the same type of primitive but human creature reported last October by Mary Leakey (see *Foundation News*, Winter issue, page 5). She found teeth and jaws in Tanzania dating to 3.75 million years ago, the oldest reliably dated hominid fossils.

The new finds were reported jointly this past March at a National Geographic Society press conference, by Richard Leakey, director of the National Museums of Kenya, and Donald C. Johanson, director, scientific research, Cleveland Museum of Natural History and a Leakey Foundation grantee. They said the fossils were conclusive evidence that *Australopithecus*, an extinct species once thought to be transitional between ape and man, was, instead, a contemporary of early man that became an evolutionary dead end.

Mr. Leakey also reported the discovery in Kenya of a *Homo erectus* skull dated at 1.5 million years, making it the oldest known example of this species from which *Homo sapiens*, or modern man, is believed to have evolved about 200,000 years ago. The best known example of *Homo erectus* is Peking Man, found in China nearly 50 years ago and heretofore estimated to be about 500,000 years old.

At the same time, Dr. Johanson detailed how he was able to construct a composite hand from three million year-old bones of a group of human-like creatures he found this past October in the Afar Depression of Ethiopia. According to Dr. Johanson, the composite hand he has assembled from the bones looks like a modern hand and shows no evidence of the knuckle walking that some thought was a characteristic of early man as well as apes. Rather, examination of the bone fragments showed these early men walked erect.



Photograph by David Brill, © National Geographic Society

Dr. Johanson at the site of his new hominid fossil finds in the Afar, Ethiopia this past October.

SPRING LECTURE SCHEDULE SETS A NEW RECORD

It has been a busy spring on the Leakey Foundation lecture circuit. The Foundation has organized and presented more than 40 lectures by distinguished scientists in its continuing effort to inform the public of the latest research on man and his origins. It is the largest number of spring lectures sponsored by the Foundation since its inception. An estimated total of 20,000 people attended these events.

Among the distinguished speakers have been Dr. Jane Goodall, Dr. Donald C. Johanson, primate specialists Dian Fossey and Biruté Galdikas-Brindamour, Dr. Jonas Salk, Dr. Sherwood Washburn, Dr. Ofer Bar-Yosef and Buckminster Fuller.

In addition, two special lecture events were held by the Foundation in May: a Fellows Day conference workshop with 10 distinguished scientific experts (see special supplement, in this issue) and a dialogue on the great apes, a first for the Foundation (the summary will appear in our fall issue).

Foundation lecturers appeared in all parts of the country. They spoke at Caltech, the University of California, the California Academy of Sciences, Sweet Briar College, The Denver Museum of Natural History, the Portland Zoological Society, Chicago Council on Foreign Relations Forum, Northwestern University, the Buffalo Zoological Society, Chicago's Brookfield Zoo, Stanford University, the Cleveland Museum of Natural History and the Chicago Academy of Sciences.

Although no further lectures are scheduled for the summer months, plans are now underway for the fall and spring season, 1976-77. Among other plans, the Leakey Foundation is expected to repeat its annual series of lectures at Caltech and at the University of California, Los Angeles. In addition, a series of symposia, another primate dialogue and an endangered species conference have been proposed.

Trustee Joan Travis chairs lecture programs for the Foundation.



Patricia Walker, Foundation grantee, in her Nairobi office. Ms. Walker, from England, is developing an osteological key to identify 80-plus species of East African mammals for archeologists to use to identify their own finds.

COLLECTOR'S CORNER



The Foundation has a very special group of outstanding and not generally available books and cassettes which it offers at 10% discount with memberships of \$25 or more. Why not take advantage of these highly selective materials to learn the latest in the fields of human evolution, early cultures, conservation?

For example: among the most exciting offerings is Bernard Campbell's latest text, *Humankind Emerging*, published in 1976 and available for just \$14 including tax and handling.

Like art? One of the most beautiful books we've seen in years is the award-winning *The Hunter and His Art* which traces man's history through the rock art of southern Africa. It's \$32.85 through the Foundation.

Jane Goodall's book *In the Shadow of Man* is now out-of-print, but the Foundation still has some paperback copies at just \$1.75. What a find!

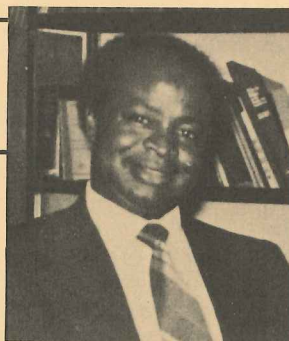
To understand the kind of scientific inquiry Louis Leakey inspired you should read the newly published anthology *Human Origins: Louis Leakey and the East African Evidence* edited by Glynn Ll. Isaac and Elizabeth R. McCown. Its essays, data, photos were all contributed by top scientists, among them Foundation trustees, lecturers and grantees. Hardback is \$15.95, paperback, \$9.95.

In the area of cassettes, there are special recordings of Foundation symposia of 1972, 1973, and 1975, including individual tapes of more than 25 distinguished scientists presenting their latest findings. Among them Bernard Campbell, F. Clark Howell, Mary Leakey, Jane Goodall, Sherwood Washburn, J. Desmond Clark, Raymond A. Dart, Dian Fossey, David Hamburg. Individual cassettes are \$8.

For a complete list of book and cassette offerings and a price list write Leakey Foundation headquarters.

PROFILE

DR. BONIFACE I. OBICHERE Foundation Trustee
 Director, African Studies Center,
 University of California, Los Angeles



Dr. Boniface I. Obichere has been a trustee and member of the science and grants committee of the Leakey Foundation for the past four years.

He is professor of African history at the University of California, Los Angeles and heads up its highly successful African Studies Center. The Center has the largest African studies program in the U.S. — with over 60 professors, several thousand undergraduates, 50 M.A. studies students and nearly 100 Ph.D. candidates in all disciplines. While a great many American students are enrolled at the Center, it has also attracted a record number of African students including citizens of Nigeria, Kenya, Ghana, Angola, Rwanda, Burundi, Senegal, Zambia, Uganda, Zaire, Rhodesia and South Africa.

This may well be something of a tribute to the brilliance of its director.

Watching Dr. Obichere in action in a classroom is a unique experience. He is quick and direct. He has wit and enthusiasm. He draws out different viewpoints. He advances theories. He spars, teases, debates, projects and targets his comments and questions — constantly striving for a realistic perception of the subject at hand.

Dr. Obichere came to the University of California nine years ago.

He was born 43 years ago in the little farming community of Owerri in eastern Nigeria. He got his early education in the Catholic schools of Owerri, coming to the United States in 1959 where he received his B.A. (cum laude) from the University of Minnesota in 1961, his M.A. in 1964, and his doctorate from Oxford University, England in 1967.

A friend of Louis Leakey's, he describes him with great fondness and warmth and remembers how he treated skulls "with such delicacy and care — like new-born babies. He was so very, very human — the opposite of what one would think of as an abstract scientist," Dr. Obichere tells us.

Long a supporter of the Leakey Foundation, Dr. Obichere supplies an important informational link between the Foundation and the interests of the various international African studies programs. At a recent meeting of the Association of African Studies Programs in Washington, he presented the various Leakey grant

opportunities available to African students and reviewed the three already given by the Foundation in the fields of primatology, wildlife management and archeology.

Dr. Obichere is a busy man, indeed!

He travelled to Ghana in August 1975 for an international conference on military history (he is compiling a book on the role of the military in African history). He edits the very successful quarterly *Journal of African Studies* published by the University of California Press. He does programs on African affairs for the Voice of America. And of course, he keeps a regular and very active teaching schedule.

He is a member of the Historical Society of Nigeria as well as Ghana, the American Historical Association, the African Studies Association of America, the Royal Historical Society of England, the International Studies Association of America, the Association for the Study of Afro-American Life and History, and the Academy of Arts and Sciences, among others.

He has served on the editorial boards of numerous publications as well as authoring or editing dozens of articles and studies of African history, culture, politics education for American, French and English journals and textbooks.

Dr. Obichere is also an active lecturer, presenting research papers at symposia and conferences throughout the U.S. and Africa. Among them: Yale University's symposium on the Study of the Black Experience, the African Studies Association annual conference, the conference of the Association for the Study of Negro Life and History, and American Historical Association meetings.

He speaks Igbo, English and French. He reads German and Portuguese and has traveled extensively throughout Africa, Europe, the United States, Canada, and the Caribbean.

Dr. Obichere is married and has one child, a son, four years old. Although he finds little time for leisure interests, photography and swimming are among his favorite pastimes — "That is," he says grinning broadly, "when I have the time."

notes

Trustee Fleur Cowles was the special guest of honor at a Foundation dinner and trustees meeting this past April during a brief visit to the U.S. from her London home. Miss Cowles, who is head of the European-based Leakey Foundation reported on activities of her group and outlined plans for a possible London Leakey Memorial symposium in the near future.

Denver fellows Mr. and Mrs. David Lawrence hosted a dinner party on April 29 for Leakey Foundation trustees Dr. and Mrs. Edwin Munger, Mr. and Mrs. Lawrence Barker, Jr., Mr. and Mrs. Frank Woods, Mrs. Ronald Pelosi and Mrs. Max K. Jamison to meet Denver community leaders during the weekend of Jane Goodall's special appearance in that city at the Museum of Natural History. In addition, Museum leaders and Foundation trustees were the dinner guests of Foundation fellows Mr. and Mrs. Donald Todd preceding the lecture at Phipps Auditorium, April 30. Tickets for Dr. Goodall's lecture were completely sold out within 10 days of going on sale! Working for the success of this special Denver program were: Mrs. Sally McKagan, secretary of the Museum Associates; Ms. Linda Le May, coordinator of the event; Ms. Arminta Neal, assistant director for planning; Ms. Carol Hayward, president, Museum Associates; and Mr. and Mrs. Allan Phipps. Mr. Phipps is president of the Museum's board of trustees.

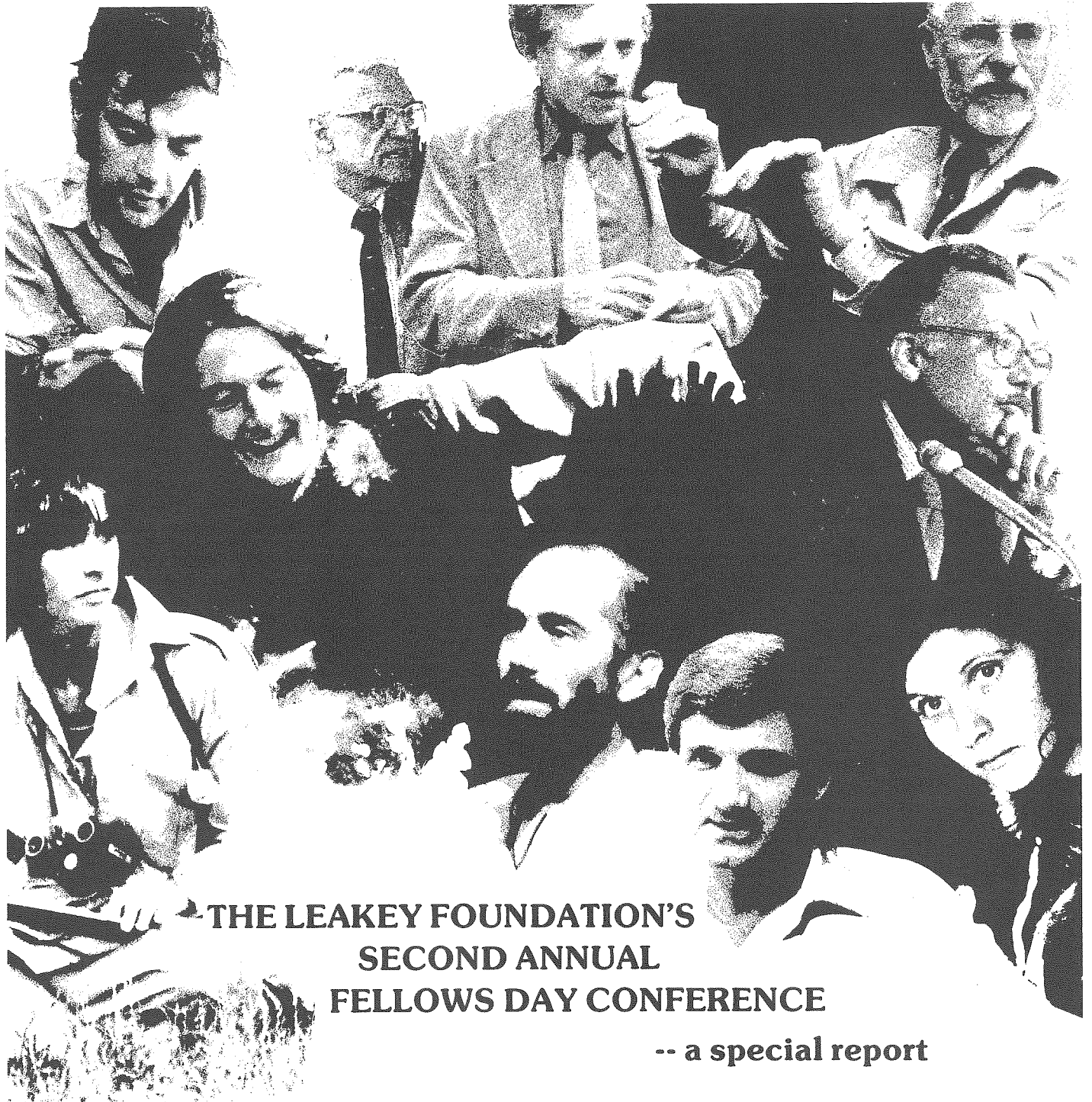
San Francisco fellows were the sponsors of three special speaking engagements in May by Foundation grantees Biruté Galdikas-Brindamour, Dian Fossey and Dr. Donald C. Johanson. Ms. Galdikas-Brindamour and Ms. Fossey appeared before the San Francisco Zoological Society to talk on their individual long-term great apes studies. Dr. Johanson spoke of his recent discoveries of 3.5 million year old hominid fossils in Ethiopia at the College of Marin in co-sponsorship with their department of behavioral sciences.

Dr. Ofer Bar-Yosef spoke at the Museum of Man, San Diego, June 10, concerning excavations at 'Ubeidiya in the Jordan Valley, the earliest known hominid site in the Near East, and a project long supported by the Leakey Foundation. Dr. Bar-Yosef is on a teaching-study leave from Hebrew University in Israel and was at the University of California, Berkeley through the spring of 1976.

Dr. Donald C. Johanson received the Golden Plate Award of the American Academy of Achievement this past June in San Diego. Dr. Johanson, a Leakey Foundation grantee, was cited for his recent discovery of 3.5 million year old man-like fossils — the oldest ever found. The find has been heralded as "an unparalleled breakthrough in the search for the origins of man's evolution."



Special fellows dinners were held to honor Dr. Jonas Salk during his two Foundation sponsored lecture appearances this spring in Los Angeles. At the Caltech dinner (l to r): Mrs. Otis Chandler, Dr. Lee DuBridge, Mrs. Coleman Morton, Mrs. Owens Miller, and Dr. Salk. A second dinner was hosted by Mr. and Mrs. Kenneth Leventhal at their home.



THE LEAKEY FOUNDATION'S SECOND ANNUAL FELLOWS DAY CONFERENCE

-- a special report

WHAT THE EXPERTS HAD TO SAY

L.S.B. Leakey Foundation News
Fellows Day Supplement

It was an extraordinary gathering.

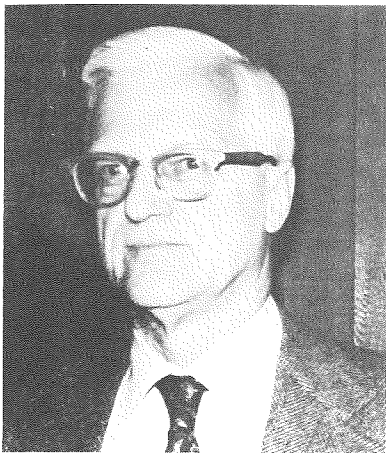
Ten scientists, representing almost as many disciplines, and clearly among the major authorities in their fields, led off the Leakey Foundation's second annual Fellows Day workshop sessions at the Getty Museum, Malibu, Ca. on May 23.

The purpose: to inform, educate and update 150 Foundation fellows and trustees who had gathered there specifically to hear the newest ideas, insights, theories, facts and finds concerning man's origins, behavior and survival.

Among the areas explored: the remarkable find just this past October of 150 bone fragments of a family or group dated at about 3.5 million years and resembling early man; the promising discovery of hominoid fossils which may directly link man and ape at 10 million years; the latest developments in high precision dating techniques; new theories on the migration of hominoids 25 million years ago; current studies in plate tectonics; recent observations on the predatory behavior of baboons; kinship and male dominance in orangutans; and a surprising report on gorilla infanticides.

Following each workshop, the experts participated in a unique and informal question and answer interchange with Foundation fellows, leading to further insights and often some surprising, even conflicting, but always persuasive views about how we evolved, how we behave, and why we are as we are.

In an effort to share some of the scientific excitement and insights from this most memorable Fellows Day event with all of our Foundation members, we have prepared this very special question and answer report. We think you will find it as provocative and inspiring as the ten scientists whose ideas they reflect.



SHERWOOD WASHBURN
Professor of Anthropology
University of California, Berkeley

Subject: THE EVOLUTION OF LEARNING

Q. *You have been credited with saying: "It is the communication of thought, rather than thought itself, that is unique to man, makes human cultures possible, and that is the primary factor in separating man and beast." Does this imply that thought is possible without language? Could you elaborate on just what constitutes (in primatology) the concept of thought?*

A. Monkeys can learn by observation, solve problems in the laboratory, and give every indication of effective thinking. But they can convey the results of their thought to other monkeys in only a very limited way.

Man's language gives him a highly efficient system of communication so that many people may use the results of one person's thought or discovery. The whole complex of belief and technology which separates human behavior from that of the non-human primates is dependent on linguistic communication.

Q. *At what point in the evolution of man do you see the swing to a nuclear family occurring? When did the concept of the father as an integral unit in the nuclear family evolve and why?*

A. One theory of the origin of the family is that it is the result of the division of labor that came with hunting, especially hunting large animals. Women gathered, men hunted, and they shared the results of their labors.

Q. *Please elaborate on your statement: "Learning is not a general thing, but depends on a group of very specific human abilities. Evolution is a way of defining these abilities and seeing why they evolved." What abilities? Why did they evolve?*

A. Dogs easily learn to distinguish individual human beings by their smell, a task which humans cannot learn. Humans easily learn complex visual tasks which are impossible for dogs.

Humans easily learn the complex patterns of sounds which are the basis of language. This ability is in the brain, and no other creature has the ability to speak and to understand the meanings of language.

In evolution, selection is for successful behaviors, and each behavior is based on the facilitating biology. So in human evolution language, hand skills, cognitive abilities, bipedal locomotion, social and cooperative behaviors; all depend on the biology of the brain and other parts of the anatomy.



F. CLARK HOWELL,
Professor of Anthropology
University of California, Berkeley

Subject: PROBLEMS AND PROSPECTS IN UNDERSTANDING HUMAN ORIGINS

Q. *What is the importance of studying the past in terms of the present? The future?*

A. Few informed people doubt that organisms have changed, have evolved through the vast span of the earth's history. Humankind is no exception and clearly was not always as we know humankind now. The development of the theory of evolution and the recovery of many kinds of evidence, which demonstrates its reality as well as its mechanics, is one of the greatest accomplishments of the human intellect. The story of human evolution is mankind's story.

Paleoanthropology is concerned with studying the biological and behavioral evolution of humankind. In the past hundred years the great antiquity of the Hominidae, the zoological family which includes our own recent species (*Homo sapiens*) and all extinct species of mankind, has been well documented. In recent years the development and refinement of radiometric methods of dating have made possible a time scale for human evolution extending back some 10 million years. Increasingly, scientists from many disciplines are active in analyzing the geological circumstances, the nature of past environments, and those plant and animal communities, which reflect the world of early Hominidae.

The scientific investigation of mankind's place in nature initiated in the last century, displaced responsibilities which were previously the pressures of philosophy and religion. Everywhere there is concern with the nature and origin of the human condition. Past and ongoing researches in paleoanthropology afford scientific insight into such matters which must affect the life perspective of everyone.

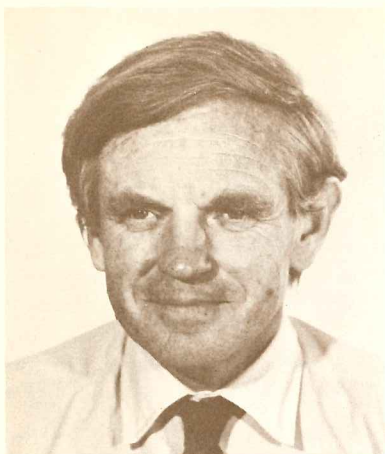
Q. *Would you elaborate on some of the untapped potentially rich sites left to be excavated? Where are they? What are some of the problems in archeological work at these sites?*

A. Investigations into the origins and past history of mankind are actively pursued by scientists throughout Eurasia and Africa. Increasingly over the past 20 years those studies have become multi-disciplinary and involve the cooperation of a diversity of scientists from many nations. In a world of ever-intensifying nationalism, paleoanthropological studies have become increasingly supranational, for the goal is to understand the origin and history of *all* mankind.

An ever more full and revealing record of the biological evolution and cultural development of humankind has been recovered from these on-going field researches. However, there are still important gaps in the hominid fossil record and human behavioral capabilities and adaptations are still poorly understood in various parts of the Old World at several points in time over the past several million years. The problem of hominid origins in general, and of the origin and dispersal of the genus *Homo* in particular, are actively under investigation. However, many areas of the tropics and subtropics of Africa and Asia have still to be examined for evidence relevant to the solution of these problems. Such researches must become a major focus of paleoanthropological field studies within the next decade.



Question and answer sessions followed each workshop.



GARNISS CURTIS
Professor of Geology
University of California, Berkeley

**Subject: NEW CALIBRATION POINTS
 IN HOMINID EVOLUTION IN EAST AFRICA**

Q. *How precise are dating methods? Which are the most precise? Why?*

A. **Precision** is a word that refers to the ability to reproduce an experiment and get the same results each time. Radiometric dates by any of the methods can have high precision but low accuracy, that is, not be close to the true age of the material dated.

For high accuracy as well as high precision, each dating method has its own special requirements. To use the Carbon 14 method, one must have carbonized material and it can't be much older than approximately 35,000 years or all the carbon 14 will have decayed away. To use the Rb/Sr (rubidium strontium) method one must have minerals containing Rb, and to use the K/Ar (potassium argon) dating method, one must have minerals or rocks containing potassium. Only under extraordinary conditions can the Rb/Sr method be used to date rocks as young as 2 million years (only one such rock has been dated).

The fission track method offers the greatest age-range of application — a few months to the oldest rocks, 4.5 billion years. Uranium, which causes the fission tracks, must be present in the sample, and to date very young material it must be present in very large amounts and in glass. This, of course, limits its applicability greatly, so that it can never be as useful as Carbon 14 in the range of a few hundred years to 35,000 years. However, uranium-rich glasses have been found in some Roman sites and in some later ones also. In older rocks there are a number of minerals that are enriched in uranium, such as zircon, and this mineral has proved very useful for fission track work. Heating of the sample from geological or other causes anneals the tracks, so that they cannot be seen, and this limits the use of this method in many cases. The precision of the method is generally quite a bit lower than other methods, and where other methods can be applied, such as K/Ar, they are preferable.

Potassium is one of the eight most common elements composing the earth, so that the K/Ar method can be used with a large number of minerals and over a span of time from 5,000 years to 4.5 billion (there are no older known minerals in the solar system). As with any of the methods of radiometric dating, to date an event using K/Ar, the mineral must have crystallized at the time of the event, or very close to that time. Potassium-bearing minerals that have been derived by erosion from older rocks elsewhere and transported to the site in question cannot be used to date the site, because the age obtained would be the time the mineral crystallized in the older rock. With a good, unweathered material high in potassium, such as sanidine, very high precision can be obtained with this method.

Q. *What looks possible in the future regarding the development of new and the perfection of already-existing dating techniques?*

A. The racemization technique now being developed particularly by J. L. Bada, looks extremely promising for dating bone directly, possibly back to one or two million years in certain cases, although its best range will almost certainly be less than 100,000 years. So many chemical changes take place during the fossilization of bone that do not take place at constant rates, it seems unlikely that any technique will be developed that will give high accuracy to the dating of bone more than a few tens of thousands of years old.



DONALD C. JOHANSON
Director of Scientific Research
Cleveland Museum of
Natural History
Co-Director,
International AFAR Expedition,
Ethiopia

**Subject: RECENT DISCOVERIES IN THE
 AFAR TRIANGLE, ETHIOPIA**

Q. *With regard to your exciting discoveries last season in the Afar Triangle, you have stated that "There is evidence of cooperative behavior" among these hominids. Will you elaborate on what that evidence is?*

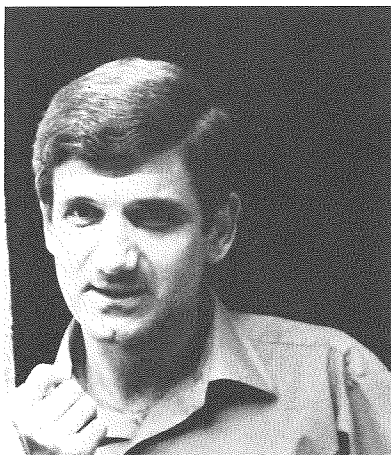
A. The unprecedented discovery of a single locality at the Hadar Site in Ethiopia, containing the fossilized remains of some five to seven individuals have suggested to me that early hominids were participating in cooperative behavior. The close association of these individuals and the presence of children and adults can only mean that in life some 3.0 million years ago they were living as a cooperative group. Whether it was a "family", a band or some sort of socially organized group, it is certain that they were somehow associated and were participating in a common life-style.

Q. *Since the announcement of your recent discoveries, what has been determined about the hand-bones used in assembling the "composite hand" in regard to the potential of tool-making/manipulation?*

A. Detailed research on the fossilized hand bones from A.L. 333 has commenced only recently following the removal of the stone matrix adhering to the specimens. It now appears certain that the metacarpals II-V (the bones located between the wrist and the fingers) belong to a single left hand. The finger bones sample more than one hand and the wrist bones are from a right hand. No evidence of knuckle-walking affinities can be discerned in the hand bones. For the moment it is best to be prudent and say that there does not appear to be any major aspect of the hand which would preclude tool making and fine manipulation. Projected detailed studies will refine our knowledge of the "composite hand."

Q. *You have expressed the feeling that "Lucy" should be classified as *Australopithecus africanus*. What is the feeling about the classification of the recent fossil bones dated at 3.5 million years that you found last season?*

A. Although "Lucy" definitely exhibits close affinities to *Australopithecus africanus* as is known from South Africa, she does possess some primitive characters in her jaw and pelvis which may make her distinctive from *A. africanus (sensu stricto)*. The most recently discovered hominid material from A.L. 333 is best dated to about 3.0 million years based on K/Ar dating and stratigraphic evidence. Only a small portion of the specimens have been cleaned but diagnostic elements such as the proximal femur and the dentition are not distinctive of australopithecids but are more reminiscent of fossils previously recognized as *Homo* known from the sites of Koobi-Fora, Olduvai, Laetoli and Hadar.



DAVID PILBEAM
Professor of Anthropology
Yale University,
New Haven, Conn.

Subject: SIWALIK HOMINIDS: NEW EVIDENCE ON MAN'S EARLIEST ANCESTORS

Q. You have been credited with saying that the development of language "would have made possible for the first time in primates the reward and reinforcement of nonaggressive behavior patterns". Does this rest on the assumption that before the development of language the only possible reinforcement was for aggressive patterns? At what point in the development of man do you think language emerged?

A. I should have said "non-emotion based behavior patterns" rather than "nonaggressive!" As far as one can tell, modern language probably entered along with modern man some 40,000 years ago. Before that I believe hominids utilized spoken languages, but languages that were structurally truly primitive in the sense of being less efficient information transmitters. Such primitive vocal languages may have existed in rudimentary form several million years ago.

Q. Bernard Campbell in his new book, *Humankind Emerging*, says: anthropologist David Pilbeam does not believe that aggressive behavior is innate in either man or in the monkey and ape. "The degree to which such behavior is developed," he states, "depends very considerably indeed upon cultural values and learning. Territoriality, likewise, is not a 'natural' feature of human group living; nor is it among most other primates." Would you elaborate?

A. Not being a professional ethologist, I hesitate to stick my neck out. However, human behavior (individually or in groups) is so variable and adaptable that it seems very difficult indeed, to put one's finger on an "innate" complex human behavior pattern. That is not to say that such patterns don't have a genetic component; of course they do. But developmentally, these patterns are extraordinarily malleable. It's hard to think of "typical" human behavior, except such grossly general categories as "language," for instance.

Q. Regarding the jaw fragments founds in the Siwalik Hills, it has been noted that there is no convenient layer of volcanic ash for precise potassium-argon dating. How then, can these fragments be dated? With what precision?

A. There are, in fact, layers of volcanic ash in the Siwalik deposits, but these have in most cases been mixed with older sediments, weathered, transported, etc. This makes them difficult to date because potassium-bearing mineral crystals from the volcanic eruptions must be painstakingly separated from those derived from older surrounding rocks. Eventually we hope to have radiometric dates, either potassium-argon or fission track.

At present, the dates are based on comparisons of the Siwalik faunas with those in Africa and Europe which have been radiometrically dated. The Siwalik primates appear to be from 14 to 9 million years old, approximately, with the most recent discoveries dating around 10 million years.

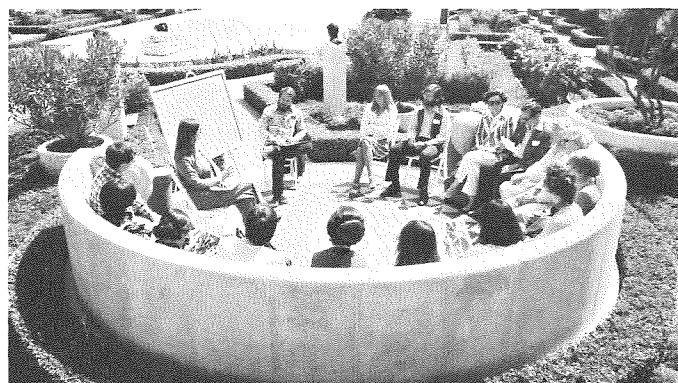
Q. Will you elaborate on the importance of your recent dramatic finds in the Siwalik Hills of Pakistan? How do these fossil discoveries correlate/differ from *Ramapithecus* finds in Kenya, Turkey or Hungary?

A. The new material represents at least four "clusters" — different species that probably should be different genera. At present three genera are named: *Ramapithecus*, *Sivapithecus*, *Gigantopithecus*.

All share certain features which seem to be adaptively important, so all could be described as being at the same "grade" of evolution. They have large chewing teeth, the teeth have thick enamel, and they apparently were living in open country and feeding mainly on tough vegetable food. In these features they differ from living apes (and monkeys) and the earlier African fossil apes of the Miocene, and resemble Plio-Pleistocene hominids like *Australopithecus* and *Homo habilis*.

In other features such as size of front teeth, relative development of male canines, and locomotor adaptations, these species were variable. One of them, *Ramapithecus*, was apparently more man-like, the others more ape-like.

As a 'grade' these forms seem to have been derived from earlier forest apes and to be broadly ancestral to later, Plio-Pleistocene hominids. They resemble finds from Turkey, Kenya, Greece and Hungary of about the same geological age. *Ramapithecus* is known from all these areas, though probably more than one species is represented, and perhaps as many as three.



Some workshops were outdoors in the Getty Museum gardens.



Even the Museum's library was used as a Foundation classroom.



Fellows were eager for the latest facts on man and his origins.



BERNARD CAMPBELL
Professor of Anthropology
University of California,
Los Angeles
Leader, Lake Rezaiyeh Expedition,
Iran

Subject: THE FAUNAL DIVERSITY AND PALEOENVIRONMENTS OF MARAGHEH, N.W. IRAN

Q. *Why was the Lake Rezaiyeh site chosen for excavation? Are there other potentially fossil rich sites in the area that might be excavated at a later date?*

A. There are many fossiliferous sites in the Lake Rezaiyeh area which we hope to excavate in future years. We chose northwest Iran because it lies in the center of the triangle which the range of *Ramapithecus* forms, with its points in Hungary, Pakistan, and East Africa (Kenya). Northwest Iran also contains deposits of the correct age, and the government is cooperative.

Q. *Thus far in the field, the Lake Rezaiyeh expedition has not revealed any hominid fossils. Do you predict that any will be found eventually? Why/why not? Might the lack of hominid finds be significant?*

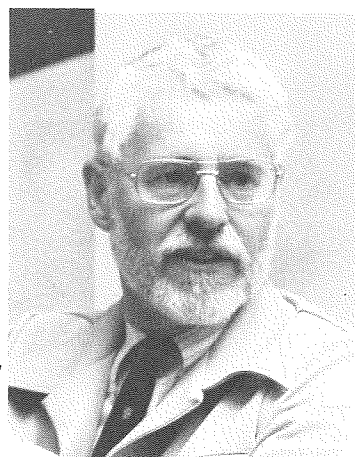
A. Since the deposits are in the right geographical area and of the right age, and the fossil animals discovered reveal the right environment, it seems extremely probable that we may discover early proto-hominids of the kind now known from Pakistan, Turkey, Hungary and Kenya. If we fail, the lack itself, will not be without interest.

Q. *Would you care to add any further comments about the importance of the finds from the 1975 Lake Rezaiyeh expedition field season?*

A. The extensive fossil collection we have made demonstrates that both woodland and savanna are represented in the area at the date of the deposit (c. 9.0 million years B.P.) and that the conditions for fossilization were excellent. Our fossils are of fine quality and so we feel that any primate fossils we find in the future may prove to be exceptionally complete and well preserved.



Some scientists showed casts of their latest fossil finds.



JOHN VAN COVERING
Associate in Neogene
Stratigraphy
University of Colorado
Museum, Boulder, Colo.

Subject: PLATE TECTONICS, PALEOCLIMATOLOGY AND HOMINID MIGRATIONS

Q. *Why have so many early man fossils been found in East Africa? How do we know how old they are?*

A. East Africa is essentially a fossil-trap in an otherwise almost featureless continental platform. Because of the Rift Valley structures and associated vulcanism, potential fossil beds can be buried rather than simply shifted about by the next year's flood. The alkaline conditions created by climatic dryness in the Rift Valley rain-shadows and by Rift Valley alkaline vulcanism are essential to the calcification of buried bones. Probably, the region supported no more and possibly fewer hominids than other parts of Africa, but their bones would have decayed in open air or rotted in forest soils elsewhere.

The Rift Valley vulcanism, again, is responsible for the extraordinary radiometric control on the stratigraphic succession of East African fossil beds. Without the valleys themselves, however, the lavas and tuffs that are sandwiched with the fossil beds and which provide the dated samples, would also have been removed by later erosion or would have been stacked into meaningless volcanic piles on the featureless plains.

Q. *What kind of terrain did the early hominids occupy?*

A. Our concept of hominid paleo-environments is biased because the fossils come only from certain selected environmental regimes; that is from places where bones are likely to be preserved, such as from subsiding sedimentary basins, with dry or alkaline conditions at least intermittently, or from caves. Hominids living in forests, mountains, ocean beaches, or on open plains would die and be forgotten.

By carefully subdividing hominid-bearing fossil assemblages on taphonomic principles, it does seem that they group (speaking of Miocene forms) more with tree-or water-loving mammals, than with contemporaneous grasslands-adapted mammals. But this only applies to the fossils that we have found in these certain, special paleo-environments. So, we know they lived on floodplains and near caves, but for the most part they are "rare animals" here: were they more abundant in the non-fossilizing environments?

Q. *What influences have environmental changes had on the course of human development?*

A. If we had a clear idea of the environments humans are presently best adapted to, the question would be easier to answer. (It might also be of some help to our city planners.)

Roughly 10 million years ago, in the Late Miocene, the temperate zone of Eurasia underwent the beginning of a long-term shift towards present highly seasonal climate from a more equable, semi-tropical climate. Because *Ramapithecus* endured this change and associated hominoids, for the most part, did not, we assume that humankind developed an affinity for open grasslands *per se*, but this is now looking like an oversimplification.

Interestingly, the behavior of humans differs from that of great apes in somewhat the same ways that behavior in other grasslands animals differs from their tropical forest relatives. A closer study of Miocene paleo-environments would do much to clear up the question of early-hominid habitat preferences and environmental effects on these habitats.



DIAN FOSSEY
Director,
Karisoke Research Centre,
Rwanda

Subject: INFANTICIDE: REPORT ON RECENT OBSERVATIONS OF THE MOUNTAIN GORILLA

Q. Which aspects of gorilla behavior have been illuminated for you by comparative studies?

A. By far, the most accurate study comparisons among gorillas would occur between George Schaller's excellent study in 1959 and 1960 and my own ongoing research over the last eight years.

Some of the more outstanding differences between our studies: a) *Group size*: Schaller found mean Kabara group size 16.9 animals (range 2-30) while the means from my study varied from 9 to 14 (range 3-20) between 1967 and 1974, with an overall mean throughout the Virungas of seven animals per group. b) *Group definition*: both studies agreed that a group contains at least one silverback, one or more females and maintains a relatively stable composition over periods of time. Schaller, however, included a 'variable number of young' within a group structure which is not a prerequisite for group types as defined by my study. c) *Sexual maturity*: Schaller felt that females could conceive at about six years of age while the results of my study have given a much older mean parturition age. Both studies concluded similarities concerning the onset of male sexual maturity. d) *Longevity*: Schaller's study suggested the longevity of wild gorillas as between 15 and 30 years younger than the results obtained from my study. e) *Interactions*: Schaller noted only one of 12 interactions as showing signs of antagonism while my study noted 15% of all physical interactions as violent in nature. Schaller did not attribute the major cause for interactions between social units a result or cause of attempts to solicit females. However, in data obtained from 297 observations within the seven year period in my study, I differ. I do attribute the main cause for interactions as attempts to solicit females.

Q. One of your most recent observations has been the occurrence of infanticide by silverback males. Can you suggest any reason why such a pattern of behavior might have evolved and endured?

A. During my nine year period of study, roughly 7,000 hours of observation, there has been only three known and three suspected cases of infanticide. Therefore, this must definitely be considered a rare phenomenon acting as a mechanism in which the silverback displaces, by killing, the progeny of another male in order to propagate his own offspring. Such a strategy has apparently been successful in non-human primate societies with a more even male/female ratio than exists among the gorillas; just how successful it will be among the small population sample with which I work cannot yet be determined. I think it most likely that the entire female transfer system, outside of their natal groups into new social units, in addition to the above few incidents of infanticide, all function toward exogamy and could possibly be an inherent characteristic of a species bound toward extinction.

Q. Is the mountain gorilla an endangered species? How many do you estimate are still alive in the Virunga area? Have any measures been taken to ensure the safety of this population?

A. In my study area census work results have shown 269 animals residing within 34 groups (this includes a number of lone individual males). The mean group size within the three westerly Virunga mountains consists of nine animals per group; the mean group size within the three easterly Virunga mountains consists of five animals per group; the total mean throughout the Virungas is seven per group. This differs with Schaller's estimate of 15 per group. Specific census counts have been made on Mt. Muhavura where 13 animals were found in two groups (includes one lone silverback) in 1972. In 1976 only eight animals remained within the same two groups (also included one lone silverback), thus there was a reduction of at least five animals within a four year period of time. Because of the poaching factor and lack of Europeans to assist in patrolling the eastern sector of the Virungas, I consider that area nearly a lost cause with regard to observation of viable populations unless a secondary camp of one or two persons can be situated *this* year, on Mt. Muhavura.

Within the immediate study area of some 225 km square around the Karisoke Research Centre, the population seems to have stabilized for the moment. In this small portion of the Virungas it should continue to be stable as long as my camp is in operation. More stringent measures must be taken against poachers found within the Parc des Volcans of Rwanda. In Zaire (Parc des Virungas) park guards are allowed to shoot (not necessarily kill) poachers. In Rwanda park guards are allowed to imprison poachers for a few days, or, until they pay their fine — \$10 to \$100 depending upon what they were caught doing.

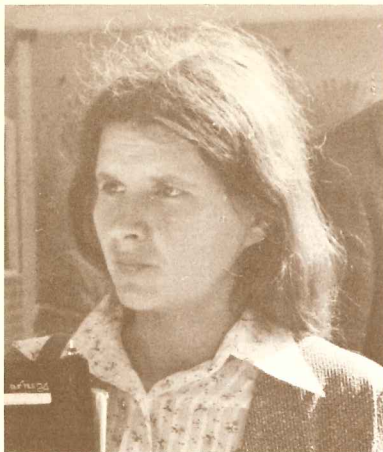
In summary, we need more Europeans capable of working within the Virungas and we need *far* more stringent law enforcement against poachers.



Fine points were discussed personally with the scientist.



Many provocative ideas were advanced at the day's sessions.



BIRUTÉ GALDIKAS-BRINDAMOUR
*Director, Orangutan Research
 Tanjung Puting Reserve,
 Kalimantan, Indonesia*

**Subject: NEW QUESTIONS ABOUT
 THE WILD ORANGUTAN**

Q. *Quite often the role of the primatologist in the wild seems to be simply to observe and record data. What are the hazards in theorizing/hypothesizing about the causes of actions? At what point in observation is the primatologist forced to interpret?*

A. This is a rather complex question and one not easily discussed in a limited space. To some extent, the primatologist begins interpreting the moment she/he makes her/his first observation in the field. Perception and interpretation can't be easily separated. However, higher-order interpretation is best begun only after the researcher is certain to have adequate samples relevant to test her/his hypotheses. For instance, any conclusions regarding the overall social organization of one population of primates must be based on wide sampling of all age-sex classes within that population. Rare events (such as orangutan males actually fighting) are often extremely important to one's testing of the hypotheses (and thus, one's "interpretation") — usually out of all proportion to the frequency of their occurrence.

Q. *As part of your research on the wild orangutans in Indonesia, you have taken on the job of rehabilitating captive orangutans. By rehabilitation, do you propose to "put them back in the forest"? Will such an action infringe on the territory of adult males already in the study area and affect their behavior?*

A. First, adult male orangutans are *not* territorial. Territoriality implies a defense of the home range boundaries and orangutan males do not defend real estate. Further, aside from members of their own sex-age class or estrus females, adult males tend to ignore other orangutans. Thus, releasing ex-captive animals will not infringe on the "territories" of adult males (since they don't defend territories).

However, as we see it, the main problems associated with rehabilitation are 1) competition for food or overloading the carrying capacity of the environment, especially during periods of minimal food resources, and 2) introduction of diseases (acquired from humans) to the wild population. For these reasons, we have not encouraged rehabilitation on any grand scale by the ex-captives associated with our camp, although we do not prevent them from returning to the forest.

Q. *It is often said that the orangutan is the only living Asiatic representative of the great apes, implying that at some point in time other apes lived in Asia. Could you elaborate on these other prehistoric apes? In what ways might their life-styles have paralleled/differed from present-day orangutans?*

A. There was a variety of Dryopithecine apes living in Asia during the Miocene, possibly including our human ancestor. Present-day orangutans are exclusively creatures of the tropical rain forest belt and quite arboreal. Most probably some of these other Miocene apes were terrestrial animals which ventured out into the grasslands; others probably inhabited riverine forest or woodland type areas on the edges of grasslands. The ancestor of the orangutan was probably always restricted to tropical high forests. A Pleistocene (perhaps Pliocene, also) ape is *Gigantopithecus*, distinguished by its huge teeth; this animal was probably a ground herbivore.



SHIRLEY C. STRUM,
*Professor of Anthropology
 University of California,
 La Jolla*

Subject: BABOONS OF GILGIL: PREDATOR OR PREY?

Q. *Quite often the role of observer in the field seems to be simply to observe and record data. What are the hazards in theorizing/hypothesizing about the causes of baboons' actions? At what point is the observer forced to interpret the causes of baboon actions?*

A. It is important to try to maintain data collection at a descriptive rather than interpretive level. I avoid imputing intention to the baboons' actions and use the smallest units I can to record the behavior descriptively without, at the same time, destroying the integrity of the behavioral sequence. After complex sequences are repeatedly observed, they can be given a descriptive level. This is used afterwards as a shorthand for consistent sequences but it is not an interpretation of the cause of the behavior. If a "typical" action occurred with unusual elements, it would be noted down with the unique aspects. Later, categories of behavior can be revised. Sometimes you find that discriminations are not fine enough or that they are too fine.

The first part of any field study usually involves continual reassessment of behavioral categories. Interpretations of behavior come at a later point, when the data is being analyzed, but even then we cannot assign motivation to the behavior. We can simply describe its contingencies. Unlike human subjects, who can talk to us about their intentions, their perceptions, and their motivations, baboons are silent on these subjects.

Research into motivation is possible to some degree and laboratory studies have been important in this regard. However, it is too easy to take our own uniquely human view of things and project it into an animal's behavior if we are not careful in our interpretation process. It is important to make the distinction between reasonable interpretations of behavior and speculations about origins, causes, or functions. I think we are presently in a transitional period where the rules for the interpretation of behavior are being reformulated.

Q. *As one of the solutions to the current situation at Gilgil it has been proposed that the troop of baboons be moved and relocated to another (safe) park/reserve. Can you suggest ways in which such a move might affect the behavior of the "Pumphouse Gang"?*

A. Moving the baboons to another site would be an experiment, in and of itself. Since few wild groups have been relocated, it is not possible to predict the behavior. However, since we have 5 years of excellent data on the troop we would have a baseline against which we could compare the behavior of the baboons in the new setting. Several interesting points: would "Pumphouse" continue to practice predation under different and perhaps potentially more dangerous circumstances? Would the behavior spread to other troops? How would the resident baboons react to the stranger troop and vice versa? Would "Pumphouse" know what was acceptable food in the environment or would they have to learn as a result of trial and error or observation?

... AND ON THE SOCIAL SIDE



Fellows (l to r): Mrs. James Stewart and Mrs. Justin Dart co-chaired hostesses; Mrs. Max K. Jamison was Fellows Day program director.



Checking for next workshop (l to r): James Stewart, Foundation's executive board Dian Fossey and Mrs. Justin Dart.

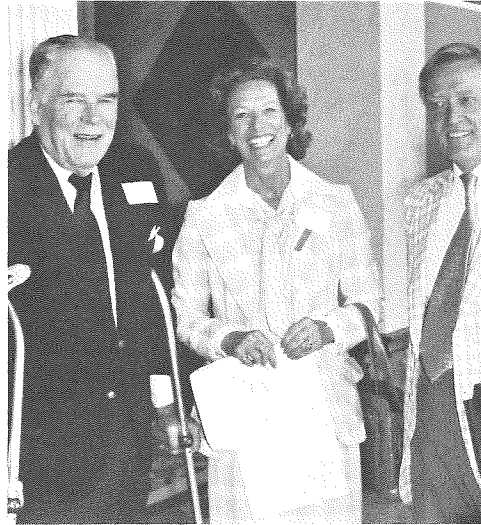


VP Robert Beck with wife, Helene. Foundation's executive board co-hosted the day's conferences.

More than 150 trustees and fellows enjoyed the opportunity to meet and greet each other again this year, at the Leakey Foundation's second annual Fellows Day Conference at the Getty Museum in Malibu, Ca. in May.

They came from as far away as Texas and as close as Los Angeles. Individually they represented a diversity of interests — there were ranchers and business people, politicians and merchants, actors and corporation executives, doctors and writers, lawyers and bankers — yet all had been drawn together by a common interest and a deep commitment to furthering research on man and his origins.

Highlight of the day's events was the series of informal workshops "tutored" by 10 eminent scientists reporting their latest findings in such areas as paleoanthropology, geology, dating techniques, primatology, and ethology. Many of these workshops were held out-of-doors in the magnificent Roman-like gardens of the Getty Museum.



L to r: fellows Justin Dart, Mrs. Max K. Jamison and Lawrence Barker.



At lunch (l to r): Mr. and Mrs. Farley Marks O'Brien with Mrs. Kenneth Leventhal.



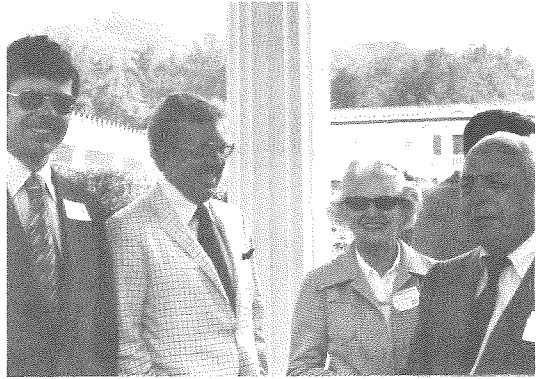
30 Leakey Associates planned and hosted Fellows Day. Among them: Jean Brody (r) and Beverly Evans.

There was also a buffet luncheon on the museum's loggia, a post-conference cocktail party, and specially arranged tours of the museum's multi-million dollar art collection for all Foundation guests.

The entire conference, which started at nine in the morning and ended at six in the evening, was coordinated and planned by the newly-formed Leakey Foundation Associates, directed by Mrs. Max K. Jamison, trustee and chairman of the national fellows program for the Foundation. Mrs. James Stewart and Mrs. Justin Dart who co-chaired conference hostesses, were on hand to greet and welcome guests along with members of the board of the executive committee of the Leakey Foundation.

Members of the Leakey Associates who helped plan the conference include Mrs. Kenneth Leventhal, Mrs. Owens Miller, Mrs. Brawner Ralphs, Mrs. Renata Russell, Mrs. Edwin Munger, Mrs. Clay Seaman, Mrs. David Friedman, Mrs. Jay Sandrich, Mrs. I. David Weiner, Mrs. Sidney Adair, Mrs. Jean C. Schwarzenbach, Mrs. Mason Phelps, Mrs. Christopher Shafer, Mrs. Robert Niven, Mrs. George Jagels, Mrs. Kurt Mann, Mrs. Coleman Morton, Mrs. Bernhard Tingle, Mrs. Robert Evans, Mrs. B.E. Bensinger III, Mrs. Robert Beck, Mrs. Henry Escher, Mrs. Richard H. Keatinge, Ms. Anne Getty, Mrs. Charles E. Kern, Mrs. Cathlaine McIlwain, Mrs. Edith Chapman Smith, Ms. Jean Brody.

On this page are some of the highlights and the people who shared in this special Foundation event.



L to r: vp Gordon Getty with president Edwin Munger-greeting fellows Dr. and Mrs. Ed Roemer.



Reviewing eventful day (l to r): Mr. and Mrs. Charles Kern and Henry Escher, Jr.



L to r: fellow Hulsey Lokey with scientists Don Johanson, Jack Harris and Mrs. Lokey.

L.S.B. LEAKEY COMMEMORATIVE VOLUME IN THE WORKS

The Foundation's Louis S.B. Leakey commemorative volume comprising statements from dozens of friends, relatives, associates and acquaintances and covering many personal, historical, laudatory, critical, humorous and dramatic anecdotes, is now being compiled for publication. It is expected to ultimately give a picture of Louis Leakey as an extraordinarily gifted, controversial and multi-faceted man whose impact continues to grow and be felt despite his death in 1972.

Trustee Fleur Cowles, creator of *Flair Magazine*, and for many years associate editor of *Look Magazine* as well as head of the European-based Leakey Foundation, will edit the volume. It was assembled by trustee Joan Travis over the past four years.

Material is still being gathered. If anyone has any photos or stories to share, please contact Joan Travis, L.S.B. Leakey Foundation, Foundation Center 206-85, Pasadena, Ca. 91125.

PRIMATOLOGY CONFERENCE IN CAMBRIDGE IN AUGUST

The sixth Congress of the International Primatological Society will be held in Cambridge, England, August 23 to 27. It is expected to draw scientists from every part of the world and from all disciplines.

On the program will be half-day symposia on such topics as sexual and aggressive behavior, primate breeding, the economics of primate conservation and feeding behavior. There will be a full day symposium on hominid evolution and round table discussions covering field studies of chimpanzees, orangutans, baboons, gibbons and macaques as well as language and its origins. A showing of research films by many of the participants is also expected.

For further information on registration and other details write: Dr. D.J. Chivers, Secretary, I.P.S. Organizing Committee, Laundry Farm, Barton Road, Cambridge, England.

F.R.O.M. HOLDS FIRST LECTURE SERIES

The Foundation for Research into the Origin of Man held its first lecture series in Washington, D.C., March 12-13. Chaired by Dr. T. Dale Stewart, the Smithsonian Institute's Anthropologist Emeritus, six speakers appeared during the day-long session: Richard E. Leakey, director, National Museums of Kenya; Dr. Alan C. Walker, Harvard Medical School; Dr. Donald C. Johanson, Cleveland Museum of Natural History; Dr. Erik Trinkaus, Peabody Museum; and Professor Glynn L.I. Isaac, University of California, Berkeley.

In addition, a panel discussion was presented by Smithsonian scientists including: Dr. J. Lawrence Angel and Dr. Robert S. Corruccini of the department of anthropology; Dr. Richard W. Thorington, Jr., department of vertebrate zoology; and Dr. Frank C. Whitmore, Jr., geologist from the U.S. Geological Survey.

News in Brief

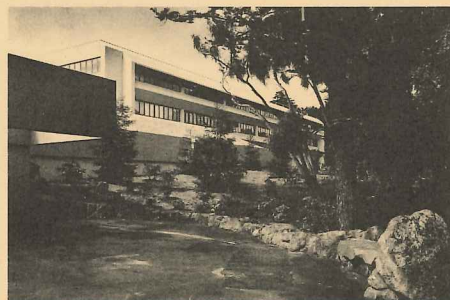
LEAKEY FOUNDATION PLANS "ENDANGERED SPECIES" CONFERENCE

Plans have been proposed for a special conference "Endangered Species: Man and His World" to be held in early December in Los Angeles under the sponsorship of the Leakey Foundation.

Although still in its formative stage, the theme for this conference is expected to be explored by six or more scientists, conservationists, and humanists, whose own concern for intelligently coping with the challenges facing mankind matches that of the Leakey Foundation.

The program will address itself to the complex and delicately interdependent relationships between man, animal and the physical environment, and should be a landmark presentation in the Los Angeles community. It will be open to the general public.

Participants and program are to be determined this summer.



San Francisco's new anthropological museum. The first one was destroyed in the earthquake of 1906.

WATTIS HALL OF MAN OPENS

The opening of the Wattis Hall of Man on July 1 ends the 70-year hiatus in anthropology at the California Academy of Sciences, San Francisco.

Dedicating the Hall will be Dr. Clifton Kroeber, son of the first curator of anthropology. The first museum was destroyed in the earthquake of 1906.

A gift of \$1 million from the Paul L. and Phyllis Wattis Foundation made the project financially feasible and the new addition is named in the memory of the late Paul L. Wattis, San Francisco businessman and philanthropist. Another \$3.5 million was donated from private sponsors to cover planning and construction costs.

Many new concepts in museum exhibits are utilized. Among them: an elevated activities area where musicians, dancers and craftsmen from around the world will demonstrate the living arts. Another exhibit, Early Man Wall, interprets man's biological and cultural evolution from primate ancestors to the present. Dr. F. Clark Howell professor of anthropology at the University of California, Berkeley and head of the science and grants committee of the Leakey Foundation was the primary consultant on the early man project.

WORLD WILDLIFE CONFERENCE TO BE HELD IN SAN FRANCISCO

The World Wildlife Fund will hold its fourth international congress in San Francisco November 28 through December 1, 1976, at the St. Francis Hotel.

Theme of the congress, "The Fragile Earth: Toward Strategies for Survival," will provide a forum for examining issues, viewpoints and the aspirations of conservationists, scientists, governments, businesspersons and industrialists. Both members and donors from 26 participating countries will be on hand for the event.

Central to the congress are six seminars with internationally known panelists. In addition, a film festival of award-winning wildlife documentaries will be offered along with a concert celebrating nature and conservation, and exhibits and demonstrations of conservation accomplishments by corporations and conservation organizations.

UC INVITES PUBLIC TO JOIN RESEARCH EXPEDITIONS

The need for alternative sources of funding and the desire to involve the public in scientific research are behind the establishment of a unique new program at the University of California, Berkeley, the University Research Expeditions Program (UREP). Designed to help raise funds for field research projects, UREP invites members of the public to help finance and actively participate as short term volunteers in field expeditions which can benefit from the assistance of serious non-professionals.

Participants in the program, who are selected by the principal investigator, make a specific financial contribution (determined by the needs of each project) to the university. The contribution, which is tax-deductible, covers their field expenses and a portion of the staff, logistic, research and administrative costs of the project. In some cases the participants' contributions supplement an existing grant, while in other cases they may be the sole source of funding.

Joining an expedition does not necessarily require any prior academic or field experience in the discipline as participants are provided with preparatory instructional materials and in-the-field training in those data collection methods involving techniques which can be learned with minimum preparation.

Five projects are open to application this year. Among them: a paleontology project in south-central Wyoming where participants will assist in the excavation and identification of vertebrate fossils dating back 55 million years (July); a survey of the primate species present in a West African tropical forest (July); and an insect ecology study in Central America where participants will assist in gathering basic environmental data on an aquatic ecosystem (December).

Applications and further information about this new program may be obtained from: University Research Expeditions Program, c/o Botany Department, University of California, Berkeley, Ca. 94720.

Grant SPOTLIGHT

The grant program of the Leakey Foundation, under the guidance of 16 distinguished scientists who make up the Foundation's science and grants committee, depends upon public support for its success. Membership in the Foundation and special contributions (even the smallest donation) directly assist vital international research into man's origins. Won't you help? Send a contribution to the Leakey Foundation today!

The recent grant allocations of the Leakey Foundation cover a highly specialized and exciting range of research and study projects. They include: an urgently needed comparative study of Asian and African fossil faunas; a unique examination of Amazon hunting both from the perspective of ecology and ethnoecology; a scholarship toward a graduate degree in wildlife management for an African student; and a grant to two assistants needed for vital research on mountain gorillas in Rwanda. All promise to be of greatest value in providing new opportunity and data on human evolution, early cultures and conservation. Details of these and other projects follow:



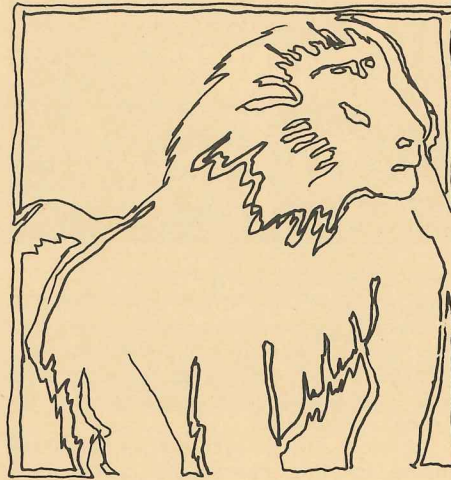
Tepilit Ole Saitoti **\$7,450 needed**
Wildlife management scholarship

Mr. Saitoti is 26 years old and a Maasai brought up in a traditional Maasai environment. In 1967, he joined the Tanzania National Parks ranger program and was a ranger and guide for five years. During this period he worked with Mary Leakey at Laetolil.

In 1971, he portrayed the main character in the National Geographic Society film "Man of the Serengeti" and then narrated the film for NGS on college campuses in the United States. Mr. Saitoti obtained a certificate at the Goethe Institute in Germany and completed his Bachelor of Fine Arts degree at Emerson College this June.

Recently he was accepted for a master's degree in natural resources at the University of Michigan, Ann Arbor. It is his goal to obtain this degree in wildlife management and ecology in order to be of assistance to his people and the conservation effort in East Africa.

Funding is needed to allow Mr. Saitoti to complete his education after which he intends to return to Massailand to work in wildlife conservation. "What is needed," says Mr. Saitoti, "is a native ecologist administrator who will not only think of the animals but also consider the people in the environment and see to it that neither of the two is deprived of their rights."



Shirley Strum **\$8,000 needed**
Baboon study, Gilgil, Kenya

Dr. Strum is the co-director of the Gilgil Baboon Project in Kenya, initiated in 1970, with Dr. R.S.O. Harding of the University of Pennsylvania. In the past six years, extensive data has been collected on a troop of olive baboons dealing with range utilization, male and female behavior patterns, infant development, communication, kinship, baboon bipedalism and predatory behavior. This project has become a focus of interest to scientists world-wide due to the special nature of the project: it represents one of the few primate study sites where data has been continuously collected on an undisturbed, wild group of individually identified animals with known kinship. The Gilgil site, on savanna land, has provided an excellent contrast with the investigation of baboons living in a forest habitat like that of Gombe.

The recent sale of the land upon which the site is located to an African cooperative, has jeopardized future research opportunities and the actual existence of the baboon troop. Dr. Strum intends to return to the site in August of 1976 with one other trained research assistant, to begin an intensive data collection program before the land changes hands.

A pledge of \$4,200 designated in support of this intensive research has been received by the Foundation, providing another \$6,000 can be raised before August.

Douglas L. Cramer **\$1,000 needed**
Hominid survey in the Afar Triangle

Dr. Cramer, assistant professor at Rutgers University, plans to spend two to three weeks in Addis Ababa, Ethiopia, making molds of primate fossils at the museum there. The molds will be returned to the United States where casts will be made for study purposes. These fossils have been gathered by the Rift Valley Research Mission from the Afar depression.

He then plans to accompany the Research Mission on a field survey of possible hominid sites. This survey will probably last through the month of August, 1976 and will be under the direction of Dr. Jon Kalb, who heads the Mission. The Mission is to explore and document in full, paleontological, archeological and hominid localities in a selected area which will then be incorporated into a larger context fundamental to understanding the evolution of the Afar sedimentary basins.

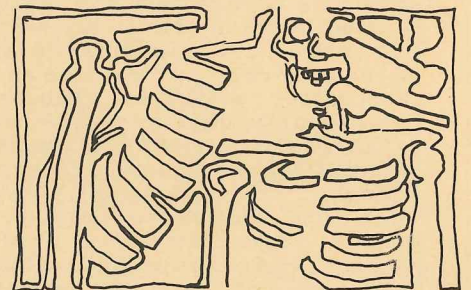
Elisabeth Vrba **\$1,331 needed**
**Comparative studies of
Asian and African fossil faunas**

Dr. Vrba, who heads the paleontology department at the Transvaal Museum, Pretoria, South Africa, and is associated with C.K. Brain, is currently doing research which has afforded a wealth of new evidence on paleoenvironments of early hominids in southern Africa. Her projected comparative studies of fossil faunas, especially antelopes and Bovidae, at U.S. museums will provide the necessary data to permit her to extend this research to other areas, including parts of eastern Africa and Asia, and to undertake comparative studies never before attempted.

Increasing evidence is emerging from research on African fossil faunas that Asian and African faunas show close parallels during various times in the past.

Among the faunal groups, the Bovidae should prove particularly useful to our understanding of vitally important aspects of man's ancestry. They also offer information on chronology, taphonomy and paleoenvironment.

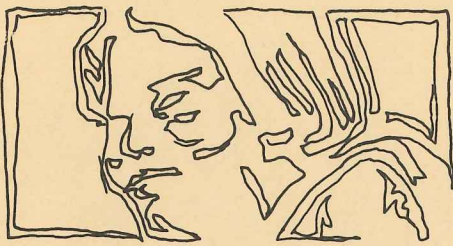
During the past 20 million years Bovidae radiated spectacularly into just about every type of environment that the African continent offered. They occupied a central part of the food chain. Not only do they provide information as "eaters" of the surrounding vegetation, they also generally constitute the bulk of the "eaten" and as such may contribute to our knowledge of past predation/scavenging patterns by carnivores or hominids. Provided that possible taphonomic interference factors can be recognized and compensated for, bovid fossil assemblages are potentially excellent indicators of paleoenvironment.



Ivan Suzman **\$1,800 needed**
Pelvi-femoral mechanism analysis

Mr. Suzman has been working on the mechanism of early hominid gait and locomotion at the University of the Witwatersrand, South Africa for the past two years. An American doctoral candidate of Dr. Philip Tobias, who is head of the anatomy department there and a Leakey trustee, Mr. Suzman has studied thoroughly parts of the Australopithecine and other early hominid remains at both Witwatersrand and at the Transvaal Museum, Pretoria. He now needs to study the corresponding structural parameters in a large number of modern human skeletons and to study the corresponding bones in a large collection of modern anthropoid ape skeletons. He will therefore need to travel to Zurich, Birchington in Kent, England and to several other major centers in Europe to complete his research.

The project is the most comprehensive set of investigations yet made on the pelvi-femoral mechanism and it is hoped that a number of controversial differences of interpretation at present in the literature may be resolved by his studies.



Leslie Sponsel \$5,000 needed
Indigenous exploitation of animal resources in the Amazon forest

Mr. Sponsel, a doctoral candidate at Cornell University, went to Venezuela for the first time in 1975 to study the Sanuma Indians, a sub-group of the Yanomamo Indians. His work entails an integrative biological and anthropological approach to the behavioral ecology of predation by this group of Indians.

Focusing on man-animal relations, Mr. Sponsel will first view the Sanuma as a biologist would any other predator, second in terms of their knowledge of the ethology of the prey species, and third in the way culture articulates the hunter with his society and habitat.

Due to begin in August 1976, this study of hunting from the perspective of both ecology and ethnoecology is a new approach which should produce important insights into how hunting and gathering peoples subsist, and how their subsistence affects their social organization and view of the world. This kind of work is particularly important now, because there is very little time left to study hunters and gatherers in South America (or for that matter, anywhere in the world) in anything like a pristine state. The ethnographic data that Mr. Sponsel brings back from his study should be of greatest value to anthropology.

Jane Goodall \$23,000 needed
Gombe Stream Research Center, Tanzania

Observations of the free-ranging chimpanzees of Gombe which have been conducted by Dr. Jane Goodall and her team of scientists, students and Tanzanian field staff, suffered only a momentary hiatus of one day at the time of the May 19 kidnapping episode.

Valuable data continues to be gathered by the Tanzanian field staff whose training in gathering of information about the chimpanzees and baboons of Gombe was begun by Dr. N. Owen in 1969, and has since been accelerated as part of a program to intensify the education of Tanzanians about their own national park system and their magnificent animals.

Of major interest were interactions observed between communities, two instances of cannibalism, keeping of detailed records of grooming, travel and group charts, state of health of known individuals and a variety of other aspects of the Gombe chimpanzee community.

Present funding comes to an end in October 1976 and budgetary needs are being sought for a 14-month period (through 1977) which will insure the continuity of the long-term nature of the research at Gombe. The center is now in its sixteenth year of operation.



Dian Fossey \$3,000 needed
Gorilla study, Karisoke, Rwanda

As part of her on-going long-term research on the mountain gorilla at the Karisoke Research Center in the Virunga Mountains of Rwanda, Dian Fossey has made a modest application to the Leakey Foundation for grant support for two field assistants, Andre and Dominique Lucas. Both are zoology students who maintained the camp during Ms. Fossey's recent lecture tour to the United States. Their seven-month participation in the eight-year-old mountain gorilla study will include rechecks of census tabulations previously acquired, daily observations among the study groups of mountain gorillas, and patrol work with the park guards and camp staff.

This patrol work is central to the research effort as poachers are known to have been responsible for 37% of all gorilla mortalities within the past seven years. In addition, the Lucas' will take films of gorilla behavior and development. No films have been made since 1972, which has seriously disrupted the continuity of documentation on maturation aspects of development among the younger animals.

BECOME A MEMBER OF THE LEAKEY FOUNDATION

New and renewing members will receive a complimentary book of their choice.

- \$25 FRIEND** *In the Shadow of Man*, Jane Goodall. (paperback)
 OR
Territorial Imperative, Robert Ardrey. (paperback)
- \$100 CONTRIBUTOR** *The Missing Link*, Vol. 2, "The Emergence of Man" series, Time-Life. (hardcover)
 OR
 "Women-Primitive and Modern," Margaret Mead. (cassette).
- \$250 ASSOCIATE** *By the Evidence*, Louis Leakey. (hardcover)
 OR
Leakey's Luck, Sonia Cole. (hardcover)
- \$1,000 FELLOW** In addition to a unique encapsulated replica of a jaw of *Kenyapithecus africanus*, FELLOWS may select two copies of any of the books/cassettes listed above.
- \$5,000 BENEFACTOR** In addition to a unique replica of the Olduvai Articulated Foot, BENEFACTORS may select four copies of any of the books/cassettes listed above.

Membership in the Leakey Foundation brings many benefits. You will receive:

- A year's subscription to the *L.S.B. Leakey Foundation News* quarterly covering our activities nation-wide as well as internationally.
- Invitations to lectures, conferences, symposia and special events with distinguished scientists from around the world.
- 10% discount on significant scientific books, special transcripts, field reports, cassette tapes, and dialogues of work-in-progress.
- Travel benefits: charter trips and safari excursions at special discount rates.
- An opportunity to meet scientists in an intimate atmosphere with friends who share the same interests.
- A chance to keep up with the latest ideas and trends of utmost importance to man and his origin in the fields of archeology, anthropology and conservation.

BEST OF ALL, your contribution will directly support the work of individuals and international research teams around the world in their quest to better man's knowledge about himself, his behavior and his environmental future.

I would like to become a member of the Leakey Foundation in the following category:

- \$10 STUDENT
 \$25 FRIEND
 \$100 CONTRIBUTOR
 \$250 ASSOCIATE
 \$1,000 FELLOW
 \$5,000 BENEFACTOR

I would like to receive the following complimentary book/cassette offered to my membership category:

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My check for _____ payable to the Leakey Foundation is enclosed. Contributions to the Foundation are tax-deductible as provided by law.

Mail to: L.S.B. Leakey Foundation, Foundation Center 206-85 Pasadena, California 91125

DATING STONE TOOLS DIRECTLY

Continued from page 1.

a surprisingly high surface concentration of the fluorine within the first two atomic layers on a sample previously measured. If generally confirmed, it will resolve one problem with which the research has been grappling since the beginning of the studies — the effect of variability in fluorine in the environment on its movement into lithic samples. Preliminary data on Calico samples has revealed a degree of complexity in the geological depositional picture whose interpretation must await more specific information from the project geologist.

As each problem is carefully worked through, it will hopefully move us closer to the time when direct "dates" can be obtained on lithic artifacts recovered from ancient sites. The development of this technique will be another example of how modern archeology is utilizing technical resources now available to their best advantage, toward the ultimate goal of a more complete and comprehensive understanding of what it was that made *Homo sapiens* the way he is.

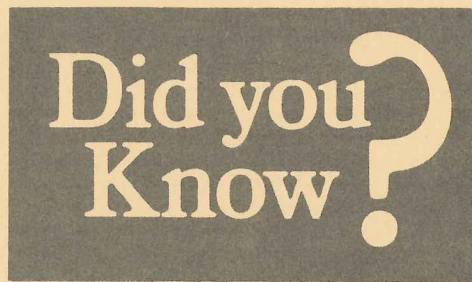
(Dr. Taylor is with the department of anthropology and the Institute of Geophysics and Planetary Physics, University of California, Riverside. The fluorine diffusion dating of chipped lithic materials project was initiated by Dr. Taylor in 1975 in collaboration with Professor Thomas A. Tombrello, Department of Physics, Mathematics and Astronomy, California Institute of Technology.)

RADIOCARBON CONFERENCE

More than 50 scientists from all over the world attended the ninth International Radiocarbon Conference at the University of California in Los Angeles and San Diego, June 20 to 26.

In addition to a series of special conference sessions, the group honored Willard F. Libby, director of the Institute of Geophysics and Planetary Physics, University of California. Dr. Libby received the Nobel Prize for chemistry in 1960 for his pioneering studies of radiocarbon dating.

The conference was made possible by grants from the Leakey Foundation, the University of California and the National Science Foundation.

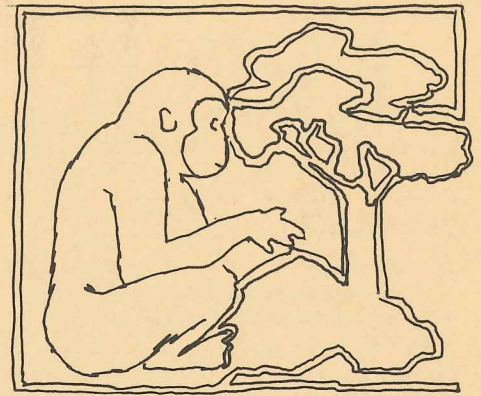


Two types of solar observation have cast some doubt on universally accepted theories of why the sun shines, says an article in the *New York Times*. The sun's energy source is thought to be the fusion of hydrogen nuclei in its core, resulting in the formation of helium and the release of energy.

One consequence of this reaction should be the production of neutrinos, sub-atomic particles of no mass and no electrical charge. Over the past three years, however, attempts to observe the neutrinos have failed.

The second, and more recent finding is that the sun appears to pulsate, expanding and contracting by about five miles every two hours and 40 minutes. If this is so, say Drs. J. Christensen-Dalsgaard and Douglas O. Gough of Cambridge, then "a very drastic change in the solar model" might be called for. They doubt that the new model could generate the observed amount of sunlight by fusion reactions.

The current issues of two scientific journals, *Nature* and *Science*, have discussed these apparent anomalies, and revolutionary proposals have been offered to account for them. Among these are: that a partial energy source of the sun is a "black hole" at its center; that the sun is temporarily burning low at its core, and another ice age could result; and that the actual reaction responsible for solar energy is simply unknown.

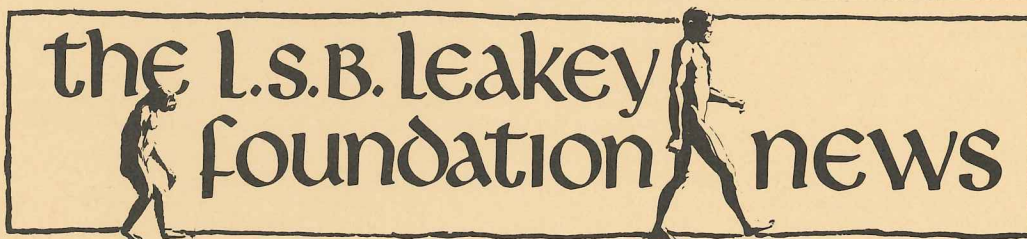


The discovery of anthropoid material in Hungary recently, including three distinct forms, one of which seems closer to the direct line of human evolution than *Ramapithecus* of India or *Kenyapithecus* of Africa, seems proof to Hungarian scientist Miklos Kretzoi, that the process of hominization did not occur in an isolated tropical population (like Africa or India) but was an evolutionary trend that took place among a whole range of apelike creatures throughout the Afro-Eurasian landscape. The direct line to us then would seem even more obscure.

New excavations in Ecuador may put the beginnings of farming and urbanization in the Americas back to around 3,000 B.C. This date is 1,000 or 1,500 years earlier than the Formative stage is now thought to have appeared in Mexico and Peru.

It is believed that the excavation site, Real Alto, grew corn and had a population of perhaps 1,000 around 2800 B.C. It consisted of a village of 50 to 100 oval houses, 35 feet long by 25 feet wide, thought to be multi-family dwellings. They are arranged around a plaza with two central platforms — a form of city planning followed 2,700 years later by the Maya of Yucatán, by civilizations in Peru, and in the lower Mississippi Valley in the 16th century A.D.

The excavation is being done by Dr. Donald W. Lathrap and his colleagues from the University of Illinois, Champaign-Urbana.



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