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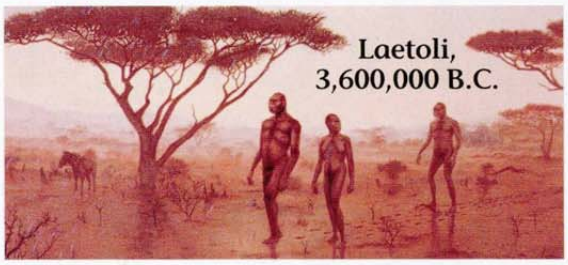


They are precious clues to the past,

rare fossil tracks left millions of years ago by humanity's ancestors.

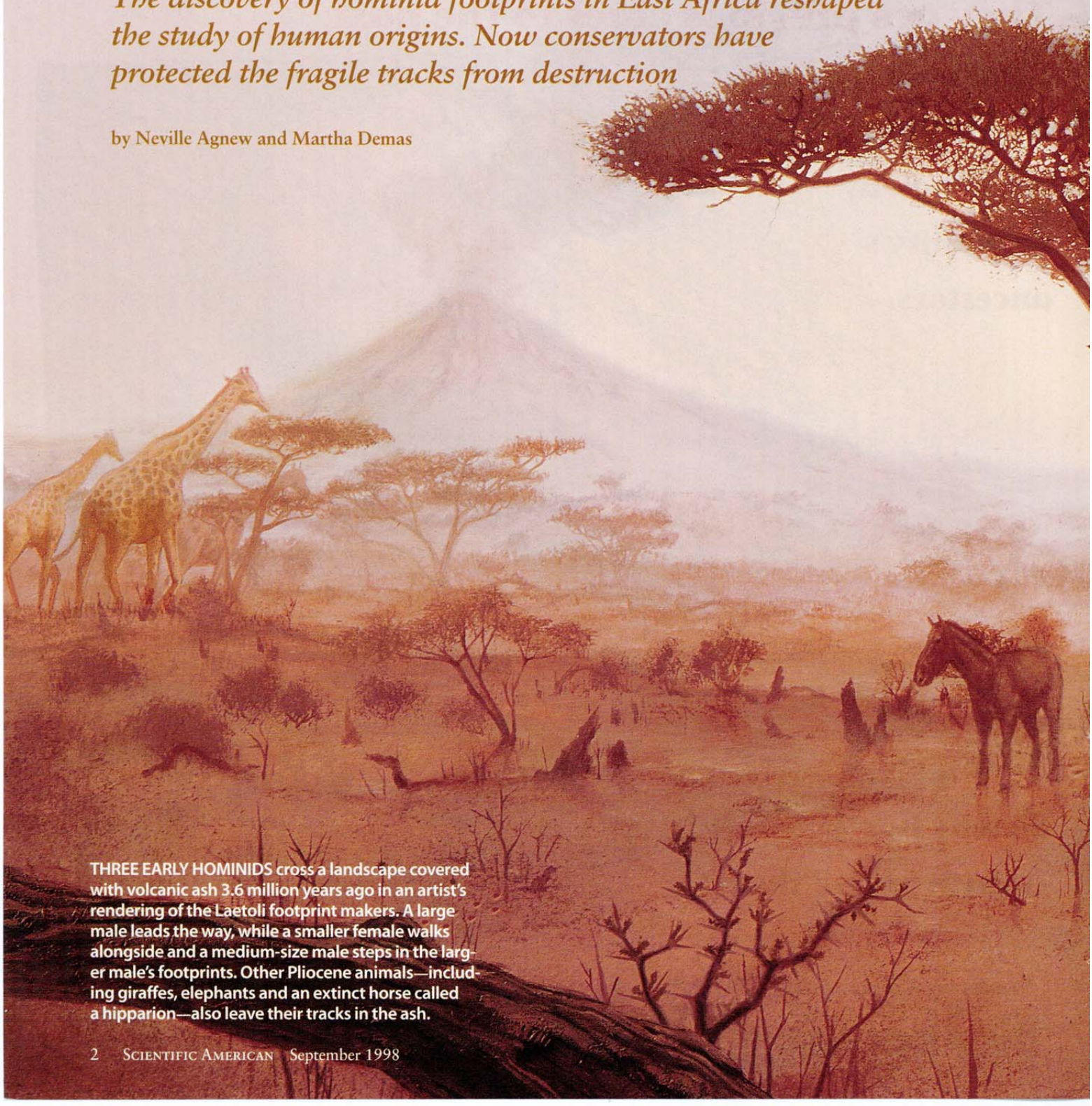
So why has science buried them?

A Last Look at Laetoli

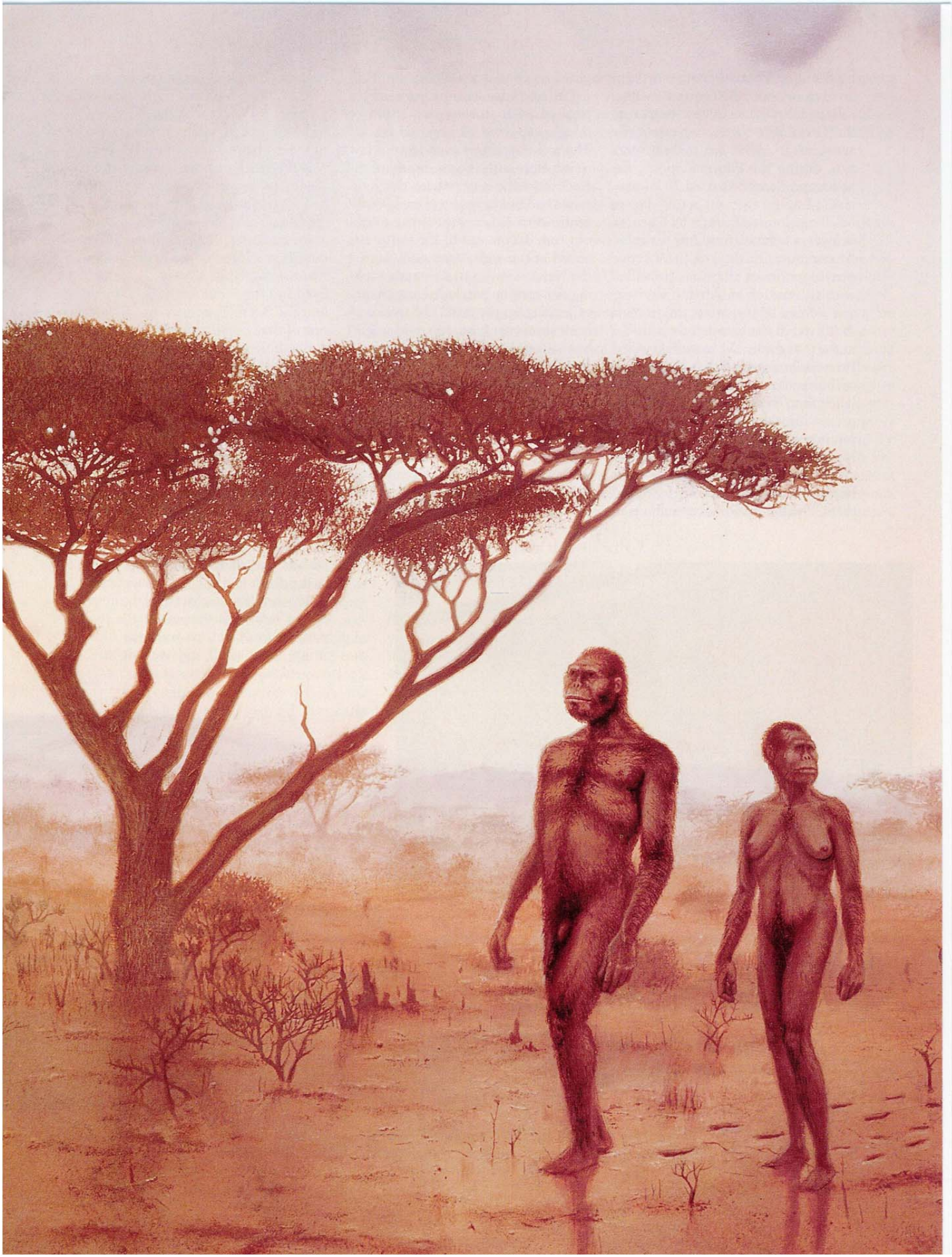
Preserving the Laetoli Footprints

The discovery of hominid footprints in East Africa reshaped the study of human origins. Now conservators have protected the fragile tracks from destruction

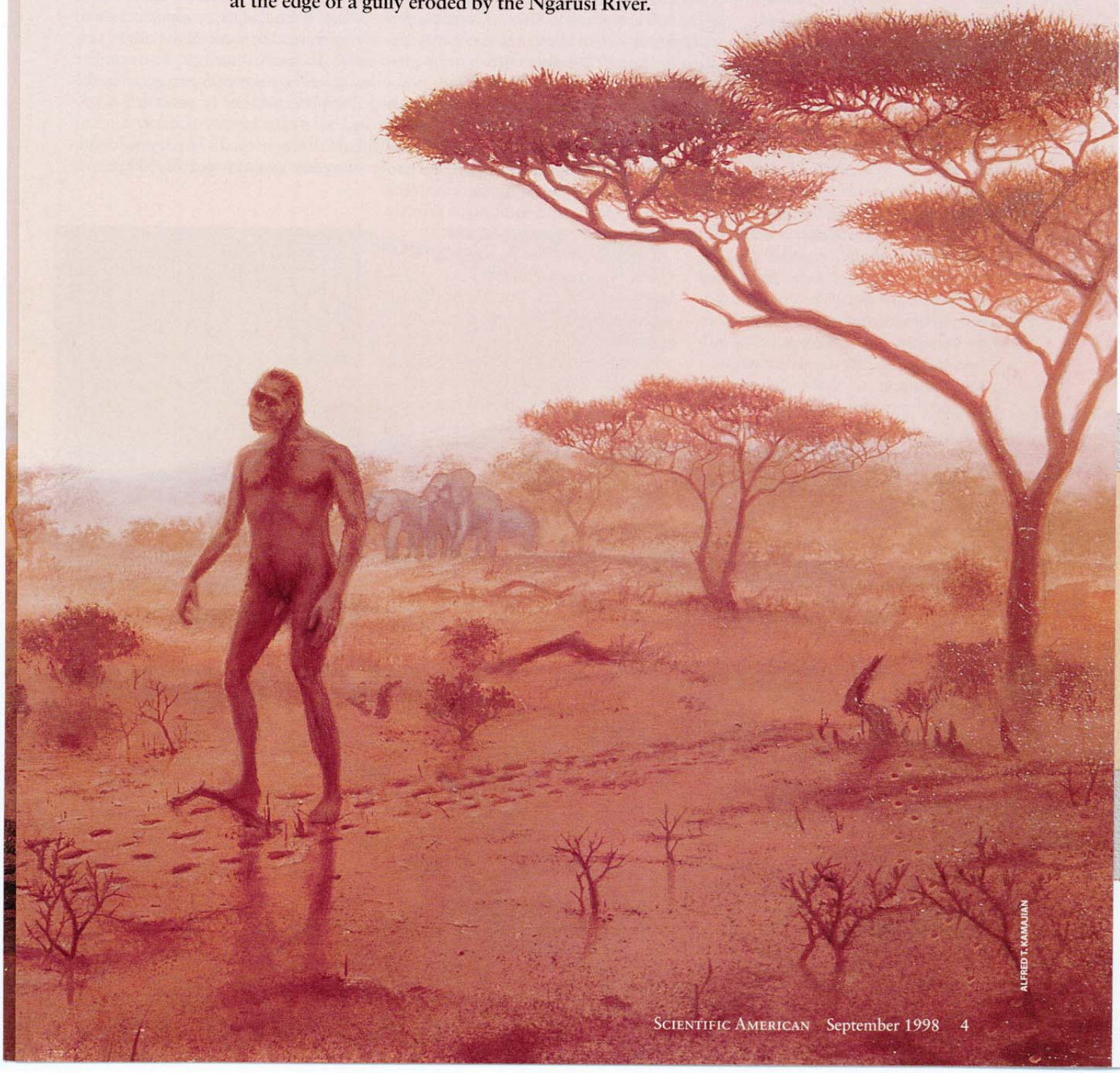
by Neville Agnew and Martha Demas



THREE EARLY HOMINIDS cross a landscape covered with volcanic ash 3.6 million years ago in an artist's rendering of the Laetoli footprint makers. A large male leads the way, while a smaller female walks alongside and a medium-size male steps in the larger male's footprints. Other Pliocene animals—including giraffes, elephants and an extinct horse called a hipparion—also leave their tracks in the ash.



One of the most remarkable events in the annals of anthropology occurred 20 years ago in an area of northern Tanzania called Laetoli. A team led by famed archaeologist Mary D. Leakey was searching for fossils of the early hominids that ranged through East Africa millions of years ago. In the summer of 1976, after a long day in the field, three visitors to Leakey's camp engaged in some horseplay, tossing chunks of dried elephant dung at one another. When paleontologist Andrew Hill dropped to the ground to avoid getting hit, he noticed what seemed to be animal tracks in a layer of exposed tuff—a sedimentary rock created by deposits of volcanic ash. On closer inspection of the area, the scientists found thousands of fossilized tracks, including the footprints of elephants, giraffes, rhinoceroses and several extinct mammal species. But the most extraordinary find came two years later, when Paul I. Abell, a geochemist who had joined Leakey's team, found what appeared to be a human footprint at the edge of a gully eroded by the Ngarusi River.



ALFRED T. KAMAJIAN

LAURIE GRACE

LAETOLI AREA in northern Tanzania lies in the eastern branch of the Great Rift Valley, where many hominid fossils have been found. Other well-known hominid sites include Hadar and Omo in Ethiopia, Lake Turkana in Kenya and Olduvai Gorge in Tanzania.

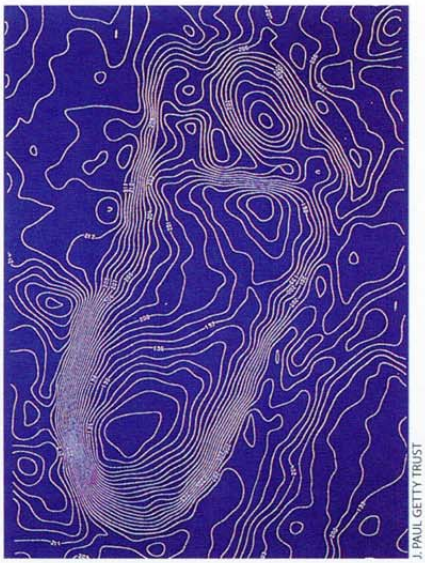
Excavations of the Footprint Tuff—as it came to be known—in 1978 and 1979 revealed two parallel trails of hominid footprints extending some 27 meters (89 feet). The volcanic sediments were dated radiometrically to be between 3.4 million and 3.8 million years old. The discovery settled a long-standing scientific debate: the Laetoli footprints proved that early hominids were fully bipedal—they had an erect posture and walked on two feet—long before the advent of stone toolmaking or the expansion in size of the human brain. What is more, the trackway provided information about the soft tissue of the hominids' feet and the length of their strides—information that cannot be ascertained from fossil bones. For these reasons, the Laetoli footprints attracted a huge amount of attention from scientists and the general public. Leakey, who died in 1996, regarded the discovery as the crowning achievement of her six decades of work in East Africa.

That the footprints have scientific value is obvious: they have answered fundamental questions about humanity's past. But they also have a profound cultural symbolism. In a powerfully evocative way, the tracks of those early hominids represent the long evolutionary history of humankind. The footprints bear witness to a defining moment in the development of our species and speak to us directly across thousands of millennia.

For the past six years, the Getty Conservation Institute—a Los Angeles–based organization concerned with the preservation of cultural heritage—has worked with Tanzanian authorities to ensure that the Laetoli footprints stay intact for years to come. A team of conservators and scientists recently completed a project to protect the footprints from erosion, plant growth and other causes of deterioration that have threatened the trackway since its discovery.

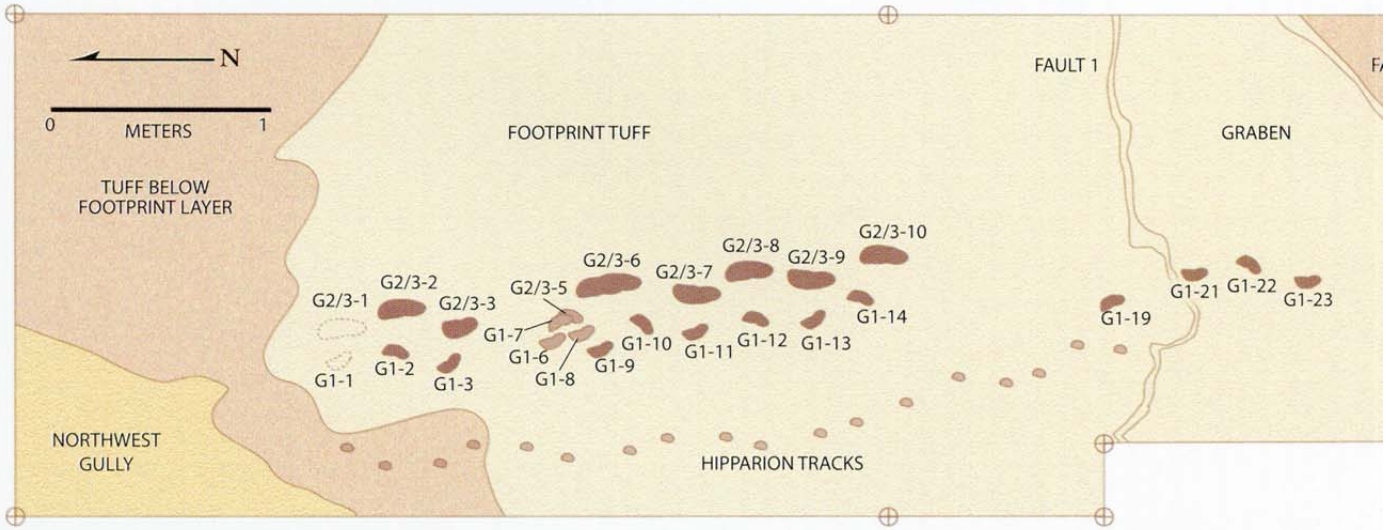
A Pliocene Eruption

Skeletal remains stand a better chance of survival in the fossil record than impressions in mud or volcanic ashfall. Yet traces of many animals dating back to the Paleozoic era, some as old as 500 million years, are known throughout the world. Because an animal leaves many tracks during its lifetime but only one set of bones when it dies, statistically it is not so surprising that some of the tracks survive as fossil imprints. The number and variety of tracks preserved in the Laetoli exposures is nonetheless unusual. At the largest of the 16 sites at Laetoli where tracks have been found, there are an estimated 18,000 prints,



J. PAUL GETTY TRUST

CONTOUR MAP of hominid footprint G1-36 (*right*) was created by taking two overlapping photographs of the print with a high-resolution camera. The deep impression at the bottom of the print indicates that the hominid walked like a modern human, placing its full weight on its heel. The length of the footprint is about 20 centimeters (eight inches). On the next page, two views of footprint G1-25 show that it suffered little damage between its discovery in 1979 and its reexcavation in 1995. The reexcavated print (*far right*) is shown next to a photograph of the print taken in 1979 by a member of Mary Leakey's team.



representing 17 families of animals, in an area of about 800 square meters.

Laetoli lies in the eastern branch of the Great Rift Valley, a tectonically active area. About 3.6 million years ago, during the Pliocene epoch, the Sadiman volcano—located 20 kilometers (12 miles) east of Laetoli—began belching clouds of ash, which settled in layers on the surrounding savanna. At one point in the volcano's active phase, a series of eruptions coincided with the end of an African dry season. After a light rainfall, the animals that lived in the area left their tracks in the moist ash. The material ejected from Sadiman was rich in the mineral carbonatite, which acts like cement when wet. The ash layers hardened, preserving the thousands of animal footprints that covered the area. Shortly afterward Sadiman erupted again, depositing additional layers of ash that buried the footprints and fossilized them. Finally, erosion over millions of years reexposed the Footprint Tuff.

The two parallel trails contained a total of 54 footprints that could be clearly identified as hominid tracks. The soil covering varied from a few centimeters at the northern end of the trackway—the area where the footprints had first been discovered—to 27 centimeters (11 inches) at the southern end. To the north, the footprints ended at the wide, deep gully cut by the Ngarusi River; to the south, faulting and erosion precluded any chance of picking up the trail. The trackway itself shows faulting, too, with a graben—a section that had dropped 20 to 40 centimeters because of tectonic activity—near the midpoint. Part of the trackway is also heavily weathered: in this section the tuff had changed to dried mud and the footprints were poorly preserved. But in the less weathered part of the trackway the preservation was good, allowing clear recognition of soft-tissue anatomical features such as heel, arch and big toe.

As so often happens in the field of paleoanthropology, disagreement soon broke out regarding the interpretation of the evidence. One point in dispute was the species of the hominids that made the footprints. Leakey's team had found fossilized hominid bones in the Laetoli area that were the same age as the trackway. Most scientists believe these hominids belonged to the species *Australopithecus afarensis,* which lived in East Africa between 3.0 million and 3.9 million years ago. In fact, one of the Laetoli hominid remains—a mandible with nine teeth in place—became the type specimen, or defining fossil, for *A. afarensis.* (The famous hominid skeleton known as "Lucy," discovered in 1974 in Ethiopia, is another representative of this species.) But Leakey did not accept that the Laetoli hominids were specimens of *A. afarensis;* she resisted assigning them to any species. (Leakey was cautious about interpreting her discoveries.) She did believe, however, that the makers of the Laetoli footprints stood in the direct line of human ancestry.

Another dispute concerned the number of hominids that made the two parallel trails. In one trail, the footprints were small and well defined,

G. ALDANA J. Paul Getty Trust

HOMINID TRACKWAY consists of 54 footprints running north in two parallel trails. In the G1 trail the prints are small and well defined. In the G2/3 trail the prints are larger and poorly defined, indicating that the trail may have been

but in the other the prints were larger and less clear. Some scientists speculated that the trails were made by two hominids—possibly a female and a male—walking abreast or close to each other. [For artistic representations of this interpretation, see "The Footprint Makers: An Early View," by Jay H. Matternes, on page 10, and "The Laetoli Diorama," by Ian Tattersall, on page 11.] Other scientists believed the trails were made by three hominids. In this view—which most paleoanthropologists now share—the trail of larger footprints was made by two individuals, with the second hominid purposely stepping in the tracks of the first [see "A New Look at Laetoli," at right].

The footprints prompted other intriguing questions: Where were the hominids going? What caused them to break stride—which is indicated by the position of four footprints in the northern section of the trackway—as though to look back on where they had come from? Were they a family group? Were they carrying anything? And how did they communicate? These tantalizing questions will never be answered, but scientists can use the evidence gleaned from the Laetoli site to attempt to re-create the moment when the hominid tracks were made.

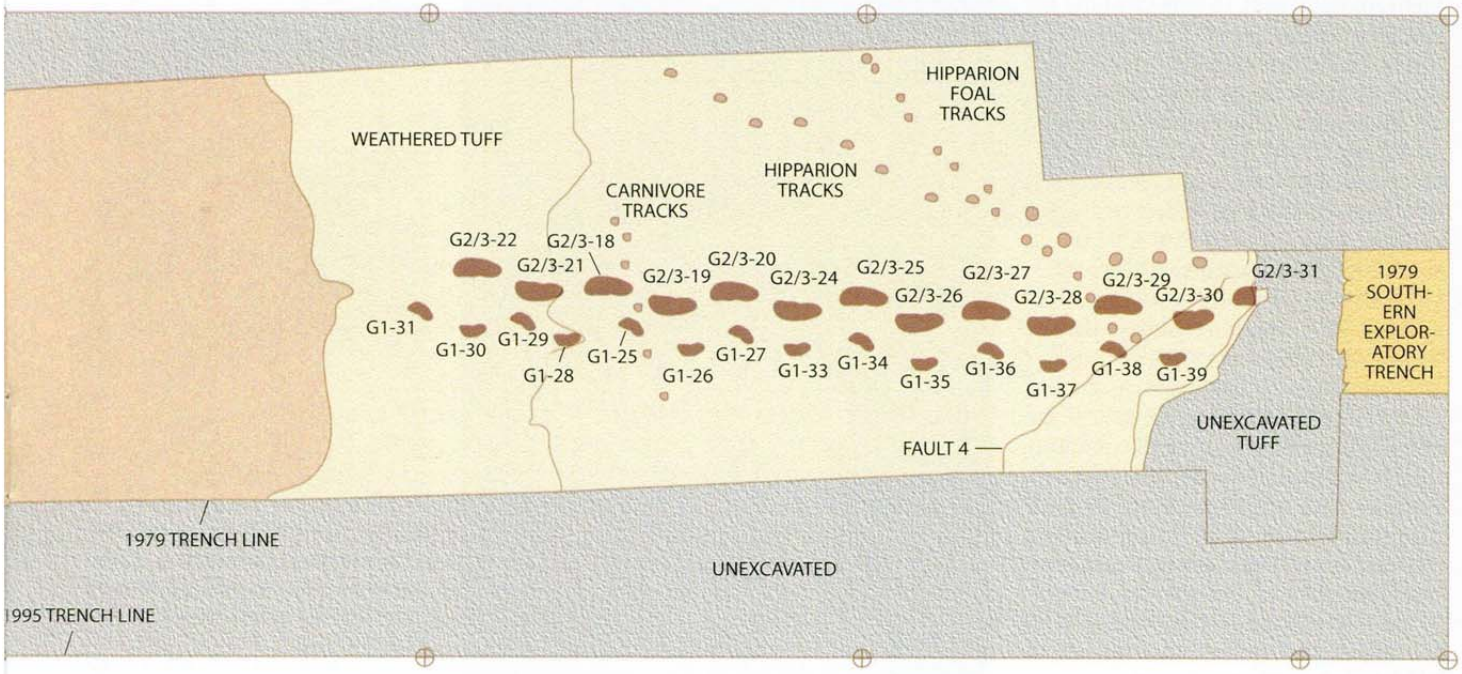
Much of the controversy over the footprints arose because few scientists had the opportunity to study the prints firsthand. At the end of each field season, Leakey's team reburied the trackway for its protection. But the team members made casts of the best-preserved sections of the trails and documented the site fully. Researchers created three-dimensional contour maps of some of the footprints by photographing them from two perspectives—a process called photogrammetry. Leakey later published her work with several co-authors in a monumental monograph that dealt not only with the hominid prints but also with the many animal tracks and the geology of the Laetoli area. The evidence collected by Leakey's group—which also included fossilized pollen and impressions of vegetation—provides an unparalleled record of the African

A New Look at Laetoli

The artist's rendering of the Laetoli footprint makers on pages 44 through 46 reflects the widely accepted interpretation that the trackway was made by three hominids. Many of the larger tracks at the site have features indicating that they may be double footprints. The evidence suggests that a relatively large hominid—about five feet tall, based on the size of its footprints—walked first, and a hominid four and a half feet tall deliberately stepped in the leader's footsteps, perhaps to make it easier to cross the slick, ash-covered ground. A smaller hominid—about four feet tall—apparently made the parallel trail of well-defined footprints. The trackway indicates that this hominid adjusted its stride to keep up with one or both of the other hominids.

The illustration shows the two larger hominids as males and the smaller individual as a female, but this was not necessarily the case: the smallest member of the trio could have been a child. The female is shown walking slightly behind the lead male because the two could not have walked abreast without jostling each other.

—The Editors



made by two hominids walking in tandem. The two northernmost tracks (*far left*) were destroyed by erosion between their discovery in 1978 and reexcavation in 1996. Four other tracks in the northern section—G1-6, G1-7, G1-8 and G2/3-5—mark the point where the hominids apparently broke stride. Also present are the tracks of a hipparion.

savanna during Pliocene times and a context in which to understand better the hominid trackway.

The Root Problem

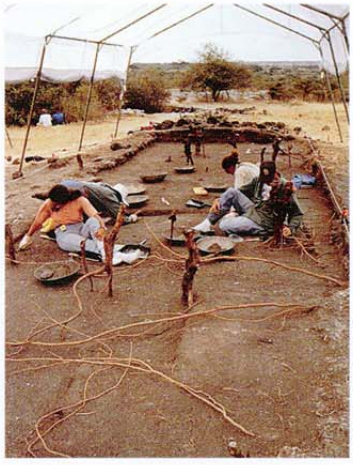
Fieldwork on the Laetoli footprints ended with the 1979 season, and Leakey's team used local river sand to rebury the site. Because the tuff is soft and easily damaged, the mound of sand was covered with volcanic boulders to armor it against erosion and the animals that sometimes roam across the site—particularly elephants and the cattle of the Masai people living in the area. We now know that seeds of *Acacia seyal*, a large, vigorously growing tree species, were inadvertently introduced with the reburial fill. The loose fill and the physical protection and moisture retention provided by the boulders created a microenvironment conducive to germination and rapid plant growth. Over the following decade, the acacias and other trees grew to heights of over two meters. Scientists who occasionally visited the Laetoli site began to voice concern that the roots from these trees would penetrate and eventually destroy the hominid footprints.

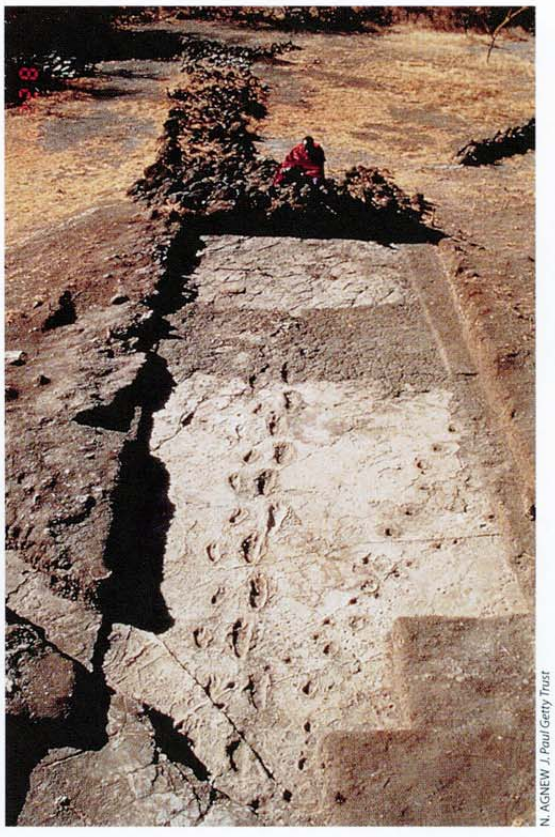
In 1992 the Antiquities Department of the Tanzanian government approached the Getty Conservation Institute, which has extensive experience in preserving archaeological sites, to consider how the trackway might be saved. The following year a joint team from the institute and the Antiquities Department excavated a sample trench in the reburial mound to assess the condition of the hominid footprints. The assessment revealed that tree roots had indeed penetrated some of the tracks. But in the areas where no root damage had occurred, the preservation of the prints was excellent. Leakey's intuitive decision to rebury the site had been the right one. With hindsight we can now say that perhaps greater care should have been taken in how the site was buried. Also, periodic monitoring and maintenance—including the removal of tree seedlings before they became established—would have avoided the need for a long and costly conservation effort.

The Getty Conservation Institute and the Tanzanian government agreed to collaborate on the project, but before fieldwork could begin, various options had to be considered. Fossil bones are routinely brought into the laboratory for study and permanent safekeeping.


T. MOON *J. Paul Getty Trust*


N. AGNEW *J. Paul Getty Trust*


A. BASS *J. Paul Getty Trust*


N. AGNEW *J. Paul Getty Trust*


M. DEMAS *J. Paul Getty Trust*

REEXCAVATION began in 1995 with the southern section of the trackway (*top right*). Conservators extracted the acacia tree roots that had penetrated the Footprint Tuff (*middle right*), then removed the fill from the footprints (*top left*). The reexcavated trackway (*bottom left*) was photographed with a Polaroid camera (*bottom right*) to record conditions.

Indeed, to leave them in the field would be irresponsible: they would certainly be lost or damaged. But could the entire hominid trackway be lifted and moved to a museum in Tanzania? Was it technically possible to do this without damaging the footprints? Some scientists were vehement in their belief that this was the only way to save the tracks.

Removal would have been very risky, however, because the techniques for cutting out, lifting and transporting such a large trackway had not been proved. The Footprint Tuff is far from being a homogeneous stratum. It consists of many thin layers of volcanic ash, each with different weathering, hardness and cohesion. Without strengthening the tuff with resin—an intervention with unknown long-term consequences—fracturing would probably occur during removal. What is more, removing the trackway or the individual footprints would separate them from the many animal tracks that had been made at the same time. Part of the significance of the hominid trails—their setting in the savanna landscape of East Africa together with the tracks of other Pliocene species—would be lost.

An alternative proposal was to shelter the trackway, erecting a protective building over it. The site could then be opened to the public, and the footprints could be studied by visiting scholars. The Laetoli area, however, is remote. There is no road to the site and no water or power lines nearby. Experience in Tanzania has shown that without proper financing, trained personnel and an adequate infrastructure, sheltering the site could prove disastrous: it could result in the deterioration of the trackway rather than its preservation. Even in countries where resources are plentiful, archaeological sites have been damaged when planning has been inadequate or when climate-controlled enclosures have not performed as expected. Moreover, no shelter could fully protect the trackway from weathering: moisture from the ground below would rise to the surface seasonally through capillary action. Soluble salts in the water would crystallize on the surface, causing stress that would eventually rupture the trackway. During the dry season, dust accumulation in the prints would require frequent cleaning, which would inevitably lead to damage.

The third option was to reexcavate the trackway, remove the vegetation that had damaged it and then rebury the site more carefully, taking steps to prevent root growth that might harm the footprints. Reburial is a proved preservation method. The trackway survived underground for thousands of millennia; if reburied, it would be protected from erosion, physical damage and rapid fluctuations of moisture. Reburial is also readily reversible: the tuff can be uncovered in the future if the other options become more feasible. For these reasons, the Getty Conservation Institute recommended reburial. In 1993 Tanzania's Antiquities Department decided to proceed with this recommendation, and a committee was set up to assist the implementation of the plan. Participating in the discussions were Leakey and other eminent paleoanthropologists, Tanzanian officials and a regional representative from the United Nations Educational, Scientific and Cultural Organization.

LEAKEY'S CAST OF THE TRACKWAY was used to guide the final stages of the reexcavation of the footprints (*top*). Once the tracks were exposed and photographed, conservators recorded the condition of each print, noting any damage caused by root growth or erosion (*bottom*).

Saving the Footprints

The conservation project began in 1994. During that year's field season, the trees and shrubs growing on and near the reburial mound were cut down. To prevent regrowth, the conservation team applied the biodegradable herbicide Roundup to the tree stumps. In all, 150 trees and shrubs were killed, 69 of them directly on the reburial mound.

Reexcavation of the trackway took place during the 1995 and 1996 field seasons, beginning with the southern section. This section was where the densest revegetation had occurred and, coincidentally, where the best preserved footprints had been found in 1979. Archaeologists and conservators used Leakey's photographs of the trackway to find the exact positions of the hominid footprints. Also useful was the original cast of the trackway, which was replicated, cut into conveniently short sections and used as a guide for the final stages of reexcavation. A temporary shelter erected over the excavated area protected it from direct sunlight and shaded those who were working on the trackway.

In the southern section of the trackway the trees had fortunately developed shallow, adventitious roots rather than deep taproots because of the hardness of the tuff. As a consequence, there was far less damage than had been feared, and most of the footprints were generally in good condition. In areas where the tuff was weathered, however, roots had penetrated the prints. Here the conservation team surgically removed stumps and roots after strengthening adjacent areas of disrupted tuff with a water-based acrylic dispersion. Team members used miniature rotary saws to trim the roots and routers to extract the parts that had penetrated the surface of the trackway. The holes created by root removal were filled with a paste of acrylic and fumed silica to stabilize them against crumbling.

Recording the condition of a site is

The Footprint Makers: An Early View

by Jay H. Matternes

I worked on my painting of the Laetoli footprint makers during the early fall of 1978, shortly after the discovery of the hominid trackway. As part of my research, I flew to Africa to confer with Mary Leakey and her associates at their base camp in Tanzania's Olduvai Gorge. When I boarded the plane, the only information I had on the project consisted of a few photographs of the footprints and the surrounding area, along with a report on the geology of the Laetoli site and a list of the animal tracks found there.

While at the base camp, I consulted with Leakey and made a number of drawings of proposed layouts. She drove me to Laetoli so I could familiarize myself with the main features of the terrain. The analysis of the Laetoli sediments indicated that there had been several types of volcanic ashfalls in the area—some settling undisturbed on the ground, some redeposited by wind—but all the ash had come from the Sadiman volcano. Geologists believe the color of this ash was light gray, not very different from the color of the hardened tuff in which the footprints were discovered.

I based my reconstruction of the two walking figures on the descriptions of *Australopithecus afarensis*. Fossil specimens of this species had been found at Laetoli and the Afar Triangle of Ethiopia; the bone fragments and dental evidence indicated that the two hominid populations looked roughly the same and lived at the time the footprints were made. I inferred the limb proportions of the adults from the skeleton of "Lucy," the female *Australopithecus* whose fossil remains had been found in Ethiopia in 1974. I assumed these hominids would have been lean, energetic bipeds, capable of exploiting a variety of habitats. For this reason, they would have probably had relatively little body hair, to ensure rapid heat loss. They would have also developed a dark skin to counteract the injurious effects of ultraviolet radiation.

At the time I worked on the painting, only a few fragments of *A. afarensis* skulls had been found. I had to base the facial features of the female figure on those of *A. africanus,* a species I had earlier reconstructed. Leakey wanted me to emphasize the small stature of these hominids, so I painted several guinea fowl near the figures. The male figure carries a digging stick, presumably the only tool of this species (the earliest stone tools did not appear until much later). The female carries her toddler on her hip, probably the most convenient position for a habitual biped. The theory that the trails had been made by three hominids was not put forth until after I finished the painting.

The final depiction (*below*) accorded with the few facts of the Laetoli site that were then known. The painting first appeared in the April 1979 issue of *National Geographic* magazine to illustrate an article by Leakey about the trackway.

JAY H. MATTERNES is an artist who specializes in the depiction of hominids and extinct mammals. His work has appeared in museums worldwide.

JAY H. MATTERNES

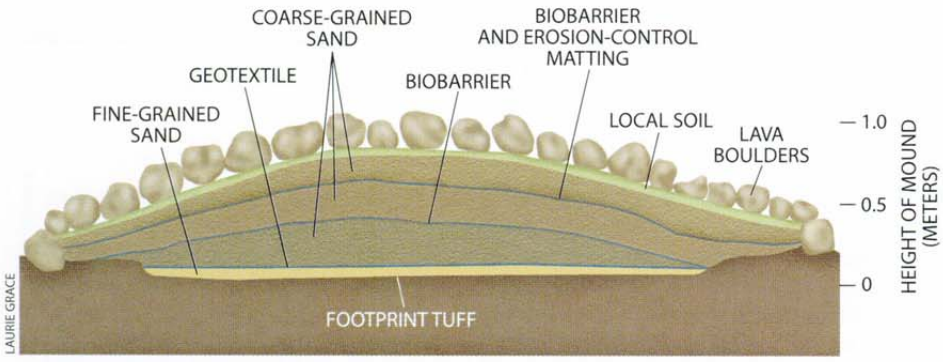
HOMINID FAMILY members leave their tracks in the ash from the Sadiman volcano.

one of the most important and challenging conservation activities. The team conducted a full survey of the exposed trackway to provide the baseline data that will allow future investigators to assess changes. Using a Polaroid camera, team members made eight-by-10-inch color photographs of the footprints. They then laid acetate sheets over the photographs and noted the places where there were fractures, loss of tuff and intrusive root growth, as well as any other salient information.

During the reexcavation, the conservators noted dark stains in and around each hominid footprint. This darkening was the result of the application of Bedacryl, an acrylic consolidant that Leakey's team had used to strengthen the footprints before making molds of them. (Silicone rubber was applied to the trackway to create molds, which were then peeled off and used to make fiberglass casts.) The staining was an unforeseen side effect: although the Bedacryl did not damage the footprints, it impaired their legibility and thus their scientific value. The Bedacryl could be removed by gently poulticing the footprints with acetone and tissue paper, but because there was a risk of damage to the prints where the underlying tuff was fragile, only two prints were cleaned.

In consideration of the fact that few researchers had ever seen the exposed footprints—most of the scientific literature is based on casts and photographs—Tanzania's Antiquities Department invited a group of scientists to reexamine the trackway while the conservation and recording work was going on. Bruce Latimer, curator of physical anthropology at the Cleveland Museum of Natural History, Craig S. Feibel, a geologist at Rutgers University, and Peter Schmid, curator of the anthropology museum at the University of Zurich, were nominated by specialists in the field of paleoanthropology to come to Laetoli. Their studies included a formal description of the footprints, stature and gait of the hominids and an examination of the thin layers of the Footprint Tuff.

Once the footprints were uncovered and the root damage repaired, a team of photogrammetrists recorded the trackway to make new contour maps of the prints. The new maps are accurate to within half a millimeter, which is far better than the maps made by Leakey's team in 1979. The Laetoli trackway may now be one of the most thoroughly documented paleontological sites. The new



REBURIAL MOUND over the hominid trackway includes five layers of sand and soil (*diagram*). The conservation team poured fine-grained sand directly on the Footprint Tuff (*top photograph*). The reburial layers are separated by polypropylene geotextiles and erosion-control matting (*middle*). The mound is capped with lava boulders to protect the trackway from cattle and other animals (*bottom*).

bers poured a layer of coarse-grained sand and covered it with a special kind of geotextile called Biobarrier, which is designed to block root intrusion into the burial fill.

Biobarrier is studded with nodules that slowly release the root inhibitor trifluralin, a low-toxicity, biodegradable herbicide. Trifluralin is not soluble in water, so it is nonleaching and nonmigrating: it inhibits root growth but does not kill the plants whose roots contact the nodules. The effective life of Biobarrier depends on the temperature of the soil and the depth of burial. Based on the manufacturer's data, the material will have an effective life of about 20 years at the Laetoli site. Above the Biobarrier, the conservators added another layer of coarse-grained sand, then laid down a second covering of Biobarrier and a synthetic erosion-control matting.

The conservation team topped the mound with a layer of local soil and a bed of lava boulders to provide a physical armor for the reburial fill. The mound, which is one meter high at its apex, will be allowed to revegetate with grasses; because they are shallow-rooted, they will stabilize the reburial soil without posing any danger to the trackway surface. But the staff of the Antiquities Department will regularly monitor the site and remove any tree seedlings that take root. The geotextiles are a second line of defense should the maintenance lapse. The shape of the mound, which has a slope of about 14 degrees on each side, will facilitate the runoff of surface water.

The entire process was repeated for the northern section of the hominid trackway during the 1996 field season. This section had suffered the most erosion because surface water from the surrounding area drains into the Ngarusi River across the northern end of the trackway. It was this drainage that exposed the first hominid footprint found by Abell in 1978; unfortunately, the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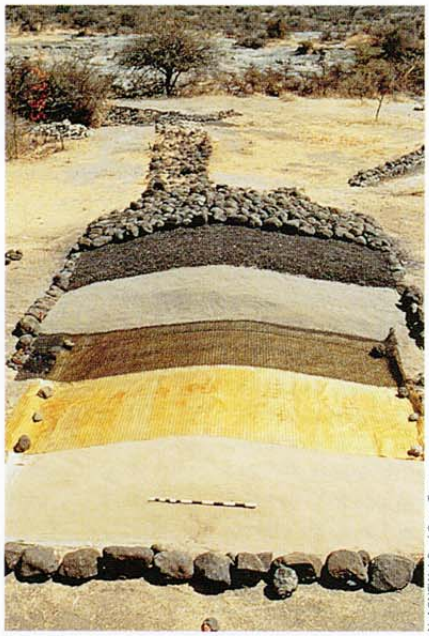
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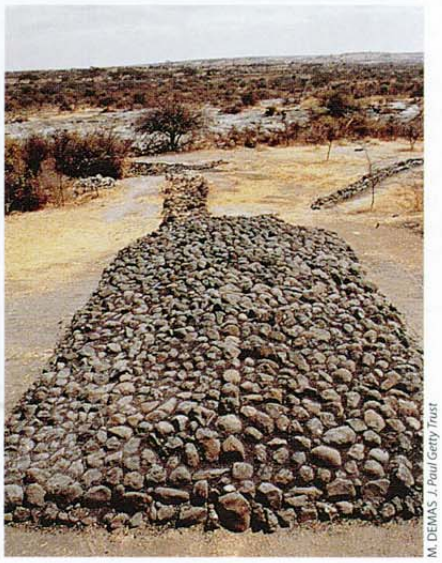

M. DEMAS J. Paul Getty Trust

same drainage resulted in the loss of this print and an adjacent one in the 18 years between the burial of the trackway and its reexcavation. To prevent further erosion, simple berms were constructed from lava boulders around the trackway to divert runoff from nearby areas. Two gullies that were threatening the northern end of the trackway were also stabilized by placing lava boulders and erosion-control matting on their slopes.

Near the trackway, the team members dug a monitoring trench, 2.5 meters square, which was reburied according to the same method used on the trackway. Parts of this trench will be periodically reexcavated to assess the subterranean conditions and the continued effectiveness of the Biobarrier. Acacia trees have been permitted to survive around the monitoring trench to see how well the Biobarrier can block the tree roots. Although polypropylene materials may be expected to last for many years underground, their use in tropical environments such as Laetoli where large numbers of termites live has not been properly evaluated. The monitoring trench will allow the Antiquities Department staff to check the performance of the geotextiles without disturbing the trackway itself.

A Sacred Ceremony

Experience has shown that successful preservation of remote sites requires the cooperation of local people. If they feel excluded, there are frequently adverse results, from neglect to deliberate harm. Most of the people in the Laetoli area are Masai. They have maintained to a large degree their traditional way of life, which centers on their herds of cattle. Cattle grazing on and around the trackway site would cause erosion of the reburial mound and the destruction of the system of berms and drains for diverting the surface runoff. While tend-

ing the cattle, herders with time on their hands might also be tempted to interfere with the reburial mound. Everyone in the region knows of the intensive activity at the site in recent years, and some local people have been curious about the Biobarrier and other materials used in the reburial.

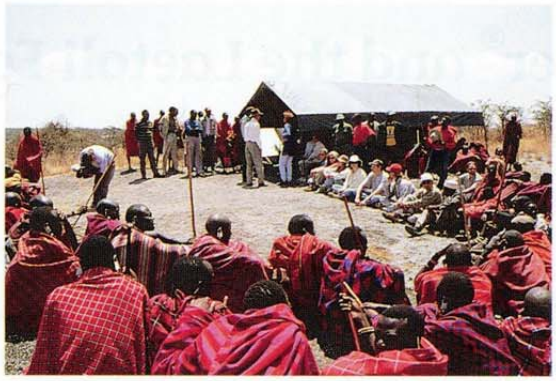
Laetoli lies within the Ngorongoro Conservation Area, a vast tract set aside by the government to preserve both the natural environment and the Masai community's way of life. This extraordinary undertaking, perhaps unique in Africa, has a good chance of succeeding under capable management. We frequently consulted the conservation area's regional coordinator—who became a member of the advisory committee for the Laetoli project—and the chairmen of the two closest villages, Endulen and Esere. On their recommendation, a meeting at the site was called by the *Loboini* of the region, the traditional religious leader and healer.

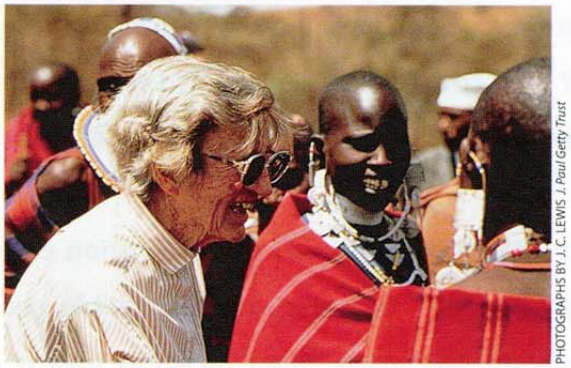
In a daylong meeting attended by about 100 people, including men and women of all ages, the *Loboini* emphasized the significance of the trackway and explained the need for its protection. A sheep was sacrificed and a sacred ceremony held to include the site among the places revered by the Masai people. In 1996, after the northern section of the trackway had been reexcavated, the ceremony was repeated. Leakey herself attended this meeting and was greeted by some of the older people who recalled her work in the Laetoli area in the 1970s.

Ultimately, the survival of the site will depend on the vigilance of the Tanzanian authorities and the international community. The Antiquities Department has appointed two Masai men from the area as full-time guards and instituted a detailed monitoring and maintenance plan. The plan calls for regular photography from specified perspectives around the site, periodic removal of all seedlings—especially acacias—and repair to the berms and drainage system.

Because the Laetoli site is not open to visitors, we have installed a permanent display at the Olduvai Museum, which overlooks the gorge where Leakey and her husband, Louis S. B. Leakey, made so many of their famous discoveries. The museum is a short distance off the dirt road that runs from the Ngorongoro caldera to the Serengeti Plain; it is accessible to both local people and international visitors. The room devoted to Laetoli contains the cast of the southern section of the trackway, along with text and photographs that explain why the site was reburied and how it is being protected. In the past, the Olduvai Museum primarily served international tourists en route to the Serengeti Plain. But the text of the Laetoli exhibit is in Swahili as well as English, so it is hoped the local people—particularly Tanzanian schoolchildren—will come to the museum to learn more about the Laetoli footprints and will be inspired to care for the site.

Footprints are evocative. When astronaut Neil Armstrong trod on the surface of the moon, images of his footprints were instantly recognized as symbols of humankind's first steps into the cosmos. Between the Laetoli footprints and those on the moon lies a 3.6-million-year-long evolutionary journey. Looking at the myriad animal tracks at Laetoli, one has the sense that hominids were not frequently encountered on that landscape—their tracks are too few in number compared with those of the other fauna. These creatures must have belonged to an insignificant species that somehow escaped the inevitable extinctions in the harsh environment. The wistful trail of three small figures carefully making their way across the recently fallen ash from Sadiman is both humbling and stirring. These fragile traces of humankind's beginnings on the plains of Africa deserve to be given every care and protection for their future survival.





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CEREMONIAL BLESSING OF THE TRACKWAY took place in August 1996, when men and women from the Masai community gathered at the Laetoli site (*top*). Leakey attended this event and reacquainted herself with the local people (*bottom*). The great archaeologist died just four months later.

The Authors

NEVILLE AGNEW and MARTHA DEMAS led the Getty Conservation Institute's project at Laetoli in Tanzania. Agnew received his Ph.D. in chemistry from the University of Natal in Durban, South Africa. He headed the conservation section of the Queensland Museum in Brisbane, Australia, before joining the Getty institute in 1988. He has undertaken conservation projects in China, Ecuador and the U.S. and is now the institute's group director for information and communications. Demas earned a doctorate in Aegean archaeology from the University of Cincinnati and a master's in historic preservation from Cornell University. She joined the Getty in 1990 and is currently involved in developing and managing conservation projects in the Mediterranean region and China.

Further Reading

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Biobarrier® and the Laetoli Footprints

One of the most significant anthropological finds of the last century are the Laetoli footprints. Discovered in the Laetoli area of northern Tanzania more than 20 years ago, these 3,600,000-year-old footprints vividly suggest how our early human ancestors may have lived. To protect those tracks, scientists have now painstakingly reburied them. The leaders of this conservation project describe in detail how and why it was done in this feature article from SCIENTIFIC AMERICAN.

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