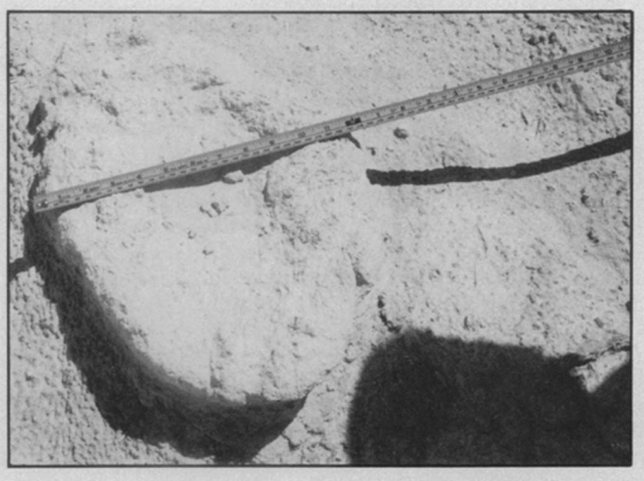
BIGFOOT OR BIG FEET?

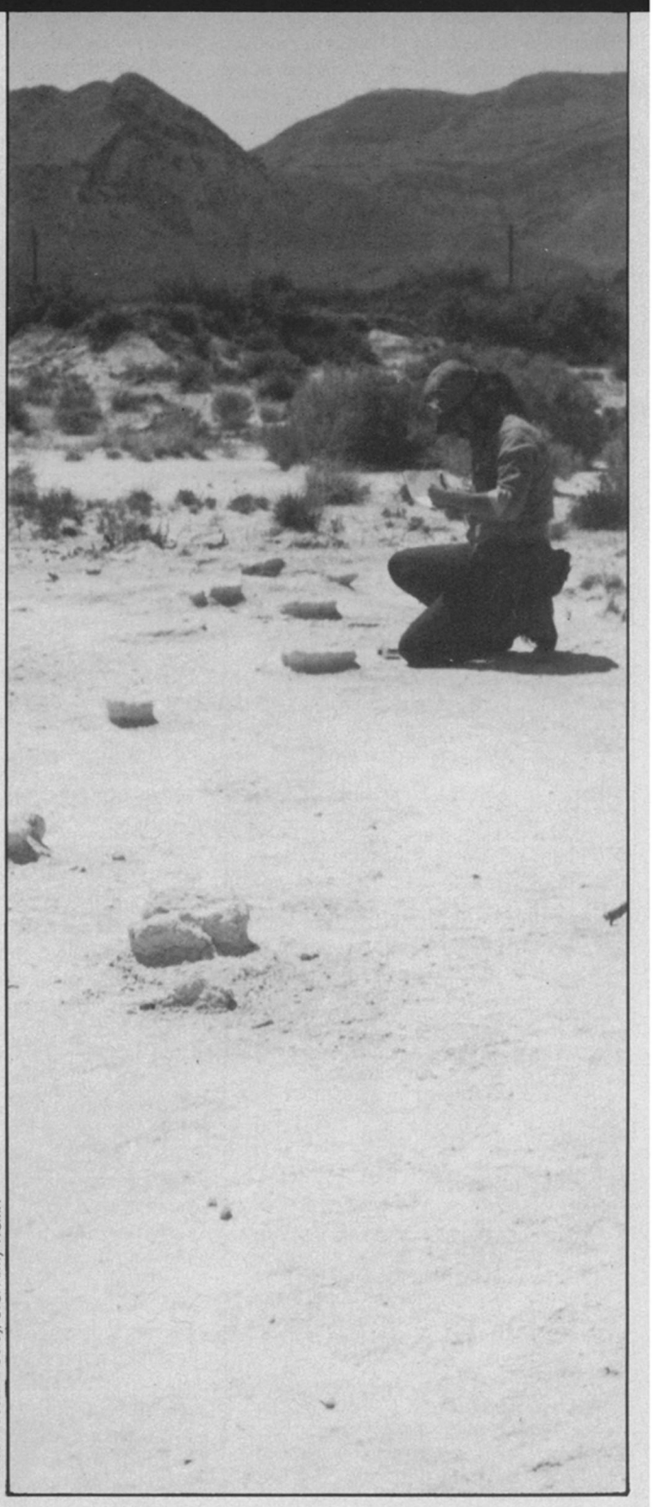
Fifty years after their discovery, ancient tracks on the missile range have finally lured scientific investigators

BY JANET RALOFF

"In the fall of 1932 Ellis Wright, a government trapper, reported that he had found human tracks of unbelievable size, imprinted in the gypsum rock on the west side of White Sands. At his suggestion a party was made up to investigate. Mr. Wright served as a guide. O. Fred Arthur, supervisor of the Lincoln National Forest, Edgar Cadwallader and one of his sons from Mountain Park and the writer made up the party. As Mr. Wright had reported, there were 13 human tracks crossing a narrow swag, pretty well out between the mountains and the sands. Each track was approximately 22 inches long and from 8 to 10 inches wide. It was the consensus of opinion that the tracks were made by a human being for the print was perfect and even the instep plainly marked. However, there was not one in the group who cared to venture a guess as to when the tracks were made or how they became of their tremendous size. It is one of the unsolved mysteries of the Great White Sands."

—from "Story of the Great White Sands," a 1938 pamphlet





Photos: Robert A. Corey, U.S. Army-WSMR

Footprints photographed May 22, 1981, 5 miles from NASA's alternate Space Shuttle landing strip. Eidenbach, upper photo, says the caliche-soil prints are "fairly hard"—like plaster of Paris impregnated with pebbles and sand. "But you can kick one and knock it to smithereens." Soil specialists have told him that depending on the soil's salts, chemical stabilizers to preserve the prints in place might prove "more disastrous than just leaving things alone."

What is responsible for those mysterious tracks on New Mexico's alkali flats may never be known for certain. But if archaeologist Peter L. Eidenbach has his way, it won't be for lack of trying. Last week he discussed with SCIENCE NEWS plans for multidisciplinary field studies at the White Sands Missile Range, where at least two sets of the tracks have been found. Those studies were due to begin this past Friday, September 11.

Ellis Wright believed the footprints he had discovered at White Sands in 1931 belonged to a hominid, or a human-like being. The tracks do suggest a bipedal, or two-legged gait. That has led others to suggest they might have been made by a "bigfoot" — the legendary hairy creature, also known as Sasquatch. But the footprints' apparent five-foot-long stride has led most to suspect a camel is behind it all.

Don't laugh. The idea of a camel roaming the New Mexican desert isn't as outlandish as it might at first sound. The U.S. Army briefly tested a camel corps during the 1850s to cope with Southwest desert terrain. When the corps disbanded around 1860, many of the animals were turned loose. "There has been speculation by some that these stray camels may have wandered into the Tularosa Basin by following the Rio Grande up from the Big Bend area in Texas," Eidenbach says. Though topographic-reconnaissance maps supplied by the Army Corps of Engineers show no camel expeditions into the Tularosa Basin — of which the White Sands Missile Range is only a small part — it's the area soil that really leads Eidenbach to discount Army camels.

The footprints appear to be calcic or gypsic in composition, Eidenbach says, suggesting they were formed well over 100 years ago. While that "kind of rules out the camel corps," he says, it does not necessarily rule out camels. In fact, he notes, "There is good fossil evidence for the presence of a late-Pleistocene camel-form in this vicinity."

Eidenbach says, "I didn't do an acid test, so I'm really not sure, but [the footprints] appear to be pedestals on a very stable calcic or gypsic horizon." He described a soil horizon as a layer of soil that is distinguishable morphologically (by physical structure) from those above and below it. In the Southwest, the upper horizon tends to be undeveloped sands, clays and silts — recent deposits made by the various processes of erosion. Below is a horizon or zone from which certain materials have been leached and transported downward by the draining action of rain and other water.

"In this portion of the country, where the parent material — the rock — is primarily limestone, we get a lot of carbonates and sulfate salts deposited on the surface" of this second, lower horizon. "Gradually," Eidenbach says, "the more dissolvable of those salts get leached out of this 'B' zone and into a lower unit" — another naturally formed stratographic horizon. "It's essentially the same sort of process that is poisoning a lot of agricultural soils," Eidenbach notes, where insufficient subsurface drainage causes toxic levels of salt to rapidly build up in over-irrigated soil.

If there is a high enough concentration of these dissolvable salts, as there is in much of the Tularosa Basin, hard layers of redistributed salt form underground. Eidenbach explains that when the salts are primarily calcium carbonates, a calcic horizon forms; calcium sulfate and some of the related salts that make up the dunes of the White Sands will potentially produce a gypsic horizon.

These salty subsurface beds form relatively rapidly when there is either a large amount of water or continuous source of water. "But in New Mexico, the process occurs slowly," Eidenbach says, "because it's driven strictly by precipitation. And where these camel tracks are, there's not much — probably only 8 to 10 inches annually."

When it gets dense enough, "this salt layer plugs up any drainage downward," he adds. Frequently, the eroding forces of wind and rain then strip away surface soils. "And that's what appears to have happened in the case of these tracks," Eidenbach told SCIENCE NEWS. The sandy or silty clays that once sat above the tracks have eroded away, leaving behind only a calcic or gypsic horizon — "which is almost like a crude concrete."

But Eidenbach is seeking a second opinion. He said he will have John Hawley of the New Mexico Bureau of Mines and Mineral Resources — "probably the best qualified soils and 'geomorph' person in this general area" — take a look. And if Hawley confirms the apparent antiquity of the soil, Eidenbach says "potentially we're looking at tracks that date anywhere from 18,000 to no more recently than 8,000 years ago."

What makes Eidenbach so confident the tracks are those of a camel is the creature's stride. "Horses have a walking stride where the tracks superimpose," he explains. "This characteristic superimposition of a hindfoot track onto a forefoot track results in what appears to be a bipedal stride." However, Eidenbach says the tracks he saw at White Sands "are very round, much larger than the kind of track you'd expect from a horse." And their 60-inch stride is almost twice the average for a modern horse — "on the order of 25 to 30 inches max," he adds. Prehistoric horses were even smaller.

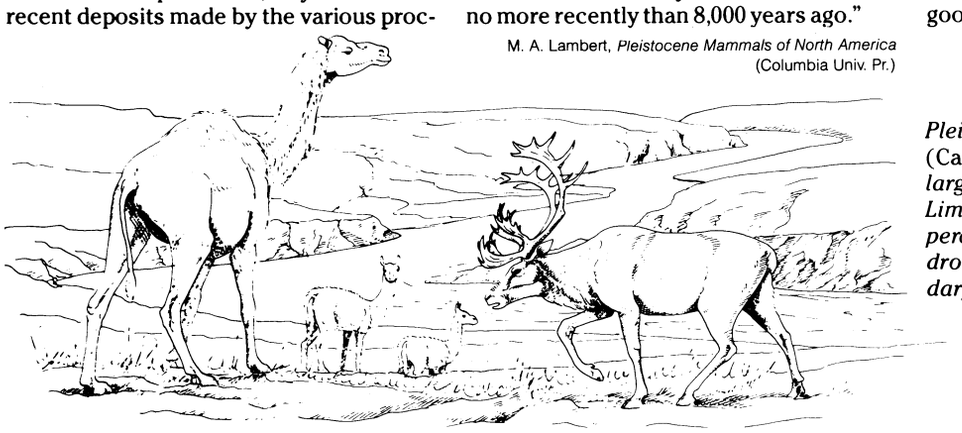
But "camels apparently walk in a fashion similar to horses," Eidenbach notes, with a stride averaging between four and five feet. And Pleistocene camelids such as Yesterday's camel *(Camelops c.f. hesternus)* — remains of which have been found in New Mexico — had limbs up to 20 percent longer than present camels. It is this camelid — believed to have suffered a late glacial extinction between 10,800 and 12,600 years ago — that Eidenbach suspects is responsible for the White Sands prints.

In coming weeks Eidenbach will revisit the White Sands site to scout other tracks. "There are apparently in the general vicinity upwards of 100 or so," he says. "I want to see if there is any variation in them that wasn't apparent in the two sets [18 individual footprints] which I looked at so far.

"The sets of tracks that I examined on my first visit also had a lot of fire-cracked rock and a few human-produced pieces of chipped stone — flakes — associated with them. I'm hoping to locate other signs of cultural materials which might prove distinctive enough to figure what period they date from."

The project obviously excites Eidenbach, who as president of Human Systems Research (a nonprofit anthropological institute begun in 1972), has carved himself a career specializing in archaeological exploration of the Tularosa Basin, a largely unstudied domain about the size of Connecticut. "It's a completely closed basin," the researcher explains. "With no rivers draining out of it, all moisture that falls on the sides of the adjacent mountain ranges eventually flows into the basin, concentrating more and more salt in its soil. Those salts make for very poor preservation of bone materials, but apparently good preservation of tracks." □

M. A. Lambert, *Pleistocene Mammals of North America* (Columbia Univ. Pr.)



Pleistocene scene: Yesterday's camel (Camelops hesternus) *left, with two large-headed llamas and a caribou. Limbs of this now-extinct camel were 20 percent longer than those of its living dromedary cousin. And like the dromedary, it probably had one hump.*