MORE HUMAN-LIKE TRACK IMPRESSIONS FOUND WITH THE TRACKS OF DINOSAURS IN THE KAYENTA FORMATION OF ARIZONA: PART I: MAPPING, DESCRIPTION, AND COMPARISON TO DINOSAUR TRACKWAYS

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Abstract

This is a two-part presentation of research on the quasihuman ichnofossils (supposed human tracks) found in strata with the tracks of dinosaurs near Tuba City, Arizona. The material for study was collected on field trips made on June 21-27 and October 15-18, 1990 and June 1-6, 1995. This project is a continuation of previous research at Site 2. We give some corrections concerning tracks at Site 1 (See Rosnau, Auldaney, Howe and Waisgerber, 1989a, b).

Photographs, maps, descriptions, reevaluations and additional discoveries at the two main ichnofossil areas at Site 2 (H6 and H7) are presented for the first time. We compare contemporary human trackways and dinosaur trackways to the quasihuman ichnofossils in the "Downhill Trail." The results indicate the humanoid ichnofossil impressions match modern human tracks and not dinosaurs for size, stride and shape. In an appendix we present corrections concerning certain tracks.

In Part II we will present evidence from photomicrographic analysis. We will compare modern human tracks to quasihuman ichnofossils and describe additional newfound humanoid tracks at Site 2. We will present the authors' updated conclusions and answer criticisms of our work.

Introduction to Ichnology (The Study of Fossil Tracks)

Our research sites lie in the Early Jurassic Kayenta Formation and are located off highway 160, 10km southwest of Tuba City, AZ. The quasihuman features at Site 2 are in crossbedded sandstone dunes which also contain dinosaur tracks. These dunes as well as the sandstone plateau that is our Site 1 are part of the well-known Kayenta dinosaur track layer. For more topographic information see Rosnau et al. (1989a).

How fossil tracks are preserved is a mystery to many. A recognized expert on ichnofossils, Martin Lockley (1991), claims previous explanations are incorrect:

> [The answer is] avoided by specialists describing dinosaur tracks. A simple answer, that the track-bearing layer was buried through geologic time, turning to rock without the destruction of the footprints, is inadequate because it does not explain how the tracks survived the burial and preservation process.

Lockley maintains that the oft-repeated claim that tracks became hard in the sun before the next layer was deposited has been made by scientists to "cover up their own lack of understanding." He then offers his own theory that when:

> feet sink into a soft substrate, they leave impressions in layers below the surface. . . such tracks are called undertracks . . . because they are already buried at the time they are made, their preservation potential is very high. The influx of subsequent tides or floods poses little threat of erosion to an impression already nestled a few centimeters below the exposed surface (p. 22).

Yet even Lockley's explanation is inadequate because most fossil tracks are not underprints, as evidenced by fossil ripple marks and mudcracks found in the same horizon at most fossil track sites, including the research Sites 1 and 2 near Tuba City, AZ.

How Are Fossil Tracks Actually Preserved?

The sandstone track layers share a lithifying mineral with common portland cement, calcite. There is no mystery how tracks and bones are preserved in a limy sand mixture; such a stratum would harden rapidly.

Fossil tracks are sometimes covered by a fine powdered volcanic ash. At some locations, such as Sites 1 and 2 at Tuba City, the ash consolidates by fluvial action into a clay layer. Soft clay layers protect the harder track for a time, but easily erode back, leaving the tracks exposed.

Ichnofossils indicate rapid, cataclysmic burial, especially when there are mass burials of bones found over them. Our discovery of bones, teeth and Unio clams over the tracks at Tuba City is a typical example of the mixture of tracks with fossils (Rosnau et al., 1989b, pp. 83, 89, Figs. 49, 50, 51).Welles (1954, 1970, 1984) described the discovery of the first three partial skeletons of a new carnivorous dinosaur named Dilophosaurus midst the dinosaur tracks of our Site 1.

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Fossil tracks were largely ignored until 1980 because of the difficulties they posed to evolution theory. In the late 1980s paleontologist Jerry MacDonald found tracks that "look almost simian" and others that "look just like bear tracks" plus probable bird tracks in a stratum also rich with the tracks of Permian pelycosaurs. The location is New Mexico's Robledo Mountains. Stewart (1992, p.78) dismisses the out-of-place tracks as *problematica*, but Lockley (1991, p. i) states, "Billions of dinosaur tracks have been found in recent years" and "fossil footprints are neither rare nor insignificant as previously supposed." Mass fossilization of billions of tracks is not going on today, and rapid burial is indicative of cataclysm.

The Purpose of Humanoid Track Study at Tuba City, AZ

The human-like impressions near Tuba City were discovered because many people independently saw them and thought that they resembled human tracks. Navajos pointed out some at Site 1 to us as "cave man tracks." We asked Navajos herding sheep near Site 2 what they thought the quasihuman impressions were. They said simply: "man tracks."

Did humans and dinosaurs live contemporaneously? Our purpose is to determine if the quasihuman ichnofossils are the impressions of concretions or real human tracks.

Caution in Identification Designation of *Tracks*

In our previous paper (Rosnau et al., 1989b, p. 77) we explained that the term "quasihuman ichnofossils" was to be used to convey the proper degree of objectivity and even uncertainty involved in trying to deal with marks and imprints in rocks. Here we will follow this principle and when we use the terms "footprints," "tracks," "toes" they are not to be taken as implying positive identification but only as referring to appearance, until we finally attain absolute verification one way or another (Rosnau et al., 1989a, p. 42).

Update of Humanoid Ichnofossil Discovery at Tuba City—A History

In 1924 Samuel Hubbard, Curator of Archaeology at the Oakland Museum in California led an expedition to Arizona to study evidence for the coexistence of men and prehistoric animals. He was accompanied by one of the top paleontologists of the 1930s — Charles W. Gilmore, Curator of Vertebrate Paleontology, United States National Museum. Gilmore was the same scientist who studied putative humanoid tracks near Berea, KY, tracks in sandstone dated as Carboniferous ("Human-like tracks," 1938, p. 278; "Geology and ethnology disagree," 1938, p. 372) He wrote the classic and first scientific report on the now famous so-called "amphibian" and "unknown reptile" tracks in the Coconino sandstone formation (Gilmore, 1926).

While on this Doheny Scientific Expedition, Hubbard and Gilmore studied the dinosaur tracks near Tuba City, Arizona. The photographs of Gilmore with some of the tracks show they are a match for Anchisauripus *(Kayentapus hopii)* above Moenkopi village. The tracks measured 46.6 cm (16 inches) long by 35.5 cm (14 inches) wide with a 142.2 cm (52 inch) stride from heel to heel.

Hubbard (1924, p. 35) states that

> when making the casts of the dinosaur tracks. . . I found what looks exactly like a wolf track. . . . Unfortunately it was on the broken edge of the area containing the dinosaur tracks and was not accompanied by a succession of other wolf tracks, hence I can not offer it as evidence beyond a reasonable doubt . . . In light of this however, I predict that some day an area will be uncovered showing dinosaur tracks associated with animal tracks.*

Hubbard's prediction was fulfilled in 1969 when Eryl Cummings experienced engine trouble in his small plane and was forced to land near the Moenkopi Wash southwest of Tuba City. Walking around the area, Cummings spotted fossil impressions of what appeared to be the barefoot tracks of a child, three in all, in trail. Each track was about 20 centimeters (eight inches) long and exhibited human toe impressions. The child's trail was followed by a trail of small three-toed dinosaur tracks about 15 centimeters (six inches) long, as if the child was leading the dinosaur like a dog. All these tracks were headed north (Rosnau et al., 1989a, p. 43; Auldaney, 1992, p. 138).

In 1984 Lorraine Austin told Rosnau about some possible human tracks she had seen at what is now track Site 1. She stopped (like many tourists do) at the dinosaur track site on Moenave Road just off Highway 160, 10 km southwest of Tuba City, also known as the University of California at Berkeley's Museum of Paleontology Site V67239. She found human-like tracks among the dozens of dinosaur tracks there.

Rosnau, W. Horrmann and R. Freborg decided to look for the tracks seen by Austin. They spotted several humanoid impressions in the sandstone base stratum along the Moenave Road. To the southwest they saw humanoid and dinosaur tracks in sandstone slabs embedded in sand. One of the impressions resembled a human right hand, another a child's right foot. We identified both these impressions as imprint number 2 (Rosnau et al., 1989a, Figs. 1, 2, 3, 4; 1989b, Table I).

In 1985 Auldaney studied Site 1 at Tuba City and found a humanoid track-like impression we later identified as number 6. It was a child-size double impression (a print on top of a print?) with two heels and clear toe-like impressions. Still another set of toe-like impressions lay in the left side of this loose rock slab. This impression number 6 was found in

*Hubbard believed contemporary mammals and dinosaurs coexisted.

stride with other child-size, track-like features, which we labeled 5 and 4. When a l2-year-old child placed his foot in each of the double impressions, his foot, including the toes, fit the impression.

For more information on the history of the Tuba City finds, see Rosnau et al., 1989a, pp. 43-44.

New Discoveries and Data

Humanoid Track with Toe Prints

Our most astonishing discovery in 1990 was that of a humanoid feature with five distinct toe-like impressions. While searching for possible impressions which might have been overlooked in area H6 (a mound we dubbed the Classic Track area for its holotype shod footprints) Auldaney took a stride from impression 48 in its apparent direction of travel. His foot came to a small upraised mound of sandstone with a smooth top. The impression atop the mound had five indentations, which, incidentally, fit his toes for width and size. The track appeared to be a compressed spot around which the softer sandstone had eroded away. What was left was what appeared to be the impression of the front half of a bare foot on a pedestal of sandstone. We labeled. this impression 48-1. (See Figures 3 and 4.) In 1995 we found this impression had eroded to broken bits and sand.

Current Data on the Downhill Trail

Our field research of June 21 to 27, 1990 netted 41 new quasihuman ichnofossils at Site 2, for a total of 98 at Sites 1 and 2. Previously discovered impressions were restudied, photographed and mapped in more detail.

The Downhill Trail, described in our previous report (Rosnau et al., 1989b, Table VI, Fig. 23) as five impressions in Area H7, Site 2, we now see to consist of 15 impressions. It is the longest and clearest of the six putative humanoid trackways we have found. Its key impression we nicknamed the Downhill Slide (no. 51). This barefoot impression can be found by walking from the Classic Track (no. 39 in Area H6) on a line 75° west of south for a distance of 57 meters (approximately 67 paces). The Downhill Trail appears to have been made by a person picking his way up and down soft, wet and slippery sand dunes in a right-left pattern. See Table I and Figures 7-13 for details of the Downhill Trail.

TABLE I. The Downhill Trail, area H7, originally seen as a trail of 5 tracks, which we numbered 49-53, on closer examination is seen to consist of 15 tracks, beginning with 49-5. The table reads from south to north in the direction of travel. Use with the map in Figure 5. N.P. = no photo herewith; ? = periphery uncertain; NM = no measurement taken.

Imprint Number	Size (cm) (Length x width of ball)	Stride length	Comments	Figure Number(s)
49-5	34 x 9.5	39	Clear right foot depression with clear big toe.	N.P
49-4	32 x 9	80	Faint left foot depression with slightly deeper ball. Left foot toe angle shows up only in low angle light.	N.P
49-3	? x 9	42	Faint heel, sliding into depression, high arch, deep ball with right foot toe angle in soft mud which possibly oozed back into the track, causing obliteration of detail and shrinkage in size.	6, 7
49-2	? x 9	52	Ball only with a left foot toe angle with a short stride as if picking one's way on soft slippery mud, which oozes back leaving only a white outline and no depression. The obliterated depression is similar to human-like tracks in the bed of the Paluxy river in Texas, where some tracks appear as an outline of "whitish calcite etching on the toes due to the weight of the individual who made the print" (Morris, 1980, p. 33).	7
49-1	? x ?	50	This print, like 49-2, is preserved only as a white discoloration in the sandstone. It was covered by a loose nodule and was not visible when we first examined the trail. By 1990 erosion exposed the calcite discoloration associated with many tracks at Site 2.	7
49	28? x 9	52	A clear left foot slipping left in soft mud.	7, 8
50	?x?	52	Possible ball only with a clear big toe of a right foot.	8
51	32 x 13?	73	This was the first impression found in the actual downhill section of "Downhill Trail" and is the clearest impression in the trail. It is the "Downhill Slide" of a left foot on a 40-degree-angle slope. In our previous reports this impression was measured to the toe-like nodule hole eroded just behind the toe area. The real big toe, in our estimation, shows up in low angle light together with the other four toes. Thus we have corrected the length of this impression from 27 cm to 32 cm and its width to approximately 13 cm because the periphery at the ball of the foot is faint. See Rosnau et al., 1989b, p, 81, Table VI.	9
52	31? x 10	44	A sliding track gouging out mud in front of the toes. The angle could indicate the right foot of a person catching his balance while descending the 40-degree-slope. In low angle light the track has a faint heel. We now measure this impression to be 31 cm instead of 27 cm long, but even this must remain only an estimation because of the faintness of the heel area.	10, 8
53	33? x 12?	51	The toe area can be seen only in low angle light; thus only rough estimate of length was possible. Due to the sliding which occurred in track 51 which was stopped by track 52, the greatest amount of weight in track 53 would be in the heel. The width was estimated from the heel only in our last report because it was the only visible part. Here the ball is faint and the measurement of width is questionable but close.	10, 8

TABLE I. The Downhill Trail continued.

Imprint Number	Size (cm) (Length x width of ball)	Stride length	Comments	Figure Number(s)
53-1	34 x?	64	This impression is very faint but matches the human foot. It and 53-2 show a comfortable stride. It is in a lower possibly dryer layer than the tracks before 52. See the line on the map, Figure 5, between tracks 51 and 52; that is the end of a layer of mud (now sandstone) that appears to have flowed down over the mounds. We found strong evidence for crossbedded mudflow by spotting a half-covered quasihuman ichnofossil in Area H4, which we did not number but can be seen in Figure 11b.	11a, 8
53-2	35? x ?	NM	In high angle light this is a clear elongate depression. It is also in the same possibly hard, dry layer as 53-1 and is also shallow with no details. It also appears to be a sliding impression, causing it to become longer.	12, 8
53-3	NM	NM	An impression shaped like an "8".	12, 13, 8
53-4	NM	NM	Left foot with distinct periphery.	13
53-5	NM	NM	S-shaped impression with faint heel and right foot straddle in stride with 53-4.	13

Comparing the Downhill Trail to Modern Human Stride

Stride measurements were performed for a person 177 cm (5 feet 9-1/2 inches) tall. These are presented in Table II.

Comparison of the data of Table II with the stride lengths of the Downhill Trail shows that the stride between impressions 49-5 and 49-4 fits a human standing position. The step between 49-4 and 49-3 is an average stride as made by a person walking. The intervals between 49-3 and 49-2; 49-2 and 49-1; 49-1 and 49; 49 and 50; and 50 and 51 are the very short stride of someone moving slowly, perhaps picking his way cautiously on a slippery substrate. The step between 51 and 52 is between a slow and a normal walking stride. The paces separating 52 and 53, 53 and 53-1 are very short strides. These follow the Downhill Slide track (no. 51) perhaps they are short because the person was having trouble with his balance. The step from 53-1 to 53-2 is longer than a slow walk, but shorter than a normal walk. This may have occurred because the walker was coming out of a slide.

Table II. Auldaney measured his own stride. His height is 177 cm (5'9"). These are measurement ranges and maximums.

Slow Walk	.53 to 59 cm
Normal walk	.77 to 79 cm
Average run	.115 to 170 cm
Fast run	.173 to 188 cm
Longest reaching step while standing	.137 cm maximum
Standing jump	.196 cm maximum

These experiments were performed on a flat dry concrete surface using wet shoes. Different speeds were used to study stride length. Measurements were made of the water marks left on the dry concrete. These stride measurements consisted of at least six consecutive strides measured from heel to heel. The longest reaching step and jump experiments were repeated several times to obtain the maximum.

Comparison of these data with the stride lengths of the quasihuman impressions in the Downhill Trail (see Table III and Figure 5) indicates that a human is capable of producing them during normal locomotion.

Comparing the Downhill Trail to Dinosaur Trackways

Dinosaur trackways were recorded by paleontologist Samuel Welles* and by us at four undisputed dinosaur tracksites near Tuba City, Arizona: (1) the area near our Site 1 on Moenave Road (U.C. Berkeley site V67239), (2) a site west of our Site 2, (3) a site on the north edge of Site 2, and (4) a site above Moenkopi Village south of Tuba City, U. C. Berkeley's Site V6898 (Welles, 1971; Auldaney field notes, 1990). The data indicate that the Downhill Trail human-like impressions are different from any of these dinosaur trails; see Table III. *Eubrontes (Dilophosauripus williamsi)* has a much wider foot and a longer stride. *Anchisauripus (Kayentapus hopii)* also has a much wider foot and a very long stride to which a man even at a fast run falls short (see Tables II and III). *Anomoepus (Hopuchnus shingi)* has too short a foot and has an amazingly long stride for its size. The small *Grallator* tracks found near Site 2 have too short and too wide a foot. All the dinosaur tracks are wide and tridactyl, unlike the narrow quasi-human ichnofossils which show no sign of three toes. The stride of *Eubrontes (Dilophosauripus williamsi)* at Site 1 is 106 cm, too short for a human running and too long for a person walking.

If the human-like impressions were produced by dinosaurs and if we have erred in our interpretation of these impressions, as Kuban alleged in the interpretation of some of the elongate tracks at Glen Rose, Texas, then the Tuba City elongate impressions should reveal the same evidence of dinosaur digits as noticed by Kuban. Kuban (1989) maintains that:

> . . . elongate tracks on the site [at Glen Rose] typically show indistinct digit impressions; however, slight depressions and/or coloration features indicate (three toes) dinosaurian digits on at least some tracks in each trail (p. 66).

Out of all the elongate impressions at Sites 1 and 2 at Tuba City we found only one impression (at Site 1) which had three claw-like toes, impression 17 (see Rosnau et al.,

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Table III. Here our data on human-like tracks in the Downhill Trail are compared to average measurements of dinosaur trackways in the same horizon. All measurements are in centimeters. Avg = average. SD = standard deviation. n = number of individual tracks or strides measured.

	Avg	SD	n
Human-like tracks in Downhill Trail at Site 2, Area H7			
Length	33	1.1	4
Width	9	0.4	6
Stride	54	12.8	11
Bipedal three-toed dinosaurs in the flat Kayenta track layer:			
Eubrontes (Dilophosaripus) Site 1 at Moenave Road (Welles, 1971, p. 29)			
Length	30	3.4	4
Width	26	3.5	4
Stride (not published)	—	—	—
Eubrontes (Dilophosauripus) Site 1 at Moenave Road (Auldaney, 1990)			
Length	32	2.5	8
Width	27	1.5	8
Stride	106	3.5	6
Eubrontes (Dilophosauripus), large tracks north of Site 2 (Auldaney, 1990)			
Length	33	0.0	3
Width	27	1.0	3
Stride	119	0.0	2
Anchisauripus (Kayentapus hopii) above Moenkopi village (Welles, 1971, p. 32)			
Length	35	1.1	2
Width	29	0.3	5
Stride	189	1.5	4
Anomoepus (Hopiichnus shingi) above Moenkopi village (Welles, 1971, p. 36)			
Length	10	0.0	2
Width	10	0.7	2
Stride	191	11.3	2
Grallator, small tracks north of Site 2 (Auldaney, 1990)			
Length	16	2.2	10
Width	13	1.8	10
Stride	60	2.1	5

1989b, Fig. 39). It was clearly the sole exception to the rule and we interpreted it as a dinosaur skid track.

The great concentration of elongate humanoid ichnofossils at Tuba City is at Site 2. They lie in reddish brown, iron-stained crossbedded sandstone, which was covered with a softer tan sandstone now eroded away. If the humanoid ichnofossils were produced by dinosaurs walking on their metatarsi, they would clearly reveal three claw depressions infilled by lighter colored sediment. But there is no evidence of claw impressions nor are there any color variations in the digit areas of the humanoid ichnofossils. Our brushing off loose sand infill from the toe region of elongate humanoid ichnofossils revealed no claw impressions or tridactyl digits.

Thus it is quite unlikely (if not impossible) that any of the quasihuman impressions were made by dinosaurs.

Recent Research at Area H6— Near the "Classic Print" (No. 39)

Upon close study we located several human-like foot impressions at area H6 in addition to the 12 reported earlier (Rosnau et al., 1989b, Table V). We present these new data in Table IV, plus more details on the 12 original impressions.

Conclusions

Evidence in favor of these quasihuman ichnofossils being human foot tracks continues to grow. In our next report (Part II) we will present additional evidence, along with the updated conclusions of each author.

The close proximity of man-like trackways to dinosaur trackways in the Kayenta is an amazing anachronism to standard geological theory of dinosaur extinction millions of years before humans supposedly appeared on earth. Our data, however, fit the Biblical implication (Genesis chapter 1) that all organisms were formed by God in relatively recent time and that they coexisted on earth.

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Appendix—Corrections of Previous Reports

Corrections to our second article in *CRSQ*, Vol. 26, December 1989: Impression 5 (Figure 1, page 78) is shown in the map as facing north. There is a small up push of mud where a small toe fits, showing that impression 5 faces south and is in stride with the double impression 6, also facing south, 30 cm (one foot) ahead in alignment with it. This was determined from in situ photographs, measuring from the toe of 6 to the heel of 5.

Table IV. Classic track mound, area H6, and related features. These features are presented in the order of their clarity of detail and relationship. Those which appear to be made by the same trackmaker are described in their order of direction of travel. Use with map Figure 14. NP = no photo herewith. N.M. = no measurements taken. ? = periphery uncertain.

Imprint Number	Size (cm) (Length x width of ball)	Comments	Figure Numbers
39	31 x 13	This is the first humanoid ichnofossil we discovered at Site 2. It is the clearest impression discovered thus far and serves as a holotype of shod foot impressions. We named it the "Classic Print" or "Classic Track." We use it as a reference point from which to map other features at Site 2. It is a putative right foot impression which appears to have been made by a soft-soled boot-like moccasin with a concave bottom.	15, 16
40	31 x 13	A putative left-foot track of which only the heel is exposed. The rest of the track is filled with sandstone, which appears to flow across the track. See a similar track in Figure l1b. This track was discovered by Auldaney in low angle light early in the morning. It reveals a shadowy outline identical in reverse to its mate, No. 39. It is 49 cm left of 39 and faces 49° west of north in a natural standing position with 39.	15, 16, 17
39-1	27 x 12	It has a resemblance to the Classic Print 39, except that it is a flat-bottomed impression and appears to have been made on firmer ground. It is parallel to 39 facing the opposite direction (67° east of south) and is 143 cm (4 feet) away from 39.	16
42-1 & 42-2	26 x ?	Three flat-bottomed impressions with sharp shoe-like lines of varying width were mapped and recorded in our last report and were all identified as 42 (Rosnau et al., December 1989a, p. 80). These impressions have been subdivided here and numbered from left to right: 42, 42-1, and 42-2. See 42 below.	17
41	21 x 7	A putative child's or woman's left-foot track facing west about 50 cm to the left of 40. This impression appears to be part of a partial trackway which includes 41, 42, 46, 47 (?), 48-2 and 48-3. No. 41 has a pointed appearance at the toes similar to impressions made by tennis shoes in mud where the inner side of the shoe toward the big toe receives the greatest amount of weight as a person tiptoes to avoid sinking in the mud.	18, 16, 17
42	26 x ?	This child-size impression is one of three recorded as 42 in Rosnau et al. (1989b). While examining photographs Auldaney noticed the similarity to 41 in both size and shape. Impressions 48-2 and 48-3 we interpreted as child's prints. They are possibly part of a trackway with 41, 42, 46, 47, 48-2, and 48-3.	17
46	19 x 6	Identical to 41, except it is shallower. It lies about 4.75 meters (15.6 feet) 45° west of south from 42.	19, 20
47	27 x 10	A putative right foot track facing south. It may or may not have been made by the same individual that created 46. It is not in line with a trackway well enough to tell.	20
48-2 & 48-3	17 x 9?	These are tracks in stride we noted as possible child's prints while mapping for this present paper. There is a possible trackway of the same individual making these and track 41 at right angles to the Classic Print's mate 40.	20
45	29 x 12	Putative left foot impression of a pair facing north at a natural angle to each other, with the left ahead of the right.	21
44	29 x 13	This is the putative right foot impression paired with 45.	21
45-1	27 x 13	A putative but clear left foot of a pair headed east, in stride with 45-2.	21
45-2	29 x 11	A poorly preserved putative right foot paired with 45-1. These two impressions intersect 45 and 44, thus forming what appears to be a human crossroads. No. 45-2 is 48 cm southwest of 45 and bearing 45° west of south.	21
45-3	25 x 10	This is an isolated putative right foot impression facing north. It appears to have been filled with water which flowed into or out of the impression forming a "fish-tailed" fan depression behind the heel, making the whole impression resemble a fish.	22
48-4	NM	This track-like impression is to the west of 48 but was not measured because it was outside the area we mapped. It is added to the map in Figure 14. The front part of this feature is eroded, along with the sandstone around it, leaving it on a pedestal like 48-1, just 66 cm (two feet) south of it.	20
48	24? x 13?	This impression was reported in Rosnau et al. (1989b) as 29 x 13. There is a discoloration, however, which may have been caused by compression which indicates it is 24 cm instead of 29. It appears to have been widened and distorted by erosion so that 13 cm width may be too large. It is in stride with 48-1.	20

Table IV. Continued

Imprint Number	Size (cm) (Length x width of ball)	Comments	Figure Numbers
48-1	? x 10	This feature displayed five toe-like holes. It appeared to be a left foot impression and faced southwest. Compression of the sand below it caused the harder sandstone with the impression in it to be left on a pedestal as the softer sand eroded from around it. Only the front half of the track remained as of 1990. It subsequently eroded away, but at the time of its discovery it exhibited five holes starting with a large toe and followed by four smaller toe-like holes. Modern barefoot tracks have similar downward holes formed when a person clenches his toes in the act of leaping forward in wet sand.	3, 4, 20
39-2	38 x 17	This is an isolated and eroded print facing 23° west of south about 3.5 meters (9 feet) east of the Classic Print 39 on the same mound just above loose alluvium filling a depression to the east and below it. The only thing left of this print is a hardened lithified rim.	N.P.
39-5	52(Slide) x 13	This is one of a pair of side-by-side tracks east of its mate facing northeast or southwest (the direction it is facing is uncertain). It appears to be a sliding impression facing southwest, its length longer than the foot that made it. This presumed slipping could also account for it being wider than its mate. There are six side-by- side impressions facing the same direction at Site 2.	23
39-6	27 x 10	This is the putative mate to 39-5, to the west. The northern end of this impression is covered by a sand dune layer flowing down over it and covering about 6 cm.	23
37	29 x 12	This is another pair of side-by-side track-like features facing north. They are about the same size if one disregards a mud splash in front of the left track. They are about 4 meters to the west of 39-5 and 39-6 and about 5 meters (15 feet) 45° east of north of the Classic Print 39 on the same mound.	24
54-1	30 x 12.?	This is the first track of a putative humanoid trackway of four impressions. We first noted it in 1990. It may be a left toot going south. It is about 4.25 m (14 feet) south 450 west of 45-1. There may be an obliterated track between this and the next impression, 54-2.	25
54-2	NM	Measurement of this feature is impossible because of distortion of the original soft, wet mud. All the humanoid elongate impressions in this putative trackway appear to be about the same size. This impression appears to be a right foot going south.	25
54-3	NM	There is an easy stride length from 54-2 to 54-3. We cannot determine the direction 54-3 is facing or whether it resembles a right or left foot.	25
54-4	NM	A possible right foot headed south.	25
39-3	NM	Isolated and eroded elongate impression that may be facing southeast	N.P.
39-4	NM	Vague and isolated elongate depression facing east, 5.25 meters east of 39.	N.P.
39-7	NM	Vague and isolated elongate depression.	N.P.

In Rosnau et al., 1989a impression 6 is shown in Figures 5 and 6, page 45. The photos for Figures 5 and 6 were regrettably transposed. Figure 5 shows the toe-like impressions in the side of the rock where all five indentations can be seen to match in size and length the toes of a l2-year-old child. What appears to be a double print (two putative heels) in the same rock (Figure 6) also fits a l2-year-old child and is in stride with child size impressions 5 and 4. Thus impressions 6, 5 and 4 form a putative trackway.

In Figure 6 the double track is photographed in an upright position vertical to the impression and at a 45° angle towards the putative toes or front part of the imprint. The toe-like features can be seen at the top of the picture, including where they appear to hinge. Also visible is a possible up push in the hollow part of the smallest toe. In the same picture two heel-like impressions are visible toward the bottom of the photo. To the left of the double heels are a second set of toe-like impressions in the side of the rock in the lower left corner of the slab.

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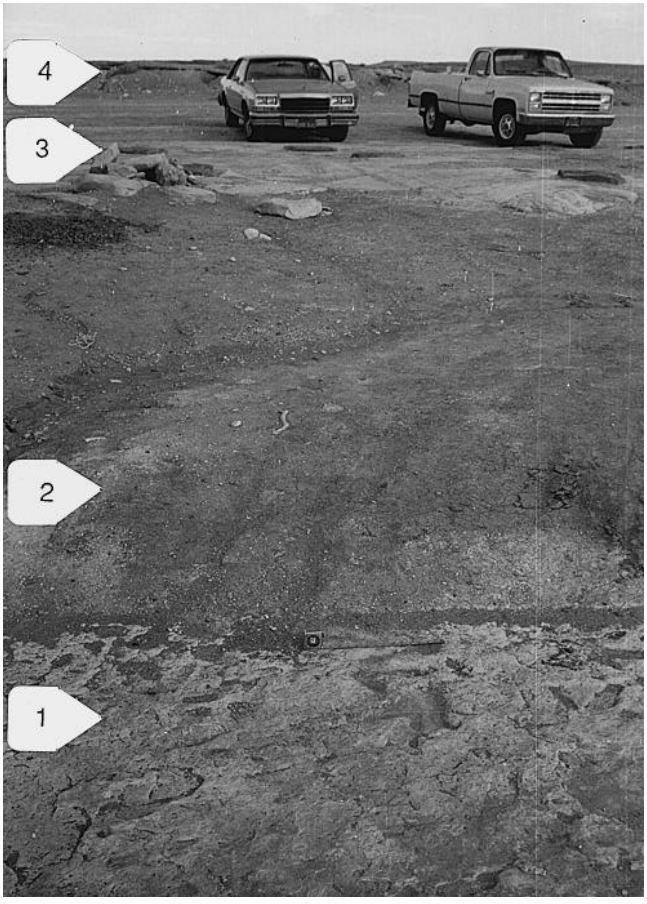

Figure 1. Strata at Site 1 next to Moenave Road near Tuba City, AZ, reading upwards. Arrow 1: Dinosaur track layer (sandstone). Arrow 2: Greenish-white bentonite grading up into reddish-brown bentonite (water-deposited volcanic ash). Arrow 3: Limy sandstone forming the bed of Moenave Road. Arrow 4: More reddish bentonite with conglomerate sandstone above. the sandstone, about 50 cm thick, contains internal casts of fossil Unio clams as well as the petrified bones and teeth of aquatic reptiles. In this stratum Welles excavated three *Dilophosaurus* dinosaur skeletons a short distance down the road. This same conglomerate at Site 2 contains petrified wood.

Figure 2. A few of the many dozens of tracks of a herd of bipedal carnosaurs, relatives of T-Rex, at the main dinosaur track area, Site 1, Tuba City, AZ.

Figure 3. By taking a stride from 48 Auldaney found 48-1. The rear half has eroded away, but the front half exhibits impressions which match those of human toes.

Figure 4. A close-up of 48-1. To see its relationship to 48 See Figure 20.

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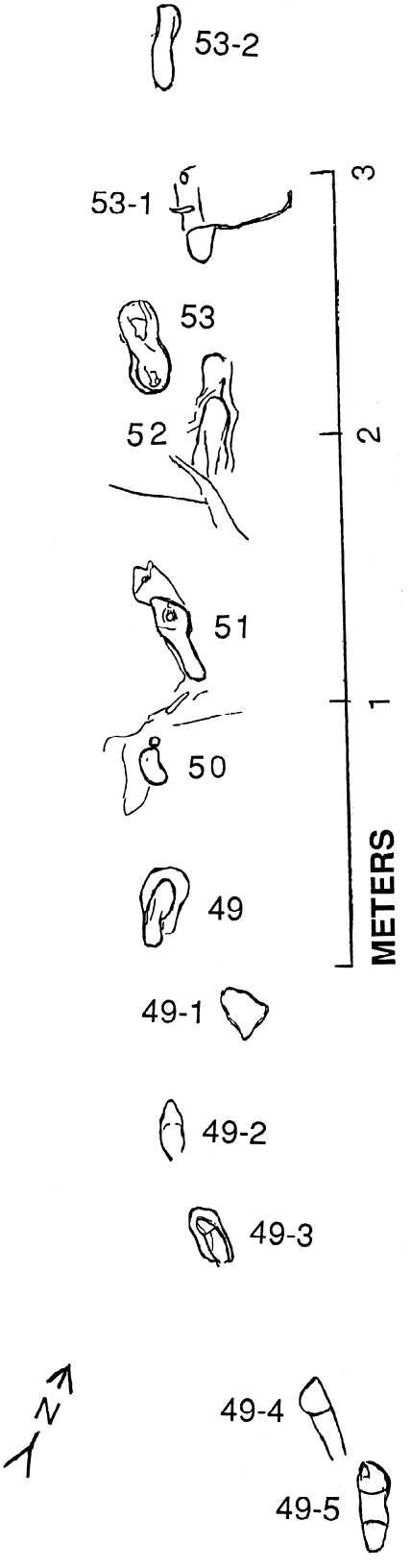

Figure 5. This is a detailed drawing of quasihuman footprints which constitute the Downhill Trail. Note the right-left pattern. The northernmost three impressions are not shown because we took no measurements of them.

Figure 6. Quasihuman ichnite 39-3 appears to be a barefoot track in soft mud, creating a distinct arch.

Figure 7. View of the Downhill Trail looking N 45° E. Quasihuman impressions 49-3 to 53-2 are in view. 49-3 is next to the shoe on the right, 49 is next to the shoe on the left. 49-2 and 49-1 can be seen between them. In this photo 49-1 is still covered by a nodule and was yet to be discovered. 50 is visible but 51 is hidden behind the downhill slope. 52 can be clearly seen, 53, 53-1 and 53-2 are invisible because of high sun angle.

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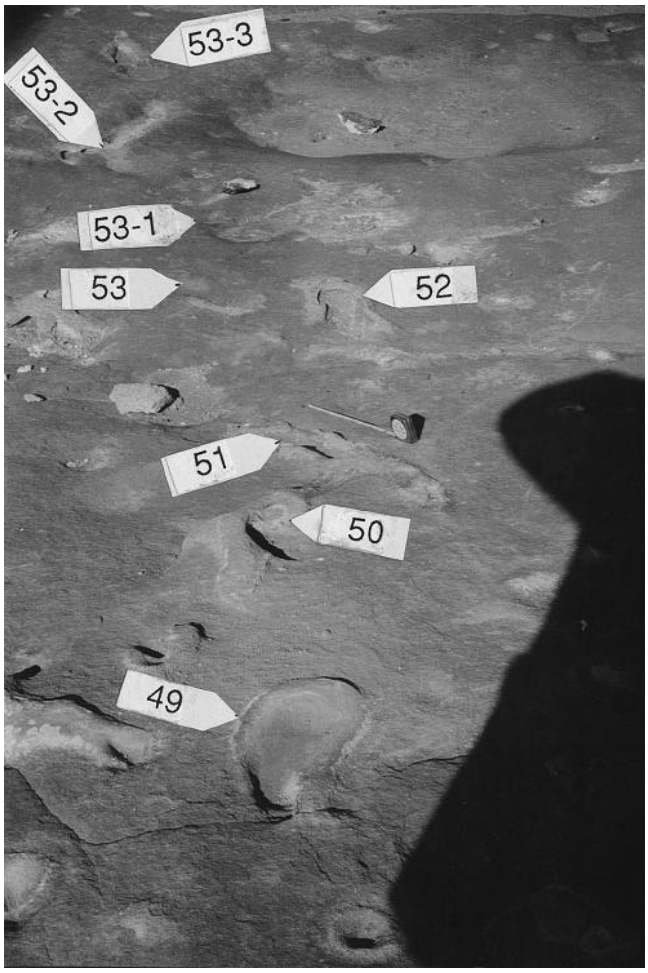

Figure 8. Putative human footprints in part of the Downhill Trail. Impression 49 is visible at the bottom, then 50 with its distinct big toe. No. 51, the Downhill Slide, is hidden behind a slope. No. 52 and its mud splashes is clearly visible. The heel of 53 and the indistinct impressions 53-1 and 53-2 can be seen as well as the figure 8-shaped 53-3. Notice that 53, 53-1, 53-2 and 53-3 veer to the left as if avoiding a puddle of water in the cavity to the right.

Figure 9. No. 51, the first discovered and most prominent of the quasihuman impressions of the Downhill Trail. Note what appears to be a mudsplash in front. The big toe has skidded downhill.

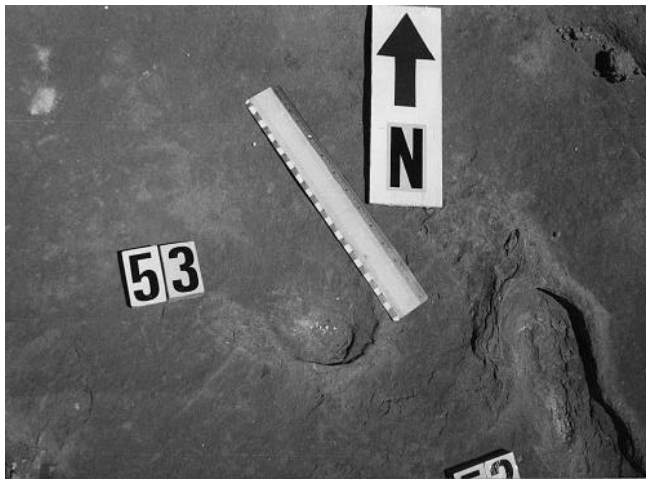

Figure 10. No. 52, lower right, appears to have brought the downhill slide to a halt, gouging out mud. No. 53, left, has a clear heel, but a faint toe area with toe-like impressions visible only in early morning light.

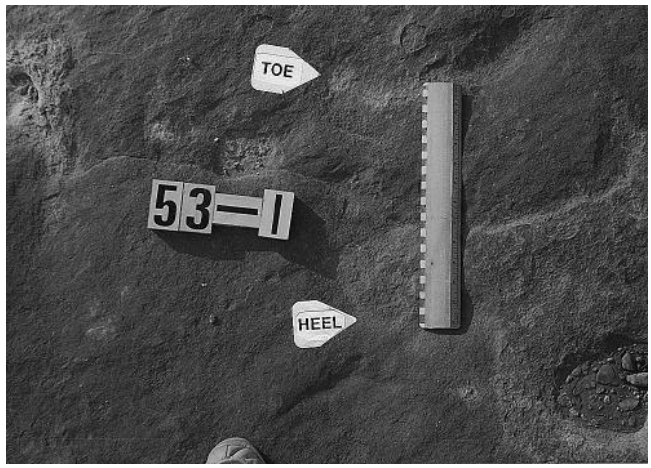

Figure 11a. Downhill Trail humanoid feature 53-1 was discovered by taking a stride from 53. It consists of slight depression with what appears to he a heel (next to ruler) and a right foot big toe-like feature filled with light-colored sandstone (arrow).

Figure 11b. The crossbedded sandstone formed into mounds at Site 2 is seen here flowing across a half exposed track-like feature in area H4. The situation is similar to that of impression 40, the putative mate of 39, where a flow of muddy sand covers the front of the feature, leaving what appears to be a heel print exposed. See Figure 15.

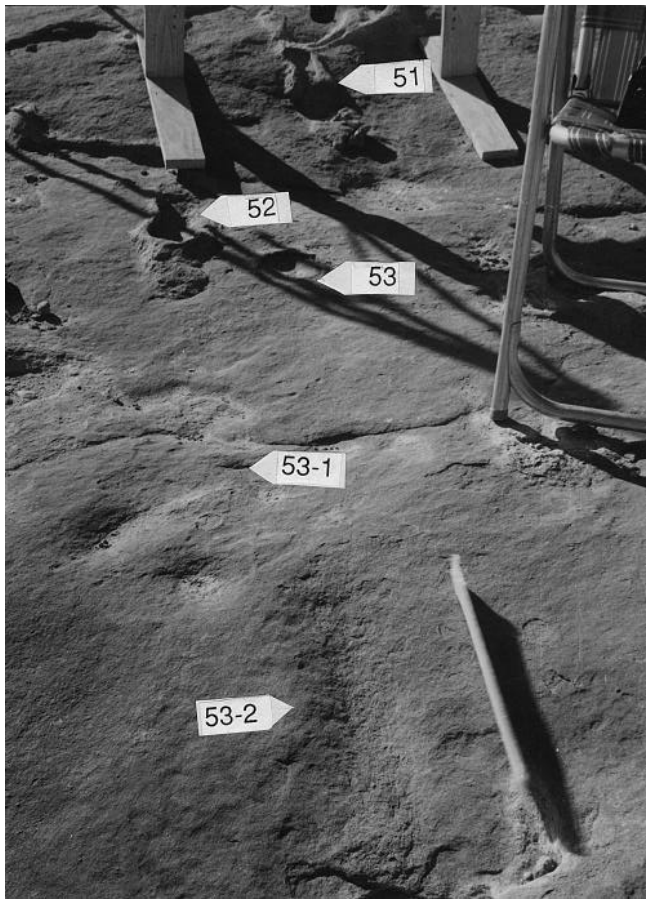

Figure 12. Putative human tracks near the end of the Downhill Trail. View is to the south. a featureless depression 53-2 is clearly visible with and early morning shadow, while 53-1 is difficult to see. In the background 53, 52 and 51 can be clearly seen.

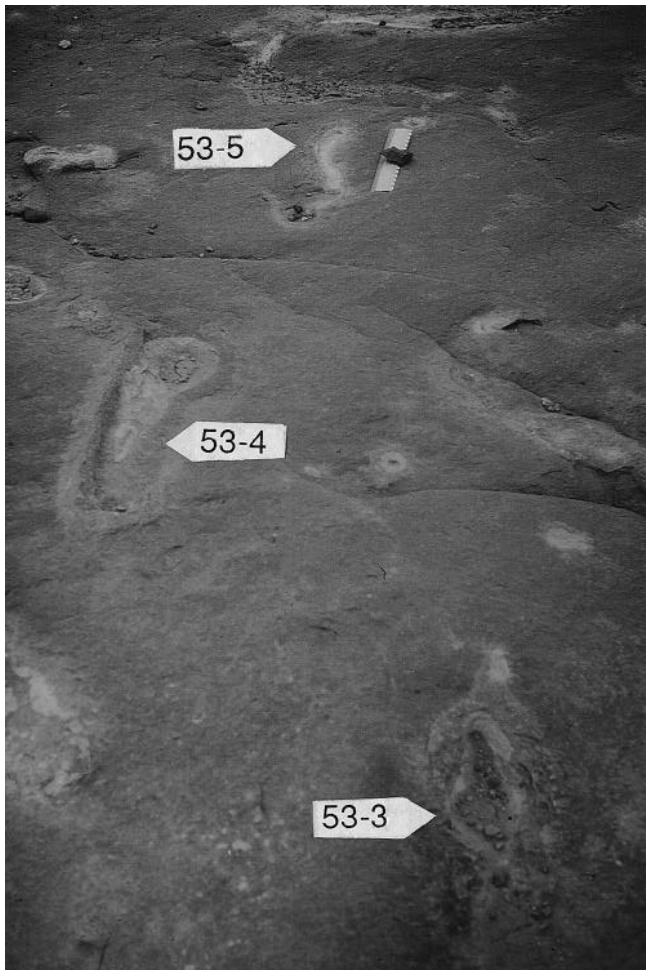

Figure 13. Humanoid impressions of the Downhill Trail looking north. No. 53-3 (a figure 8-shaped impression) is at lower right, followed by 53-4 and the S-shaped 53-5 next to ruler.

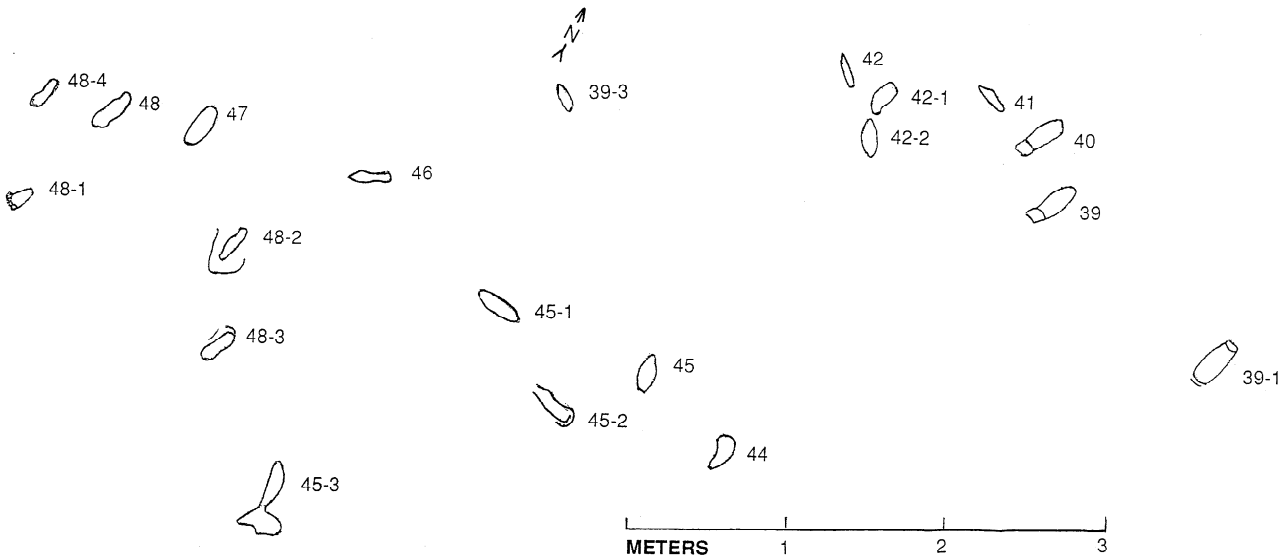

Figure14. A detalied drawing of the Classic Track mound, its namesake being the holotype shod footprint No. 39. On this mound is a concentration of elongate impressions which resemble human tracks.

Figure 15. The Classic Track 39 is seen on the right and what appears to be its mate 4 on the left. No. 39 serves us as a holotype of shod humanoid foot impressions and as a reference point for mapping other features at Site 2. This photo was taken in 1989, a few seconds after we discovered 40. Revealed in the early morning shadows 40 is a reverse duplicate of 39. By noontime only the putative heel, which has eroded out, can be seen. The front of 40 remains filled from a once-overlying stratum of mud. see Figure 11b.

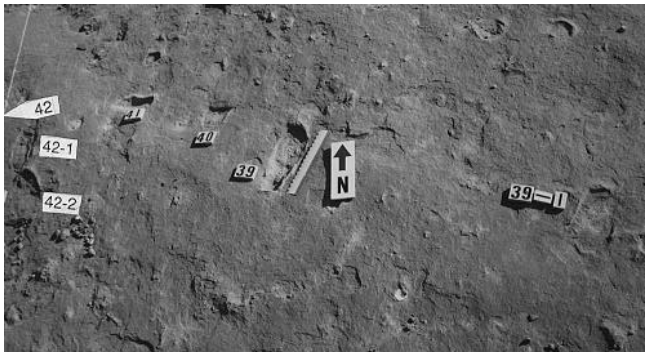

Figure 16. Putative humanoid track 39, the Classic Track, is visible in the center of the photo. What resembles its mate (40) is above that number to the left. No. 39-1, facing the opposite direction and four feet away, is seen at the right. It is similar in shape to 39. No. 41, the first impression of a putative child's or woman's trackway, is at right angles to 40. Humanoid track-like features 42-1 and 42-2 below it are visible at the center of the left edge of the photo.

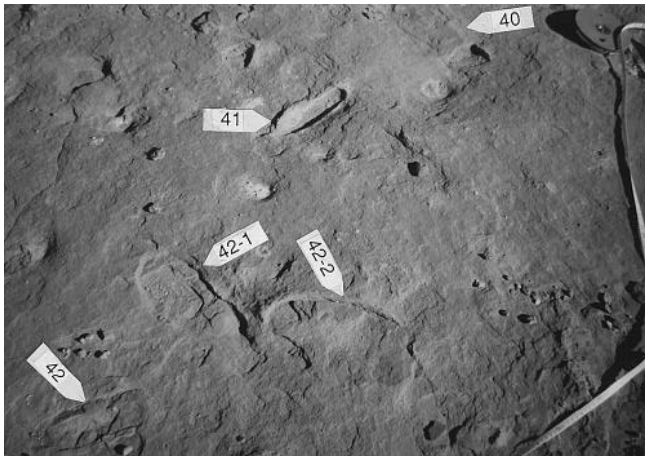

Figure 17. Humanoid feature 40, possible mate to Classic Track 39, is in the upper right while 41 is at a right angle to it, on the left. In the lower center note 42-2 to its left. In the lower left corner note 42, which could be in stride with 41.

Figure 18. Closeup of putative child's or woman's track 41. Note similarity to impression 46, Figure 19.

Figure 19. Closeup of putative child's or woman's track 46.

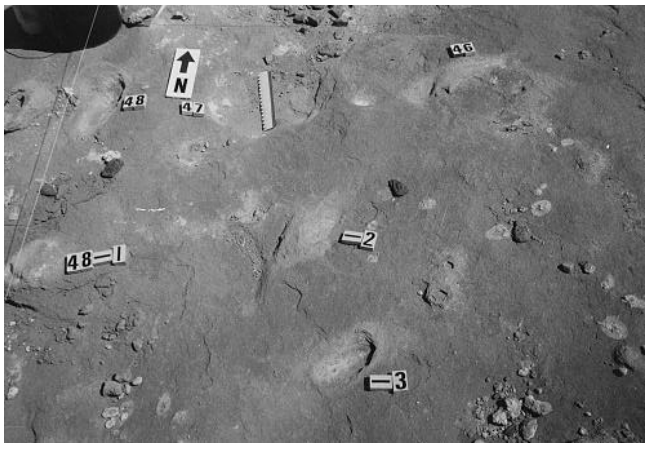

Figure 20. Humanoid impression 46 is at the upper right. Photo shows the continuation of a putative child's/woman's trackway, 47, 48-2 and 48-3. To the left of 47 is 48, within a stride of 48-1. 48-1 has clear toe-like impressions. To the left of 48 is an unmarked print, 48-4.

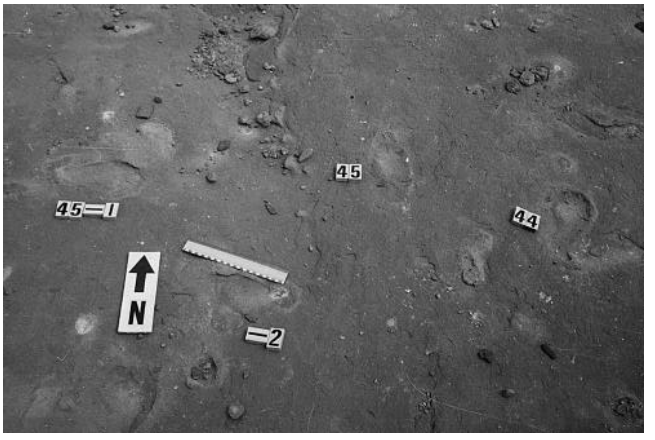

Figure 21. A possible crossroads of quasihuman tracks. No. 45-1 is seemingly in stride with 45-2, both facing east. No. 44 seems to he in stride with 45, facing north.

Figure 24. Another pair of side-hy-side quasihuman impressions, print 37. northeast of the Classic Track 39, and as distant as 45. See map, Figure 14.

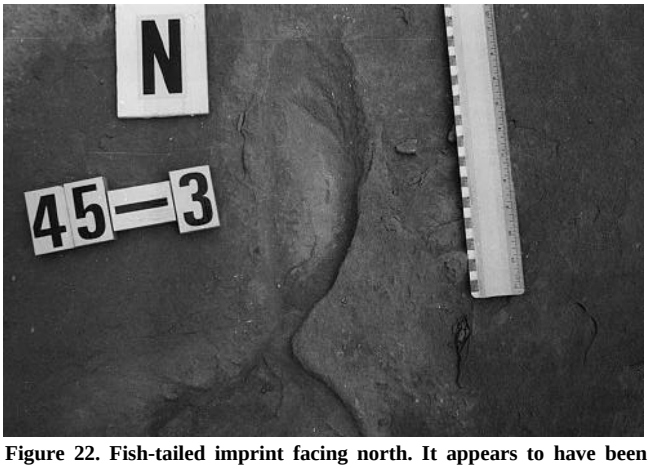

Figure 22. Fish-tailed imprint facing north. It appears to have been filled with water which flowed in or out of what looks like the heel.

Figure 23. One of six pairs of side-by-side quasihuman prints discovered to date. This pair is N 80°E of the Classic Track 39, as distant as 45-3. See map, Figure 14.

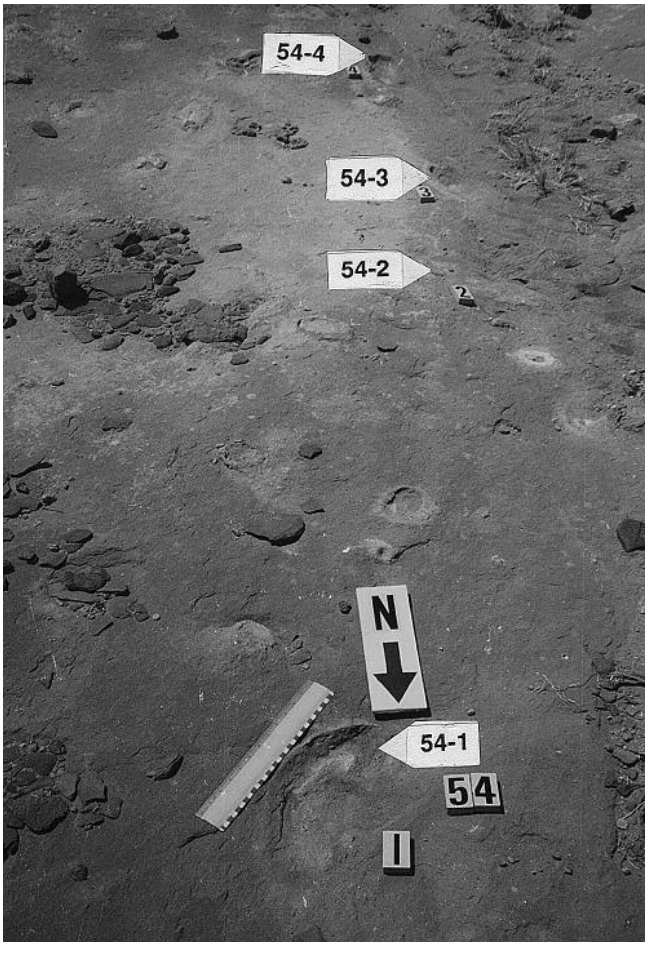

Figure 25. A quasihuman trackway discovered in June 1990 southwest of 48-2 and about as distant from 48-2 as 39. See map, Figure 14. The putative trackway consists of 54-1, a possible left print, followed by space where a track may have eroded away; 54-2, a possible right foot: 54-3. an elongate impression; and 54-4, a possible right foot impression.