

RESEARCH ARTICLE

Sasquatch & Other Wildmen: The Search for Relict Hominoids

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Editor's Note: This presentation was delivered on the occasion of the bestowing of the 2016 Tim Dinsdale Award at the Meeting of the Society for Scientific Exploration, Boulder, Colorado, on June 20, 2016. The Society has presented the Dinsdale Award every two years since 1992, for significant contributions to the expansion of human understanding through the study of unexplained phenomena. Winners have led their fields in uncovering noteworthy anomalies. The Awards Committee has recognized Dr. Meldrum's significant contribution to our understanding of the possible presence of an as-yet unrecognized primate in our midst. In the course of more than two decades, while recognizing the risk to his professional reputation, he has created a corpus of credible work by conscientiously applying his knowledge of primate evolutionary anatomy and behavior to this most difficult and controversial subject.

First off, I would like to express my appreciation to Patrick Huyghe and the members of the search committee for this honor and the privilege of addressing the members of the SSE. I accept this Dinsdale Award, not so much in recognition of my modest accomplishments, but as acknowledgement of the import of the fundamental question—*Are there biological species, i.e. relict hominoids, behind the legends of man-like monsters?*—as a legitimate and timely scientific question.

In response to persistent indications of mystery hominoids, we have witnessed a recent rash of skeptical books published on the subject of Bigfoot (e.g., Long 2004, Daegling 2004, Buhs 2009, McLeod 2009, Nickell 2011, Loxton & Prothero 2013). Some of these titles, penned by fellow academicians, have been inexplicably published by prestigious university presses, e.g., University of Chicago Press and Columbia University Press. Others are the work of journalists turned popular author, or self-proclaimed paranormal investigators. In spite of glowing endorsements by fellow skeptics, in-depth reviews of these undertakings by those with first-hand knowledge of the data and events have been much less complimentary. For example, an extensive and thorough review of Daegling's book, *Bigfoot Exposed*, was published by this journal (Meldrum 2005) enumerating extensive inaccuracies and misrepresentation of fact, inexcusable in a scholarly work by a practicing anthropologist. The review concludes with

the acknowledgement that ultimately, “it is a notable contribution precisely because it so plainly illuminates the dismissive tactics that are too common in anthropological and zoological academia regarding this subject.”

Turning to Buhs’ *Bigfoot: The Life and Times of a Legend*, we see from the outset that Buhs (a self-described “independent scholar”) undertook his book with the assumption that *sasquatch* did *not* exist, and so any issues of supposed Bigfoot biology could be left along the wayside. Buhs was not encumbered with scientific evaluation of evidence, nor distracted by the serious discussions occurring at scientific meetings and in wildlife agency seminar rooms. Christie Henry, Executive Editor of Sciences at University of Chicago Press, shepherded Buhs’ *Bigfoot*, even though she along with its author admit it has very little to do with “science.” She pointed out the irony of Chicago publishing a book on Bigfoot and mused over the challenge of finding peer reviewers, finally resorting to *historians* of science and the paranormal (Meldrum 2009).

Disappointingly, similar criticisms could be and have been leveled at the remaining distracting examples, which have attempted to reduce the subject to mere myth and legend at best, or to the delusions of socially threatened, working, middle-class male schmucks, at worst.

I am reminded of the parable of the eight blind men examining an elephant. Each attempted to explain their encounter from their limited and constrained perspectives and subjective perception. Each perhaps cleverly and creatively, but nonetheless naively, misconstrues his experience. One interprets a writhing trunk to be a snake, another concludes the stalwart limb is a tree trunk, another perceives the expansive ear as a fan, and so on. The objective reality and novelty of their encounter is missed, due to their lack of familiarity with the phenomenon and their inability to comprehend their experience within its broader context. It is a certain lesson from history, a theme developed by Kuhn (1962) and others that without a context, i.e. an accommodating niche within an existing paradigm, a novel concept, regardless of the nature of the supporting evidence, will rarely command an open and objective hearing.

Context and perception are critical in this process. In this vein it is informative to consider the general perception of literature on Bigfoot. To illustrate, where are treatments of man-like monsters placed in the library according to the Dewey Decimal System? Many of my generation, who remember actually going into libraries to browse through physical books, will recall searching the shelves in the lower end of the numbering system for titles relating to Bigfoot. Why? The explanation and enumeration of the system’s categorizations now occupy four volumes and is still not entirely precise. By some interpretations Bigfoot falls in the 100-range—

Philosophy and Psychology. This includes “things we don’t understand,” such as ghosts, UFOs, aliens, and Bigfoot. Elsewhere, the subject is to be found in the 000-range—Generalities—specifically 001.9—Controversial Knowledge, including various mysteries and oddities, phenomenon unexplained or unverified.

When my book, *Sasquatch: Legend Meets Science* was published, I was quite adamant that it be categorized as a work of natural science, with a place on the shelf alongside Jane Goodall’s books about primates (all the more appropriate since the cover bears her endorsement). In the information for librarians found on the back of the title page, it was recommended to the Library of Congress designation QL89.2 within General Zoology, but also 001.944 in the Dewey Decimal System, within Controversial Knowledge. The publisher had arranged for my book to be carried by Barnes & Noble bookstores across the country, so whenever I had an opportunity to visit a store, I would check to see where indeed my book was shelved. With few exceptions, it was in the New Age/Occult section (i.e. controversial knowledge), somewhere between works on the Bermuda triangle and crop circles. Once I confronted a store manager on the matter and to my chagrin she assured me that the title would get ten times the traffic in the New Age section as opposed to the Natural History section. So much for context and perceptions.

What’s in a name? How are labels and categories perceived? I have largely eschewed the popular moniker *Bigfoot* because of the tabloid stigma frequently attached to it. I prefer the term *sasquatch* in deference to the Native American and First Nations terms, widely translating to “wildmen of the woods.” Even that term, through its popularization and commercialization, has been diminished somewhat as a label to be taken seriously. In addition, it is too narrow for what is clearly a global phenomenon—global, but not universal. The notion of contemporary wildmen is not to be dismissed as a universal manifestation of the human psyche. It is not merely a collective archetype of human ties to the wilderness. Within a global context distinct forms emerge, distinct in anatomies, behaviors, phylogeny, and distributions. There are ecological correlates within these distributions—these are wildmen of the woods after all. There is an evolutionary and anthropological context emerging as well. The term I wish to emphasize for this global phenomenon is “relict hominoids,” a term first coined by Boris Porshnev (1963).

“Relict” is a term finding application and usage in the biological sciences. It denotes a species that has survived from an earlier period, or in a primitive form; a remnant of a formerly widespread species that persists in an isolated area. The term “hominoid” in a colloquial sense

means human-like, from the Latin *homin*—human, and the Latin *oid*—like, resembling; similar, but different. However, it also has a more precise taxonomic meaning and implication. In Linnaean classification, a hominoid is a member of the superfamily Hominoidea, which encompasses humans and great apes, i.e. chimps, gorillas, orangutans, as well as the lesser apes, the gibbons and siamangs.

For the purposes of this discussion of relict hominoids, I will limit myself to the direct human ancestors and their collateral branches since the divergence from the common ancestor shared with chimpanzees, some 5–7 mya (million years ago), although a similar discussion could be had for the apes. To understand the perception of this evolutionary history we must consider its context and the development of a paradigm that had a great influence on it. In 1934, Georgy Gause, a Russian microbiologist, published an influential concept called the Principle of Competitive Exclusion. The principle states that two species competing for the same resources cannot coexist. In other words, no two species can simultaneously occupy the same niche. One will do it more successfully and drive the other to extinction. In his famous experiments with *Paramecium*, he demonstrated that *P. aurelia* and *P. caudatum* thrived when grown separately in identical media. However, when colonies were combined in a single medium, *P. aurelia* eventually drove the *P. caudatum* to extinction. This became a fundamental principle in ecology.

In the 1960s, the hominin fossil record was sparse and the expanding field of paleoanthropology was becoming more interdisciplinary. The Principle of Competitive Exclusion was applied to interpretations of hominin fossils. After all, the hominin niche was perceived as a rather singular one, defined in its simplest terms by traits such as bipedalism, braininess, and above all, culture. Some researchers advocated that it was an altogether exclusive club, which according to the Principle of Competitive Exclusion could be occupied by only one hominin species at a given time. Hence, the Single Species Hypothesis was spawned, as it was known in paleoanthropology. This served to reinforce a perception of human evolution as an inexorable linear march toward *Homo sapiens*, with a single evolving lineage, with one hominin species giving rise to and being replaced by a succeeding species (Brace 1967, Wolpoff 1971).

Thus, an investigator of relict hominoids in the 1950s and 1960s, such as Ivan Sanderson (1961), bringing evidence of unknown sub-human creatures, be they *yeti*, or *sasquatch*, or *almas*, would be confronted by a prevailing paradigm of hominin evolution, dominated by the Single Species Hypothesis. There would be no scientific context to accommodate the co-existence, let alone *existence*, of relict hominoid species alongside *Homo*

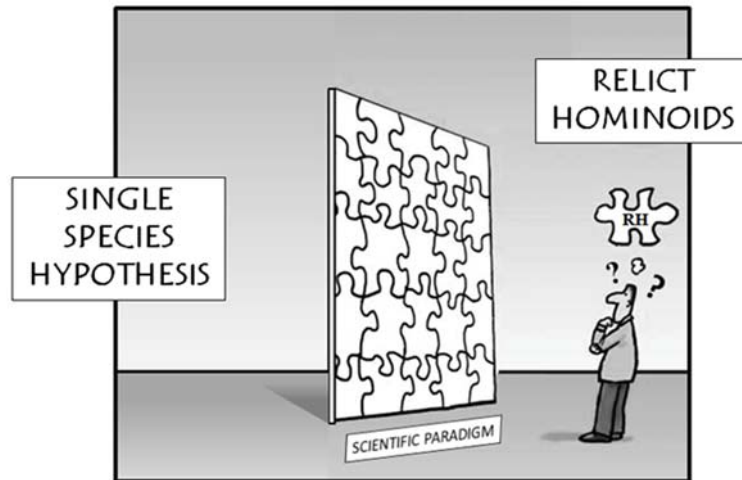


Figure 1. An investigator proposing an empirical concept of relict hominoids (RH) is confronted by an anthropological and broader scientific community operating under a paradigm largely influenced by the Single Species Hypothesis, which provides no context for accommodating it.

sapiens (see Figure 1). The persistent influence of this mindset was apparent to me even decades later, when a reviewer rejected my abstract submission one year to the American Association of Physical Anthropologists annual meeting, on the basis that “the topic [of *sasquatch*] was not of general interest to the anthropological community.” This assessment betrayed an attitude that had no rational justification then or now.

This linear exclusive-club concept of hominin evolution was challenged in the '70s by the recognition of at least two kinds of fossil australopithecines, either gracile or robust in their masticatory adaptations. Some rationalized this apparent exception to the competitive exclusion principle by pointing out that australopithecines were little more than bipedal “chimps” displaying little brain enlargement and certainly no tools, which “maketh the man” (Oakley 1959, Lewin & Foley 2004). Taxonomic diversity among this grade of contemporary species could be accommodated in these earliest of the hominins, but once a *Homo* grade was achieved, in particular *Homo erectus* (a.k.a. *H. ergaster* in Africa), then competitive exclusion was presumed to be in full force, and from then on the hominin niche was understood to be an exclusive club again (Washburn & Ciochon 1976).

This fallback position was itself undercut when Leakey and Walker (1976) provided unequivocal fossil evidence for the contemporaneous

existence of multiple species of *Homo*, as well as persistent forms of robust australopithecines coexisting in East Africa. Traveling across that landscape, 2 mya, one might encounter examples of *Homo ergaster*, *H. habilis*, *H. rudolfensis*, or *Paranthropus boisei*—at the very least—and quite likely additional varieties of hominins, yet to be uncovered. These species display the expected ecological reaction, short of extinction, in response to a sympatric competitor, i.e. niche partitioning, involving diet, micro-habitat divergence, and possibly also temporal differentiation of resource use (Winterhalder 1981). In other words, there was more than one way to be a hominin. Stephen J. Gould (1976) made a prediction in his popular column in *Natural History*, stating: “We know about three coexisting branches of the human bush. I will be surprised if twice as many more are not discovered before the end of the century.”

The past four decades have indeed been punctuated repeatedly by the discovery of additional hominin species, far exceeding Gould’s prediction. Today more than 25 species of hominin are recognized. No longer a linear array, or ladder, of succeeding hominin species, rather a veritable bush of radiating branches marks our extended family tree. And even this is almost certainly an underestimate. Conservative assessments now point to easily double or triple that number of species. There is little doubt remaining that the known fossil record grossly underestimates past hominin taxonomic and adaptive diversity. Throughout the past, the rule rather than the exception was multiple hominin species coexisting across the landscape.

Running parallel to this recognition of the contemporaneity of multiple hominin species throughout the past, is the realization through ongoing discoveries that a number of these lineages, the terminal branches of the bushy tree, have persisted until much more recently than previously recognized. Latest discoveries of Neanderthal sites in the Altai Mountains of Russia suggest an age as young as 10 kya (thousand years ago). That is less than half the youngest age previously recognized for Neanderthal fossils. A specimen of *Homo heidelbergensis* in China has been dated to 12–20 kya. *Homo floresiensis*, the diminutive hominin from Indonesia was initially dated to 13 kya, although that date has been revised to ~50 kya through more precise sedimentology of the cave deposits in which it was discovered (Brown et al. 2004). These discoveries confirm that we shared the landscape with other hominin species until only a few thousand years ago—or perhaps even into the present.

What may be an archaeological record of an encounter between modern humans and pre-sapiens hominins may have been found. Woodhouse (1979) documented and described a curious petroglyph in South Africa, left by the San Bushmen (Figure 2). It depicts a band of gracile bushmen wielding



Figure 2. A petroglyph attributed to the San Bushmen of South Africa, described by H. C. Woodhouse (1979) as depicting gracile bushmen wielding weapons confronting robust, perhaps hair-covered “men of the early race.”

weapons confronting a group of robust, possibly hair-covered, weaponless “men of the early race,” in the words of the Bushmen’s oral traditions.

Based on current understanding, a time-traveler to the Asian landscape of only 20 kya would potentially observe any of a half dozen hominin species coexisting. The implication of the recognized bushy hominin tree was a major theme developed in a *Nova* documentary series, *Becoming Human*. However, the final episode, which introduced modern humans, was titled “Last Human Standing: Many human species once shared the globe. Why do we alone remain?” Introductory remarks addressed the singular circumstance of *Homo sapiens*’ solitary inheritance of the world. It seems the influence of the single species hypothesis persists, now transposed forward to our own species. Why would the present be the exception to the rule that has quite apparently prevailed throughout hominin history? Interestingly, the producers’ explanation for this situation echoed the now defunct pronouncement of Washburn and Ciochon (1976) on the supremacy of *Homo erectus* (*H. ergaster*) over the primitive australopithecines, by suggesting that in this case, *Homo sapiens* were so successful that all other hominins were eliminated from the scene. This explanation may prove as unfounded as it was demonstrated to have been for *Homo erectus* a quarter century earlier. What was not discussed, or even considered, was the logical alternative—the potential of extant relict hominoids.

One indication of the beginnings of a shift in this paradigm came in the

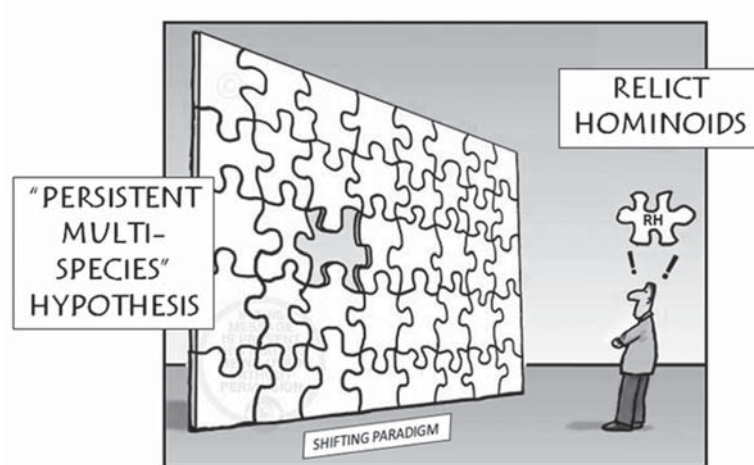


Figure 3. An investigator proposing a concept of relict hominoids (RH) confronts a shifting paradigm, revised by ongoing discoveries, which provide a theoretical framework to accommodate the possibility of persistent species of pre-modern hominoids.

form of a cover story in the March 2012 issue of *New Scientist* magazine. The cover read—*Human Evolution: The Ten Biggest Questions*. Many of these dealt with questions surrounding those adaptations that have long been thought to set the hominin niche apart—i.e. bipedalism, intelligence, language, technology, etc. However, question #9 was—*Are other hominins alive today?* That the question of relict hominoid survival into the present would be ranked among this selection of puzzling matters deemed central to current anthropological research is a significant acknowledgement (Meldrum 2012). It signals that the growing awareness of the complexity of hominin phylogeny has raised serious consideration of the possibility that pre-modern hominins, and perhaps some more distant hominoids, may still persist.

Now our investigator encounters a shifting expanded paradigm, which due to additional data reveals a context for this concept of relict hominoids. A theoretical framework we might refer to as the “Persistent Multi-species Hypothesis,” accommodates the proposition that lingering populations of relict species could exist alongside *Homo sapiens* into the present (see Figure 3). Indeed, with the past as our pattern, we should be anticipating their discovery.

Recognizing the necessity of a change of venue, a shift in perceptions

of the context of this phenomenon, Sanderson (1961) anticipated a time when that would occur:

Our term 'ABSM' [acronym for *abominable snowmen*, referring to all unknown relict hominoids] really means hominid, other than known kinds of modern man; no more and no less; and it is my firm belief that in due course, the whole business will be lifted clean out of the 'mystery class' and simply become a part of physical anthropology.

An event that should have driven this point home was the announcement of the discovery of *Homo floresiensis*, the so-called "Hobbit," and the acknowledgement by its discoverers that such hominins might have survived into historical times, if not even to the present. This was a major development for those investigating the possibility of relict hominoids (Meldrum 2004b). It was not wholly lost on others, such as Chris Stringer, paleoanthropologist at the British Museum of Natural History, who in a statement to *Nature* said, "One of the first things I thought of, on learning about the Flores skeleton, was a possible parallel with the *orang pendek*" (Gee 2004). The name *orang pendek* refers to diminutive relict hominoids alleged to survive on the island of Sumatra, known by other names throughout Southeast Asia (Forth 2008). He was not only fully aware of the matter of the *orang pendek*, but also immediately recognized the implications of the recent dates of fossils of a hominin quite similar to descriptions of this potential relict hominoid.

Henry Gee (2004) noted on the pages of *Nature* that

The discovery that *Homo floresiensis* survived until so very recently, in geological terms, makes it more likely that stories of other mythical, human-like creatures such as *yetis* are founded on grains of truth.

He further acknowledged the possibility that the diversity of hominins was always high, has remained high until very recently, and might not be entirely extinguished. This was a notable acknowledgement in what many consider a flagship scientific journal, reflecting a changing attitude toward the possibility of relict hominoids, although one generally not so openly displayed.

On Flores, the indigenous population, the Nage, refer to a diminutive hairy hominoid similar to Sumatra's *orang pendek*, which they call the *ebu gogo*. Since hearing accounts of the *ebu gogo*, geochronologist Bert Roberts also thinks it possible that *Homo floresiensis* still stalks the mountain forests of Flores (Forth 2005a). Gregory Forth, who has studied the Nage folklore for more than 20 years, agrees. He noted that "the *ebu gogo* may be grounded in some empirical, even hominological reality" (Forth 2005b).

He continued:

As amazing as it may seem, the speculation that something corresponding to *Homo floresiensis* could still be alive, or at least lived so recently to have made an imprint on local memory, is one that I believe can reasonably be taken as a point of departure for further anthropological, including ethnographic, investigation.

I said earlier that this astounding discovery *should have* driven the point home, but when discussing the impact and reception of Forth's publications and pronouncements, he acknowledged that there had been very little, if any, reaction. He was met largely with silence at the suggestion that the search for relict hominoids was a worthwhile endeavor. Even published reviews of his book focused exclusively on the ethnographic aspects, while omitting any commentary on the central premise of a potential "empirical species" of persisting wildman, as proposed by Forth (2008).

We have addressed the role of perception and context in evaluating a novel idea, but of course there must of necessity be more. There must be something substantial to place within the revised framework. There must be substantive evidence to lend weight to the hypotheses, and to counter the critics' various aspersions. I was once confronted by a colleague, who declared, "After all, these are *just* stories." My response: "Stories that apparently leave tracks, shed hair, void scat, vocalize, throw rocks, are observed and described by reliable experienced witnesses. Hardly *just* stories." Others mock the notion as "pseudoscience," but fail to persuasively explain their justification for that label, let alone account for the evidence at hand. Then there is the now popularized statement by Michael Shermer (2003), which eventually became the basis of a column in *Scientific American*—"The science starts once you have a body." On the contrary, most investigators would contend that the science starts once you have a question and observations. Each of these detractions begs the question of substance that motivates investigation, and instead either offhandedly dismisses all evidence, or demands conclusive proof up front, a priori. That is hardly the method or process of explorative science.

So what is the substance at hand that lends weight to the premise of the possible existence of relict hominoids? Given my research expertise into the evolution of hominin locomotion, especially the adaptations of the bipedal foot, my attentions have focused on the footprint evidence, for *sasquatch* in particular, but also other potential relict hominoids around the world. The footprints constitute the most prolific body of data that permits repeatable objective evaluation. They, the footprints, exist. I have amassed more than 300 specimens of footprint casts, as well as hundreds more photographs

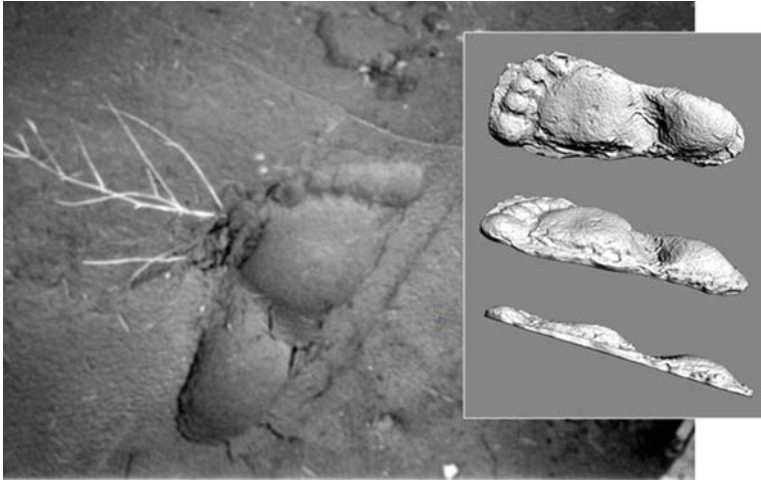


Figure 4. Photograph taken by Lyle Laverty at the Bluff Creek, California, site of the Patterson-Gimlin film of a 37-cm footprint displaying a pronounced midtarsal pressure ridge. Inset illustrates a series of stills of a 3D scan of a cast made by Bob Titmus of the accompanying footprint.

of footprints. The analyses of these have been the subject of a number of publications and public and professional presentations. I am in the process of archiving these data in digital form, as 3D scan files in the case of the casts. This will make these data available to any interested investigator.

It would seem a reasonably straightforward proposition to evaluate this trace evidence. But the discovery and excavation of the fossilized Laetoli hominid footprints in the late '70s revealed a dearth of comparative data and acumen within anthropological circles for interpreting footprints. Although advances have been made, the implications of the *sasquatch* footprint evidence have remained largely unappreciated or, at least, underappreciated. Curiously, such is often not the case when I interact with clinical practitioners, e.g., podiatrists and orthopedists, as when I made an invited presentation at the Massachusetts General Hospital in 2012. Likewise, forensic investigators and wildlife trackers are generally more open-minded on the subject and appreciative of the impact of the footprint evidence, specifically, than is the anthropological community at large.

One of the best-documented and thoroughly examined trackway is that associated with the notorious Patterson-Gimlin film, taken at Bluff Creek, California, in 1967. The controversial 60-second film clip approaches its 50th anniversary and continues to evoke discussion and

debate as to its authenticity and ramifications, but has withstood concerted efforts to falsify it. The associated footprints were examined, filmed, photographed, and cast by multiple witnesses. The casts form the basis of the ichnotaxon *Anthropoidipes ameriborealis* (Meldrum 2007), namely the “North American ape foot.” Ichnotaxonomy is a Linnaean system of classifying tracks and traces generally of as-yet-unknown extinct animals. In this instance, the living trackmaker is unknown, i.e. unrecognized or unacknowledged, but not extinct. The nomen applies to the tracks, not the trackmaker, and a description and diagnosis establishes the distinctions of these tracks from those of other species (Meldrum 2007).

One particular footprint in the trackway at the P-G film site, photographed by then U.S. Forest Service timber cruiser Lyle Laverty, and subsequently cast by investigator Bob Titmus, would prove to be pivotal in interpreting the distinctions in morphology of the *sasquatch* foot. This very distinct footprint captured the dynamic trace of a flat, flexible, bipedal foot resulting in this instance in a midfoot pressure ridge (Figure 4). More on that to follow.

In 1996, I had occasion to personally examine a line of very fresh, 38-cm hominoid tracks in the foothills of the Blue Mountains outside Walla Walla, Washington (Meldrum 1999, Murphy 2010:153–160). Several of these footprints exhibited evidence of midfoot flexibility, producing either distinct pressure ridges bearing remarkable resemblance to the Titmus cast from the P-G film site, or in one instance of very wet mud, an extrusion feature at the midfoot. The implications of this correlation, corroborated through numerous additional documented footprint examples, provided insight into the functional morphology of the *sasquatch* foot (Meldrum 2004a, 2010).

Sasquatch footprints indicate that its foot is not merely an enlarged facsimile of a human foot. The human foot is generally characterized by a relatively rigid longitudinal arch. This arch is a fairly recent evolutionary innovation associated with the gracilization of the human skeleton and adaptations for endurance walking and running (Hilton & Meldrum 2004). It derives from a primitive foot pattern marked by a larger range of flexion and rotation at the midtarsal joint. This midfoot mobility is integral to the ape’s grasp-climbing adaptation, where the prehensile vs. propulsive functions of the foot are coordinated. When walking on the ground, this flexion of the ape’s midfoot is called the “midtarsal break.” This denotes a “break” in the sense of an axis of flexion, not as some form of damage or dysfunction. On the contrary, this flat, flexible foot morphology provides a biomechanically sound and effective adaptation for a massive terrestrial bipedal primate to negotiate steep, uneven terrain in mountainous forests.

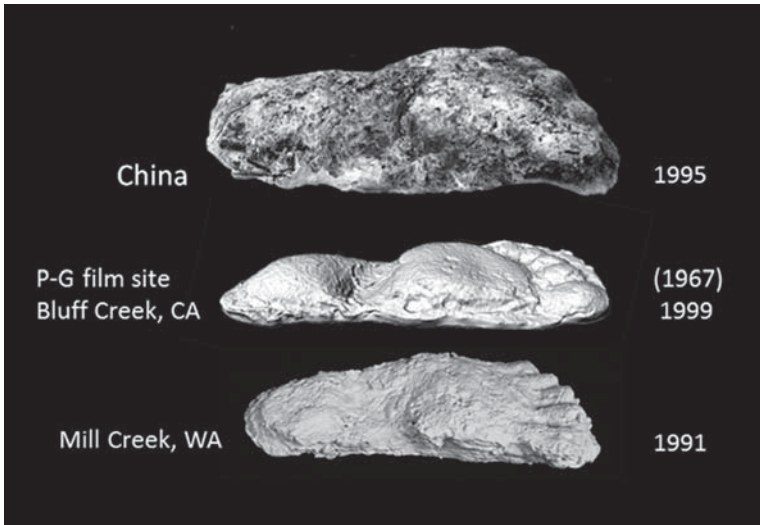


Figure 5. Independently collected footprint casts exhibiting similar midtarsal pressure ridges, marked by a double convexity just distal to the ridge (Note the dates; see text for discussion).

In contrast, the human foot has evolved along a very different path—one that took our recent ancestors into more open flat terrain, where distance running and walking were the activities selecting for a lighter skeleton and a more rigid foot platform. The arched foot and shortened heel of the modern human foot lend advantage to running behaviors (Meldrum & Hilton 2004).

This action of the *sasquatch* foot, as it correlates to these distinctive footprints, is evident and observable in the Patterson-Gimlin film subject. The elevation of the heel, while flexed at the midfoot, concentrates pressure beneath the forefoot. Under appropriate conditions of gait and substrate, this may occasionally produce the distinctive pressure ridge evident in the Titmus cast and other examples (Meldrum 2007). The observable subtleties of correlated form and function within a distinct biomechanical context make this film and associated footprints render the cliché adage “Oh, that’s *just* a man in a fur suit” rather vacuous.

This interpretive model of the *sasquatch* foot function received dramatic corroboration during a visit to China’s Shennongjia Nature Reserve, in Hubei province. It was there that in 1995, a park ranger, Mr. Yuan Yuhao, claimed to have witnessed an upright, hair-covered hominoid, a *yeren* (Chinese—*wildman*) while patrolling within the park (Meldrum & Zhou 2012). He was climbing a slope near the head of a valley at an elevation

of approximately 2100 m. The site, which I inspected, is a mosaic of fir forest and sedge meadows, not unlike the Rocky Mountain habitat I am so familiar with. Yuan observed the *yeren* through binoculars at a distance of approximately 500 m. It was covered in reddish brown hair, reclining, and sunning itself on the exposed facing slope. When Yuan called out to it, it returned his gaze. Instead of the expected snout and prick ears atop its head, he described a flat face. Furthermore, it arose and walked away bipedally into the nearby tree line. Yuan estimated its height at 2.3 m. He subsequently tracked the creature and cast a clear pair of its footprints on the banks of a spring.

The casts measure approximately 38 cm in length, 16.5 cm across the forefoot, and 10 cm across the heel. A distinct midtarsal pressure ridge indicates a significant degree of flexibility in the midfoot (Figure 5, top). Presumably the right and left footprints were left as the *yeren* squatted beside the spring to drink. This action apparently elevated the hindfoot, concentrating pressure beneath the forefoot distal to the transverse tarsal joint. The plasticity of the moist bare soil resulted in a pressure ridge proximal to the transverse tarsal joint. The deepest points on the cast lie just distal to the pressure ridge, apparently beneath the talonavicular joint medially, and to a lesser degree beneath the cuboid laterally. These two points of concentrated plantar pressure lend a distinctive appearance to the proximal edge of the forefoot ahead of the transverse pressure ridge. The margin is marked by a double convexity. In all distinguishing characteristics the casts resemble those of North American *sasquatch* footprints, especially those recovered at the Patterson-Gimlin film site. This resemblance not only substantiates the model of foot form and function, but indicates a circum-Pacific distribution to this form of relict hominoid, with its likely origin in Asia (Meldrum 2006).

Another example to further demonstrate this remarkable consistency of foot form and function comes again from the Blue Mountains of southeastern Washington State. This example was cast by Paul Freeman on January 14, 1991, along Mill Creek, outside Walla Walla, Washington. The tracks measured nearly 35 cm in length by 13 cm across the ball. The step length ranged from 1.0 to 1.2 m and the trackway was followed for more than two miles. Not only does the cast exhibit the distinctive pressure ridge in the appropriate position and orientation, but the double-convexity formed by the joints of the transverse tarsal joint is evident as well (Figure 5, bottom).

Now here is the remarkable aspect to all this. Although the Titmus cast was gotten in 1967, to my knowledge only a single screened black and white photo of it, depicted among a number of other casts in Titmus' growing

collection, was ever published, and that initially in 1973 (Green 1973:32). The first replica and analysis of that cast was published by me in 1999, after Titmus' death. A photo of the footprint itself, depicted in Figure 4, taken by Lyle Laverty, was published in 1978 (Green 1978:122), but no previous investigator had identified or drawn attention to the midfoot pressure ridge, let alone interpreted or discussed its significance for *sasquatch* foot function. Mr. Yuan had discovered and cast his footprint pair in 1995, with no knowledge of the North American *sasquatch* phenomenon, let alone details of alleged footprints. The Mill Creek cast was documented in 1991. To these could be added the tracks I cast near Walla Walla in February 1996 (Meldrum 2004a). How could these independent examples, separated by nearly three decades and half-a-world apart coincidentally share these sound and significant subtleties of anatomy and functional morphology? Simply a convergent happenstance of unrelated hoaxed footprints? I think not.

Another remarkable example recently came to my attention. One of the first questions I asked myself when initially undertaking a systematic survey of the footprint evidence, was to determine if there were examples of repeated appearance of particular individuals. It stood to reason that if these creatures were as rare as I suspected, then should tracks be found in a given region over time, and the likelihood of them originating from a particular individual should be high. These could be recognized based on size, shape, and proportions of the foot, configuration of the toes, or other distinguishing features. So I was on the lookout for examples of footprint casts that could be attributed to a particular individual with some confidence. There were two very clear examples of footprint casts from the Walla Walla, Washington, region that at first glance seemed distinct from one another: One had what seemed to be a somewhat "arched" foot with toes disposed rather squarely across the distal end of the foot; the other was quite flat with toes lying along a rather inclined toe row. But the feet were very similar in size and proportion and the toes were otherwise similar, especially the distinctive big toes of both, which were similarly pronounced with a characteristic pad shape, among other details. Recalling that the very flexible foot of a chimp, for example, can be flat in one step, but display a raised medial margin of the foot (not equivalent to a fixed longitudinal arch), I wondered about this pair. What if I assumed that these casts did come from the same foot and considered them with the toes aligned, rather than the footprints aligned along generalized long-axis of the footprint (Figure 6, left). With the toes aligned, the margins of the forefeet segments likewise came into alignment and the only divergence was in the respective angles of the heel segments (Figure 6, right).

Movements about the transverse tarsal joint are not just a simple



Figure 6. Two independently collected footprint casts (38-cm long) from the Walla Walla, Washington, region, which appear to be from the same individual. The cast on the left exhibits a position of foot pronation, while that on the right exhibits foot supination. Alignment of the toe row and forefoot contrasts the respective angle of the hindfoot, illustrating the mobility of the transverse tarsal joint.

hinge action, but also describe a twisting action between the forefoot and hindfoot, and may also involve adjacent joints, such as the subtalar joint, and tarsometatarsal joints. This coordinated twisting/flexing action can raise the medial border of the foot and increase the angle between the forefoot and hindfoot—i.e. supination. Alternately, it can flatten the foot and lessen the angle between the forefoot and hindfoot—i.e. pronation. These actions are present in the human foot, but to a lesser degree due to the limited range of motion in the joints involved in the relatively fixed longitudinal arch. The intersection of the axes of the forefoot and hindfoot segments in the representative *sasquatch* track falls at the inferred position of the transverse tarsal joint, in agreement with examples of midtarsal pressure ridges previously discussed. The two casts in question here were documented independently, by two different investigators, at different locations within the region, separated by nearly two years. What are the odds that such subtleties of footprint anatomy, correlated with intricacies of foot function, could have been so accurately incorporated into these separate and distinct tracks by two independent investigators with no pertinent knowledge or training, let alone the skill to fabricate such a contrasting, yet correlated pair of footprints?

The off-handed dismissal or overt omission of the footprint evidence is all too prevalent in the aforementioned skeptical works. For example,

the latest by Loxton and Prothero (2013) essentially takes the skeptical approach that since these creatures couldn't exist, then all footprint evidence is either hoaxed or misidentified, and proceeds to selectively focus on those examples they feel best make that assumed point. Their prejudicial approach is betrayed by the total lack of consideration of my extensive publication record and presentations on the *sasquatch* footprint evidence. Instead they cite anthropologist and fellow skeptic David Daegling (whom they inaccurately identify as an expert in primate locomotion), asserting that the underlying skeletal anatomy of the foot cannot be inferred with any degree of confidence from a footprint, and that investigation has shown that footprints are not good indicators of underlying anatomy (Daegling 2004). The assertion is baseless and curiously ignorant of the data and clinical practice. Similarly, McLeod (2009) in *Anatomy of the Beast* betrays a lack of discernment of the significance of the footprint evidence. When confronted with footprint casts, he quips: "To me they looked like clown feet, squared off at the toes, with no arch" (p. 12). An honest assessment, made by one oblivious to the very anatomical distinctions that lend credibility to the casts as the trace of a distinctly adapted hominoid. He characterizes the late Dr. Grover Krantz's lucid and thorough treatment of the footprint evidence as a "bewildering jumble" while disparaging the late professor as "one gone absolutely mad over hominid footprints" (p. 74), while again omitting any reference of my published discussions of footprints evidence.

To the contrary, Krantz, as I, recognized the significance of the footprint evidence for the question of *sasquatch* existence (Krantz 1992, Meldrum 2006). Even in the absence of a type specimen, the morphology and function of the *sasquatch* foot as inferred from the footprint record, both here and abroad, attest to the existence of this relict hominoid. The distinctions present are precisely those an informed researcher of hominoid locomotion would expect to find. They exhibit an elegant and appropriate adaptation of the foot of a large-bodied bipedal hominoid for negotiating steep, broken, mountainous, forested terrain. On the whole the footprint record is remarkably consistent, while also displaying the sort of individual variability one would anticipate in a biological population of long-lived hominoids. Of course there are hoaxes, as any reasonable person would expect under the circumstances. But in my experience these instances are rare. Far more common are misidentifications often by well-meaning but overly enthusiastic amateur investigators.

The compelling core of footprints exhibit subtleties of anatomy, as well as dynamic signatures of an animated step that have remained largely lost on many, excepting the most informed experts in functional morphology and experienced human and wildlife trackers. The implication of this evidence

is monumental, and on that basis difficult if not impossible for some to even acknowledge, let alone engage. However, it has been shown that the existence of species of relict hominoids living alongside *Homo sapiens* in present times would be consistent with the prevailing circumstances of taxonomic and adaptive diversity throughout prehistory. There have always been multiple species of hominoids coexisting across the landscape. Why, in spite of a shifting paradigm and in the face of so much suggestive evidence, should the very *possibility* of relict hominoids be summarily rejected?

It has been said—“No history is without legend; No legend is without *history*.” The fundamental question remains: Are there biological species of relict hominoids yet to be discovered behind the legends of *sasquatch* and other wildmen?

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