Chapter 9

Steps from History

The Happisburgh Footprints and Their Connections with the Past

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Abstract Human footprints were discovered at Happisburgh, UK, in 2013. This paper describes their discovery and the difficulties of recording such enigmatic remains in a coastal environment. The geological and environmental context in which they were found is given, together with the evidence of the dating of the site to either 850,000 or 950,000 years ago. The implications of how humans coped with long, cold winters of northern Europe is discussed; the evidence of a family group indicates that seasonal migration is highly unlikely, leaving the possibilities of either physiological adaptations, such as functional body hair, or the use of technologies such as shelter, clothing and fire. The second part of the paper shows the various ways in which the footprints have reached wide and diverse audiences through media reports, exhibitions and books. They show the powerful messages that footprints can generate through the ideas and emotions that they provoke and the immediacy of their connection with the deep past.

Keywords Human footprints · Lower Palaeolithic · Early Pleistocene · Britain · Europe

Introduction

Footprints tell stories. They can provide information about bipedalism, posture, gait and stature, as well as on occasion, the sex and age range of a group and activities being undertaken (e.g. Leakey and Hay 1979; Day and Wickens 1980; Charteris et al. 1981; Behrensmeyer and Laporte 1981; Bell 2007; Roberts 2008; Bennett et al. 2009; Dingwall et al. 2013). Modern-day trackers can provide new insights into past

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prints through their skills and knowledge (Pastoors et al. 2015, 2017). But footprints also connect a wider public directly to our past. They are the visible trace fossils that everyone can recognise from life today and therefore have a resonance with a wider audience than the bones and stones that contribute most of the evidence from our deep past. The Happisburgh footprints were discovered in 2013. This paper explains their discovery and the information that can be gleaned from them while reviewing how these short-lived glimpses of our distant cousins make unexpected connections with the present.

Background to Happisburgh

Happisburgh is a small village on the northeast coast of Norfolk in the UK (Fig. 9.1). The cliffs on which the village sits consist of glacial sands, silts and clays that were deposited by the Anglian Glaciation, which is correlated with Marine Isotope Stage (MIS) 12, c. 450,000 years ago (450 ka). Beneath the glacial succession lies the Cromer Forest-bed Formation (CF-bF), which is composed of estuarine, fluvial and alluvial deposits that span the Early and early Middle Pleistocene, between c. 2 and 0.5 million years ago (Ma). The CF-bF outcrops extensively around a 70 km stretch of coast between Sheringham in the north to Pakefield in the south. The deposits include several important interglacial sites famous for Early and early Middle Pleistocene fossil remains (Reid 1882; West 1980; Preece et al. 2009; Stuart and Lister 2010; Preece and Parfitt 2012).

In the last 20 years, there has been accelerated erosion of the coastal cliffs and the underlying sediment, which has led to increased exposures of the CF-bF and, for the first time, the discovery of undisputed Lower Palaeolithic artefacts within the sediments. Of particular note are Pakefield, dating to c. 700 ka (Parfitt et al. 2005), Happisburgh Site 1 (HSB1) dating to c. 500 ka (Ashton et al. 2008; Lewis et al. 2019) and Happisburgh Site 3 (HSB3), dating to c. 850 ka or possibly c. 950 ka (Parfitt et al. 2010; Ashton et al. 2014). This evidence has extended the record of human occupation of northern Europe by at least 350,000 years and has also provided important insights into the environments of the early human occupation in northern latitudes (Candy et al. 2011; Ashton and Lewis 2012).

Happisburgh Site 3

The pre-glacial Pleistocene succession at Happisburgh was first investigated by Reid (1882) and more recently by West (1980). West described the sediments exposed at the base of the cliffs and in the foreshore at a number of locations and also in a

Fig. 9.1 (a) Map of Britain showing location of Happisburgh; (b) plan of Happisburgh Site 3, exposed and recorded foreshore sediments, location of footprint surface and of borehole HC; (c) schematic cross-section of recorded sediments from Happisburgh Site 3 through to borehole HC showing stratigraphic position of footprint surface. (Illustration C. Williams)

borehole near the former slipway on to the beach (Fig. 9.1). This borehole (HC) demonstrated a sequence of laminated silts and sands beneath the Happisburgh Till. Palynological data from the laminated silts indicated an interglacial vegetational succession, which West attributed to a late stage of the Early Pleistocene.

Happisburgh Site 3 was discovered in 2005, some 330 m to the northeast of Borehole HC, while undertaking a coastal survey of CF-bF deposits on a 3 km stretch of coast to the north of Happisburgh. Seasonal excavation until 2012 revealed a series of deposits that relate to those of West in Borehole HC (Parfitt et al. 2010). At Site 3 they consist of a series of estuarine sands and silts which infill channels. The channels have a lag gravel at their base up to 0.2 m in thickness, from which an artefact assemblage has been recovered, consisting of c. 80 flint flakes, flake tools and cores, all in remarkably fresh condition.

The sediments also contain a rich assemblage of fauna and flora (Parfitt et al. 2010). Pollen, wood and other plant remains indicate a regional vegetational succession that had changed from deciduous woodland to coniferous forest. The more localised environment can be reconstructed from study of the insect remains suggesting a floodplain that consisted of a mosaic of grassland, stands of alder, small pools and marsh. This is supported by grassland pollen recovered from a hyaena coprolite. The vertebrate remains include part of the skull of European sturgeon (*Acipenser sturio*), which today spawn in deep-water estuaries. Together with other indicators of brackish water and the interpretation of the laminated silts and sands, the evidence suggests that the site was in the upper reaches of an estuary of a large river. Other vertebrate fauna includes giant elk (*Cervalces latifrons*), red deer (*Cervus elaphus*) and an extinct form of horse (*Equus suessenbornensis*), alongside larger herbivores such as an early form of mammoth (*Mammuthus meridionalis*) and hippopotamus (*Hippopotamus amphibius*).

The shift in the vegetational succession towards coniferous forest suggests that the site dates towards the end of an interglacial with a cooler climate (Parfitt et al. 2010). This is supported by the beetle remains, which indicate that summer temperatures were similar to East Anglia today with an average of about 17 °C. But the winters were between −3 and 0 °C, whereas today the average is 4 °C. A modern-day analogue would be southern Scandinavia or Denmark, which would have made winters a challenge to survive and prompts questions about the level of technology in terms of shelter, clothing and fire (Ashton and Lewis 2012).

The age of the site is constrained by the overlying glacial sediments, which indicate that it is older than 450 ka. A reversed palaeomagnetic signal suggests that the site predates the Brunhes-Matuyama boundary at 780 ka and is Early Pleistocene in age. Refinement of the age can be determined by the mammalian fossils; *Mammuthus meridionalis* is known to have become extinct about 800 ka, and the horse, *Equus Suessenbornensis*, also became extinct about this time, both of which support the evidence from the palaeomagnetism. A maximum age can be determined from the extinct giant elk, *Cervalces latifrons*, and red deer, *Cervus elaphus*, which first evolved about a million years ago. The pollen suggests a date towards the end of an interglacial, with the two most likely stages being MIS 21 at 850 ka or MIS 25 at 950 ka (Parfitt et al. 2010).

The Footprint Surface

Fieldwork at Happisburgh continued after the excavations were completed in 2012, with funding by English Heritage (now Historic England), through a programme of geophysical and coring surveys to understand better the distribution of CF-bF sediments on the foreshore and inland and whether evidence of their survival could be found offshore through further survey and diving (Ashton et al. 2018). In early May 2013, during the survey work, an area of laminated silts was exposed c. 110 m northwest of borehole HC and c. 140 m of the excavations of Site 3 (Figs. 9.2 and 9.3; Ashton et al. 2014). The laminated sediments could be traced laterally between the three locations. Although the exact stratigraphic relationships

Fig. 9.2 View of footprint surface cliff top looking south. (Photo M. Bates)

Fig. 9.3 View of footprint surface looking north. (Photo M. Bates)

remain uncertain, they are of a similar age and, based on Site 3, date to either 850 ka or 950 ka.

In the new exposure, beach sand had been removed by the sea, and the laminated sediments were subject to wave erosion. When exposed, the bedding surfaces provide natural planes of weakness, and the washing out of sandy laminae results in the removal of layers of laminated silts and the exposure of new, undisturbed bedding surfaces. In most cases, these surfaces are flat or gently undulating and display ripple structures formed during the original deposition of the sediments. However, one horizon had very different surface characteristics where a series of hollows ranging from circular to elongate in outline were visible over an area of c. 12 m². The elongate hollows were generally 30–50 mm in depth, 140–250 mm in length and 60–110 mm in width. The visual similarity to Holocene footprint surfaces prompted more detailed investigation of this horizon. However, the surface was located in the intertidal zone and was prone to rapid destruction by wave action or to reburial as the beach was re-established. The situation presented particular challenges for recording and analysis of the features and prevented either lifting of the footprint surface as sediment blocks or standard casting of moulds of the surface. Initially it was hoped to laser scan the surface, but availability of equipment was a problem. However, a relatively new technique of multi-image photogrammetry was just beginning to be more widely used in archaeology, and so, with the expertise of Sarah Duffy from the University of York, a team was mobilised, and this method was used a few days after discovery.

Multi-image photogrammetry simply uses a series of digital images of an object or surface with fixed points, taken from different angles, which when combined with specialist software creates a 3D model (Fig. 9.4). The principle was fine, but the practicality was more difficult. The combination of tides, blown beach sand, weather conditions and time constraints made recording the surface extremely difficult. Prior to recording, water was used to wash away the beach sand that had been deposited during previous high tides, though it was impossible to completely clear the surface and remove all water from the hollows due to persistent rain. Field measurement of the hollows was not possible because of the time constraints, but multi-image photogrammetry proved to be an effective method for rapid recording of the surface features and allowed subsequent metric analysis of footprint shape and size, although estimates of depth were more problematic. Laser scanning was also attempted a week later, but by this time, the features had become severely eroded through successive tidal cycles, and by the end of May 2013, they had been completely removed (Ashton et al. 2014).

After recording, the first task was to determine the agency responsible for their formation. The possibility of them being recent footprints was immediately ruled out due to the hardness and compaction of the laminated sediments. Walking across similar sediments has little impact even in heavy boots. Extensive searches were made for natural erosive agencies that might be responsible, but none of the hollows were consistent with the range of processes that are normally found in an estuarine environment. After initial scepticism and careful scrutiny of the evidence, it was

Fig. 9.4 Model of footprint surface produced from photogrammetric survey. (Modelling S. Duffy)

concluded that the hollows were indeed ancient human footprints (Ashton et al. 2014).

The surface was analysed using vertical images produced from the multi-image photogrammetry. Depth measurements were not possible as water or sand was often retained in the base of the prints. A total of 152 hollows were measured, and this revealed that the lengths, widths and width/length ratios were consistent within the expected range of juvenile and adult hominin footprints (Ashton et al. 2014). In some cases, left or right and front or back of the foot were also apparent, including two instances of toes, providing information about direction of movement. The less elongated features were also potentially hominin footprints, where impressions from just heels or the front of feet were preserved, or overprinting had obscured original features. The time elapsed from initial exposure to recording also led to some erosion of the surface, which affected the shape and clarity of the prints.

More detailed analysis by Isabelle de Groote, from Liverpool John Moores University, was limited to 12 prints where complete outlines could be clearly identified (Ashton et al. 2014). They were thought to indicate at least five individuals with foot lengths between 140 and 260 mm. Based on recent populations, stature can be estimated from foot length using a ratio of 0.15 for foot length/stature (Dingwall et al. 2013). Fossil skeletal evidence suggests that body proportions of Middle

Pleistocene hominins were similar to modern humans, and therefore this ratio can also be applied to past populations (Carretero et al. 2012; Pablos et al. 2012). The 0.15 ratio suggested a height range for the Happisburgh hominins of between 0.93 and 1.73 m, indicating the presence of adults and children. For the orientation studies, a larger dataset of 49 prints was analysed, showing a preferred south-north orientation. In 29 cases where the arch and the front/back of the foot could be identified, the direction of movement was also assessed, showing a preferred direction of movement to the south.

Unfortunately, there are no human fossils from Britain that date to this period, but the closest comparison is Gran Dolina (TD6) at Atapuerca in northern Spain where bones and teeth dating to c. 800 ka have been named as *Homo antecessor* or Pioneer Man (Carbonell et al. 2005, 2008). This attribution has recently been examined using 2D morphometrics on a range of footprints from Pliocene, Pleistocene and Holocene sites (Wiseman et al. 2020). They conclude that the dimensions of the Happisburgh footprints were most similar to the *H. erectus* footprints from Ileret in Kenya. This conforms with an attribution of the Happisburgh hominins to *H. antecessor*, thought to be a European cousin of *H. erectus*. If this attribution is correct, then estimates of stature from the fossil bones from Gran Dolina TD6 can be compared to Happisburgh. The tali recovered from TD6 show a mean stature of 1.73 m for males and 1.68 m for females (Pablos et al. 2012). This would suggest that the tallest individual at Happisburgh was an adult male with the smaller footprints being produced by either adult females or juveniles and by children. An obvious interpretation is that the Happisburgh footprints were left by a family group.

The search for further footprints at Happisburgh has been difficult. Excavation is not practical as the deposits extend for several hundred metres and are up to 2 m in depth with multiple horizons. The chance of selecting the right area and encountering a footprint surface is minimal. In fact the sea is the best excavator through the twice daily peeling off of surfaces in an impartial way. Since 2014 there have been periodic exposures of the laminated silts between Site 3 and Borehole HC, and on occasion there have been reports of possible footprints. Often by the time a visit to the site is made, the prints have either eroded away or have been buried by beach sand. In one case, a small exposure was revealed during a field visit and a record made (pers. comm. Simon Lewis). The most successful approach has been through several local collectors and trained amateurs, who equipped with GPS have been able to collect, record and report new artefacts and fossils and also alert us to any new exposures with potential prints. On-the-spot photography with multiple images is encouraged, and this will hopefully capture enough information of any future footprint surfaces before they are eroded away.

Implications of the Happisburgh Footprints

Questions remain about how the Happisburgh hominins survived the long, cold winters of northern Europe. One suggestion is that they seasonally migrated. However to make any appreciable difference to winter temperatures, they would have had to have travelled to coastal areas of southern Europe. This might have been feasible for adult hunting groups, but the evidence from Happisburgh shows the presence of children. Such a journey would have been virtually impossible as a family group. The implication from the footprints is that the humans were residents and surviving the long, cold winters.

An alternative option for survival was that the Happisburgh humans had functional body hair that gave them sufficient protection from the cold. The favoured hypothesis that hominins lost their body hair over several million years in open, equatorial areas of Africa deserves re-examination (Wheeler 1984, 1991, 1992). The argument goes that with bipedalism, there was less need for protection from the sun, leading to a reduction in body hair, other than the scalp. One of the evolutionary advantages was better thermoregulation through more efficient sweat glands, which also enabled longer day-time hunting. This may have been the case, but there is no direct proof. It may have had advantages for Africa, but there were serious shortcomings for the more seasonal climates of Europe. So perhaps humans entering Europe from Africa still had body hair, or it redeveloped as they evolved in more northerly latitudes.

The simplest answer to how the humans coped with cooler climates is that they had better control of fire and were more capable of making clothes and shelters than previously thought. Unfortunately there is no evidence for the use of these technologies at this time. Better evidence for ways of buffering against the cold start to be introduced from around 500 ka. At High Lodge in Suffolk, there are scrapers that were ideal tools for processing hides, presumably for building simple shelters or use as clothing (Ashton et al. 1992). From 400 ka at Beeches Pit, also in Suffolk, or Menez Dregan in Brittany, there are distinct hearths from fires (Gowlett et al. 2005; Preece et al. 2007; Ravon 2018). If earlier evidence is to be found, then Happisburgh with its rich organic preservation is an obvious place to look.

If the footprint evidence is correct and the humans were all-year residents, then perhaps the biggest challenge was the short growing season of northern latitudes (Ashton 2015; Hosfield 2016). This implied a greater dependence on meat and more effective scavenging or possibly hunting. If meat acquisition was a struggle, what other resources were available? The big advantage for Happisburgh was its estuary situation, providing important resources such as collectable shellfish and seaweed over the difficult winter months. Perhaps these pioneering populations were able to cope in northern Europe but only in coastal or estuary situations (Cohen et al. 2012).

Impact of the Happisburgh Footprints

The evidence that the footprints provide of a family group, wandering along the edge of an estuary, not only received academic attention as the oldest footprints outside Africa but drew wide appreciation from public audiences around the globe. Here was the story of a family group, somehow surviving the cold winters of northern Europe at almost a million years ago. The footprints were published in February 2014 to coincide with an exhibition Britain: One Million years of the Human Story at the Natural History Museum in London, where Happisburgh began the story with video footage of the footprint discovery (Ashton et al. 2014; Dinnis and Stringer 2014). A British Museum press release on February 7th, a few hours before the publication, led to widespread coverage by all UK television and radio networks, as well as many abroad, with an astonishing 250 newspaper reports around the world.

But news is short-lived, so it is more gratifying to see how the footprints have endured in other, sometimes unexpected, ways. The footprints prompted mention in several books. One of the more popular accounts has been in *The Road to Little Dribbling: More Notes from a Small Island* by Bill Bryson, who visited Happisburgh and described the footprints on his return journey around Britain (Bryson 2015). A more unusual project was undertaken by the Dutch radio broadcaster and writer, Mathijs Deen, who in *Over Oude Wegen: Een Reis door de Geschiedenis van Europa* (Down Old Roads: A Journey through Europe's History, Deen 2018) explores by car the famous ancient journeys and stories along routeways that still connect us today. The first journey that he describes was that potentially taken by *Homo antecessor* from Atapuerca in northern Spain to Happisburgh.

This year, a beautifully written book, *Time Song*, was published by Julia Blackburn (2019). It interleaves her own stories and encounters, with thoughts on Doggerland, the now vanished prehistoric landscape that lies beneath the North Sea. She reflects on the Happisburgh footprints and the people who left them behind. They feature in 2 of the 18 *Time Song* poems, with the first about their discovery:

The weather was bad.

Rain falling,

Waves crashing.

Over the next two weeks.

The hollows were photographed.

and scanned with lasers,

Before they vanished,

Leaving no trace.

One hundred and two footprints.

Twelve of them complete,

Indicating five individuals.

Of different ages:

A little human group.

Moving in a southerly direction.

Across the mudflats.

Of a large tidal river,

Between eight hundred and fifty.
 And nine hundred and fifty.
 Thousand.
 Years ago.
 Making a further jump back.
 In the history of habitation.
 In this country,
 Now called England.
 (Blackburn 2019: 62–63)

A very different topic has been covered by Antonia Malchik in her thought-provoking book, *A Walking Life: Reclaiming Our Health and Our Freedom One Step at a Time* (Malchik 2019). The book examines from an American perspective the car-centric culture in which we live and the barriers imposed by a modern world on the freedom to walk. Bipedalism, she argues, is one of the characteristics that make us human, represented in part by the footprints from Happisburgh. Walking is essential for our health, a powerful means to rehabilitation and important for societal welfare. The interactions that it brings can encourage and bind communities, in contrast to the often cocooned, loneliness of suburban, motor-driven life.

She devotes much of the final chapter, “Meandering”, to her visit to Happisburgh, describing her own journey and the significance of the discovery. One section particularly struck me, where she comments on a deep, underlying lesson from the Happisburgh footprints: the importance of meandering, rather than efficiency, for learning.

“The footprints weren’t in a straight line,” Ashton told me when we met at his British Museum office. Not being in a straight line was a criticism other researchers had levelled at the find. But to him, the wandering nature of the footprints made complete sense. Because the Happisburgh footprints included children. This wasn’t just a temporary hunting party, a group moving through seasonally. These people were living there.

The Laetoli footprints are in a straight line, and it’s easy to imagine those hominins some three or four million years ago walking across the savannah, heading ... where? The Happisburgh footprints, though, give us movement and life, images of children veering off to poke in the mud, chase some small animal or crustacean, or peer at a plant, just as my children did at that age. Just as the infants in Karen Adolph’s lab do, roaming around in the most inefficient manner possible because that is how we grow and explore and learn. (Malchik 2019: 204)

Is this another human characteristic, at times forgotten from our childhood – that of curiosity?

Connections to the present were also made through a small, but powerful, exhibition at the British Museum in April 2017. Called *Moving Stories*, the exhibition drew together three journeys about migration. The first was the million-year-old journey told by footprints discovered at Happisburgh. A life-size image of the footprint surface was projected onto the floor, and visitors were encouraged to step into the prints of their distant relatives (Fig. 9.5). The surface was animated with water ebbing and flowing across the surface – an image that would have been apparent at the time of their creation over 850,000 years ago, as well a view that we had on their discovery. A muted soundtrack took the visitor back to Happisburgh through the sounds of gently flowing water, with the cries and calls of estuary birds

Fig. 9.5 Moving Stories exhibition at the British Museum, April 2017. The footprint surface is projected onto the floor and gently animated with flowing water. It has its own space within a shipping container, representing modern migration, with a window onto the second story of the pictorial diary, *Ali's Boat*. (Photo British Museum)

and background chatter of children and their parents. The exhibition explained that this was a metaphorical journey that had taken the family beyond the natural boundaries of the known world. But it was this and similar journeys that eventually led to adaptation to more difficult environments through better provision of basic human needs: food, clothing, shelter and fire.

The Habbisburgh journey was juxtaposed against the heart-wrenching story of exile in the contemporary work, *Ali's Boat*, by Iraqi artist Sadik Kwaish Alfraji. *Ali's Boat* is a pictorial diary that tells the story of a young boy wishing to escape the horrors of present-day Iraq. It is inspired by an encounter with his 11-year-old nephew who, on Sadik's departure from Iraq to the Netherlands in 2009, gave him a drawing of a boat, with the words "I wish this boat takes me to you". The exhibition showed how in the present day many migrants still have a quest for the same basic human needs of food, warmth and shelter but with boundaries and barriers drawn by politics rather than geography.

The third journey of Moving Stories was told through the work of Édouard Glissant, a poet and philosopher from Martinique, about the slave trade diasporas from Africa. Remarkably his work offers a positive outlook, suggesting that although migrants may lose their social and cultural unity, they gain cultural diversity and multiplicity; importantly differences can unite, rather than divide and are the means to build global communities. The underlying lesson of all three journeys was that migration not only brings hardship but also opportunities and it is an inherent human trait that goes back to the deep past.

Conclusion

It is quite astonishing how a few simple footprints beneath a beach in Norfolk can invoke such wide and varied reaction and generate such profound thoughts and ideas. Many people are simply awe-inspired by their age, brief appearance and the serendipity of being spotted and recorded. For others they are a journey by pioneers, pushing the boundaries of the known world, or one to the unknown world through their enigmatic appearance and disappearance as a brief glimpse into the now drowned landscapes of the North Sea. They are both past and present. The importance of history is what it can tell us about today or tomorrow or the thoughts and emotions that it can provoke. For most, the power of Happisburgh lies in the family group and the everyday story of children playing at the water's edge. I admire the eyes, knowledge and skills of the modern tracker and envy their ability to interpret a different world. I lack their skills, but I do have my own vision of Happisburgh some 850,000 years ago.

The tide was gently rising as the family group picked their way around the shallow pools on the mudflats of the estuary edge. They paused to watch a herd of horse grazing near the reedswamp on the far bank. A lone rhinoceros and three mammoths could be seen as silhouettes in the distance. The parents watched warily and rather enviously as a cackle of hyaenas greedily tore apart the flesh of an elk, little more than a stone's throw away. They had been beaten by their competitors to the injured animal. Today their family would survive on the plant roots and shellfish they had eaten earlier. Tomorrow there might be other opportunities before the lions, wolves and hyaenas took their share. The three children seemed oblivious to the danger, splashing about bare-foot at the water's edge. The older boy realised the risk and encouraged them on; they had to reach the safety of the deep pine forest before dusk. The sun was sinking fast and a chill breeze rippled across the water as a skein of geese took flight. The family continued on their way leaving trails of footprints in the estuary muds. (Ashton 2017: 1)

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