
PARADISE LOST?

THE SEARCH FOR DOGGERLAND

Deep beneath the North Sea lies a place we call Doggerland: the drowned land that once connected Britain to the Continent. Drawing on the latest cutting-edge research BRIAN FAGAN tells its shape-shifting story.

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*View across the North Sea, taken
from the east English coast at Norfolk.
Doggerland lies beneath the waves.*



Britain as part of the Continent? A century ago, the very thought would have turned elderly British gentlemen in London clubs mauve in the frontispiece, as the immortal P G Wodehouse once put it. With all the talk about Brexit, many of us tend to forget that the British Isles were firmly linked to Northwest Europe until about 8,000 years ago. This is the story of the submerged plains, estuaries, and extensive wetlands that now lie beneath the North Sea, a place known to geologists and archaeologists as Doggerland.

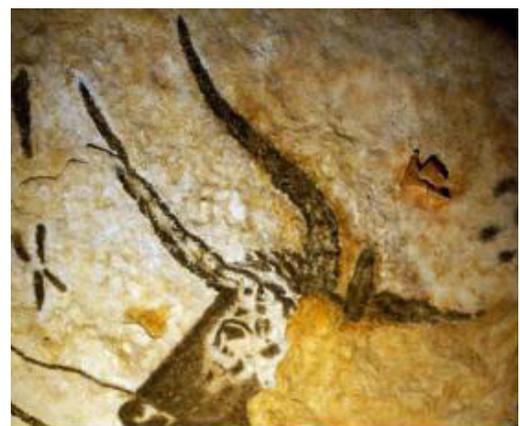
Fiction meets facts

A convenient starting point is with the 17th century diarist Samuel Pepys, who remarked on ancient hazel fragments found in the filthy mud of the London docks. When blackened oak stumps and other tree fragments washed ashore at low tide on eastern English beaches, the devout proclaimed them to be victims of the Biblical flood. Inevitably, they became known as Noah's Woods. The novelist H G Wells described this sunken land in his novel, *A Story of the Stone Age*, in 1897.

Yet even after Charles Darwin's theories of evolution and natural selection, Victorian geologists dismissed the submerged forests as 'too modern' for serious attention. The exception was the geologist Clement Reid, who worked for the Geological Survey. Reid became fascinated by the stunted tree stumps from long-vanished woodlands. He wrote of an extensive alluvial plain that had once covered the entire North Sea, about 36m below modern sea level. Judging from the plant remains, he suggested that much of the submerged land had been marsh and fen, crossed by major rivers, and protected by sand dunes. Reid published his findings in a short essay entitled



Left. Samuel Pepys, 17th century author, politician and chronicler.

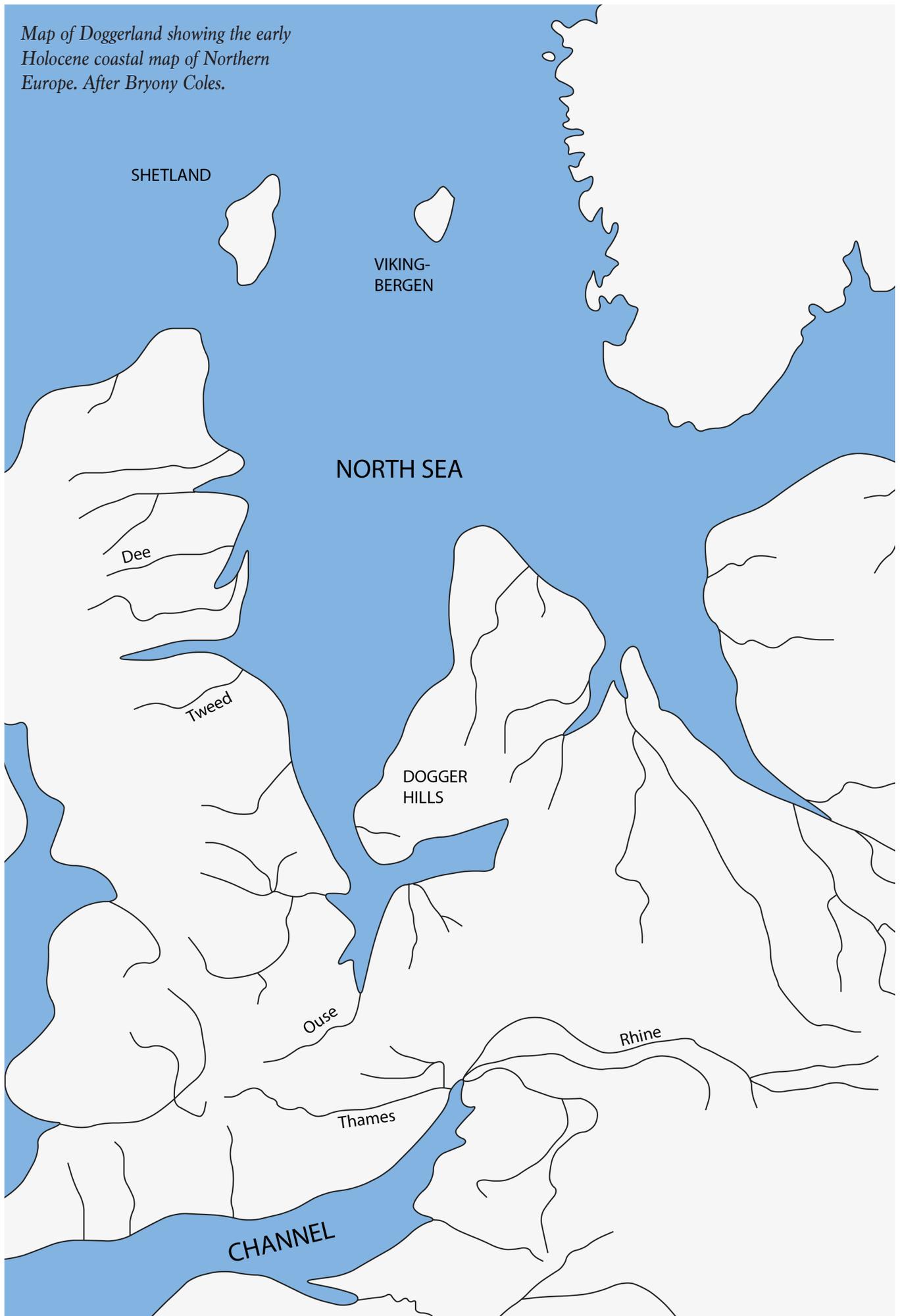


**A STORY OF
THE STONE AGE**
H. G. Wells



Right. A Story of the Stone Age. H G Wells' novella set in prehistoric Doggerland.

Map of Doggerland showing the early
Holocene coastal map of Northern
Europe. After Bryony Coles.



Submerged Forests in 1913. His brief volume was ignored, even if one reviewer described it as 'a delightful little book.'

Reid died in 1916, leaving a legacy of a marshy, anonymous, sunken land behind him. These matters remained for years, despite the development of a new scientific method for studying minute fossil plant and tree pollens from ancient peat bogs. Pollen analysis, also called palynology, became a powerful tool for studying ancient environmental change in stratified, waterlogged deposits. Then, in 1931, a British trawler named the *Colinda*, working the Leman and Ower Banks in the southern North Sea, brought up a lump of peat.

The crew cursed, but one of the blocks emitted an unusual sound. The skipper broke it open with a shovel and out fell a beautifully preserved antler harpoon head. Eventually, the harpoon ended up in the Norwich Castle Museum and was exhibited at a meeting of the Prehistoric Society of East Anglia on February 29, 1932. The members admired the antler head, which was identical to examples found on land along the shores of the Baltic on the other side of the North Sea. But how had it travelled so far from land? Had it been dropped from a canoe while fishing offshore? Or had someone lost it while crossing the North Sea on dry land when sea levels were lower than today? Generations of fishers had brought up the bones of long-extinct animals from the Dogger Bank, which rises about 45m above the seabed. But the trawler's harpoon added a human dimension to the mystery.

The Colinda Point. This beautifully preserved antler harpoon was recovered from the sea bed by the British trawler, Colinda, in 1931. (219mm long.)



Large and small points (arrowheads and spearheads) made of bone and antler, from various locations within Doggerland, part of the extensive collection at National Museum of Archeology in Leiden, Netherlands.



Photo: with thanks to the Rijksmuseum van Oudheden in Leiden

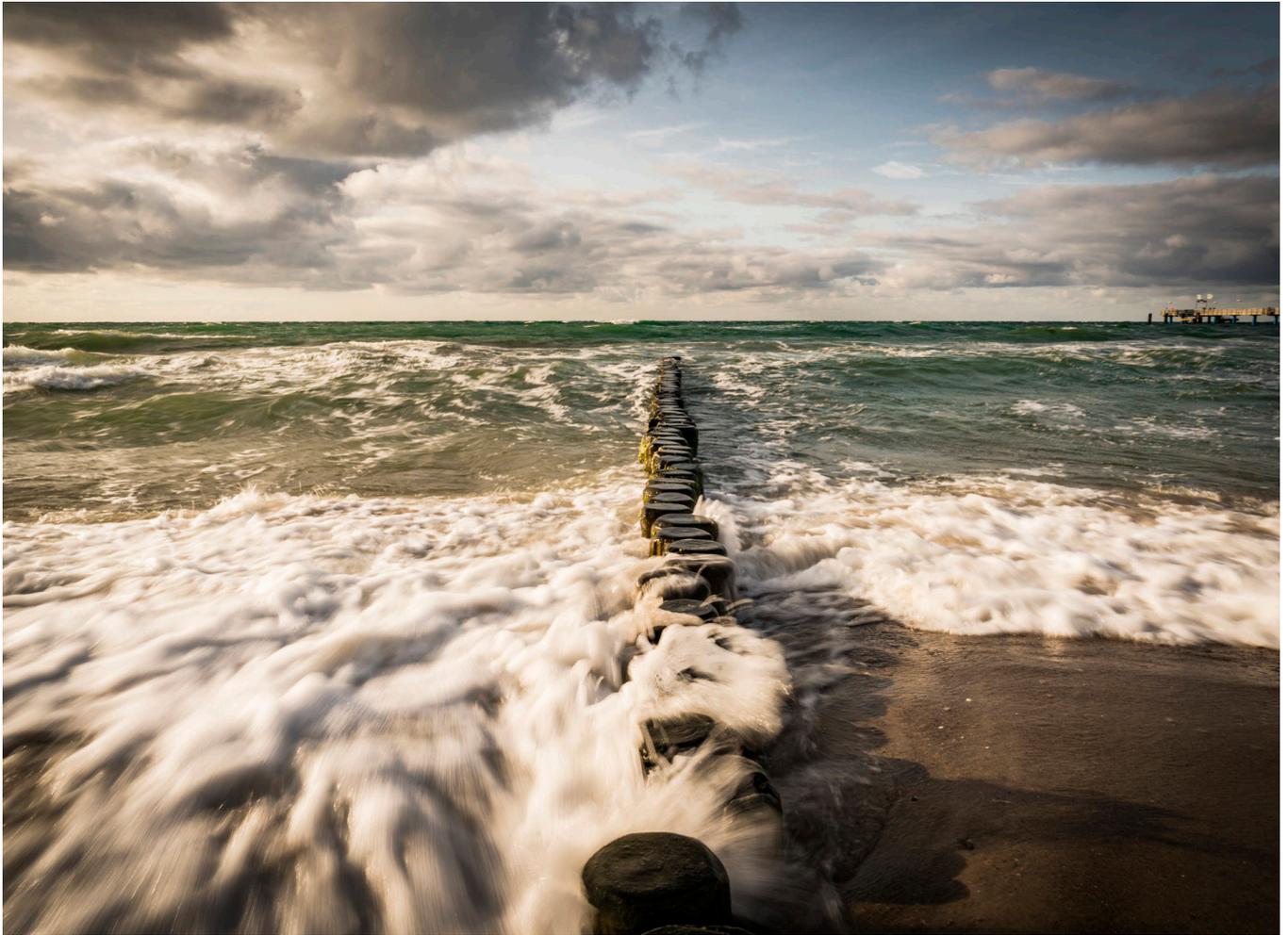
Fortunately, two Cambridge University botanists, Harry and Margaret Godwin, persuaded *Colinda's* skipper to return to the Leman and Ower and collect further peat samples. The pollens in the samples were from vegetation that thrived in fresh, not salt, water. Cambridge archaeologist Grahame Clark, a friend of the Godwins, wrote a seminal book, *The Mesolithic Settlement of Northern Europe*, in 1936, in which he waxed lyrical about the now-sunken landscapes below the North Sea. But World War Two intervened and it was not until the 1990s that geologists and geomorphologists collected vast reservoirs of information about the North Sea bed as part of oil exploration. They established that today's sea level had risen 120m since the last Ice Age maximum of some 20,000 years ago.

Finding the vanished

Finally, the archaeologists took notice, especially after one of their colleagues, Bryony Coles, published an important paper in 1998 where she summarized all the available evidence on the sunken North Sea landscape, which she named Doggerland, from about 20,000 years ago to the final disappearance of a landscape in about 5500 BC. She also published a series of maps based on bathymetric contours that chronicled the slowly vanishing landscape. Her hypothetical maps showed that land had extended from the Shetland Islands to Norway at the height of the last glacial period. Then sea levels rose, and the coastline receded slowly, forming a large inlet, bounded on its eastern side by the Dogger Hills, now the Dogger Bank. As sea rise continued, the Dogger Hills became an island, then vanished.

Rising sea levels after the Ice Age reduced Doggerland to a landscape of extensive coastlines, estuaries, and wetlands at a time of profound environmental change throughout a warming Europe. As the Scandinavian ice sheet retreated, so the Baltic came into being, first as an ice lake, later as a brackish sea. In 5500 BC, just as Doggerland finally vanished, the sea broke through the narrows between modern-day Denmark and Sweden and formed the ancestor of today's Baltic Sea.

The dynamic landscapes of the low-lying Baltic coastline were a magnet for hunter-gatherer bands long before Doggerland was flooded. Excavations in shell middens and waterlogged sites revealed antler and bone tools, also organic finds such as fishing weirs. With its estuaries large and small, extensive wetlands, and excellent preservation conditions, Scandinavian archaeologists have painted a vivid picture of people who lived off fish, sea mammals, and molluscs. Given that the Baltic coast shell middens testified to many centuries of exploiting the same habitats, it was a reasonable assumption that similar societies had once flourished in Doggerland itself. Indeed,



Looking across the North Sea from the Baltic coastline.

the rich Baltic environments might have paled in comparison with those in Doggerland's wetlands. But what landscapes actually lay under the North Sea?

Archaeologists Vincent Gaffney and Simon Fitch of Birmingham University examined the seismic data collected by the oil industry during prospection work. A company named Petroleum Geo-Services (PGS), a geophysical prospecting company, gave them access to 6,000km² of seismic data from the Dogger Bank for a pilot study. When they identified the course of a river winding across the bank for 40km, PGS donated 23,000km² of three-dimensional seismic data from English territorial waters in the southern North Sea. A team of researchers spent 18 months exploring an unknown prehistoric land. Doggerland came to life as a vibrant, diverse habitat, a paradise for ancient hunters and fishers.

The seismic data revealed about 1,600km of river channels and 24 lakes or marshes. The largest covered 300km². At least three rivers flowed from the slightly higher ground that is now the Dogger Bank. (Did you know that Dogger Bank was named after the 'dogger', a traditional North Sea fishing boat, because of its rich fishing ground?) The rivers meandered through wide valleys, fed by numerous small streams. Everywhere, watercourses, large and small, flowed through mazes of channels. These unstable defiles changed course without



A 17th century monochrome panel painting showing various vessels off an unnamed Dutch harbour. In the centre is a 'dogger' fishing boat.

warning when sudden floods inundated the landscape. The result was an ever-changing maze of back channels, creeks, and swamps.

A bountiful land

One might assume this was a monotonous, waterlogged landscape, but it was nothing short of a paradise for hunters and fishers with an encyclopaedic knowledge of their homeland. The landmarks were subtle – a clump of trees overhanging a small pond, an outcrop of white sand exposed at half-tide, and tall reed beds where hunters could build platforms and lurk undetected. Shallow lakes were common, where fowlers could don decoy headdresses, swim silently among sitting ducks, then pluck them from below the surface..

Deer, wild pigs, also numerous small mammals, thrived along river banks, by lakes, and in marshes. Waterfowl were everywhere, especially during spring and autumn when migrating birds paused in Doggerland. Fish and molluscs were there for the taking. Salmon runs alone could sustain a small band for weeks, while pike and perch were plentiful, easily speared in shallow water. Plant foods of all kinds included seasonal berries, also acorn and hazelnut harvests. Doggerland abounded in raw materials of all kinds, quite apart from antler, bone, and bird feathers. Reeds became baskets, fish traps, and huts, also fishing nets and hooks.



The Doggerlanders lived in a water-dominated landscape, so much so that everyone would have spent much of their lives afloat in reed or dugout canoes from childhood onwards. Survival depended on a close understanding of the ever-changing landscape and its resources, for the lowlands were a dynamic environment that was never the same from season to season, even month to month. Experience must have counted for everything, whether ashore or afloat. As far as we can discern, people lived in small bands, probably of extended families. None of these bands were self-sufficient, for the diversity of habitats was such that food supplies could change literally from day to day. One learned how to fish and hunt, how to survive by learning from elders and experienced people. In societies where one's lifespan was in the twenties, youngsters learned from imitating 'older' people, from chants and songs that recited endless mnemonics that mapped the landscape across hunting territories large and small. All knowledge passed from generation to generation by word of mouth. And, judging from the experience of living hunter-gatherers, information about even the most prosaic commodities such as acorn, pike, and sleeping ducks passed from person to person over considerable distances - intelligence passed between fellow kin and by word of mouth.

On the move

Hunting bands are dynamic, ever-changing phenomena. People quarrel and resolve the dispute by moving; a young man and his wife may elect to join another band a few kilometres away; a band may split up to exploit neighbouring territories; a hunting accident could kill all the hunters in a band. Almost certainly, Doggerland bands were constantly on the move, partly because of the nature of their food quests, moving to new camp sites at short notice. Almost all their possessions were portable, which means that little survived once a site was abandoned, especially in a landscape where floods were commonplace and sea levels rose frequently. So the archaeological record is thin.

This was a cold, often rainy world, where people lived in small bands, without contact with other people for weeks, even months on end. Such contacts as did take place must have been in the warmer months when canoes and rafts could paddle safely. The landscape itself was defined by muddy channels, and dark water, where one travelled down narrow defiles with the surrounding landscape masked by reeds that pressed on one's canoe. People wore skin cloaks and layered fur garments against the cold. Judging from modern-day experience, many of the women would have been expert with needle and thread, crafting anoraks, seal hide for boots, and soft rabbit fur for decoration, even socks and underwear.

Early life on Doggerland: Illustration of a Neanderthal using a flint blade with a handle made of birch pitch to shave a head.

Illustration: Kelvin Wilson



Had you travelled through Doggerland 8,000 years ago, you would have seen few signs of human occupation. Scents and sounds could reveal a small camp site of reed huts - dogs barking, the voices of children playing, the soft chipping sound of a stone adze carving a dugout canoe, women scraping a deerskin pegged out on damp ground. The scent of wood smoke or the stench of rotting fish: your impressions would be fleeting, dwarfed by the marshy landscape. Come spring, dark smoke would rise from dry reedbeds, as the hunters set fire to undergrowth to encourage new plant growth for elusive prey. One trod softly here, especially when approaching a camp on high ground, or a group of fishers in their dugout canoes. Kin ties were the currency in this low-lying wet world, where an encounter with others could be thwart with rivalry and volatile peril.

Archaeology and Doggerland

This is very much a theoretical scenario, for seismic data do not provide information on archaeological sites inaccessible far below modern sea level. Gaffney and his colleagues have ranked the various landscape features in Doggerland as to their potential for archaeological discoveries. Highest ranked, as we would expect from exploring sites on higher ground, are lake shores, marshes, and



Evidence of Doggerland's ancient appeal: a skull fragment recovered off the Dutch coast that belonged to a male Neanderthal. A cavity in the bone was the result of a benign tumor probably carried from birth.

coastlines. One day, a future map might yield enough information for a more thorough, ship-based exploration of the submerged landscape using core borers to sample sub-surface deposits. Such cores might provide signs of human activity, such as pollen grains of cultivation weeds, or signs of humanly set fires to foster new growth. Meanwhile, the archaeologists have to extrapolate from finds on higher ground, or washed up by storms or rising tides.

The Dutch have been especially active. For years, amateur sleuths have scoured the coastline of the Netherlands in all weathers, with fascinating results. A current exhibition at the Rijksmuseum van Oudheden in Leiden displays more than 200 objects from Doggerland. Hyena droppings and mammoth molars document what was a predator-rich environment.

A fragment of a brow-beetled young Neanderthal male, dredged up off the coast of Zeeland, tells us that he was a habitual meat eater. A small cavity behind his brow may be a scar from a harmless subcutaneous tumour, once visible as a lump above his eye. Another remarkable Neanderthal find came in the form of a razor-like scraper mounted in a birch tar pitch handle, perhaps used to remove body hair. The Neanderthals made small hand axes, identical multipurpose tools to numerous examples found in French rock shelters.

Other finds include skull fragments belonging to *Homo sapiens*, with cut marks caused by defleshing, perhaps during a burial ritual. We also know of more than 2,000 small flint arrow barbs used for hunting smaller game, especially birds, commonplace finds at sites on higher ground on both sides of today's North Sea. Bone points and harpoon heads are also part of the find inventory, which grows with

Neanderthals found Doggerland rich territory for hunting and gathering. This is an artist's impression of the owner of the skull shown on the previous page.



Illustration: Tom Björklund/Moesgaard Museum, Denmark

every storm. Two bone spear points were fashioned from human bone, perhaps, once again, as part of a long-forgotten ritual.

The flood story

A tapestry of intriguing finds duplicates those from sites on higher ground, even if no one has yet located an undisturbed Doggerland site. But we now have enough to know that the low-lying plains with their narrow channels, wetlands, marshes and open grassland plains, were a rich landscape for both animals and humans for thousands of years. Such was the diversity of fish, plants, and wildlife that food was easy to acquire, with plenty of fallback during lean times of year. And there were always molluscs to fall back on as a supplement to other foods, as was also long the case on Baltic shores.

There was no such thing as a universal lifeway in Doggerland, for even locations far from the open sea changed dramatically, sometimes within the span of a short generation. People lived at the mercy of rising sea levels. Cherished mussel beds would vanish and never reappear; severe winter gales could bring storm surges and exceptionally high tides; sand dunes could bury long-exploited wetlands. Sea water was ever-intrusive. In such a horizontal landscape, a rise of even a few centimetres could have serious consequences. A sheltered canoe landing-place from one's childhood could have vanished by the time one was twenty years old. Once conspicuous ridges, by Doggerland standards, could become islands in a decade or less. Fortunately, every band was accustomed to movement, even if they returned to the same locations again and again.

But as time went on and the ocean continued to rise, Doggerland became ever more of a watery world, dotted with ever-larger lakes and increasingly sluggish rivers that overflowed their banks, their gradients reduced by higher sea levels. The wetlands vanished as Doggerland turned into a complex archipelago of islands. The largest was that of the Dogger Hills, which remained above the sea surface long after the remainder of Doggerland had disappeared.

Tsunami!

Life in Doggerland was challenging enough with constantly rising sea levels. By 7000 BC, it was no longer a continuous land bridge, but an archipelago. Two thousand years later, only a handful of islands still existed. By 5500 BC, nothing remained. But there was a death knell, or there may have been.

In about 6150 BC, a massive submarine landslide displaced 3200km² of sediment on the European continental shelf west of southern Norway. The Storegga slide covered 80,000km² of the seabed and

is known geologically from Greenland and northeast Britain and widely through southern Scandinavia.

By any standards, Storegga was a major event and produced a tsunami that must have been of considerable magnitude fairly close to the period when Doggerland was becoming completely submerged. A major question immediately arose. Was the Storegga tsunami strong enough to cause the final demise of Doggerland? Or had most of its energy already dissipated when it reached the shallow waters of the southern North Sea?

Tsunamis are, of course, geological events, but Storegga could have ranked as an ungodly disaster to the people – if there were still people hunting on the southern lowlands. The problem is compounded by the reality that hunter-gatherer societies are constantly on the move, so it is virtually impossible to discover tsunami deposits on archaeological sites. Changes in shell midden composition, structural damage, geomorphological changes like subsistence identified over a significant area could be tell-tale signs. But traces of any form of structure in archaeological sites of the day, especially shell middens, are very rare. There's a likelihood that the Storegga event left no traces of its progress in human terms, especially since tsunami run-ups of less than 5m tend to leave little in geological terms. Identifying such deposits is, in any case, very difficult, even evidence of storm surges. Finally, the tsunami struck during a harsh cold snap, making deposits attributed to it even harder to locate.

All these factors depend on geological data and on disagreement as to the nature of southern Doggerland at the time. Some believe that it had virtually disappeared before the tsunami swept south. Others argue that it was the final, fatal chapter of the inundation. There are some realities that can be added to the tsunami equation. First, Doggerland extended from the Yorkshire coast across to Denmark at the end of the Ice Age, the Dogger Hills being at most an upland at the southern end. By 7000 BC, however, Doggerland had fragmented into a complex archipelago. The Dogger Hills became an island that endured for another thousand years. Certainly, by 6200 BC, global sea level had risen rapidly between 1m and 4m, to the point that Dogger's Island would have become a shallow sand bank by 6510 BC.

Bathymetry (underwater topography) and other approaches have hinted that a small area of about 1,000 km² may have survived south of today's Dogger Bank, also many smaller islands to the south. Under these calculations, Dogger Island would have disappeared about 1,150 years *after* the tsunami, as would many of the smaller islands. The remnants of Doggerland were coastal lowlands off the continental and British coasts where farmers may have settled.

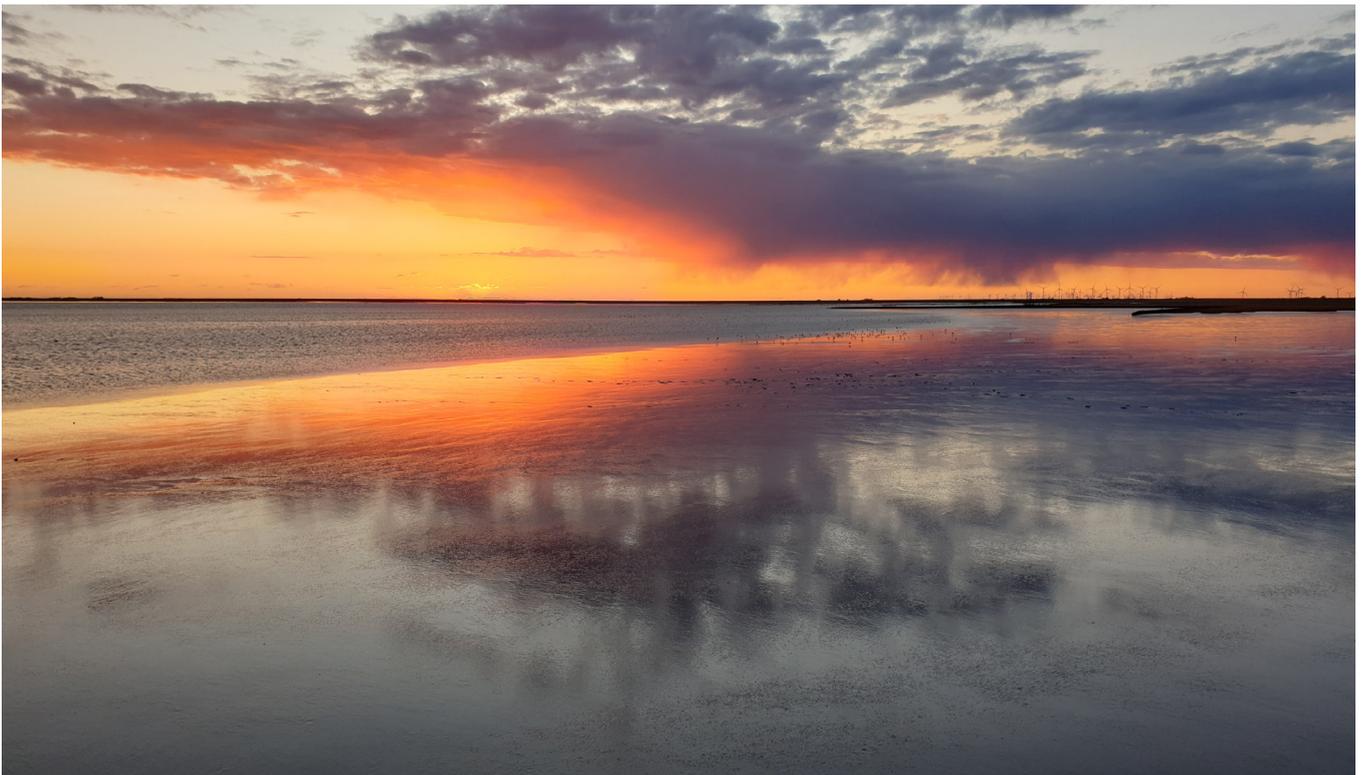
Back to the Future

The debate continues, as does research using state-of-the-art methods. One thing is clear. The height of the tsunami run-up and the degree of scouring or deposition of deposits depended a great deal on local topography, which affects the behaviour of waves approaching a coast. Inlets and valleys played an important role in challenging wave-energy. So did the shallowing water south of Dogger Island, which may have caused waves to shoal and dissipate.

Taking the evidence as a whole, it seems likely that Doggerland vanished under the North Sea as a result of inexorable sea level rise, not from a lasting flood caused by the Storrega tsunami. Without question, some areas, especially to the west of Dogger Island, were badly affected, whereas other more protected habitats experienced little impact. There was certainly not a catastrophe involving thousands of casualties. Most important of all, the so-called Dogger Littoral, coastal plains on both sides of the encroaching ocean may have formed an exciting staging ground for the innovations and social transitions that came with the transition to farming that came about after a rapid spread of the new economies across Europe around 6000 BC.

Far from being a remote backwater, Doggerland was clearly an important catalyst for economic and social change. Well over 50,000 years of human occupation under the North Sea prepared the way for major changes in human life on both sides of the now-sunken lands. These developments thousands of years ago remind us that Doggerland's long history has pressing importance today.

*Sunset over a placid
North Sea.*



Centuries of sea level protection are at stake along the Netherlands coast. Estimates of 7m or 8m of sea level rise within the next seven centuries or so sound as if the threat is only long-term. But the threat is both real and potentially immediate. Catastrophic sea surges and more frequent severe storms caused by a warming world have major potential for much more imminent disasters, resulting in major loss of life in coastal landscapes at or below sea level. For the Netherlands, planning for improved sea level defences is clearly an exercise in multigenerational preparation that is hellishly expensive and involves very tough decisions about both the short- and long-term future.

Doggerland reminds us of the historical realities of sea-level changes, and that preparation is vital. Like so much climate change policy, the decisions we make today will have more impact on the distant future than within a few decades. Doggerland shows us that we really are planning for our great grandchildren as a matter of urgency. Unlike the prehistoric Doggerlanders, we lack the luxury of easily mobility to the point that many families of the future will spend their lives afloat in marina apartments. Our remote forebears knew their environment intimately and we do not. The question of questions is brutally simple: how can we live in intimate terms with landscapes that are vanishing rapidly in front of our often-oblivious eyes?

Brian Fagan, Distinguished Emeritus Professor of Anthropology at the University of California, Santa Barbara, is a *New York Times* best-selling author. He is an experienced small-boat sailor with first-hand experience of sailing on the North Sea.

This feature draws heavily on Vincent Gaffney, S. Fitch, and D. Smith, *Europe's Lost World: The Rediscovery of Doggerland* (York: The Council for British Archaeology, 2009).

Doggerland the exhibition is on until 31 October 2021 at the brilliant Rijksmuseum van Oudheden in Leiden, the national archaeological museum of the Netherlands. To book visit www.rmo.nl

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