The Significance of Underwater Cultural Heritage

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Abstract: The underwater cultural heritage is typically associated with the study of shipwrecks and what they can tell us about the history of ship building and maritime trade over the past five millennia. During the past decade an interest in this underwater world has been extended much further back in time, and not simply to earlier examples of underwater finds but to whole landscapes that have been drowned by sea level rise at the end of the last glacial period. In fact, for 90% of human existence on this planet, sea levels have been lower than the present, typically by about 40 m, and for shorter periods by as much as 130 m, in response to the growth and decay of the continental ice sheets. The period of high sea level that we presently enjoy was only established about 6000 years ago. Collaborative research between archaeologists and marine geoscientists on the continental shelf is likely to provide new and more precisely dated evidence of submerged palaeoshorelines, of importance in refining models of sea level change, in showing how past societies have responded to the challenge of rising and falling sea levels, and in providing insights into the challenges that face our own society and civilization in the coming centuries.

The underwater cultural heritage is typically associated with the study of shipwrecks and what they can tell us about the history of ship building, maritime trade and migration over the past five millennia. During the past decade an interest in this underwater world has been extended much further back in time, and not simply to earlier examples of underwater finds but to whole landscapes that have been drowned by sea level rise at the end of the last glacial period. In fact, for 90% of human existence on this planet, sea levels have been lower than the present, typically by about 40 m, and for shorter periods by as much as 130 m, in response to the growth and decay of the continental ice sheets. The period of high sea level that we presently enjoy was only established about 6000 years ago. Sea level was then low throughout the last Ice Age, until we reach back to the previous period of high sea level about 125,000 years ago. And this alternation of high sea levels lasting for about 5–10,000 years, alternating with periods of low sea level ranging between -40m and -130m below present for periods of about 100,000 years, has been the norm for most of the past 1 million years.

The submergence of large areas of the continental shelf by sea-level rise has long been recognised as a major factor in changing the palaeogeography of coastlines in Europe. However, archaeologists have been reluctant to explore the submerged landscapes of the continental shelf or to pursue the implications of sea level change. The main deterrents to such an exploration are the long-standing belief that little of interest is likely to have survived the process of marine inundation, and that the costs of underwater exploration are in any case prohibitive, with little likelihood that much useful
information would be recovered. It is only during the past decade that the climate of opinion has begun to change, and three factors can be identified as contributing to a growing momentum of interest in this submerged world.

The first and most compelling fact is that despite the preconceptions of land-based archaeologists, archaeological sites and extensive features of the pre-inundation landscape do survive inundation and continue to be preserved underwater, and there has been a steady growth in the numbers of prehistoric settlements that have been discovered over the past 30 years. Some have been found by chance exposure and discovery, others by targeted survey, and increasing numbers as a result of commercial activity on the seabed combined with archaeological monitoring. In Europe alone, it is estimated that there are as many as 3000 such underwater sites, ranging in age from over 300,000 years to 6,000 years ago, and at depths ranging from less than 10m to more than 40m, often with unusual and spectacular conditions of preservation of organic materials such as wood and fibres, thanks to burial in anaerobic sediments. There is clear evidence that substantial traces of submerged prehistoric landscapes and archaeology are preserved on the continental shelf and can be recovered, and as more underwater exploration and excavation are carried out, so the cumulative impact of the finds becomes more compelling.

Perhaps the best known sites are the underwater Mesolithic sites of Denmark, where the relatively calm and shallow waters, the relatively easy accessibility of the seabed, and the longstanding knowledge from dredging and fishing activities that the seabed is littered with prehistoric stone artefacts, have all encouraged exploration and the development of expertise in underwater survey and excavation. Sites such as Tybrind Vig, and Mollegebaet II demonstrate the unusual quality of preservation and the range of finds that can be preserved in these underwater conditions. These include an extensive material culture based on wood, such as fish weirs originally built out from the shoreline over a distance of several hundred metres, dugout canoes, richly carved and decorated timber artefacts such as canoe paddles, and human burial grounds. Similar sites of Neolithic and Mesolithic age have been systematically examined more recently in the offshore regions of the German Baltic, producing a similar range of finds and including collapsed remains of timber-built dwellings.

It can of course be objected that the conditions in which these sites occur are atypical and that more exposed and wave-swept coastlines are inherently unlikely to preserve material. However, it is clear that underwater preservation occurs in many other locations, in the English Channel off the north coast of France, on the southern coastline of England offshore from the northern shore of the Isle of Wight, and in the North Sea. Remains of a Neanderthal skull recently dredged up from the trawler fishing grounds of the North Sea, along with literally tons of Ice-Age faunal remains of mammoth and walrus give some indication of the richness of material present on the seabed. Handaxes recently recovered during the course of commercial seabed operations in the North Sea off the coast of East Anglia, together with sediments preserving details of the palaeoenvironment, and dating to a period of 300,000 years or more, demonstrate that even in apparently unpromising conditions of preservation, material can survive intact and be recovered, even though it must have undergone repeated terrestrial exposure and marine inundation during several cycles of sea level rise and fall. Further afield there are the submerged Neolithic and Bronze Age villages in the Bulgarian sector of the Black Sea, the remarkable Pre-Pottery Neolithic village of Atlit Yam of the coastline of Israel, with a stone-lined well, and evidence of fishing, seafaring and farming. Similar finds of submerged PalaeoIndian settlements are being discovered in the Americas, in areas like the Gulf of Mexico off the Florida coastline.

The conditions under which archaeological material survives inundation and can later be discovered is, of course, complex, depending on the interplay between coastal topography and marine currents during the inundation phase of sea-level rise, and the further interplay between the accumulation
of marine sediments that bury and protect material, and the erosive activities of submarine currents, or indeed human operations on the seabed, which re-expose the material to view and to systematic recovery. As more sites are explored, so predictive models about the locations which might have been attractive to prehistoric people, as fishing locations, or conditions of shelter for tying up boats, and about the geological conditions in which material is likely to be preserved and discovered, become more refined, so facilitating the discovery of new material.

A second fact that has contributed to the growth of this field is the improvements in technology for underwater exploration that have occurred in recent decades, driven in large part by the development of commercial operations such as oil and gas exploration and geoscientific and biological exploration of the oceans. Ships equipped with remote sensing equipment for rapid bathymetric survey and sub-bottom and side-scan profiling, remotely operated vehicles and cameras, submersibles, a variety of coring equipment, and more sophisticated techniques for deep diving including mixed gas technologies, have all expanded the horizons of what is possible.

Thirdly, it has become increasingly obvious just how much of the prehistoric record we are missing by ignoring these extensive and now submerged landscapes. These are the areas that offered the most attractive terrain for human settlement during long periods of the Pleistocene. Coastlines are not uniformly attractive, but they frequently offer greater diversity and richness of resources than their adjacent hinterland, and support greater concentrations of population and larger settlements. Better supplies of surface water, greater density and variety of plant and animal life on land, and marine resources of shellfish and inshore fish or stranded sea mammals, all easily accessible at the shore margin even without seagoing boats, are likely to have made coastlines powerful attractors of population at all periods of human prehistory, and at all technological levels, from the very earliest period and with the simplest level of technology.

These are the areas that are likely to provide the key evidence for some of the most important transformations in human social evolution, including the early dispersal of ancient humans from Africa, the extinction of our close cousins such as the Neanderthals, the earliest development of seafaring and fishing, the early dispersal of agricultural economies, and the roots of many ancient civilizations. These are developments that took place when sea level was lower than present, and the key evidence is likely to lie on the now-submerged landscape and in coastal locations that are now underwater.

Given that sea levels have been lower than present for 90 per cent of human history on this planet, it seems likely that we are missing a very significant part of the evidence for early human development and social evolution, and perhaps the most significant part, with the surviving evidence on dry land forming a truncated fragment of the whole. It is not only whole areas of evidence that we are missing by ignoring this submerged landscape, or the deeper history and early development of a human interest in maritime activities. As the evidence accumulates, so the possibility begins to emerge of focussing on the impact that sea-level change would have had on past human societies and how they coped with such changes. This is an issue that has recently come more sharply into focus as modern society begins to appreciate the reality of future sea-level change and the disruptive or destructive effects that this is likely to have on our own real estate and livelihoods. Yet, much greater changes of sea level occurred in the past. With the melting of the ice sheets of the last glaciation, sea levels rose through a vertical height of more than 100 m between about 16,000 and 6000 years ago. Of course, that dramatic rise was not experienced within a single lifetime, but it is likely that the effects were noticeable on the time scale of the individual life, and certainly within the span of collective memory. Moreover, the effects were sustained over many centuries, resulting in the drowning of huge areas of previously productive land. How did our ancestors deal with such changes? And how, for that matter, did they respond when new territories opened up with a corresponding drop in sea level during earlier cycles of sea level change?
These are fascinating questions, the answers to which no longer lie solely within the realm of speculation, and which, in addition, may give us some insight into the changes that our modern civilisation is going to have to face in the coming centuries.

Investigation along these lines will not be easy. Underwater exploration is expensive and uncertain in terms of the likelihood of archaeological discoveries. However, new collaborations are underway between archaeologists, geoscientists and government agencies responsible for the underwater heritage, sometimes with the active cooperation and assistance of commercial companies, who frequently have little to lose by cooperation and a great deal to gain in terms of interest amongst a wider public.

Moreover, collaborative research between archaeologists and marine geoscientists on the continental shelf is likely to provide new and more precisely dated evidence of submerged palaeoshorelines, of importance in refining models of climatic and sea level change, on which predictions about future such changes will depend. This is a young field of scientific exploration – the last frontier of archaeological discovery. It is, moreover, a new field that is exciting interest amongst scientists, scholars and policy makers across many disciplines, which lies at the very heart of our shared existence and identity, and which is likely to develop a new narrative of our history on Earth that is capable of capturing the wider public imagination.

Further sources of information


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