

NAS and SCAPE Conference 2016

Saturday 5th & Sunday 6th November 2016

Abstracts

Innes McCartney

Bournemouth University, UK

The Wrecks of Jutland 1916: Scotland's naval legacy discovered and the current threats it faces

The Grand Fleet which fought at Jutland was solely based in Scotland, at Scapa Flow, Invergordon and Rosyth. Over 6,178 sailors and 14 warships failed to return to these bases. Multibeam and ROV surveys in the Jutland battlefield in 2015-6 has now led to every ship sunk in the battle being found and identified. This is arguably Scotland's greatest naval shipwreck legacy.

The paper will show that the shipwrecks are living memorials to WW1's greatest naval action and their remains are among the most important archaeological resources of WW1. New data on each wreck and the entire dataset viewed collectively is reshaping our understanding of how events played out. This is especially so in the cases of the ships based at Invergordon and Rosyth where the majority of the casualties were based.

In accordance with the themes of the conference this presentation will be focused on the latest research and discoveries in the battlefield and the threats the wrecks face. Several of the wrecks were Scottish-built and specific archaeological findings related to one particularly interesting case, HMS Ardent will be presented for the first time. Importantly it will also examine the extent to which the wrecks are under threat.

During the last decade more than half have been extensively damaged by illegal looting. The presentation will show for the first time some of the very specific evidence relating to this activity which has been uncovered in the last two years. The North Sea's hostile environment is contributing to the breakdown of even the most robust of the wrecks and these environmental factors will also be addressed.

Richard Bates¹, M. Bates², S. Dawson³, C. Wickham Jones⁴

¹ University of St Andrews, UK, ² University of Wales Trinity St David, UK, ³ University of Dundee, UK, ⁴ University of Aberdeen, UK.

What's left? Seamless mapping of prehistoric landscapes in Orkney

Improved understanding of past relative sea-level change means that the reconstruction of past landscapes as a seamless model from offshore to onshore is recognized as an important step towards understanding prehistoric communities and the world in which they lived. Many recent research projects have undertaken this, with the general aims of understanding the dynamics of environmental change and its impact on past human lives, together with investigation of possible preservation of archaeological materials.

Reconstructions are fraught with difficulty, however, not least because of the complexity of the environmental models that must be developed due to the varied environmental niches involved and their progression through time. At best, any models can only represent broad time periods calibrated at singular (ground truthed) points within the landscape(s). Furthermore, it has to be remembered that the preservation of any past landscapes or remains represents an unusual event, it is more common for the past to have been lost or eroded rather than preserved as an easily mapped unit. Projects that seek to reconstruct seamless offshore to onshore landscapes

must address differences in preservation across the boundaries, and reconcile the often disparate information gained from a range of investigation techniques in the two different present day situations.

In Orkney we have been attempting to make onshore offshore palaeo-environmental reconstructions of Mesolithic to Neolithic landscapes. The investigations have required an interdisciplinary approach in which geophysical remote sensing techniques are combined with a range of ground truth data sources including standard environmental indicators (flora and fauna) and new methods such as sediment DNA analysis. The results of this work will be presented and implications discussed with reference to the extant archaeological record.

Nicolás Alonso Rodríguez, Belén López, Covadonga Ibáñez, Valentín Álvarez, Jesús Ignacio Jiménez, Lucia Ruano, Alfonso Martínez y Zaida Hernández-Úrculo
Arqueobañugues

Coastal archaeology in Bañugues (1977-2015): Investigation of an archaeological site affected by sea erosion in Asturias, Spain

The cove of Bañugues, on the Cantabrian Sea, is located in Asturias, in the north coast of the Iberian Peninsula. For decades, its prehistoric archaeological site has been studied by several researchers. Nevertheless, since the seventies of the twentieth century, coastal erosion processes have revealed another series of new archaeological sites -ancient and medieval chronologies- but remained in the background and they have never been studied in depth.

From 1999 to present, a multidisciplinary team has spent several campaigns researching in different parts of Bañugues cove. Over the last two decades different archaeological works have been developed: archaeological prospection by the coastline to document erosion and recover material remains, geomagnetic survey campaigns to map the structures and two archaeological excavations. They have allowed to unveil an archaeological space which has been occupied from ancient times to the present day.

The changes in the coastline along the centuries have conditioned the ways and times in which such space has been used. Some of these changes were identified in the excavations of 2014 and 2015: They have been documented roman buildings “ex novo” (I-III A.D.), reuse of burial spaces in late antiquity and medieval periods; reconstruction and expansion of a medieval temple (XI-XVIII A.D.) and finally a phase of abandonment towards the nineteenth century.

Sea erosion which, apparently, has increased over the past three decades, has served to expose the debate on the study and conservation of coastal archaeological sites. The archaeological sites of Bañugues not only are just the tip of the iceberg on the debate but also the area of operations and laboratory on the problem of coastal erosion and coastal archeology appearing for the first time in archeology in Asturias.

Paula Martin

International Journal of Nautical Archaeology

New Discoveries on the west coast of Scotland relating to the droving trade and the kelp industry

Under the theme ‘New Coastal and Underwater Research and Discoveries’, I would like to offer a paper on ‘New Discoveries on the West Coast of Scotland relating to the Droving Trade and the Kelp Industry’.

Work by Colin Martin, Dave Cowley and the author has led to the identification and survey of several enigmatic small curved features as early cattle-droving piers, used at high water. These can be linked in to known droving networks, cattle-market sites etc. They were later replaced by wider, sloping stone jetties which could be used by larger boats at most states of the tide.

Kelp-grids have been recorded in Ireland, but now similar but not identical features have been recognised in air photographs on the west coast of Scotland, though not yet surveyed on the ground (perhaps we will have surveyed one or more by the end of the summer this year).

James Fitton¹ Jim Hansom¹ & Alistair Rennie²

¹ University of Glasgow, UK, ² Scottish Natural Heritage, UK

The National Coastal Change Assessment, Scotland

The UK's Climate Change Risk Assessment anticipates increasing sea level to further impact on the existing coastal erosion and flooding on Scotland's soft coastlines and increase the risk to assets found on these coasts. Shoreline Management Plans cover only short sections of the Scottish coast and limit the information available to coastal managers. Consequently, the National Coastal Change Assessment (NCCA), commissioned by the Scottish Government and CREW, has established historic coastal change rates by extracting the coastline position from OS 2nd Edition County Series maps (1892-1905) and compared them with the 1970's and current coastal positions (updated by LiDAR datasets). Using the coastal change rates the coastline position can be projected into the future, albeit mediated by a Coastal Erosion Susceptibility Model (CESM) whose function was to limit erosion to areas where the hinterland is susceptible to erosion.

Areas of present and future erosion were used to identify vulnerable socio-economic, cultural and archaeological assets. Recent checks on the erosion status of coastal archaeology (SCHARP) can be used to validate and update change analyses. Taken together this information aims to inform existing strategic planning (Shoreline Management Plans, Flood Risk Management Planning, Strategic and Local Plans, National and Regional Marine Planning) and to target support toward areas and assets which may remain, or may become, vulnerable over the coming decades. This proactive and strategic approach to coastal erosion will enable more robust management policies and adaptation strategies to be developed. More information and webmaps are available at www.dynamiccoast.com This presentation will outline the methodological challenges of the NCCA, present the project outputs and discuss the management implications to coastal archaeology.

Allan Kilpatrick

Historic Environment Scotland

Boom to Bust: The harbours and shipyards of the lower Clyde

From the 18th century the Clyde from Greenock and Port Glasgow has been a major centre for shipbuilding and was the main harbour for the import and export of goods from the West of Scotland. The story of the shoreline is a complex one of changing fortunes and lost opportunities. It has seen the birth, growth and gradual decline of heavy shipbuilding. The towns developed extensive harbours, shipyards and associated industry and one even had a seaplane base. For the past three hundred years their coastline has experienced near constant change.

Initially both towns' harbours grew rapidly servicing the city of Glasgow then both suffered decline after the Clyde was dredged giving large ships access to the city centre. Ship building grew rapidly but suffered from competition in the second half of the 20th century and only one yard continues to the present day.

The Yard-by-Yard project aims to record shipyards, harbours and associated industries. The work done by Historic Environment Scotland, in conjunction with the local community, has produced a series of digital maps which show the development of the area from the early 1800s to the modern day. The project has used historical mapping, aerial photography and documentary sources and it has worked with the local community to capture local memories and personal archive as part of the national record. Yard-by-Yard represents a new way of working for HES, combining traditional recording and survey practice with community engagement throughout the record creation process. The outcome is a far more comprehensive record of an important part of Scotland's industrial heritage.

José Manuel Matés Luque

Arqueocean

What the river holds: riverscape archaeology in Bilbao, Basque Country, Spain

Bilbao is a city which is famous for its commercial activities since the Middle Ages. Ships were built on its river shipyards and a vivid evolution of commercial and maritime activities developed since. However, during the industrial revolution in the mid-19th century everything changed as the city adapted to the increasing demand of goods both for import and export. This led to the reclaiming of the river and to the building of new infrastructures which changed their riverscape; once more, the new build of the city after the 1983 floods changed everything. Fortunately, during the last few years repairs on the riverbanks has allowed us to record and identify some of the late 19th century maritime structures such as railways for cranes and to understand how the city has evolved through centuries.

This paper will present the archaeological watching briefs carried out in the last few years which are proving to be a valuable source of information to understand the importance of Bilbao as a river city. The information gathered during the research allowed to contrast blueprints, contemporary photographs and documents with the archaeological data. All this information has allowed to understand better how a city like Bilbao needed to be flexible in its needs for commercial success. Perhaps it is no surprise that the current port works on the mouth of Bilbao are the descendant of an activity which started in the Middle Ages. Understanding its origins will give a continuous understanding of its evolution. And we are sure that if the works dig deeper, the medieval or post-medieval maritime evidence will be found.

Sandra Henry & Mark Littlewood

ORCA Marine, University of the Highlands and Islands Archaeology Institute

The survival of Orkney's maritime wartime heritage

Recent projects undertaken by ORCA Marine in the University of the Highlands and Islands Archaeology Institute are helping to map and analyse the condition of many of Orkney's marine historic assets. They form baseline surveys that allow continued monitoring of sites and help to inform management and conservation strategies. They also form part of a dataset upon which future research can be based, for example using the data as a basis for looking into ship construction details.

This work is helping to develop understanding of site formation processes, identifying from the wreck site evidence of the events that caused their sinking, how the events that caused their sinking affect how the wrecks look now, and helping to clarify some of the conflicting records from the time concerning the circumstances of their sinking.

The work provides a snapshot of a particular moment in the wreck's lifespan. The wreck sites provide not only an account of a singular moment or event in time (i.e. their wrecking) but also how ensuing events such as salvage operations or how the marine environment including hydrodynamics and marine ecosystems impact the wreck site over time.

This paper will highlight various projects, including condition assessments and surveys of some of the significant wartime historic remains that lie on Orkney's seafloor from World War I, providing insights into their extent, condition and survival. Many of these wrecks have not previously been recorded to the detail undertaken by ORCA Marine and their collaborative partners. This allows the gathering of new data on the impact of salvage activities and environmental factors on these wreck sites. Orkney's maritime wartime heritage forms an insight into the survival of similar wrecks around Scotland, and the wider regions of the North Atlantic and North Sea environments.

Andy Sherman

North of England CITiZAN Team, MOLA

Seek and ye shall find: Intertidal archaeology in England and the CITiZAN project.

The Coastal and Intertidal Zone Archaeological Network (CITiZAN) is the youngest of the UK's community archaeology projects recording the archaeology of the archipelago's shoreline. The aim of the project is to teach members of the public the archaeological skills necessary to identify and record archaeological sites at threat of erosion from rising sea levels and the actions of wind, wave and tidal scour around the coast of England. In the first eighteen months of the project CITiZAN has helped record numerous new archaeological features, ranging from the base of a lost Bronze Age shaft on the Sussex coast to the World War Two anti-invasion defences of Northumberland.

CITiZAN's northern team have been working with local volunteers and heritage groups around the shores of the Humber Estuary, to record the prehistoric landscape of Northeast Lincolnshire. This paper will show how even a reasonably well studied stretch of English coast can continually reveal previously unrecorded archaeological features and how community archaeology groups can effectively preserve these features by record before they are destroyed.

Joanna Hambly, Ellie Graham, Tom Dawson

University of St Andrews, UK

The state of Scotland's Coastal Heritage: results and reflections from the Scotland's Coastal Heritage at Risk Project.

Over 2012-2016 a network of over 1000 volunteers worked with the Scotland's Coastal Heritage at Risk Project (SCHARP) to monitor, document, investigate and interpret archaeological sites impacted by coastal processes around the coast of Scotland.

Volunteers have submitted over 1100 surveys updating information about existing sites known to be under threat, as well as around 350 new sites not previously recorded. Community-led projects at individual sites have rescued, recorded and interpreted significant archaeological archives that would otherwise have been lost to coastal erosion.

In this paper we will present the results of what the surveys have told us about the state of the resource and consider what this immensely valuable data set contributes to our understanding of how and to what extent coastal change is impacting archaeological heritage around Scotland.

Paul Sharman & Julie Gibson

University of the Highlands and Islands Archaeology Institute

Prospecting for Orkney's medieval harbours and landing places

Maritime activity has been the key to the human occupation of the islands of Orkney since they were first settled. Orkney has a rich array of evidence for maritime activities such as fishing, waterborne trade, transport and communication. Their remains survive both on land and underwater, on the coast and even further inland (e.g. navigation beacons). The study of such activity has tended to concentrate on the 18th - 20th centuries, usually from an historical or ethnographic point of view, partly due to the fact that more evidence survives than for earlier periods, yet maritime cultural heritage is central to the history of the islands, especially in the Norse and medieval periods when Orkney was the centre of an earldom and a stopping point on routes linking Scandinavia, Scotland, Ireland and the North Atlantic.

This paper will present ongoing research that is being undertaken to identify Orkney's early harbours, landing places and maritime infrastructure before they are lost to coastal erosion. Until recently, landing places of the Norse and Medieval period in Orkney have been mainly thought of in terms of beaches, slips and nousts. However, a multi-disciplinary methodology is being used to try and identify maritime landscapes, sites and structures of the period - especially landing places and harbours. This includes targeted walkover, diver and marine geophysical surveys, historical, toponymic, ethnographic and cartographic data, and the use of local knowledge about currents and tides to identify where landings are or were possible. This has resulted in the recognition of the adaptation of reefs and tidal ponds with small cut channels and low masonry for use as harbours and protected landing places in several places around the islands.

Reflections on the approach and results will be presented, as well as thoughts for the future.

Joris Coolen¹, Natascha Mehler², Marianne Nitter³, John Preston⁴

¹ Centre for Baltic and Scandinavian Archaeology, Germany, ² German Maritime Museum, Germany, ³ Archaeological Museum, University of Stavanger, Norway, ⁴ University of Edinburgh, UK

Investigating the Norse harbours of Unst, Shetland: approaches and methods from geomorphology and climatology

Wave action is an important agent of coastal erosion, and as such poses a threat to archaeological sites along the coast. In this paper we would like to introduce the fetch method, a simple tool to estimate the wave climate at a certain place along the coast based on a simplification of wave theory and modelling. A basic understanding of the local wave climate is not only essential to assess the vulnerability of sites to coastal erosion but may also help to identify and explain the location of certain sites.

In the project "Harbours in the North Atlantic AD 800-1300 (HaNoA)", a six-year project funded by the German Research Council (DFG) focusing on Norse harbours and landing sites in the North Atlantic (Iceland, Greenland, Shetland and Faroe), the fetch method has been applied to identify potential harbours and anchorages as well as evaluate the quality of different landing-places within a natural harbour. In this paper we will especially focus on

the island of Unst (Shetland), one of the case studies of HaNoA, and explore the relationship between the Norse settlements and wind fetch.

The Norse settlement of the North Atlantic islands relied upon a network of harbours that played key roles in the development of North European economies through the late Middle Ages. Many of these harbours fell into disuse, their locations are uncertain and the reasons for this are unclear. A crucial geomorphological characteristic of a successful harbour is *structural equilibrium*. A harbour must have physical stability for boats to use it safely season to season, year on year. Should the harbour be located on a changeable coastline (or one that becomes changeable) it may become unviable

The geomorphological setting of Norse harbours in the Atlantic is variable, with contrasting landform stability over varying time scales. We assess geomorphological change on the island of Unst, Shetland, a coastline used by the Norse. Unst offers a complex coastline of deep fjords and arcuate embayments and thus significant differences in forces acting upon the coastline. Evidence exists for instability in the beaches used by Norse that could have been driven by the changes in climate conditions from the Medieval Climatic Anomaly to the Little Age and the present day. We model coastlines using the sediment dynamics model MIKE21. Model results agree well with the location of extant sandy beaches on Unst, but model runs with modern environmental drivers also build beaches where none currently exist. Blown sand deposits were formed in the 12th-13th century, consistent with High Medieval settlement times and the onset of the Little Ice Age, suggesting that some Norse landing sites began destabilising at this time.

This research shows how beach instability can be modelled to determine the likely circumstances under which beaches formed, changed or disappeared and thus the potential geomorphological drivers of coastal change, harbour use and our ability to identify past harbour sites.

Jennifer Jones

East Carolina University

Remnants in the sand: Management approaches to beached shipwreck stability in the US Eastern seaboard from Maine to Florida

The archaeological remains of ships in the beach zone are part of a complex and dynamic system, being periodically exposed and reburied, they vary between being both visible and frequently forgotten features of the physical and cultural coastal landscape. These limited and nonrenewable resources play an important informational role as tangible pieces of maritime heritage that also document dynamic coastal processes. Shipwreck remains in the beach zone are highly susceptible to variations in stability (natural and anthropogenic) within the landscape, these variations in turn affecting decisions regarding importance and management strategies. The challenges to certain management strategies may result in these resources being damaged, ignored or forgotten, leading to a potential loss of pertinent social, economic, and physical information.

Although little can be done to prevent natural coastal processes, a better understanding of them allows for their mitigation and management. At the same time, an understanding of perceptions toward the beached wreck resource and associated management practices may guide practitioner decision-making and allow for the development of appropriate and innovative strategies of management. The purpose of this research is to examine the variables that contribute to beach zone wreck stability by placing them in a socio-natural context, and examining how compromises to the cultural resource stability in turn, creates management challenges. Through a hybrid approach of shoreline change analysis, historical documentation, 3D modeling, and manager interviews, this research aims to assess short- and long-term site changes in an effort to present alternative and innovative management strategies that take into account the socio-environmental context of a specific site and the general nature of cultural resources and management practices in the coastal zone.

The conference is sponsored by: Historic Environment Scotland, Dive Master Insurance, BSAC, SAA, Wessex Archaeology Scotland, 3Deep Media and ADUS Deep Ocean.

Mike Belasus

German Maritime Museum

German ships in the North Atlantic trade 15th to 17th century

Within the three years research project “From The North Sea to the Norwegian Sea – Interdisciplinary studies on the Hanseatic League’s trade in the North Atlantic” at the German Maritime Museum Bremerhaven is, among others, trying to answer the question on what kind of ship could master the open ocean to reach the trading destinations on Iceland, Faroe and Shetland. In fact information on ships that were used for the North Atlantic trade mainly from Hamburg and Bremen is scarce and for now completely derived only from historical documents. This turns out to be problematic as terms for ship types do not represent technical definitions. As there is for now no direct archaeological evidence for the Hanseatic League’s ships that headed north, finds of ships and ship timbers from other areas had been considered to get a first glance on shipbuilding and the mechanisms of change in building methods.

Two main building methods can be distinguished in the medieval period for sea-going and coastal craft: the bottom-based Kollerup-Bremen shipbuilding method and clinker shipbuilding methods. The new carvel shipbuilding method is established from the late 15th century onwards in Northwest Europe. The archaeological evidence shows that there was no immediate change over but in many cases, rather a convergence to achieve flush carvel built hulls. Considering the Kollerup-Bremen type with its flat bottom and limited sailing abilities and the fact that the German merchants only started to participate in the North Atlantic trade from the late 15th century onwards, the question comes up if there could have been technical issues that prevented them from this enterprise until they managed to gain the knowledge to build ocean-going vessels to stand a journey of several weeks across the North Sea and Norwegian Sea.

Colin Martin

University of St Andrews, UK

Treasure from the deep – the archaeological potential of Scotland’s historic shipwrecks

The title is a tease – my presentation is not an apologia for treasure hunting. The treasures are wholly archaeological, and derive from the rich resource of historic shipwrecks. Shipwrecks represent closed and closely-dated contexts containing uniquely related cohorts of evidence. Second, unless salvaged they have the potential to retain all categories of material culture, not just the discards or accidental losses which characterise most terrestrial assemblages. Third, waterlogged conditions frequently preserve fragile organic artefacts and a full range of environmental material. Finally, if a ship or parts of it survive, it will yield evidence on the construction and operation of one of the most complex machines most societies ever produce.

These points are illustrated by two shipwrecks in Scottish waters – Swan, lost off Duart Castle in 1653, and Dartmouth, which sank close by in 1690. Both were small warships, excavated by our team from St Andrews University in association with the National Museums of Scotland and Historic Scotland. The talk will not be a resume of the projects, but an exposition on the nature and potential of nautical archaeology, leading far beyond the immediacy of these particular ships. Topics will include constructional and repair methods which saved timber; aspects of weights and measures; and medicine at sea (Dartmouth): the metallurgical secrets of an English gunfounder previously unknown to historians; new light on early Scottish pewter; and clay pipes as markers of Cromwellian troop movements (Swan).

My aim will be to emphasise that shipwrecks of all periods are resources of enormous archaeological potential, and to urge greater integration in their study with the discipline at large.

Sally Evans¹, Jacqui Mulville¹, Camilla Speller², Keri Roswell² and Krista McGrath²

¹Cardiff University, ²University of York

Biomolecular whaling; Capturing cetacea via proteomics

North Atlantic islands have a special draw for humans evidenced by their continual colonisation from the Mesolithic onwards. In mainland Britain, the arrival of farming heralded a major decline in wild resource exploitation. However the Isles offered early farmers unexploited lands and rich marine and avian resources resulting in a different trajectory with hunting, fishing and gathering remaining central to procurement strategies throughout history. This project focuses on the Bronze Age to Norse human relationship with the sea as evidenced in the exceptional cetacean assemblages of the Western Isles (e.g. Mulville 2002).

Cetacean bone is relatively common in insular assemblages but remains an under-studied facet of the archaeological record, a situation stemming from difficulties with applying standard morphological methods of identification to worked or fragmentary material (Mulville 2002). Proteomics (Buckley et al 2014) and aDNA (Evans et al 2015) have had considerable success in identifying cetacean species from even tiny fragments of bone. This paper presents our initial research applying proteomic techniques to the identification of cetacean from the Iron Age to Norse settlement at Bornais, South Uist. The implications for both archaeological interpretations and modern conservation biology will be discussed.

John Wombell

North of Scotland Archaeological Society

The Loch Hourn survey

The project began as a personal endeavour through a series of chance events. I have been involved at Kinlochourn Estate on the West Coast doing garden conservation work with a group of friends since 1992. Kinlochourn lies at the head of Loch Hourn regarded as the most 'fiord like' of the Scottish sea lochs. It is about 12Km in length in two parts – Inner and Outer, and is 'dog legged' in shape. It is surrounded by mountains that rise to 3,000ft. The Knoydart Peninsular forms the south shore and the Glenelg Peninsular the north shore.

In 1998 one of my friends, a forester, suggested we collect cones from remnant Caledonian Pine that grow on cliffs part way down the loch, to raise from seed trees for a Millennium planting. We pulled our small boat in at a cleared landing place where close by I noticed the ruins of two small stone built huts. In 2000 as a piece of work for the University of Aberdeen Field Archaeology Course I explored 3Km of the north shore of the Inner Loch on foot to discover many more small hut remains. None of the remains were on public record.

Also in 2000 I joined the North of Scotland Archaeological Society (NOSAS) and two years later the society undertook the first of what turned out to be 6 week long residential seasons of survey and recording, finishing in 2009. By then we had put some 1,500 new sites on public record, all recorded to a minimum of Level 2 and had completed 2 small evaluation excavations. The site periods range from the Bronze Age through to the recent past but the most remarkable group of remains are the 60 or so small huts, a fishing station and numerous landing places on the north side of the Inner Loch that relate to various phases of the 18th and 19th C West Coast Herring Fishery. The presentation will show the distribution of sites discovered and will interpret and contextualise them within the scope of the historical research undertaken for the project.

Alessandro Pasqua

University of Georgia, USA

Advanced geospatial techniques and archaeological methods to investigate historical rice cultivation at Wormsloe Historic Site, Georgia, USA.

Despite much of the environmental history of Wormsloe State Historic Site on the Isle of Hope, Georgia, having previously been documented and described, there are still some unanswered questions. For example, whether rice cultivation was ever performed at Wormsloe has been a question without a definitive answer up until now. The primary goal of this study, therefore, is the investigation of a tidal salt marsh that may provide legacy evidence of rice cultivation and place Wormsloe within the agricultural context of the Southeastern U.S. coast in the 18th and 19th centuries. Through advanced remote sensing techniques such as airborne LiDAR, terrestrial laser scanning (TLS), and unmanned aerial systems (UAS), as well as archaeobotanical techniques such as phytolith analysis, the micro topography of the island was mapped and soil components identified to provide archaeological evidence of historical rice cultivation. Airborne LiDAR and TLS were employed to create 3D bare earth digital elevation models (DEM) of the area under investigation where present-day topographic features such as ditches and embankments were indicative of water control within a potential rice field. Furthermore, UAS were used to collect multiple images of the terrain from different angles that were employed to create a 3D model of the landscape through the photogrammetric technique known as Structure from Motion (SfM).

Finally, phytolith analysis was employed to analyze microscopic silica bodies in the soil that can be indicative of historical crop cultivations. Results reveal the archaeological presence of rice phytoliths which, combined with micro topographic features of legacy water control, suggest the area was indeed historically used for the cultivation of rice in the form of subsistence agriculture. This study fills a gap in Wormsloe's environmental history, increases Wormsloe's cultural, archaeological, and historical significance within the Southeastern coast, and provides advanced geospatial methods for assessing landscape legacies.

Joanne S Porter¹, Bob Anderson² and Kevin Heath³

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The wreck of the Rinnigal steam pinnace, Lyness, Scapa Flow, Orkney Isles: a preliminary report

The wreck site of a steam pinnace was first documented in the Scapa Flow 2013 Marine Archaeology Survey. In the 2013 survey the site was investigated using side scan techniques and some clues came to light regarding the identity of the wreck, via anecdotal oral history. On 9th May 2014 a team of 8 divers surveyed the site of the unidentified pinnace and generated a site sketch map, a photographic record of key structures and measurements to construct a 3-D model of the site. Biological surveys of the area directly adjacent to the wreck were also conducted. Further dives allowed additional photographic records to be made. The primary focus has been to record the exposed structural remains and interpret the wreck formation of the site. This paper describes the results of the work, and discusses in particular the way in which the wooden parts of the structure were crafted using double diagonal method and other key aspects of the wreck through reference to historical records and also to a renovation project recently undertaken on Pinnace 199 by a team at Portsmouth Historic Shipyard.

Scott Timpany

University of the Highlands and Islands Archaeology Institute

Woodlands under the waves: investigating submerged forests in the Northern and Western Isles, Scotland

It is strange to think of the now relatively treeless environments of the Northern and Western Isles as once being areas where woodland flourished and if you could step back into prehistory you would have experienced this environment in a completely different way. These woodlands would have provided a home for flora, fauna and fungi together with offering a material resource for construction and fuel. These trees and/or areas of woodland may also have had cultural significance to the people who lived within this landscape. And the amazing thing is, these trees are still here!

In sheltered bays across the Northern and Western Isles, preserved within intertidal peats the remnants of stumps, trunks, branches and roots of these trees can be seen today as submerged forests resting beneath the waves. This paper presents ongoing research into these former woodlands in locations in Orkney and North Uist and discusses the different types of information that can be gleaned from these trees and the peats containing them. Working with the local community areas of submerged forest have been mapped, sampled and undergone stratigraphic investigation. Following fieldwork, laboratory analysis including pollen, waterlogged plant remains, fungal spores and wood identification are providing details on the character of these woodlands and how they were interacted with. All of this information is providing us with a picture of how these woodlands and the surrounding landscape would have looked in the past and allows us to better understand a now long lost environment.

All of this work takes place against a backdrop of tidal erosion and sea-level change, which exposes these remnant woodlands but at the same time will ultimately destroy them. This talk then also aims to elucidate on why submerged forests are an important archaeological resource and why they should be studied before they are lost to the sea.

Jacqui Mulville¹, Charles John², Stephen Mills¹

¹ Cardiff University, ² Cornwall Archaeological Unit

The Lyonesse Project: Sea level change in the Isles of Scilly

This paper presents the results of the Lyonesse Project, ten years after the idea was first discussed. The aims of the Project were to: reconstruct the evolution of the physical environment of Scilly during the Holocene (11,700 cal BP to present); investigate the progressive occupation of this changing coastal landscape by early peoples; explore past and present climate change and sea-level rise; develop geophysical techniques for mapping submerged palaeolandscapes; improve management and promote better understanding of the islands' historic environment; and encourage local community engagement with the historic environment.

Six main types of work were involved: an audit of recorded and reported coastal and subtidal peat exposures; auger and GPS surveys of the intertidal peat sites; geophysical survey and diver inspection of the subtidal peats; sampling and palaeoenvironmental analysis of selected intertidal and subtidal sites; a programme of radiocarbon and optically stimulated luminescence (OSL) dating; and outreach to inform the public, disseminate results and encourage volunteer participation.

The results corroborate previous evidence that in c 7000 cal BC Scilly was a single large island, with a rapid rise in sea-level separating the outmost islands. By c 3000 cal BC there was a major change to the main island group, with tidal flooding between the northern islands. The 500-year period between 2500 and 2000 cal BC saw the most rapid loss of land and the development of the greatest extent of intertidal area at any time in the history of Scilly. After this the rate of change slowed significantly and by c 1500 cal BC the pattern of islands was approaching that of today, but with the dramatic difference of a vast intertidal area of saltmarsh in what is now the islands' inner lagoon.

The paper will conclude by presenting how these results articulate with the archaeological evidence to provide a long term overview of the links between land, sea and people and inform the challenges that lie ahead for insular communities.

Rhiannon Philp
Cardiff University

They left only footprints: an investigation of the prehistoric footprints at Port Eynon

Prehistoric footprints are incredibly rare and often short lived sources of archaeological evidence. Yet they are also some of the most direct evidence for human-environment interaction that can be observed. There are currently nine recorded intertidal sites containing Holocene era human footprints in the UK; six are found in South Wales. With the British coastline at the mercy of increasingly violent weather patterns and rising sea levels, it is imperative that as much information is recovered as possible when new sites are discovered.

In 2014 human footprints were identified by local archaeologists within peat deposits at Port Eynon on the Gower Peninsula in South Wales and logged on the local HER. However, direct investigations of the deposits were not carried out at the time. As part of my wider doctoral research, fieldwork was undertaken in 2015 to try to determine the extent and to obtain environmental sequences from the deposits in which the footprints were discovered for palaeoenvironmental analysis.

This paper will present the results from the analysis of these deposits and address how they inform our understanding of the environment in which these footprints were made and their relationship with other local archaeology. It will also address how the site fits within the wider scheme of Holocene footprint sites in Britain.

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An Update on the Archaeological Study of the Wreck of HMS Erebus in Nunavut, Canada

In May 1845 Sir John Franklin set out from England with HMS Erebus and HMS Terror on a Royal Navy expedition in search of a Northwest Passage. The disappearance of Franklin's ships and men spawned unprecedented contemporary and modern searches together spanning almost 170 years. The discovery of HMS Erebus by Parks Canada and its partners in September 2014 promises eagerly awaited archaeological answers to lingering and particular historical questions about the Franklin Expedition and events aboard Erebus, both before and after the ship was deserted in April 1848. Erebus was a bomb vessel launched in 1826 and exquisitely refit for polar exploration, first in 1839 and again in 1845. The wreck provides a rare opportunity to study a polar-adapted ship with many state-of-the-art technologies, including auxiliary steam screw propulsion. Parks Canada's initial archaeological assessment of the wreck, now into its third season, is coming to a conclusion and plans are in motion to begin targeted excavation. This paper will give an update on our exploration and study to date of this engrossing wreck and will outline: three-dimensional site mapping, photogrammetry, hull interior imaging, site formation processes, in-context artefact assemblages, some notable artefact and feature finds, and DNA sampling, all within the context of the site evaluation.

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The Al Hallaniyah Island Shipwreck, Oman

This paper examines the excavation of an early 16th century Iberian shipwreck discovered in 1998 off Al Hallaniyah Island, Oman in the Arabian Sea. It presents the historical research that led to discovery of the wreck site, the excavation work undertaken during three expeditions from 2013-15 and the preliminary scientific and archaeological analysis of key artefacts upon which the probable identity of the shipwreck - as the Portuguese nau *ESMERALDA* - is proposed. The work was undertaken in collaboration with Oman's Ministry of Heritage & Culture and is the first such excavation of an ancient shipwreck site conducted in Oman in accordance with the 2001 UNSECO Convention.

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Mapping submerged Stone Age sites - how do we cope with an international problem.

A central problem in maritime archaeology is how to map in a cost-effective way the submerged Stone Age sites down to depths around 140 m representing the low sea levels of the glaciations.

This presentation suggests the application of acoustic-response from man-knapped flint and other silicate minerals as a realistic method for locating submerged Stone Age sites. Tests carried out with a preliminary setup have proven that acoustic response can be obtained from known Stone Age cultural layers covered by at least 1 m of sediment. Experiments carried out have furthermore recently established that naturally cracked flint pieces do not have the same resonance features, allowing a very useful discrimination between natural and human flint.

There is good reason to believe that the method will work on all silicious minerals that have been knapped by humans. Whereas the general principle has been established, an extensive and necessary development of the method to be able to pick up responses from as small amounts of knapped lithics as possible and from lithics located as deep in the sea floor sediments as possible is ongoing.

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Early historic whaling in Scotland and the Anstruther Whale Fishing Company: 1757 – 1762

The history of whaling in Scotland usually focuses on the developments in northeast Scottish ports during the late 19th and 20th centuries in connection with whaling in the southern oceans. However, prior to this industrialised whaling the focus of Scotland's first major whaling industry was based in the Forth, developing from 1750 across many of the small ports and villages in Fife and the Lothians. The industry targeted Arctic hunting grounds of the Bowhead whale (the Greenland Right Whale) around Svalbard and later Greenland. This whale fishing industry was an important part of the maritime history of Scotland linked to the economic and political importance of whale oil and developing naval power across the North Atlantic. The industry grew rapidly during the late 18th century, interrupted by Seven Years War and American Revolutionary War, which saw the experienced sailors and hardy, modified vessels of the fleet pressed into service. The early Scottish whaling industry contributed significantly to

the wider maritime and naval history of the time including maritime technology and invaluable experience in extreme conditions, which would support later phases of polar exploration in which Scotland played a key role.

Recent work by WA Coastal & Marine on behalf of the Scottish Fisheries Museum is presented. The Whale Store, now part of the Scottish Fisheries Museum complex in Anstruther, Fife is a well-preserved remnant of the short-lived but characterful Anstruther Whale Fishing Company which operated from the site between 1757 and 1762. A history of the building, the company and its' ships the *Rising Sun* and ill-fated *Hawke* are discussed within the wider context of early historic Scottish Whaling in the Arctic.

Alexandra Tyas

University Centre of the Westfjords, Iceland

Managing coastal heritage in the Westfjords: A case Study of 19th century Norwegian whaling stations

Coastal cultural heritage sites have received a lot of attention in recent years due to the increasing threats they face due to climate change. The surveying of sites at risk is therefore usually prioritised, in order to record sites before they are lost to the sea. However, in countries where the management structure is lacking, this prioritisation does not occur. It is therefore unknown how many sites are at risk, from what threats, or if sites have already been lost.

This study set out to explore the state of heritage management in Iceland, with a focus on coastal and underwater sites. In order to address this, a case study of a 19th century Norwegian whaling station in the Westfjords was chosen for archaeological surveying, as a representative site which has both a coastal and underwater component. A background analysis on the current Icelandic management structure, legal environment, and current threats to coastal heritage sites was completed. The conclusions suggest that the legal environment in Iceland is sufficient; however it is the implementation and enforcement of the laws which is lacking. Underlying issues seem to be the lack of funding for archaeology, and the lack of value of heritage sites to the local communities. This study therefore aims to address these issues, with suggestions for future management and protection methods focusing on public engagement, education, and increasing awareness of the social and economic benefits coastal heritage sites can provide.

Martin Bellamy

Glasgow Museums

Unmasking an imposter: The false legacy of the Comet II engine

In 1825 the steamship Comet II was rammed by the Ayr off the coast of Gourock with the loss of 70 lives. This disaster created a huge media storm with a vast amount of press coverage in local, national and international papers and scores of poems, religious tracts and pamphlets were published.

Several months after it was sunk the vessel was recovered in a search for bodies and valuables. As part of the salvage operation the engine and boiler were removed from the wreck and sold. The boiler was sold for scrap, but the engine was apparently still in workable condition. It is not known who purchased it, but in 1877 it was 'discovered' driving a paint mill in Glasgow. Its authenticity was 'verified' by a number of engineers and it was taken out of the works, restored and presented to Glasgow's newly opened City Industrial Museum. Some doubts persisted about its authenticity and so it was initially labelled as 'believed to be that of the second Comet'. This qualification was gradually lost and in recent years it has featured in the Clydebuilt museum at Braehead and the



opening displays of The Riverside Museum, where it was presented as the genuine engine. Recent research, however, has demonstrated that it definitively cannot be the Comet II engine.

This paper will trace the history of the engine and demonstrate how it has been revealed to be an imposter. It will also explore issues of accuracy and authenticity in constructing the legacy of Scotland's maritime heritage.