

A Wicked Noah's Ark: Exercise Magwitch, Rat Island 2017



Archaeological Excavation Report



Breaking
Ground
Heritage



A Wicked Noah's Ark: Exercise Magwitch, Rat Island 2017. Excavation Report

Code BI17

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'By the light of torches, we saw the black Hulk lying out a little way from the mud of the shore, like a wicked Noah's ark. Cribbed and barred and moored by massive rusty chains, the prison-ship seemed in my young eyes to be ironed like the prisoners. We saw the boat go alongside, and we saw him taken up the side and disappear. Then the ends of the torches were flung hissing into the water, and went out, as if it were all over with him'. Charles Dickens, 'Great Expectations'.

Non-Technical Summary

In 2014, major winter storms revealed human remains on 'Rat Island' (also known as Burrow Island) between Gosport and Portsmouth (NGR SU62075 00760). Local legends have it that the island which overlooks the old Naval base was the resting place of hundreds of Prisoners of War. These stories tell of buried Frenchmen, of Americans from the Wars of Independence and sometimes of those incarcerated on the Prison ships that were moored in the docks.

These remains were recovered as quickly as possible - the grave cuts into the consolidated beach shingle are still visible. Part of the cliff (just under 3m of made ground) overhanging the graves collapsed during this recovery process leaving at least one set of human remains behind. Since this initial recovery, further erosion occurred and a team composed of serving military, professional archaeologists, professional forensics experts, and Wounded Injured and Sick (WIS) service personnel on the Op Nightingale programme excavated this area in May 2017 to recover archaeological remains immediately threatened by erosion processes.

The 2017 season recovered the remains of four individuals raising the total recovered to a minimum number of nine individuals when combined with the 2014 results. This report contains the background history of the site, the technical report on the archaeological recovery, the osteological report and isotopic studies accomplished on four of the bodies. Further to this, it includes the results of the facial reconstruction undertaken on the skull of A7 by Facelab at Liverpool John Moores University.

The overall results therefore are that the remains of a minimum of nine individuals were recovered from graves on the south east end of Rat Island. These burials were in elm coffins, some of which were stacked on top of one another. The isotopic signatures indicated that the deceased had mixed diets and that at least two individuals had originated from the mainland of Europe. Two of the people had been the subject of autopsies – with a craniotomy of skeleton A7 being the most obvious example. Lack of associated small finds or artefacts meant that any conclusions as to whether these were prisoners or prisoners of war from the hulks, or both, was impossible.

The team concluded that there is a VERY HIGH likelihood of further human burials being present on the island, with the eastern and south eastern portion of the island especially sensitive. Indeed, fragments of wood, consistent with the elm coffins found in the excavations were visible close to a rubble wall in this area.

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Introduction

This report draws together the findings of the excavation work on Rat Island in 2017 and also included material recovered in 2014 from the rapid collection work following storms. It will consider the potential origin of the human remains recovered, include the osteological assessment of the remains by Cranfield Forensics Institute and the facial reconstruction of one of the individuals (A7) by Facelab at Liverpool John Moores University. The report also highlights locations for further study, and various hyperlinks which can be accessed for further analysis. Whilst including desktop assessment of the island and its history, and background data on both prison hulk and prisoner of war populations, this report does not intend to become the authoritative text on the subject of such burials as this would be beyond the scope of such work.

This report, and the fieldwork with which it is associated, was accomplished using guidance laid down within the codes of the Chartered Institute for Archaeologists.

Circumstances of the fieldwork

Initial work in the spring of 2014 was effectively a salvage operation after storm damage and with a limited time for recovery of material. The work of 2017 was funded through Conservation Stewardship Funding of the Defence Infrastructure Organisation (Ministry of Defence) and planned around a week of fieldwork in May which worked best for availability of specialist support, military logistics, and tidal patterns which enabled safe access and egress onto the island (with military combat support boat available for emergency evacuation if needed). The fieldwork also had to be accomplished in a period which would have no negative effects on the overwintering birds for which the area is notified as a Site of Special Scientific Interest (SSSI).

Comments on the organisation of the report

This report includes a synopsis of material from the 2014 recovery work, an excavation report for the 2017 season and an osteological specialist report (with isotopic results). Furthermore, a desktop

study precedes the fieldwork component of this report to contextualise the results and to establish a history for the island.

Summary of site archive

All paper archives are held by Richard Osgood at the Ministry of Defence. Although several items such as clay pipe stems and gaming tokens were seen on the intertidal areas of Rat Island during the project, no small finds within securely sealed stratigraphic contexts were encountered, bar coffin nails (see below). No environmental samples were taken. A photographic archive will be included with this report and deposited with the Hampshire Historic Environment Record. All human remains were held at the Cranfield Forensics Institute (an approved repository) prior to intended reburial. The Hampshire Historic Environment Record will be informed of any reburial in order to complete this record

Potential of the data

The data within the report is an initial assessment of the results of fieldwork. More studies could be made of the human remains that were recovered, in particular with DNA assessments. If further fieldwork is attempted on Rat Island, the assemblage reported on here should be incorporated within results. The work of 2014-17 has illustrated the high potential for further human remains on the island – the erosion levels will be monitored by archaeologists within the Ministry of Defence to establish whether additional fieldwork is required at any point.

Legislation, Policy, Plans



Rat Island Grave Locations

Wessex Archaeology

Fig 1: Rat Island Grave Locations marked in red on Burrow Island (courtesy of Wessex Archaeology)

Work on the Ministry of Defence (MOD) estate is guided by the Department for Culture Media and Sport (DCMS) Protocol for the care of the Government's Historic Estate and, specifically within Defence, Joint Service Publication 362 Leaflet 12 (Defence Lands Handbook). Rat Island is not covered by one of the MOD Integrated Rural management Plans (IRMPs) nor covered by a Regional Prime Contract (RPC) hence the funding for such work came from Defence Infrastructure Organisation and the Conservation Stewardship Plan. The fieldwork required two statutory permissions – From Natural England and the Ministry of Justice (see below)

Background

In 2014, following heavy storms on the south coast, the Archaeology team within the Ministry of Defence were contacted by police in Portsmouth to report the discovery of human remain on the intertidal area at Burrow Island (also known as 'Rat Island') between Gosport and Portsmouth in

Hampshire, England. On visiting the site to collect these elements from the police, the MOD heritage team saw that further human remains were still present in grave cuts which were eroding from one side of the island. A team of volunteers was assembled and the human remains were recovered. Erosion continued and hence a more structured programme of fieldwork was carried out in 2017.

The site (from hereon in being referred to as Rat Island) was certainly known about – with local stories discussing the presence of human remains across the island even to the extent of this being mentioned in maritime tours of the docks.

Desktop strategy

Following the initial site visit in 2014, the authors undertook a standard Desk-based assessment of the area – with map regression, air photographic examination, an interrogation of the Hampshire Historic Environment Record (HER), newspaper searches, any holdings within Ministry of Defence Files, and a search of local history literature. Discussions were also held with Abigail Coppins – a leading expert on PoWs and prisoners of the period and curator of the English Heritage Prisoner collections at Portchester Castle.

The results of this are presented below.

After the fieldwork in 2014, and prior to the excavations of 2017, a Ground Penetrating Radar (GPR) survey of the area directly above the most concentrated areas of burials (Area A) by Peter Masters of Cranfield Forensics Institute. This survey was able to distinguish anomalies at some 2m below the surface of the made ground of the island which were perhaps further burials.

A Documented History of Rat Island – Christopher Daniell

There are two main sources for the history of the island: maps and newspapers. However, the search is complicated by the fact that the island has two consistent names: ‘Burrow Island’ and ‘Rat Island’. There has been some speculation about the name Rat Island, which was either because of the rats living on the early 19th century prisoner hulks and coming ashore on the island, or because of the waste offal from Royal Clarence Yard which was washed up on the island which the rats then ate. The earliest example of the name Rat Island so far discovered was the name given on the 1812 painting by John Schetky (see below). Whilst ‘Rat Island’ has been consistently spelt, there are numerous variations of Burrow Island. The earliest recorded name is on two Tudor maps ‘Barrow Island’ (pers comm R Harper, who has suggested that the site may have been so called because of a Prehistoric barrow located on the island), and ‘Baro’ (1678). There are several maps by De Gomme who proposed a fortification upon the island. His terminology included: ‘The Barow Island’, ‘Redout upon the Little Island’ (1688), ‘The Eyland called the Bou... Gosport ...’ A 19th century document records: ‘Burrough Island bough of John Holt in 1679 for £22:10:0; deed dated 17th Sept 1679’.

The spit joining the island at low tide to the mainland was known as Burrow Bank and in 1857 a portion was ‘under removal’ (*Portsmouth Times and Naval Gazette* 28 February 1857).

The earliest detailed maps of the area go back to the 17th century and the first map with any detail dates from 1678, which shows a small island and shingle bank formed by the convergence of Forton Creek with Portsmouth Harbour. The Victorians speculated that the site had either a Roman or Medieval fort on it (*Portsmouth Times and Naval Gazette* 28 February 1857), but there is no independent evidence for this, though in 1871 the *Hampshire Telegraph* reported that dredging in the harbour had discovered Roman pottery at a depth of 16 feet. ‘There is a legend that the fort was preceded by a Norman Castle. An old letter of 1847 which I have seen mentions ‘the ruins of

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Borough Castle, traditionally ascribed to King Stephen,' (Note: Capt G Civil note in the English Heritage Monument Long Report, National Archive, Swindon. Capt Civil's letter no longer exists.)

The earliest known structure is a small fort called Fort James built by the famous Dutch defensive engineer Sir Bernard De Gomme in 1679. Fort James was part of a much bigger defensive scheme around Portsmouth harbour as the vulnerability of the naval dockyards had become apparent during the Second Dutch War (1672-1678). Fortunately a detailed set of plans have survived of Fort James, copies of which are in Portsmouth City Library. The plans show a strong rectangular two-storied fort with walls six feet thick with a platform for guns and a curtain wall, also six feet thick. Within the fort is a 'House for a Sargeant', two guns and various rooms, with corner turrets each as a 'sentry house'. (Portsmouth Map Collection, Dartmouth Collection James Forte).

However, within a few decades of the fort's completion it was un-used and falling into decay. In 1698 the drawbridge was said to be needing repair and ten years later in 1707/8 Admiral Sir George Byng noted that the fort was in poor condition (G H Williams, *The Western Defences of Portsmouth Harbour 1400–1800*. Portsmouth City Council 1979 . p. 19). In 1742, an order was made to recover its 2 guns which were weed-covered

(http://www.pastscape.org.uk/hob.aspx?hob_id=238752&sort=4&search=all&criteria=monckton&national=q&recordsperpage=10). There was a scheme to rebuild it in 1750, but this was not carried out (Williams, ibid pp 21-22). During the 18th century the fort continued to decline.

There is a drawing of the ruinous fort in the National Maritime Museum collection, described as Rat Island 1812" by John Schetky, which shows the fort and curtain wall before its demolition (National Maritime Museum PAI 0913). There are no windows or fixtures or fittings shown, but the walls look substantial, high and strong. There is also a small curtain wall running down to the sea and then turning parallel to the sea. The artist's location is not clear, but the most logical location is at Priddy's Hard looking across Forton Lake to Royal Clarence Yard (indicated by the buildings behind). That the view is of Forton Lake in the foreground is also emphasised by the small ships and the pencilled in small ship which appears beached in the immediate foreshore. It is also possible that the fort is shown on two other drawings.

On a map of 1810 the fort is shown in outline, but with an additional feature stretching into Portsmouth Harbour. This could be a jetty which was used for transporting the stone away from the island.

By the late 1820s the fort had been completely removed. English Heritage have a record from 1953 which states a 'letter of 1828 says "the walls of the Castle [ie Fort James] have lately been taken down" (Note: Capt G Civil note in the English Heritage Monument Long Report, National Archive, Swindon. The original letter no longer exists.) By the 1830s there was nothing left of the fort.

The first indication of a 19th Century military presence on the island is the report of an accident in 1833 (*Reading Mercury* 4 Nov 1833). A gun exploded on St Mary's Quay and the wadding was catapulted over to the island, severely injuring Master-gunner Ross. Thereafter there were frequent newspaper reports of plans or activities on Rat Island.

In 1846 the *West Kent Guardian* (14 February 1846) reported a planned scheme to make the island into a coaling station. A pier was to be created, on the end of which was a large coal store. This

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scheme was dropped in 1847 because of ‘insuperable’ objections, in particular because the jetty would lead to the ‘unavoidable accumulation of muddy deposits’ (*Morning Post*, 16 August 1847). *The Evening Chronicle* (31 August 1846) also reported on the proposed coaling station and there was the recommendation that Rat Island should be converted into a fort as it could sweep the entrance of the Harbour ‘and be made useful than Blockhouse Fort’.

Possibly as part of the planned coaling station in May 1846 Lieutenant Richard Tylden of the Royal Engineers drew a plan and sections of the island (The National Archives MPH 1/233/6). There is no trace of the fort on the plan and the island is devoid of any trees and only has two structures upon it, one of which is a building 46 feet long and 18 feet wide, and the other is a 6ft square structure. The length of the island is 348 feet and its width is 108 feet.

Instead, in 1847, the Ordnance granted permission for the Admiralty to make the island into a drill-ground for HMS Excellent’s men to drill with field-pieces (London Daily News 8 March 1847), whereas the *Shipping and Mercantile Gazette* (9 March 1847) stated that the officers and seamen would be exercised ‘in field fortification, storming etc. Some heavy 60 pounders will be mounted on the island’ in defence of the harbour and dockyards. Later in the year the Board of Admiralty visited the harbour, which included Rat Island ‘where officers and men of the Excellent are instructed in the formation of field works etc and other kinds of fortifications’ (*Morning Post* 11 August 1847). The *Dover Telegraph* (14 August 1847) added the detail that the Lords ‘inspected the plans of Lieut. Savage, of the Royal Naval College, for Service Batteries, one of which is erected on the island’. In preparation for this thousands of tons of spoil from the excavated dockyard basins were dumped by convict labourers.

Rat Island was also used as a Victorian burning ground on occasion and on 16 September 1854 *The Hampshire Advertiser* reported that the St Vincent was towed into harbour and as a precaution ‘a large number of the blankets and hammocks etc used by the Russian prisoners, supposed to have been infected by cholera (as she came into port with several cases on board), were burned on Rat Island in this harbour’. The *London Evening Standard* (12 September 1854) stated that the blankets belonged to the men ‘who died on cholera’ whilst on board and the *Evening Mail* (13 September 1854) quantified the burnt amount as ‘several hundred beds and blankets’.

For the rest of the century the island had two main uses, the first as a drill ground and the second as a site of experimentation.

Drill Parade Ground

In 1847 the Ordnance granted permission for the Admiralty to use Rat Island as a drill ground for Excellent’s men with field-pieces (*The Daily News* March 8 1847) and the function of the island as a drill ground was the island’s primary role for the rest of the century. In the same year a high ranking visitation visited the island where the officers and men of the Excellent are instructed in the formation of field work etc and other kinds of fortifications’ (*West Kent Guardian* 14 August 1847).

In 1854 the ‘newly raised men of the Excellent were drilled in musket and sword exercise ...and the men of the ordinary were also exercised in the use of the floating engines’ (which were not specified) (*Hampshire Advertiser* 29 July 1854). This use continued until the end of the century, but in 1900 the *Hampshire Telegraph* reported that Rat Island ‘was formerly used as a drill ground for

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field gun practice by the seamen of the Excellent' (*Hampshire Telegraph* 22 September 1900). In an article, written in 1926, stated that field work took place on Rat Island 'and on one day a week the Marine Cadets were instructed ... in field fortification work' (*Hampshire Telegraph* 27 December 1929).

However, this use unfortunately led to some accidents and even deaths, and the newspapers reported in 1862 the death of Robert Price, who was 21, who was an able bodied seaman on HMS Excellent. He was practicing drill and was moving a 12-pounder Armstrong gun when it overbalanced and crushed his head – causing instant death (*Portsmouth Times and Naval Gazette* 28 June 1828). In 1870 Henry Hicks, a leading seaman with HMS Excellent, also died on the island whilst practicing gun drill, this time because of a heart attack (*Hampshire Telegraph* 24 September 1870).

An odd occurrence happened in 1861 when a bullet was fired through the bread-room of Royal Clarence Yard. The police investigated and a number of men from the Excellent who 'were at rifle practice, with blank cartridge – and it is supposed the bullet was fired by one of those men thoughtlessly; it is, however, strange that it is not one as issued by the Government' (*Morning Advertiser* 18 Oct 1861).

However, the logistical difficulties were written about in the *Naval and Military Gazette* (10 February 1872): 'It is estimated that one hour of drill hour in every five is lost daily by drill parties in going to and from Burrow or Rat Island for field battery drill and laboratory processes etc'.). The reference to a laboratory on the island is not elaborated upon. On the foreshore large fragments of crucibles have been found and these may have been part of experiments on the island.

Experimentation

The island was also used as a base for experimentation. In 1847 the officers and men of Excellent created a 'sand-bag battery' (*Shipping and Mercantile Gazette* 6 October 1847). In 1849 a series of experiments were undertaken to blow up a practice stockade. The reports were widely published in a variety of newspapers with one of the longest accounts given in the *Salisbury and Winchester Journal* (29 September 1849). A practice stockade was erected, from the recently broken up brig Curlew, with different amounts of gun powder being detonated against it. Whilst the 5lb and 10lb charges did not affect the stockade, when 5lb of powder in a flannel cartridge was used, with 120lb bag of sand over it three planks of the stockade were blown down with fragments being thrown in all directions. The experiment then stopped as a splinter hit the Commander in the leg and he suffered a considerable wound (*Lloyds Weekly London Newspaper*, 30 September 30th 1847) which turned out to be very heavy bruising (*The Daily News*, September 26 1849 page 7). Earlier in the year *London Evening Standard* (22 March 1854) reported that experiments were carried out on the island by the Royal Marine Artillery, in mining and blasting operations with the *Portsmouth Times and Naval Gazette* (25 March 1854) adding that the experiments were 'to try the effects of gunpowder in blasting stockheads'. The experiments were witnessed by Vice Admiral Sir Thomas John Cochrane amongst others.

As well as for military purposes Rat Island was also used for more general purposes. The 1852 various experiments concerning Phillip's Fire Annihilator were reported on Rat Island. The experiments were described in detail by the *Illustrated London News* (23 October 1852) and the *North & South Shields Gazette and Northumberland and Durham Advertiser* (22 October 1852) and

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the *Liverpool Mail* (23 October 1852)), though there are some discrepancies between the accounts. The first experiment involved an ‘immense quantity’ of coal which was put into a trench and ignited. The next experiment involved twenty tar barrels which were put into a trough, or reservoir, forty or fifty feet by five feet in size, filled with wool, tar, naptha and ‘other flammable materials’ and then five empty tar barrels were filled with shavings and naptha and ‘other flammable materials’ poured on them and then they were set alight, and the third and last involved a purposefully built wooden building, twenty five feet long and high, was filled with combustible materials and set alight. The ‘Annihilator’ successfully put out all the flames and the experiments were deemed successful. The *North and South Shields Gazette* describes the annihilators as ‘portable engines. The largest goes on wheels, and is about the size of a small barrel’.

By the second half of the 19th century there was a considerable number of buildings on the northern end of the island. A detailed Admiralty map of 1891 shows the buildings and structures, which included: Officers’ Mess Room; Mens’ Mess Shed; Gun Shed; Gunner’s Quarters; Signal Post; Observatory; Flagstaff; Practice Battery; Jetty and Derrick. The buildings were all single storey and are shown as part of a Portsmouth Harbour photographic panorama of 1881 and in a painting by the local artist Martin Snape. In 1892 tenders were invited to ‘Remove Earth Closet Soil and Rubbish ... and further to supply Dry Earth for use with closets’ (*Portsmouth Evening News* 1892) showing that the area was still actively used.

On the 25 July 1896 the *Army and Navy Gazette* gave the first indication that homing pigeons were to be based on Rat Island as part of the Navy’s messaging systems from ship to shore. The pigeons had previously been trained by the Commander of Whale Island entirely at his own expense, and the following month the proposed plan was mentioned in the *Illustrated Sporting and Dramatic News* (22 August 1896). The *Morning Post* in September (9 September 1896) mentioned that the ‘pigeon establishment’ had not been transferred to Rat Island yet. The plan was then changed, and the pigeon loft was being built near the Queen’s private landing stage on Royal Clarence Yard (*Morning Post* 16 March 1897), but was changed again and on the 17 July 1897 the *Isle of Wight County Press* and South England reporter wrote that Rat island was ‘an ideal spot in every way’, and in November the *Army and Navy Gazette* (6 November 1897) wrote that the pigeon cote on Rat Island was ‘comparatively new’. The *Belfast Newsletter* (28 July 1897) gave details of the new communications system of homing pigeons had been initially developed by individual officers, but the Naval Intelligence Department took notice and a pigeon cote had been built on Rat Island, ‘an ideal spot in every way’. The pigeons were kept on board ship and then released up to 120 miles from shore where upon they would fly home with messages. The article reported that pigeons were even used on the Royal Yacht. However, under the main article was another with a cautionary tale – the Germans had flown homing pigeons from Dover, but the coast guard had found many dead, having been attacked and killed by British hawks.

The Mindry Family

In the latter part of the 19th century the Mindry family lived on the island and through a range of records a reasonably detailed picture can be built up of the family. The reason for the family living on the island is probably that the father, Robert Mindry, was a caretaker for the whole site. In the 1871 Census Returns the husband, Robert, was 48 and living on Burrough Island. However, also in the 1871 census Robert was again included – a rare example of a ‘double count’ on the census – and

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this time the island was described as ‘Rat Island Extra Parochial’ and his family was included. The family consisted of Robert, the father, who was 47 and a Gunner 1st Class Royal Navy who was born in Gillingham Kent, his wife Mary Anne, 47, born in Devonport, Mary Jane, 21 born in Portsea, Frederick R, 13 born in Portsea, Henry H, 11 born in Portsea, Edith, 8, born in Portsea and Helena 2, who was born on Rat Island. Helena is the only known confirmed birth on the island. However, a birth announcement in the *Portsmouth Times and Naval Gazette* (6 April 1867) states that a daughter was born on Borough Island – an alternative name to Rat Island - to the wife of Mr Henry Kuron, gunner RN and it maybe that the family were resident there before the Mindry family. Despite extensive searches no other reference has been found to the Kuron family and it maybe that the name was misspelt in the newspaper, made more likely by the lack of a birth certificate in 1867 with the surname Kuron. In 1881 Robert Mindry was away from Rat Island and his wife Mary remained with Henry, Edith and Helena. Mary was described as ‘Gunner’s wife RN’ and her 20 year old son Henry was described as a ‘Seaman RN’.

The most detailed record for Robert is his Physical and Service record (number 319657) which records that he was born on the 20th May 1821 at Gillingham in Kent. He had ‘light’ hair, blue eyes, a fair complexion and was 5 feet 8 1/2 inches tall and he could write. His only injury was a scar on his right leg. He was aged 25 when ‘ticketed’ and he first went to sea as a boy in 1836 and at the time of writing (20 May 1846) had served in the Royal Navy for 9 years. When not in the navy he resided in Hackney. In 1846 and 1847 he was on HMS Dasher, being discharged on 4 June 1847. HMS Dasher was a wooden paddle packet of 357 tons, launched at Chatham Dockyard on 5 December 1837 (<https://www.royalnavy.mod.uk/dasher>). He died in the last quarter of 1907 in Portsmouth.

The newspapers of the time revealed several tragedies which occurred to them. In 1873 the case of the young son of the Mindry’s was reported. Two of the Mindry boys were sent to Gosport for medicine as their mother was ill. Whilst attempting to cross the water the ‘10 or 11 year old’ fell overboard the boat and despite assistance being given he was drowned and his body could not be recovered (*The Hampshire Telegraph* and *Sussex Chronicle* March 5 1873). Although the boy is not named, given that Henry was 11 on the 1871 census, he is the most obvious candidate, but he appears on the 1881 Census, whereas Frederick does not, so Frederick (then aged 15) was presumably young looking for his age.

In 1877 the family again came to the attention of the press with a potentially tragic court case which was written about in the *Hampshire Telegraph* (Saturday 11 August 1877). The report told of an unnamed woman who lived on Rat Island (presumably the wife, Mary-Jane) applying to the Magistrates for the restitution of her six month old baby whom her husband had ‘detained’ overnight. As she could not breast feed the baby she was frightened that her baby might starve to death. He had been violent and aggressive towards her and had broken the Venetian blinds of the house where they lived. The Magistrate stated that the island was under naval control, so she had better apply to the commanding officer of the Excellent. The woman replied she had already done so and been referred by the commander to the civil authorities. The Magistrate said that if anything should happen to the baby the husband would render himself liable to serious indictment but he considered it a family quarrel and had no power to intervene. The outcome of the incident is not known.

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In the 1881 Census the family had moved off the island and the resident population on Rat Island was nil (*Hampshire Advertiser* 23 May 1883).

During the Victorian era the island formed a useful vantage point for cheering important guests or gun salutes – especially royalty. In 1858 the Coastguard fired for the Queen's Birthday and in 1874 the men from HMS Excellent ‘were drawn up like sentinels on the crest of the grounds’ of Rat Island with a 19 gun salute being fired (rather than the normal 21) ‘signifying that formal honour was being paid, for the first time, to the new First Lord of the Admiralty.’ (*London Daily News* 24 April 1874). Later in the same year Queen Victoria inspected the seaman and marines at Royal Clarence Yard and a large number of seamen stood on the side facing Royal Clarence Yard to welcome the Queen (*Hampshire Telegraph* 25 April 1874).

One of the last big events reported by the newspapers the transportation of Queen Victoria’s coffin to her beloved Osborne House on the Isle of Wight. The men of the Excellent and boys from the training ship St Vincent manned Burrow Island as the coffin cadets lining the island as the coffin of Queen Victoria went past (*Portsmouth Evening News* 30 January 1900). Later in the same year Edward VII and his Queen visited Portsmouth and the men on Burrow Island ‘added to the volume of welcoming acclamations’.

As a drill-ground Rat Island was no longer in use by 1900 but a scheme was reported in the *Hampshire Telegraph* (12 September 1900) to convert the island into the new naval coaling station. It was to be connected to the mainland by a railway so coal could be delivered by land and water. To enlarge the island material was going to be dredged from the harbour (*Hampshire Telegraph* 4 May 1900) This was the last major conversion scheme proposed for Rat Island but it was never carried out and in 1902 the scheme had been abandoned (*Hampshire Telegraph* 13 December 1902).

In the 20th century the island became less and less used. In 1904 tender notices were issued for the removal of earth closet soil and rubbish from Whale island and Burrow Island (*Portsmouth Evening News* 19 August 1904), and it may be that a decision had been made to formally reduce the use of Burrow Island. In the event this is what seems to have happened. During the 20th century from a previously bare patch of ground the vegetation began to take hold. Maps and aerial photography of the island show it vegetation-less until the 1920s and then slowly the trees began to grow. The maps and aerial photographs show the progressive growth of the vegetation.

It is only in the 20th century that a few mentions of beached shipping occur. In 1906 there was a mention of Rat Island in relation to a collision at sea when the Solent Queen, one of the harbour ferries collided with another ferry, the Frances, and was holed. The Solent Queen was first beached at Rat Island and the ‘collision mats’ were deployed. She later attempted to journey to Southampton, but took in so much water that she had to land at Gosport Hard (*Portsmouth Evening News* 4 December 1906). In 1946 the corvette Lupin was beached at Rat Island after springing a leak and in 1947 was to be towed to Portchester to be broken up, but owing to the bad weather had to be towed in the winter of 1947 (*Hampshire Telegraph* 29 August 1947, *Hampshire Telegraph* 14 November 1947). A large anchor structure, dated 1944, still survives at the southern end of the island and unless the tides have moved it, it is likely that the island was used in some way for D-Day, though this aspect is unrecorded.

The uses for the island in the 20th century were as a landing point for under-sea cables and also as a burning ground for unwanted fuel or munitions from Priddy’s Hard. It was in order to carry the material to be burnt that a little tramway was built from Burrow Island to Priddy’s Hard, the tracks of which can still be seen along the shingle bank.

Rat Island 2017 Excavations: Exercise Magwitch

Today the island is completely overgrown with only the odd platform or object to be found on it. There are small portions of walls or re-vetting, especially on the eastern side. At present their uses and dates are unknown.

Note – There are several islands named ‘Rat Island’ which are reported on in the newspapers, notably Rat Island near Lundy, and on Jersey. In 1856 there is a single line entry about the building of barracks, which states ‘And Rat Island, for 13 officers and 378 men’ (*Morning Chronicle* 3 May 1856), but this is not the Rat Island in Portsmouth Harbour.

The Burials

The burials discovered on Rat Island are as yet they are undated, but there are two main possibilities. The first is that they are prisoners of war from the American War of Independence or the Napoleonic Wars. If this is the case then they could be from a wide area of the globe, as fighting took place in North America, Caribbean, Europe, North Africa and the Middle East. Abigail Coppins has undertaken a large amount of research on the prisoners of war in Gosport, and there were large prisons at Portchester Castle and Forton Creek, as well as prisoner of war hulks in the harbour.

Whilst prisoner of war burials are possible, especially if there was a continuing tradition, there is more evidence for the burials being of convicts from the 1830s and 1840s from the prison hulks which lay in the harbour. Prison hulks were a common sight in Portsmouth harbour and were large decaying ships which were used to house prisoners, either as a ‘prison overspill’ system or for prisoners awaiting transportation to the colonies. A OS map of 1858 states that the south-eastern section of the island is the ‘convicts burying ground’ and in 1852 it was described as the ‘the convicts’ burial-ground’ (*Morning Chronicle* 18 October 1852). This was remembered after the burials had ceased and in 1891 a report of Queen Victoria’s visit to Portsmouth mentioned the previous convict ships ‘and any one will tell you the direction of Rat’s Island, where the prisoners were buried.’ (*London Daily News* 27 February 1891).

Another tantalising reference is located in some lines from a tale written in *The Graphic* in the 5 January 1878 edition about the Portsmouth of the 1840s and 1850s. ‘By Celia’s Arbour’ by Walter Besant and James Rice suggested that the burial of convicts was rudimentary though probably not dissimilar to many other inhumations in Portsmouth and Gosport at the time, and were at least with spiritual component:

“Brave and honest soldier – there is the roll of musketry over his grave – God rest his soul! Down below, creeping sluggishly along, go the gangs of convicts armed with pick and spade. No funeral march for them when their course is run; only the chaplain to read the appointed service; only an ignoble and forgotten grave in the mud of Rat Island”

However, there is one certain, named, burial on Burrow Island. In 07 February 1831 the *Reading Mercury* stated that Charles Morris Jones, a convict on the York prison hulk died and was buried on Rat Island. Earlier newspapers had charted the course of Charles’s life and how he came to be on the prison hulk. The Abingdon court notices of October 24 1829 give a detailed account of how Morris came to be caught. Charles Morris Jones was born and lived in Aberystwyth and in his early 20s he moved to Abingdon where he was employed in the drapers shop owned by Mr George Shepherd. He was described as a ‘gentleman looking young man’. Shepherd strongly him of stealing money, so with some friends set a trap whereby two people bought some cloth with ‘marked money’. Morris was searched and some marked money was found in his pockets. It also transpired

that Morris had an accomplice in London (who was not named) who had received goods to the value of £30 from Morris. The trial report ends ominously ‘There will be little doubt that he will be committed on Tuesday next on a capital charge’. The expectation was that he would be hanged. On November 2 it was reported that Jones was not ‘examined’ by the magistrates owing to the fact that one of the witnesses from London failed to attend. The examination was reported in the November 7 Oxford Journal when the two London witnesses had arrived. They were named Owen and Jones and had received money and different sorts of cloth and a ticketed piece of lace, which proved it had come from Shepherd’s shop. Morris had also written to Owen and boasted that he was doing very well ‘at the rate of one pound a day!’. Jones was again committed until the next Assizes. The actual trial was on the 3rd March 1830 and Morris was one of nine others found guilty of relatively minor theft – all were sentenced to death. A long trial report was given in the Reading Mercury which includes a transcript of a letter from Morris to his cousin in Upper-Baker Street. The letters indicates that Jones was pretending to be a travelling buyer of cloth which he would then post via the Alert coach to Jones in London. Jones made no defence and was immediately found guilty with his counsel pleading that his life be spared. It was the jury that pleaded that his life be spared and the judge agreed – on the condition that he be transported for life. Sometime during the week of May 17 Jones and seven others were taken to the York hulk in Gosport, in the expectation that he would be transported for life. It was nearly a year later the Abingdon correspondent reported on the 3rd February 1831 that Charles Morris Jones ‘who was sentenced to 14 years transportation, lately died at the hulks at Portsmouth, and was buried on Rat Island’.

Fieldwork

In both 2014 and 2017, the recovery of remains was accomplished by a mixture of heritage professionals (forensics specialists and field archaeologists) and military personnel on the ‘Operation Nightingale’ programme –utilising archaeology as a means of facilitating recovery post operational tours. In 2017, the logistics of this fieldwork was run by Breaking Ground Heritage.

2014

Team Composition: Richard Bennett, Tyler Christopher, Abigail Coppins, Chris Daniell, Kelly Domoney, Jeanette Dunn, Oznur Gulan, Deborah Harrison, Dave Hart, Paul Hemmingway, Nick Márquez-Grant, Ellie Morris, Amy Stringer, Steve Winterton,

BI2014 2014 results:

The 2014 was largely constituted a rapid recovery exercise prior to continued storm damage and hence, although photographs of remains were taken *in situ* and the human remains analysed at Cranfield Forensics Institute, little by way of drawn plans were undertaken as speed was of the essence. This approach was discussed with Jacqui McKinley at Wessex Archaeology beforehand to agree priorities. This work however enabled a more considered field programme to be accomplished in 2017. The area was divided up by distinct regions from south to north. A dense group of grave cuts at the southern end was delimited area ‘A’, a single cut by an inlet channel just above these as called area ‘B’, a longer ‘alcove’ above this with two clear opened graves was called area ‘C’, a further exposed single grave opening to the north of this was called area ‘D’ and finally a further ‘alcove’ with exposed grave opening above this was called area ‘E’. These grave cuts were all cut into what is now consolidated beach single and filled with a fine silt and grey sand with gravel. The edge of each grave cut was very solid and delimited areas distinctly. Pieces of slate, brick rubble some clay pipe stems and clay soul of made ground covered these areas. It was unsafe to attempt to record any of the buried remains (which were articulated) *in situ* bar the use of photography – indeed one of the burials was re-covered by a further cliff collapse after the recovery of the human remains. Hence even plans of the grave cuts were not possible although GPS readings on the grave cuts were taken. A report on the 2014 human remains by Dr Nicholas Márquez-Grant is below.

| Areas with Graves seen at Rat Island in 2014 | | | |
|--|--|--------------------|--|
| Area | NGR | Taken from | Comments |
| A | SU 6207900756 | Ankle area | Area A had four grave cuts |
| A2 | SU 6208000758 | Grave Cut | No remains present |
| B | SU 6208000762 | Femur | Single grave (most complete skeleton) |
| C | SU 6208100765 (S) and SU6208200763 (N) | Ankle Tibia/Fibula | Area C had two grave cuts – one to the south and one to the north – in a distinct alcove |
| D | SU 6208400767 | Chest | Little remaining – eroded |
| E | SU6207800764 | Chest | Little remaining – close to ashlar blocks |

The burials were cut in East-West alignment and some retained iron nails (seen in the 2017 to be coffin nails).

The numbering scheme for burials in 2014 was continued in 2017 as they formed part of the same assemblage. In addition to *in situ* articulated remains, several stray human bones were found in the intertidal area around the island. These were recovered and a grid reference taken (see Annex 2)

2017

Research Aims

The fieldwork at Rat Island in 2017 had several aims:

- Was it possible to recover any material that gave greater clarity on the dating of these burials?
- Could the team establish whether these burials were of prisoners of war or prisoners from the hulks, or indeed whether they were connected to something entirely separate?
- Could the team find any evidence for formalised burial ritual rather than dimly ‘disposal’?
- Could the team recover components of burials seen in 2014 which were inaccessible?
- If the burials were thought to be prisoners of war, could further scientific analysis establish the origin of the individuals?
- Could the team establish the likely extent of burials on the island?

Previous work on the site

In addition to the 2014 recovery operation, a GPR survey was made beforehand by Peter Masters of Cranfield Forensics Institute to augment existing knowledge and to highlight potential burial areas.

Team Composition

The team of 2017 was a mixture of military personnel on the ‘Operation Nightingale’ programme, archaeologists, forensic osteologists, historians and serving military in a support capacity (Royal Military Police, 17 Port and Maritime Regiment Royal Logistics Corps). Phil Andrews, Sarah Ashbridge, Stu Bear, Richard Bennett, Dennis Braekmans, Fiona Brock, Ricky Coleman, Sarah Holloway, Mark Khan, Briony Lalor, Nick Márquez-Grant, Hannah McGivern, Lisa Miller, Harvey Mills, Mark Mortiboys, Ad Palmer, Ryan Parmenter, Jim Rice, Alex Rowson, Emma Saunders, Matt Smith, Dave Spencer, Rob Steel, Laura Tidd, Steve Winter, Roland Wessling, Roberta Marziani. Following the site work, the programme was assisted in post-excavation by Facelab of Liverpool John Moores University, Universities of Leuven and Oxford (isotopes), Cranfield Forensic Institute (ostological assessment and isotopes), Wessex Archaeology and Brenda Craddock (plans), Royal Engineers (mapping).

Recording

Burials were given unique numbers, planned at 1:10 where possible (A6, A7and A8) and photographed in situ, A5 was recovered from the eroding cliff (on advice from Jacqui McKinley) with an assessment of the skeleton being the only record; it being neither safe, nor possible, to photograph or plan in situ. Skeleton recording sheets for all burials were completed.

A photogrammetric survey and model of burials A6/A8 and A7 was undertaken by Wessex Archaeology (see Sketchfab URL below for low-resolution version), and a Differential Global Positioning System (DGPS) record of the burials was made. A photographic diary of the fieldwork was accomplished as was a film diary which was later utilised in BBC TV 'Digging for Britain'.



Fig 2: Part of the Wessex Archaeology photogrammetric plot of burials A6 (top) and A7 (below)

After site work, Cranfield Forensics Institute assessed all the human remains (See below) and Facelab produced a facial reconstruction of burial A7, and a 3d print of the skull of this individual too.

Timings

May 2017 was selected for the fieldwork in order not to affect over-wintering birds, and also as a time when logistics support could be procured. Although the team were supported by 17 Port Maritime Regiment Royal Logistics Corps (RLC), the week of 2 – 5 May was chosen for fieldwork in order to facilitate access to and from the site over the causeway by Priddy's Hard without the need for boat.

Licenses Required (SSSI, MOJ)

Assent Ref 213984 was acquired from Natural England as the site lies within a Site of Special Scientific Interest (SSSI), and a Ministry of Justice License (17-0045) was also obtained for the Archaeological Removal of Human Remains. The Queen's Harbourmaster was kept informed of our presence too.

Fieldwork Methodology

The primary component of on-site work was to make an overhanging holm oak safe. The main limbs were removed and the remaining trunk assessed for stability. Although a large root plate remained, the roots held portions of the cliff in place. Cut into the cliff, the grave openings were stable and consolidated enough to enable retrieval of remains though not for in-situ recording of position. Initial aspirations to use a machine to remove cliff overburden mechanically were seen, following a site visit, to be too problematic. Even though a JCB or 360 degree excavator could be disembarked onto the island from a military mexeflote, there was no certainty that it would not then sink into inter-tidal muds. On-site Security for this equipment would also have been problematic. All fieldwork was thus done by hand, as was site backfilling.

On surface discovery with hand tools, graves were then lowered using trowels, hand and paint brushes and hand shovels. Material from the graves (though not sampled for environmental components, was hand sieved to ensure total recovery of grave contents.

Each grave was assigned a unique context (cutting) number with contexts (fill) within relating to this cut. The graves (bar BI17 004 which was in the cliff) were drawn in plan at 1:10, with a profile drawn across both. Burials A6, A7 and A8 were also recorded with a photogrammetric survey and the graves were then planned with Differential GPS. The area around the graves were assessed with metal detectors too but, although some items were located, no in-situ deposits were located. The fieldwork had Explosives Ordnance Disposal (EOD) experts present given the past history of the island and its proximity both to the Naval base, and also to Priddy's yard.

Fieldwork days were designed around tidal times although the requirement for longer work hours towards the end to ensure project completion, was facilitated by access to site by a Combat Support Boat (CSB) of the Royal Logistics Corps.

Burials

The fieldwork of 2017 yielded four articulated human bodies – these were labelled A5, A6, A7 and A8 to continue the numbering of 2014. Burial A5 was cut into the cliff face whilst A6, A7 and A8 were on the foreshore below the cliff, in wooden coffins. The coffins were up to 36cm in surviving depth with the deepest grave cut being c55cm. The coffin for grave A6 lay directly stacked above that of grave A8.

A5 (Context BI17 004)

Burial A5 was simply seen as an opening in the cliff face and hence neither plan nor profile of the grave was possible. The remains were recovered by the team with the presence/absence of skeletal material noted on recording forms, and with their inclusion in the overall report. All skeletal material was recovered. The burial was East-West aligned with the head towards the east end. This burial was located following recovery of lower leg (tibiae and fibulae) in 2014 and had been labelled as A2 in the previous recovery. Thus components of A2 (from 2014) are also part of this burial. Burial was extended and supine. No environmental samples were taken though all grave fill was metal detected (no finds) and sieved.

A6 (Context BI17 008)

Burial A6 was clear of the cliff face and was cut down through consolidated beach shingle, and filled with a grey sand, with orange/brown clay components above it. Both of these layers had a c20% small gravel inclusion level. The grave cut had components of a wooden coffin with iron nail attachments. This coffin was fragmentary (although traces of a collapsed lid was seen) and the human remains within, although articulated, being incomplete. The lower half of the body was missing, presumably having been eroded by tidal action. The burial was East-West aligned with the head towards the east end. The 'foot' (east) end of the grave cut had also eroded away. Although the stratigraphic association does not aid precise dating and cannot be said to be accompanying the burial, a clay pipe bowl and stem were located immediately above this inhumation. The coffin was in a grave cut aligned East-West with the head towards the east end. Burial was extended and supine. A6 lay directly above A8. No environmental samples were taken though all grave fill was metal detected (no finds) and sieved. A6 is present on the photogrammetric plan and model.



Fig 3: A6 under excavation

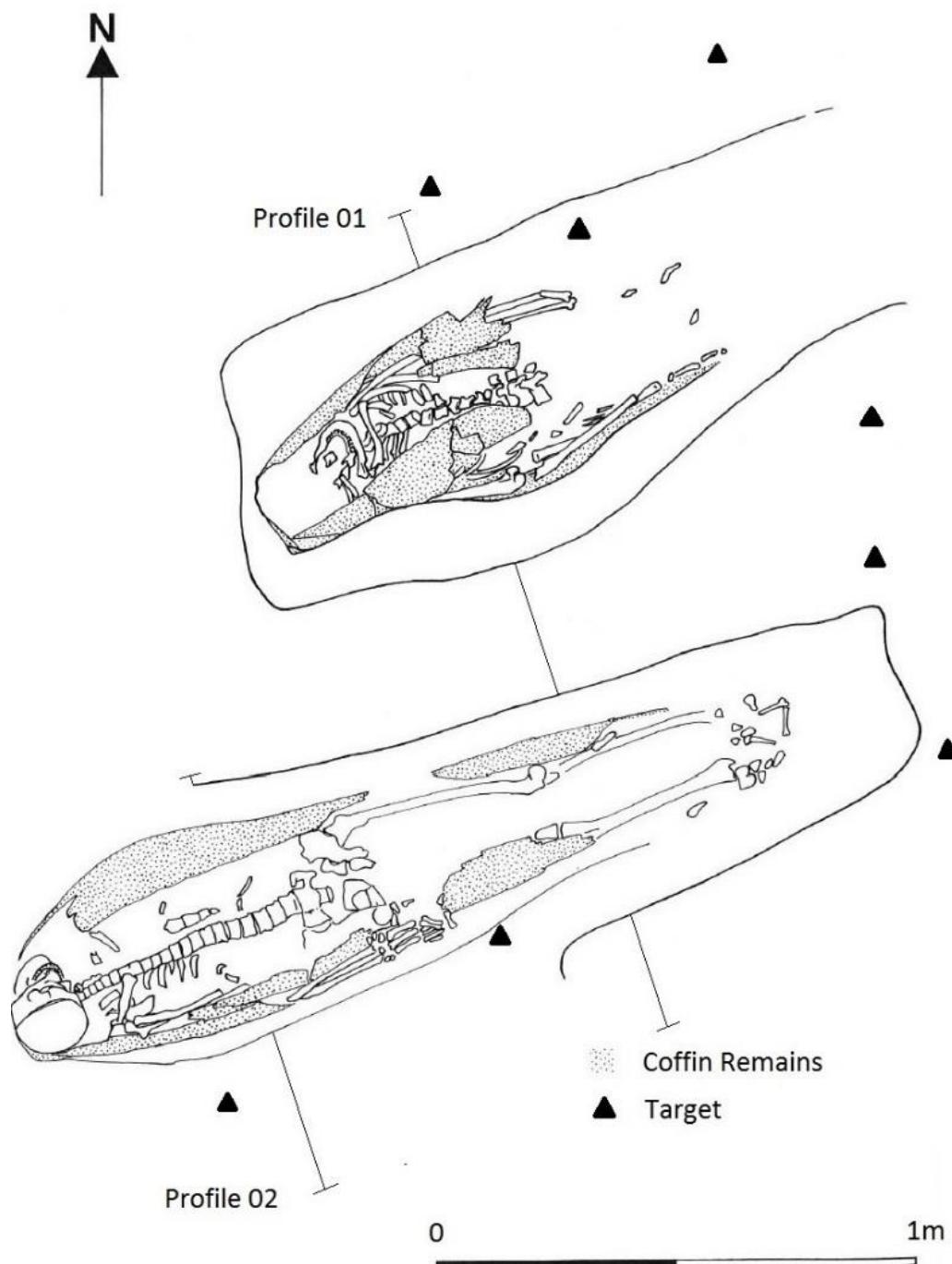


Fig 4: Grave cuttings for A6 (above) and A7 (below) at Rat Island. Note that burial A8 lay directly below burial A6.

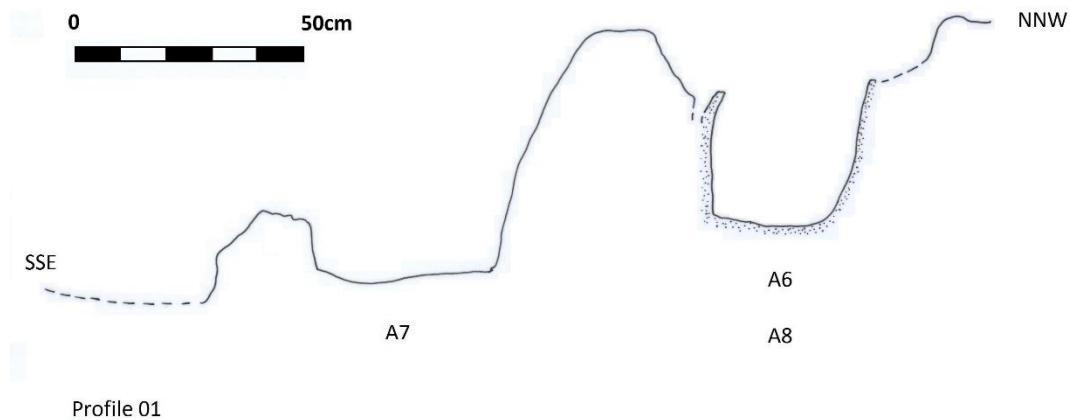


Fig 5: Profile 01 across cuttings for graves A6-A8. See Fig 4 for location

A7 (Context BI17 014)

Burial A7 was the most complete of the four burials recovered in 2017. It was clear of the cliff face and was cut down through consolidated beach shingle, and filled with a grey sand, with orange/brown clay components above it. Both of these layers had a c20% small gravel inclusion level. The burial was East-West aligned with the head towards the east end. The grave cut had components of a wooden coffin whose edges defined the grave area where the grave cut was no longer present (southern/eastern edge). The coffin still retained some iron nails and internal traces of a white material toward the upper edge where it would once have joined the lid. The wood of this coffin was elm (Pelling, R – Historic England, *Pers.comm.*). This grave was located to the immediate south of A6 and A8 and was not cut by any other features though its extreme Eastern (foot) end had been eroded away by tidal action. Even before laboratory examination, it was obvious that this burial had been subject to a craniotomy. No grave goods. Burial was extended and supine. The skull of this individual was scanned for facial reconstruction by Facelab (See Fig. 7). No environmental samples were taken though all grave fill was metal detected (no finds) and sieved. A7 is present on the photogrammetric plan and model.



Fig 6: A7 Under Excavation (Harvey Mills Photography)

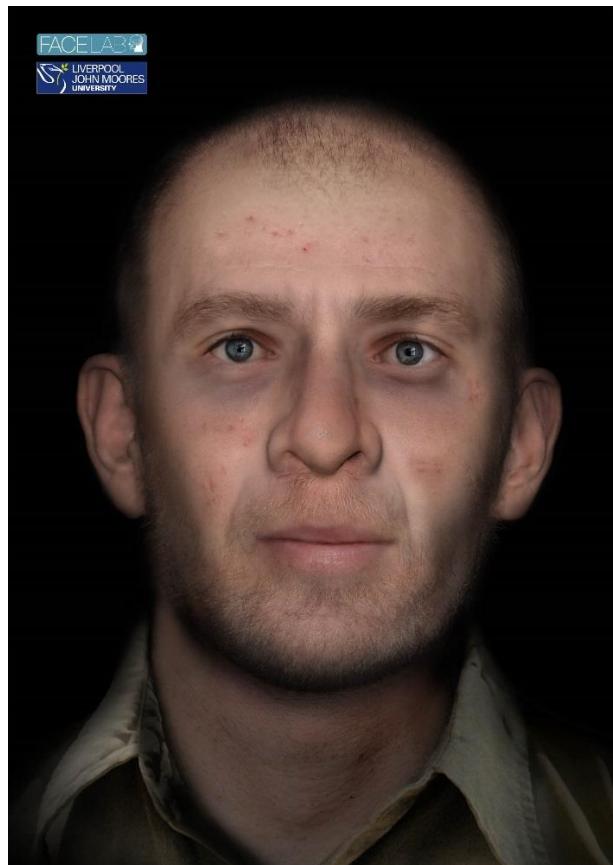
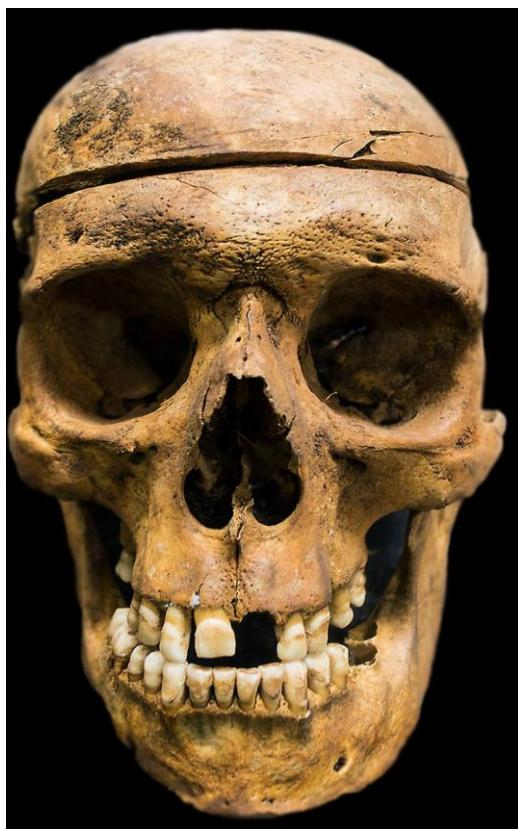


Fig 7: Skull of A7 (Harvey Mills Photography) and Facial reconstruction by Facelab of Liverpool John
Moors University

Rat Island 2017 Excavations: Exercise Magwitch

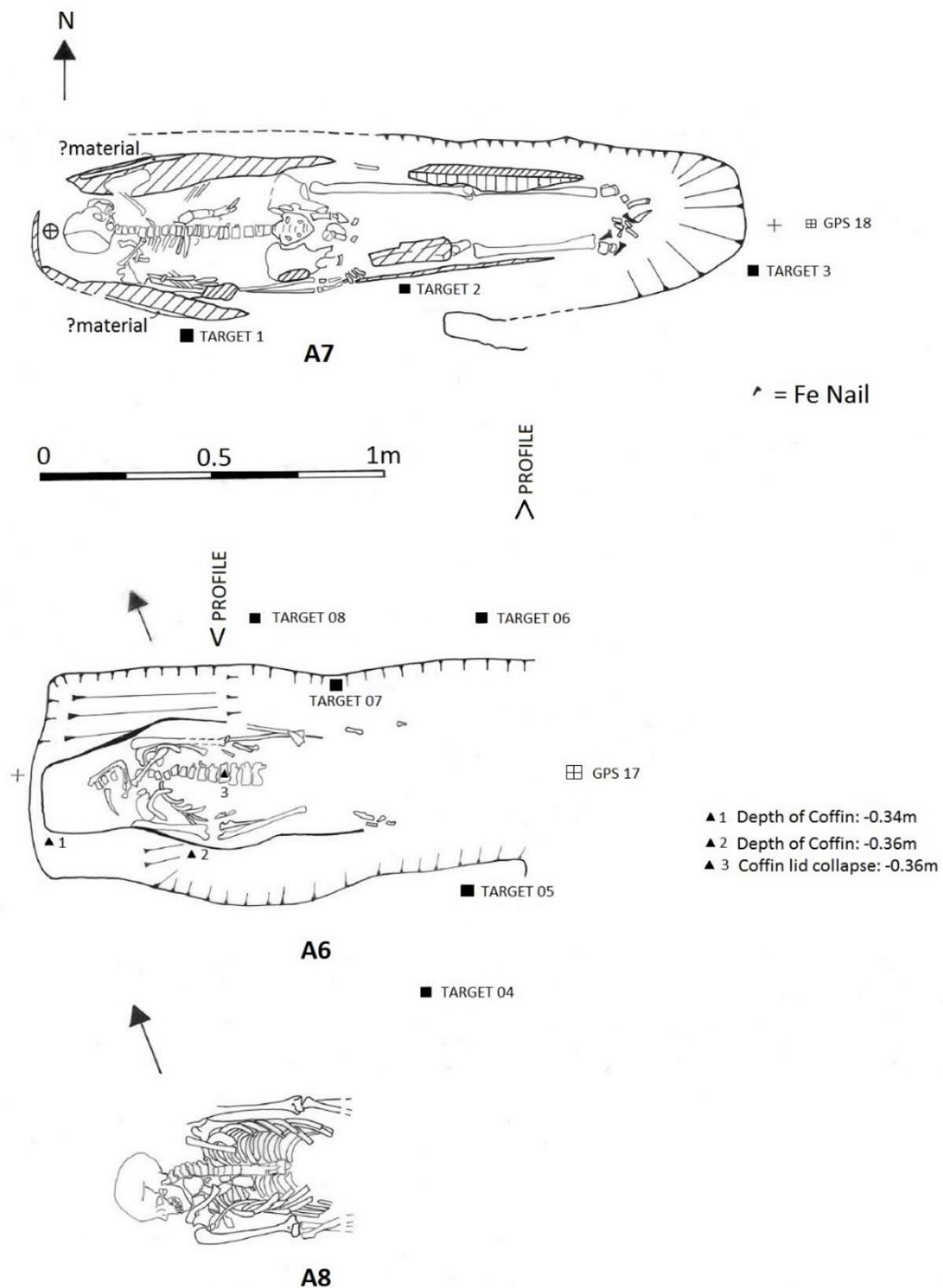


Fig 8: drawn plans of burials A6, A7, and A8. Note that A8 lay directly below A6, within the same cutting.

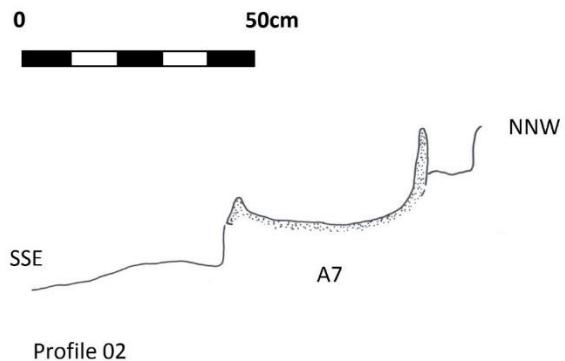


Fig 9: Profile 02 across cuttings for graves A6-A8. See Fig 4 for location

A8 (Context BI17 010)

On removal of burial A6 and its coffin, it was clear that another coffin and burial was present below it. This burial was labelled as burial A8. Burial A8 was located in part in 2014 with the lower limbs being recovered (and labelled A1 and A2). Burial A8 was clear of the cliff face and was cut down through consolidated beach shingle, and filled with a grey sand with a c20% small gravel inclusion level. The burial was East-West aligned with the head towards the east end. As with A6, this burial also retained elements of a wooden coffin and the human remains, though missing the lower half, were articulated. There were no grave good associated with this burial. The burial was extended and supine. A8 lay directly below A6. No environmental samples were taken though all grave fill was metal detected (no finds) and sieved. A8 is NOT present on the photogrammetric plan and model, but has a drawn plan.

After excavation, burials A5, A6, A7 & A8 were retained for analysis by Cranfield Forensics Institute where they will be retained prior to proposed reburial. They are held in archive alongside BI2014B, BI2014C1, BI2014C2, BI2014A1, BI2014A2, BI2014A4 (see below for details).



Fig 10: A8 under excavation

Artefacts

Small Finds

No small finds were located in stratified contexts. The burials were not accompanied with any grave goods and, unlike the burials of Napoleonic prisoners at nearby Portchester Castle, there were no elements such as rosary beads to indicate religious beliefs of those inhumed (Cunliffe & Garratt, 1994, 117-19 and plate XXIX b). A couple of lead gaming pieces with numbers stamped onto them, perhaps of a type equivalent to the bone gaming pieces in Cunliffe and Garratt (1994, 114 and Fig 32), were located by metal detecting work and the team also saw clay pipe fragments similar to the Portchester assemblage (Cunliffe and Garratt, 1994, 89-97) – again none of these were in context, rather being located in the inter-tidal muds.

Discussion

This is NOT the place for a thesis on the prison hulks within Gosport and Portsmouth, a colossal subject in its own right, but rather an excavation report. This being said, it is worth noting some of the comments made in published works on ships holding prisoners or prisoners of war as it may assist this report.

All the graves were east-west aligned and all were cut down into now-consolidated beach shingle and contained within elm coffins in various states of preservation. The bones appeared to be in good condition in spite of some elements having been washed away in the past. One of the coffins had traces of minor internal decoration and the burials, though some were stacked on top of one another, had clearly been accomplished with a degree of respect beyond what one might expect for those that died. The choice of the unconsecrated Rat Island for burial of these men was almost certainly pragmatic. Not only was the island close to the hulks and was land which was otherwise unused, its proximity ensured that the movement of the remains of people who had died of contagious illnesses was minimised. Stacked coffins without grave markers perhaps but nevertheless aligned as Christian burials.



Fig 11: Coffin of A7 under excavation and after removal of human remains. Note blue/white interior banding by lid

Perhaps most intriguingly, one of the skeletons had very clearly undergone a craniotomy. Overall the skeletons of nine individuals were recovered from Rat Island and the work then began to establish more information about these people.

Lives and deaths of those on the Prison hulks

Hundreds of individuals were incarcerated in the hulks in the Portsmouth region – and with the mass of humanity in a confined space, there was always the potential for disease to spread rapidly, to disastrous effect.

Disease

Those detained on the ships in the Portsmouth region had the gamut of early 19th Century diseases. Dysentery (1826 Portsmouth) – smallpox – influenza (1831 at Gosport) – scurvy – cholera (1833 – Portsmouth) “the deaths consequent upon this singular and fatal disease have been numerous during the year”. In 1848 it “returned, killing more than 53,000 persons in England and Wales and taking a heavy toll from the occupants of the hulks in every depot...At Portsmouth, whither it very soon spread, first the *York*, then the *Stirling Castle*, were involved, as well as prisoners, guards and even one of the surgeons; it “assumed a character of intensity and malignity such as it had not before exhibited”, and nearly 50 per cent of the patients fell victim to its ravages” (Branch-Johnson, 1957, 138-9). None of these necessarily leaves a trace on the human skeleton and our studies certainly did not pick up any major traces of disease, indeed there were surprisingly few pathological traits visible. The fact that causes of death were not even obvious to contemporary witnesses is perhaps revealed by the craniotomy to burial A7 with, perhaps, a desire to establish further information. This is something also seen at nearby Haslar Hospital (see below)

Mortality

Numerous statistics on the deaths on the prisoner of war hulks were compiled – some for propaganda reasons with the countries of the deceased. For example, Charles Dupin calculated that, of a total of 122,440 French prisoners brought to Great Britain from 1803 to 1814, a total of 12,845 died in English Prisons, 12,787 were sent back to France in a dying state, 70,041 were turned to France debilitated and only 26,767 returned healthy! (Garneray, 2003, 228). Perhaps unsurprisingly, the official British figures were somewhat different; of this 122,440 figure, ‘only’ 10,341 were said to have died in prisons (*ibid*, 228). Other studies of the hulks show that, although mortality was a constant issue and outbreaks of disease being all the more dangerous in confined spaces, “Approximately 2,400 prisoners passed through the *Vengeance* between 1806 and May 1814, a period of around 8 ½ years, of whom 120 died and had their names marked with the letters ‘DD’, ‘Discharged Dead’, in the registers. Some died on board the hulk, but the majority were sent either to the Hospital at Forton Prison or to the *Pegase* hospital ship where they died. The average number of deaths was about 15 a year and the mortality rate was approximately 5 per cent of the total number of prisoners (*ibid*, 229). Abigail Coppins of English Heritage found that there are some accounts of medical examinations of the bodies of prisoners of war, including at least one from HMS Guildford.

Nationality

We have already stated that migration from Europe to Britain was not uncommon in the late 18th and early 19th centuries, so having a ‘European origin’ visible within an isotopic signature need not mean that this was certainly a prisoner of war. The prisoner of war hulks certainly held military prisoners captured across the world and reflecting the conflicts which were fought by Great Britain at this period in time.

For officers, there were parole Depots in Hampshire (including Alresford, Andover, Bishops Waltham, Odiham, and Petersfield) and held French, Russian, Spanish and even American POWs (Chamberlain, 2008, 116-7 and 132-3). Whilst the ships held an even more international population as Chamberlain highlights:

His Majesty's prison ship Depot, Portsmouth

| Ship | Period of use | Nationality of prisoners |
|-------------------------------------|----------------------|---------------------------------|
| <i>Captivity</i> | 1796-1800 | French |
| <i>Vigilant</i> | { 1796-1801 | French |
| | { 1806-1814 | French |
| <i>Fame</i> | 1797-1801 | French |
| <i>Portland</i> | 1797-1802 | French |
| <i>Prothée</i> | { 1797-1801 | French |
| | { 1807-1814 | French, Danes |
| <i>Royal Oak</i> | 1797-1802 | French |
| <i>Sultan</i> | 1797-1802 | French |
| <i>Crown</i> | { 1798-1802 | French, Dutch |
| | { 1806-1813 | French, Germans |
| <i>Fortitude</i> | 1798-1802 | French |
| <i>San Damaso</i> | { 1798-1802 | French, Dutch |
| | { 1808-1814 | French |
| <i>Le Pegase</i> | { 1799-1802 | Spanish |
| | { 1803-1813 | Hospital Ship |
| <i>Guilford (formerly the Fame)</i> | 1806-1814 | French, Russian, Danes |
| <i>Suffolk</i> | 1806-1814 | French |
| <i>Vengeance</i> | 1806-1814 | French |
| <i>Veteran</i> | 1806-1814 | French |
| <i>Waldemaar</i> | 1807-1814 | French |
| <i>San Antoine</i> | 1808-1814 | Spanish, German, Italian |
| <i>Marengo</i> | 1809-1811 | French |
| <i>Ave Princess</i> | 1810-1814 | French |
| <i>Assistance</i> | 1811-1814 | French, Danes |
| <i>Kron Princessa</i> | 1812-1814 | French |
| <i>Sophia Frederica</i> | 1813-1814 | French |

(in Chamberlain, 2008. 59-60)

When further advances are made in the types of stable isotopes that are available for assessment on origin, there may be further opportunities to establish whether the Rat Islanders were connected to any of the above places of incarceration. As things stand however, it remains that the project has been able to differentiate a couple of individuals that at least hailed from the European mainland and thus had a different life story to the others incarcerated on the ships.

Diet

Food was given regularly both to prisoners and to prisoners of war on board the hulks. Indeed, although complaints by the latter were regular about the quality and size of the diet – though this was clearly a better predicament than that suffered by their comrades in 1812 retreating on Moscow. Indeed, the mere fact that food was regular and guaranteed might have been a distinct improvement in situation for some of the civilian prisoners incarcerated on the hulks. Vegetables, bread and/or biscuit, meat (up to five days per week – fish on the other two), salt, and beer were issued. Reports into the quality of food issued to prisoners of war were made and it was noted that inveterate gamblers amongst the French prisoners sometimes gambled their rations away. Such gambling could also extend to their clothes too and this could lead to robbery. ‘During the Revolutionary War the large number of West Indians at Portchester were ‘robbed and plundered by the European prisoners...they considering themselves as a superior race of beings to the unfortunate blacks’’ (Chamberlain 2008, 105). There is the potential for further analysis of the teeth of the human remains recovered to try to discern extra information about their diets – it should be said that our individuals did not reveal anything that can categorically state whether they were prisoners

of prisoners of war based solely on diets – although two of the four had a distinctly different diet to the others; with a larger marine-based component.

Age and Sex

The remains from Rat Island are all of males – of young adults through to those well within late middle age. This was something that the archaeology team wanted to examine as the hulks (both for prisoners and for prisoners of war) did have boys on board and, on occasion, women.

Children:

It is perhaps shocking that it was not uncommon for there to be boys below the age of 15 on the prison hulks. Indeed, there were some children even below the age of 10 years to be found. Francis Creed, for example, was an eight year old who was jailed for seven years on HMS Bellerophon for stealing three shillings worth of copper (www.bbc.co.uk/news/uk-11307850).

Women:

“How many women were there on board the hulks? Some vessels had none, others a handful, but where women can be identified amongst hundreds or even thousands of persons who passed through the individual hulks their numbers are insignificant. The wives of two soldiers can be found in the *Crown* out of about 1,200 prisoners shown on her register between 1806 and 1813. Some 2,400 prisoners passed through Garneray’s hulk, the *Vengeance*, between 1806 and 1814: amongst these Therese Chapelle, the wife of a drummer, Annette Paquet, a corporal’s wife, and Catherine Chaumay, described as a ‘Girl’ in the register, are the only females named. The two women were both captured with their husbands in the Mediterranean on 24th August 1807 and sent with them on board the *Vengeance* on 5th April 1808. Both were discharged on 25th April 1810 ‘to the Nancy Cartel for France’ leaving their husbands behind. These women endured a total of two and a half years’ captivity, including two years in the *Vengeance*. The date of the girl’s entry on board the hulk or where she was captured are not clear but she was released on 25th March 1809” (Garneray, 2003, 228). It should also be noted that the majority of officers that were captured were granted parole in the towns of the county where they were arrived in England. Thus, within Hampshire, towns such as Odiham and Alresford became home for a number of these individuals. Not all of them made it home and the burials in the local churchyards bear testament to this mortality; both for officers and their spouses. Not for them, however, a burial in the mud of Rat Island.

It is thus worth keeping an open mind with any future excavation work as to the potential presence of women and children being amongst the population buried on the island. Another point worth noting is that in-situ finds could have huge potential to answer many of the questions of origin for the rat islanders. No evidence for any shackles was recovered. No evidence for clothing, military buttons or shoes were seen – although as we have mentioned such possessions may well not have accompanied the deceased into the afterlife before they were taken by those with a more pressing need.

Parallels

Prisoners of War from all over the world were buried in Britain in the 18th and 19th Centuries. From the French at Norman Cross, to the Americans at Dartmoor. The same can be said for those that died on the prison hulks before they were able to be transported to overseas lands. People were often held on the prison ships for a long time prior to transportation – such as the Tolpuddle martyrs but, given the diseases, this could in itself be a death sentence. For example, “Prisoners who died on the hulks at Chatham were buried, without ceremony, either on St Mary’s Island or along Gillingham

Reach on what was known as ‘Prisoner’s Banks’, a marshy area owned by Gillingham Gas Company in the mid-nineteenth century. In the 1860s there were plans to extend Chatham Dockyard, encroaching upon the Prisoner’s banks, and so preparations were made to remove the bodies and re-inter them in the existing ‘French Cemetery’ on St. Mary’s island, which already contained some bodies. 711 skeletons were re-interred on the island in the spring of 1869 and a short while later a memorial was placed on the grave site” (Chamberlain, 2008, 241). It should be noted that such memorials exist in the Portsmouth and Gosport region too; a stone’s throw from Rat Island there is a memorial to American prisoners of war at Forton.

During the first year of the use of hulks at Woolwich in the 1770s, “those who died were buried hugger-mugger in unconsecrated ground along the fore-shore of the river” (Branch-Johnson, 1957, 9).

Captain William John Williams was required to conduct an inquiry into the general treatment and conditions of the convicts in the hulks at Woolwich. His findings were extraordinary and worth quoting at length given the relevance to the Rat Island studies. He found that

“It is fully established in evidence that at night the dying convict has been left without the attendance of an officer, and at the complete mercy of a watchman, a prisoner selected from among the patients in the hospital; that unless he expressed a wish, no minister of religion attends his last moments; that the breath of life has scarcely escaped his lips, when the bed on which he has lain is ransacked by his fellow prisoners, to find and possess themselves of any trifling artefacts he may have concealed; that the fact of his death is only announced through a skylight to a guard upon deck, and no further notice taken of it until morning; that the corpse is removed from the unscreened bed, laid upon the deck, and washed in the full sight of the patients; afterwards placed in a coffin, taken on shore to the Arsenal wharf in a boat, then placed in a wheelbarrow and wheeled round to the dead-house, and there deposited until taken away under the provisions of the Anatomy Act [thus post 1832 whereby convicts’ bodies could be dissected by hospitals and universities] or interred in the burial place in the marshes. In the latter case, the coffin, without pall or covering, is carried out early in the morning to the ground and there left until the hour fixed by the chaplain for reading the burial service, when the steward of the ship, with six convicts, are present. The convict burial place in the marshes comprises a slip of unenclosed land, without any defined limits, and other spots in the vicinity were pointed out to me which had formerly been used for interments. I have every reason to believe it was never consecrated; and, considering the numerous and frequent burials which have taken place, it appeared to me singular that every trace of former graves was obliterated excepting those which had been buried but a few weeks”(Parliamentary Inquiry into the General Treatment and condition of the Convicts in the Hulks at Woolwich. 1847. See Branch-Johnson, 1957, 180-181).

This scene certainly conjures up the potential scene at Rat Island

Other parts of the British coast also seem to have similar scenarios to those encountered at rat Island, with human remains eroding from the former inter-tidal burial locations. The equally evocative ‘Deadman’s Island’ in Kent being a case in point:

www.bbc.co.uk/news/amp/uk-england-kent-38797543

Answers to Research Questions

No clear dating evidence has been found within any of the burials. The history of the site (above) would suggest it impossible that there were burials after the middle of the 19th century whilst documentary references would hint that a late 18th – early/mid 19th century date was probable.

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There being no items within any of the burials it was also not possible through the archaeology alone to determine whether these were the burials of prisoners or prisoners of war (no elements such as the French military buttons seen at Portchester were located). This being said, there seems to have been some evidence from the isotopic analysis for a European continental origin of two of the four individuals assessed; A4 and A7. There was a fair degree of migration in the late 18th and early 19th C so this need not be conclusive proof for the burials being a mixture of prisoners and prisoners of war although this remains a possibility. The isotopic results gave no evidence for any of the men buried being from America or the Caribbean which at least limits the potential narrative. It should also be noted that there is in fact no empirical evidence for these individuals being from the hulks (though the non-parochial nature of the island may hint at this – the ships were outside parishes and combined with documentary sources this seems the most plausible explanation). The burials were all male and adult – thus not children or female (though this was not impossible on the hulks)

The excavations showed that, whosoever these individuals buried on the island were, there was at least some respect, decorum and dignity in their deposition. They were not simply dumped into holes in the inter-tidal muds but were within coffins, however rudimentary.

The work examined the cliffs along the perimeter of the island and located further wooden elements (potentially coffins) to the north of the assessment area, by a rudimentary rubble wall on the east side of the island. Given that stray human bones were located by these, the team concludes a near certainty of further burials being present on Rat Island.

Conclusion

Much of the south-eastern side of Burrow Island appears to have been given over to burials of prisoners/prisoners of war – presumably in the late 18th and early 19th Century and derived from the hulks within Portsmouth harbour. The burials, thus far, are all of adult males and further excavation and recovery work could provide extra details on the origins of the individuals. The layers of these inhumations are now covered in around 3m of overburden of clays and demolition rubble including brick. There is high potential for further burials to be present, and with erosion a continuous process, the site needs careful monitoring. Further to the human burials, there are several structural elements that are visible – potentially relating to Fort James or historic jettying. Should the tree coverage be removed, as proposed for Nature Conservation purposes, this would facilitate remote sensing surveys which might yield useful data to this end.

Dissemination

In addition to this report, sent to the Hampshire Historic Environment Record, a discussion of the findings was presented in Current Archaeology (Vol 339, May 2018) and at the Chalke Valley History Festival of summer 2018. The BBC television programme ‘Digging for Britain’ featured the site in one of its episodes (Digging for Britain Series 6, Episode 1 (west)) and the Ministry of Defence Conservation magazine ‘Sanctuary’ Volume 47, 2018.

Archive

As stated in the synopsis above, all paper archives are held by Richard Osgood at the Ministry of Defence. Although several items such as clay pipe stems and gaming tokens were seen on the intertidal areas of Rat Island during the project, no small finds within securely sealed stratigraphic contexts were encountered, bar coffin nails (see below). No environmental samples were taken. A photographic archive will be included with this report and deposited with the Hampshire Historic Environment Record. All human remains were held at the Cranfield Forensics Institute (an approved repository) prior to intended reburial. The Hampshire Historic Environment Record will be informed of any reburial in order to complete this record

Overall Conclusion

The remains of at least nine adult men have been encountered at Rat Island. There is the potential for many more inhumations to be present and the erosion at the location needs careful monitoring, should further recovery be required, there remains the potential for extra study into the possibility on whether these men were prisoner or prisoners of war. As things stand, we can simply say that some of the individuals appear to have hailed from the European mainland. All were of an age that could have permitted a martial role but there is no empirical evidence for this and thus the likelihood certainly remains that at least some, perhaps all, of the men were prisoners from the prison hulks of the later 18th and earlier 19th Centuries.

Acknowledgements

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Annexes

Annex 1: Archaeological Contexts

Contexts

| Archaeological Contexts for 2017 Fieldwork | | | |
|--|----------------------|----------------------------|---|
| Number | Cut/Fill | Stratigraphic Relationship | Comments |
| (001) | Layer of made ground | Above [005], [011] | Layer of mixed sandy grey soil with shell and |

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| | | | grit inclusions |
|-------|--|---|---|
| [002] | Grave cut for BI17 A5 cut into cliff | Within cliff, filled by (003) and (004) | Cut not recorded in form as unsafe. Ran E-W into cliff |
| (003) | Fill of [002] | Within [002], contained (004) | Mixed sandy grey soil with brick, grit and shell inclusion. Some larger stones. Filled grave cut and held burial A5 |
| (004) | Human skeleton A5 | Within [002], (003) was surrounding matrix | Human burial A4 held within grave cut [002] |
| [005] | Grave cut for BI17 A6 and BI17 A8 cut into foreshore | Below (001), contained (006), (007), (008), (009), and (010) | Grave cut which held two stacked coffins and the human remains they held – BI17 A8 below, and BI17 A6 above. Cut is E-W aligned |
| (006) | Fill of [005] | Below (001), within [005]. Contained (007) and (after collapse of this coffin) (008), (009) and (010) | Mixed sandy grey soil with grit and shell inclusion. Some larger stones. Filled grave cut and held burial A6 and A8 |
| (007) | Wooden coffin elements with iron nails. | Below (006), Within [005], above (009). Contained (008) | Wooden coffin which once had lid, contained burial A6 |
| (008) | Human skeleton A6 | Within (007), (006) was surrounding matrix | Human burial A6 held within coffin (007), in grave cut [005] |
| (009) | Wooden coffin elements with iron nails. | Below (007), Below (006), Within (005). Contained (010) | Wooden coffin which once had lid, contained burial A8 |
| (010) | Human skeleton A8 | Within (009), (006) was surrounding matrix | Human burial A8 held within coffin (009), in grave cut [005] |
| [011] | Grave cut for BI17 A7 and cut into foreshore | Below (001), contained (012), (013), and (014) | Grave cut which held one coffin |

| | | | |
|-------|---|---|--|
| | | | and associated human remains – BI17 A7. Cut is E-W aligned |
| (012) | Fill of [011] | Below (001), within [011], contained (013), and (014) | Mixed sandy grey soil with grit and shell inclusion. Some larger stones. Filled grave cut and held burial A7 |
| (013) | Wooden (elm) coffin elements with iron nails. | Below (012), Within [011], contained (014) | Wooden coffin which once had lid, contained burial A7 |
| (014) | Human skeleton A7 | Within (013), (012) was surrounding matrix | Human burial A7 held within coffin (013), in grave cut [011] |

Annex 2: Grid References for the human remains recovered in 2014.

| Grid References for disarticulated human bones found in 2014 | |
|--|-------------------------------------|
| NGR | Bone |
| SU 62075 00804 | Adult left ulna |
| SU 62072 00803 | Adult left radius |
| SU 62073 00802 | Adult left rib (30-50 years of age) |
| SU 62058 00823 | Left metatarsal |
| SU 62041 00831 | Right metacarpal |

Annex 3: REPORT ON THE HISTORICAL/ARCHAEOLOGICAL HUMAN REMAINS OF BURROW/RAT ISLAND, GOSPORT, UK

Report by

Nicholas MÁRQUEZ-GRANT, Cranfield Forensic Institute (CFI)

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1 Information This report outlines the anthropological analysis and isotope sampling and results that was undertaken on the human remains recovered from Burrow/Rat Island in January 2014 and May 2017 under the direction of Richard Osgood in collaboration with Breaking Ground Heritage and Cranfield Forensic Institute (see archaeological report by Richard Osgood). The human remains were recovered from individually discrete graves and appeared to have been lying extended supine within coffins as evidenced by evidence of wood and coffin nails. The anthropological examination of the remains was undertaken at Cranfield Forensic Institute, Cranfield University, Defence Academy of the United Kingdom, Shrivenham, UK in the summer and autumn of 2017. Isotope analysis was undertaken at laboratories at the University of Oxford, UK, and Leuven University, Belgium.

1.1 Request In my capacity as a forensic/physical anthropologist I was asked to lead the anthropological examination on the sets of human remains and also, prior to that, provide some supervision during the excavation of the remains and documentation on site. I also advised about stable isotope analysis and craniofacial reconstruction. A copy of all the photographs, forms, and notes are kept securely at Cranfield Forensic Institute.

1.2 Other Team Members A number of other Cranfield Forensic Institute colleagues assisted me during the examination of the human remains. During the excavation in January 2014 I was assisted by Dr Kelly Domoney and two PhD students at the time, Deborah Harrison and Oznur Gulan. In May 2017 I was assisted by another member of Cranfield University, Dr Dennis Braekmans. The examination of the remains was undertaken in 2017 by myself and two PhD students, Hannah McGivern and particularly Emma Saunders. Dr Fiona Brock coordinated the isotope work and facilitated interpretation. Roland Wessling assisted with photography.

2 Anthropological examination The analysis was undertaken at the facilities of Cranfield Forensic Institute, Cranfield University, Shrivenham, UK. The purpose of the anthropological examination was to establish the minimum number of individuals represented by the recovered remains and to ensure that if there were more than one individual under one reference number that the bones were correctly attributed to one or another individual. In addition, the anthropological analysis aimed, where possible, in providing information on an individual such as age-at-death, ancestry, sex, and stature. Any skeletal conditions or injuries as well as dental anomalies or pathological conditions were also recorded. The site code/finds number for all of the remains examined are provided below. ‘BI2014’ refers to ‘Burrow Island excavation 2014’, whilst ‘BI17’ refers to ‘Burrow Island excavation 2017’. A letter (‘A’, ‘B’, ‘C’) before a number refers to the area where the remains were excavated from (see excavation report), so that ‘C2’ refers to ‘Area C, skeleton 2’).

- BI2014 – B
- BI2014 – C1
- BI2014 – C2
- BI2014 – A1

- BI2014 – A2
- BI2014 – A4
- BI17 – A5
- BI17 – A6
- BI17 – A7
- BI17 – A8

In addition to the above, there were a number of human remains found unstratified in areas B, C, D and E in addition to a number recovered generally from the site (these were labelled 'U/S' for 'unstratified').

A detailed description of these findings can be read in section Results.

2.1 Methods: Anthropological Examination

The anthropological methods employed are well accepted standards within the physical/forensic anthropology community and employed internationally. The methods are outlined below:

- The examination was carried out following guidelines established by Buikstra and Ubelaker (1994), Brickley and McKinley (2004) and Mitchell and Brickley(2017). Bone weathering followed the 2004 scales from 0 to 5+ by J. McKinley(see Brickley and McKinley 2004).
- Where possible, the estimation of age-at-death included assessing the stage of skeletal and dental maturity (Scheuer and Black, 2000). In addition, the morphology (shape) of the sternal end of the right fourth rib where possible(İşcan et al., 1984, 1985) and the auricular surface (Lovejoy et al., 1985;Buckberry and Chamberlain, 2002) of the pelvis were also employed where possible. One of the most reliable indicators, the pubic symphysis (Suchey-Brooks method; Brooks and Suchey, 1990; Suchey and Katz, 1998), was also employed. A note on cranial suture closure and degenerative joint disease was also made although these indicators only serve as complementary methods to the others.
- Estimation of biological sex was based on the morphology (shape) of the pelvis and the skull, complemented by post-cranial measurements. This estimation was based with reference to the criteria in Buikstra and Ubelaker (1994) and Bass (1995).
- Stature was obtained where possible by applying long bone measurements to the 'White Male' formulae devised by Trotter and Gleser (Trotter, 1970). Wherever possible, the femur was the preferred bone to be measured.
- Remains were excavated and analysed with all due respect and dignity and taking into account a number of ethical issues surrounding the excavation, analysis, retention and publication of human remains.

2.2 Sampling for isotope analysis

The process of taking samples for isotopes was undertaken by Dr Fiona Brock where bone had to be cut (humerus and/or femur was used); rib shaft fragments and tooth selection was undertaken by myself.

3 Results

The results of the anthropological examination are detailed below for each of the individuals analysed as well as the commingled or unstratified remains. Each section gives an overview for each of the skeletons including the completeness, preservation, biological profile, and any unique features as well as palaeopathological conditions.

All the skeletal remains presented varying degrees of preservation, with fragmentation, incomplete bones and weathering present in most skeletons. This preservation and completeness of the skeletal remains limited the information that could be obtained during the anthropological examination.

The detailed anthropology recording forms provide further information including preservation, any other taphonomic modifications to the bone, a detailed skeletal inventory, the specific features and methods employed for the biological profile, the measurements taken, a dental inventory, and any observed anatomical variations, trauma, or pathology.

SKELETON BI2014-B

The recovered bone elements from this individual comprised over 75% of the skeleton. Primarily, the foot bones and the left fibula were missing.

Some post-mortem damage was visible across the skeleton. Weathering (erosion of the cortical bone surface) was present overall as Grade 2. The most fragmentation occurred at the ribs. There were areas of dark staining on thoracic vertebrae, the left femur and a number of ribs from the left side.

All the bones appear to be from the same individual. There was no duplication or any inconsistencies with age or sex that may suggest more than one individual.

The individual was male, as assessed primarily from pelvic traits but also from skull traits, supported by the dimensions of a number of bones. The estimated age-at-death of the individual was between 30 and 45 years based primarily on skeletal maturation, the auricular surface. A wider age range was given as 25-45 years. Stature was calculated as 1.73m (range 1.70-1.76m) by measuring the left femur. Ancestry was not assessed.

There was no observable degenerative joint disease nor infectious disease present (apart from dental caries). The only changes were bone growth (osteophytosis) to the vertebral bodies of T2 and T3. There appeared to be *osteochondritis (non) dissecans* on the right lunate with a lesion of 3.5 mm diameter. The first segment of the sacrum (S1) revealed a depression of anterior half of the body; a similar alteration was observed in the inferior surface of the fifth (L5) lumbar vertebra. A cortical lesions may be observed on the rhomboid fossa of the right clavicle. *Cribra orbitalia* could not be assessed. With regard to the dentition, dental caries was present on some teeth (9/26) and ante-mortem tooth loss was evident (3/32). Enamel hypoplasia was absent. As unique identifying features are heavy occlusal wear on lower and upper central incisors, a rotated left upper left canine and a partially erupted (impacted?) upper right canine.

Most of the damage present on the skeleton appears to be post-mortem. However, there were three rib fragments that appeared to have a cut which may be associated with autopsy cuts.

No samples for isotope analysis were taken.

SKELETON BI2014-C1

The recovered bone elements from this individual comprised between 50% and 75% of the skeleton. Primarily, the right clavicle was absent, as well as a number of vertebrae, some ribs, hand and foot bones. Part of the pelvic bones (the left and the right pubis) was also missing.

Some post-mortem damage was visible across the skeleton. Long bones were generally well preserved but fragmentation was noted on the ribs, pelvic bones, the right humerus, right radius and some areas of the skull. Weathering (erosion of the cortical bone surface) was present overall as Grades 2-3. There were areas of dark staining on the left tibia.

All the bones appear to be from the same individual; except for an additional right calcaneous (foot bone).

The individual was classified overall as possibly male, according to a number of traits in the pelvis and skull. Some traits however were ambiguous, gracile or more characteristic of female skeletons. The estimated age-at-death of the individual was between 17 and 20 years based primarily on skeletal maturation and the auricular surface. A wider age range was given as 16 and 21 years.

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Stature was calculated as 1.61m (range 1.58-1.64m) by measuring the left femur. Ancestry was not assessed.

There was no observable degenerative joint disease nor infectious disease present (apart from dental caries). There is pitting observed on the occipital and right parietal bones. *Cribrum orbitalia* was present on the right orbital roof (not observed on the left side). With regard to the dentition, dental caries was present on some teeth (4/23) and ante-mortem tooth loss was evident (1/32). Enamel hypoplasia was present too (12/22 teeth observed). There was a possible periapical cavity in the site of the upper right second premolar. As unique identifying features there was a shovel shaped upper right second incisor.

Most of the damage present on the skeleton appears to be post-mortem.

No samples for isotope analysis were taken.

SKELETON BI2014-C2

The recovered bone elements from this individual comprised between 50% and 75% of the skeleton. Many ribs, the left scapula, most hand and all foot bones were missing. Many long bones were incomplete.

Some post-mortem damage was visible across the skeleton, and in particular the ribs, vertebrae and pelvis. Bone preservation was fair with weathering (erosion of the cortical bone surface) present overall as Grade 3. There was more post-mortem (taphonomic) damage on the left bones of the skeleton compared to the right side. There were areas of dark staining on the frontal bone.

All the bones appear to be from the same individual. There was no duplication or any inconsistencies with age or sex that may suggest more than one individual.

The individual was male, as assessed from pelvic and skull traits, complemented by bone dimensions. The estimated age-at-death of the individual was limited and it was only possible to indicate an individual older than 25 years (or older than 25-30 years). Stature was calculated as 1.75m (range 1.72-1.78m) by measuring the left femur. Ancestry was not assessed.

Observations regarding pathological conditions were limited due to the condition and completeness of the skeleton. Nevertheless no degenerative joint disease was present. There was an area of woven bone present possibly on the frontal bone. There was a healed fracture on the right clavicle. There was no *cribra orbitalia*. With regard to the dentition, dental caries was present on some teeth (6/26) and ante-mortem tooth loss was evident (3/32). Enamel hypoplasia was also present (10/23 teeth observed). There are slight calculus (tartar) deposits overall. As a unique identifying feature is the wear (activity related) on the left side (lower first and second premolars, upper second incisor and canine) which is consistent with a clay pipe notch. There is also activityrelated dental wear on the right lower second and third molars, and areas of enamel chipping in several teeth.

Most of the damage present on the skeleton appears to be post-mortem.

No samples for isotope analysis were taken.

SKELETON BI2014-A1

The recovered bone elements from this individual comprised between 25% and 50% of the skeleton. The cranium (except a fragment of the left temporal bone), most vertebrae, all ribs, the sternum, the clavicles and the scapulae, the forearm bones (both radii and ulnae) were missing. The left humerus was originally in the unstratified (U/S) context but was attributed to this skeleton via visual pair matching (comparing it to the right side).

The bones were generally speaking well preserved. Excavation damage was present on the vertebrae. Weathering (erosion of the cortical bone surface) was present overall as Grade 2.

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There were a number of additional bones present. An additional left and right tibia, and left and right fibula were attributed to skeleton BI17-A5. There were a number of additional foot bones. One additional left talus and calcaneous were attributed to skeleton BI2014-A2 (which corresponds to the same skeleton as BI17-A8).

The individual was male, as assessed primarily from pelvic traits, complemented by the assessment of the mandible and long bone dimensions. The estimated age-at-death of the individual was between 30 and 50 years based primarily on skeletal maturation and the auricular surface. Stature was calculated as 1.66m (range 1.63-1.69m) by measuring the left femur. Ancestry was not assessed.

With regard to pathological conditions, some woven bone (active infectious lesions) were observed on the left and right tibia and classed as periostitis. There was degenerative joint disease on the big toe (head of right first metatarsal and base of proximal phalanx). More significant, was the fusion of the left talus and calcaneous (left foot) with osteoarthritis on the head of the talus. The latter fusion may have resulted from a traumatic incident earlier in life. With regard to the dentition, only the mandible was present. However only one tooth, the lower right third molar was present and it presented a carious lesion and calculus, but no enamel hypoplasia. At least four teeth were lost ante-mortem, with a prevalence of 4/31 teeth lost ante-mortem. The remaining teeth were lost post-mortem and the status of a third molar was unclear.

Most of the damage present on the skeleton appears to be post-mortem.
No samples for isotope analysis were taken.

SKELETON BI2014-A2

The remains labelled BI2014-A2 comprise the manubrium (sternum), seven vertebrae (T11-L5), the sacrum, at least two right and two left ribs, right clavicle, right scapula, left and right innominate bones (pelvic bones), both femora, both tibia and parts of both fibulae. A left patella is also present as well as two right metacarpals (MC1, MC2) and five hand phalanges. These bones are well preserved although with a weathering grade between Grade 2 and 3.

The bones are that of an adolescent or young adult individual, with pelvic traits indicating a possible male individual. By assessing skeletal maturation the long bones, the vertebrae and pelvic bones do not show complete fusion in all aspects and therefore a likely age of 18-21 years (or wider age range 17-25 years) is likely. By measuring the left femur it is likely that stature is 1.52m (range 1.49m-1.55m).

The right clavicle displays osteophytosis of the lateral (shoulder) end. Both femora present bowing (anterior-posterior) and there is slight bowing (medio-lateral) on the tibiae. Infectious lesions are present in both tibiae, characterised by periostitis which was active (woven bone) prior to death. The vertebrae, pelvis and lower long bones appear to correspond with Skeleton BI17-A8. A number of foot bones from BI2014-A1 is also attributed to this skeleton. The upper part of the skeleton (e.g. clavicle) would seem to belong to another individual and it is likely that BI2014-A2 includes a mix of bones primarily BI17-A8 but also belonging to BI2014-A1. Please refer to the reports for BI17-A8 for more detail.

One animal (non-human) bone was found amongst the human remains.
No sampling for isotope analysis was undertaken from these remains.

SKELETON BI2014-A4

The recovered bone elements from this individual comprised between 50% and 75% of the skeleton. Primarily, the right hand bones, both tibia and fibulae and the foot bones are missing. From the bones found unstratified (U/S), the femora were attributed to this individual as well as both radii and the left ulna by means of visual pair matching, mechanical fits, biological profile and taphonomy.

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The skeleton was well preserved with little taphonomic (post-mortem) damage. Weathering (erosion of the cortical bone surface) was low with an overall classification of Grade 1. There were areas of dark staining on the skull.

All the bones appear to be from the same individual, except for an additional left humerus, left ulna and left radius, all belonging to another individual.

The individual was male overall, as assessed primarily from pelvic traits but also from skull traits, supported by the dimensions of a number of bones. A number of traits were classified however as possible male and others as possible female, especially the cranial traits. The estimated age-at-death of the individual was between 25 and 35 years based primarily on skeletal maturation, pubic symphysis, rib end morphology and the auricular surface. Stature was calculated as 1.83m (range 1.79-1.87m) by measuring the right humerus. Ancestry was not assessed.

The skeleton was stocky, with prominent muscle attachments. There was some osteophytosis (lipping) on the articular facets of some vertebrae and ribs. On the right clavicle there was additional bone formation at the acromial (shoulder) end and it is possible that this may relate to trauma during life. On the right scapula, there was non-fusion of the acromial end to the rest of the scapula (*os acromiale*). There was a benign bone growth on the left parietal. There was no trauma, infectious disease or any other condition apparent. This bone growth is 12mm x 9mm large and has been categorised as a button osteoma. With regard to the dentition, dental caries was present on some teeth (4/23) and ante-mortem tooth loss was evident (4/28 sockets observed). Enamel hypoplasia was also present (9/20 teeth observed). There was a periapical cavity at the site of the upper right first premolar. Third molars were either not formed (agenesis) or unerupted. As unique identifying features are heavy occlusal wear on the anterior dentition but also modifications (activity related wear) on the left upper and lower second incisors and canines, characteristic of a clay pipe notch.

Most of the damage present on the skeleton appears to be post-mortem.

The lower left second molar was submitted for isotope analysis.

SKELETON BI17-A5

The recovered bone elements from this individual comprised over 75% of the skeleton. Primarily, the cranium and the foot bones are missing. The additional tibiae and fibulae from Skeleton BI2014-A2 have been attributed to this individual by mechanical fits, bone dimensions and biological profile.

The skeleton was well preserved with little taphonomic (post-mortem) damage. Weathering (erosion of the cortical bone surface) was low with an overall classification of Grade 1.

All the bones appear to be from the same individual. There was no duplication or any inconsistencies with age or sex that may suggest more than one individual.

The individual was male, as assessed primarily from pelvic traits, the assessment of the mandible and supported by the dimensions of a number of bones. The estimated age-at-death of the individual was between 17 and 21 years based primarily on skeletal maturation, although the pubic symphysis and the auricular surface were also considered. Stature was calculated as 1.86m (range 1.83-1.89m) by measuring the left femur. Ancestry was not assessed.

There was no observable degenerative joint disease nor infectious disease present (apart from dental caries). Schmorl's Nodes (depressions on the vertebral bodies) were observed on a number of thoracic vertebrae (T6-T12). There was no apparent joint disease, trauma or infectious disease. With regard to the dentition, dental caries was present on some teeth (3/16) as well as enamel hypoplasia (6/13 teeth observed). There was a slight degree of calculus throughout the dentition. There was no ante-mortem tooth loss (0/16). Enamel hypoplasia was absent. As unique identifying features there was some overcrowding in particular of the canines and second incisors and some rotation of central incisors.

Most of the damage present on the skeleton appears to be post-mortem.
The lower left second molar was submitted for isotope analysis.

SKELETON BI17-A6

The recovered bone elements from this individual comprised between 25% and 50% of the skeleton. Primarily, the lower half of the body (some lumbar vertebrae, pelvis and lower limbs) are missing. A cranium recovered as unstratified (U/S) was associated to the mandible by means of mechanical fit and dimensions.

All the bones are well preserved and complete, with low fragmentation. Weathering (erosion of the cortical bone surface) was present overall as Grade 2.

All the bones appear to be from the same individual. There was no duplication or any inconsistencies with age or sex that may suggest more than one individual.

The individual was male, as assessed from skull traits, supported by long bone dimensions. The estimated age-at-death of the individual was between 20 and 25 years based primarily on skeletal maturation, the auricular surface. A wider age range was given as 18-25 years. Stature was calculated as 1.69m (range 1.65-1.73m) by measuring the left humerus. Ancestry was assessed and resulted in a 'White/Caucasoid' individual.

There was no observable degenerative joint disease nor infectious disease present (apart from dental caries). There was no *cibra orbitalia*. The most evident pathological condition was the presence of Schmorl's Nodes on 10 vertebrae (T5-L2). With regard to the dentition, dental caries was present on one tooth (1/24) and ante-mortem tooth loss was evident (5/32). Enamel hypoplasia was present one tooth (1/21). Calculus deposits were moderate on the lower incisors and canines.

The lower left second molar was submitted for isotope analysis.

SKELETON BI17-A7

The recovered bone elements from this individual comprised over 75% of the skeleton. The additional left radius and ulna from BI17-A6 have been attributed to this individual through visual pair matching and articulation. The hyoid bone and a small number of hand and foot bones are missing.

Bone preservation was good, with weathering (erosion of the cortical bone surface) present overall as Grade 2. Fragmentation was low overall, although the ribs and sacrum were highly fragmented. There were areas of white staining on most long bones.

All the bones appear to be from the same individual. There was no duplication or any inconsistencies with age or sex that may suggest more than one individual.

The individual was male, as assessed primarily from pelvic traits but also from skull traits, supported by the dimensions of a number of bones. The estimated age-at-death of the individual was between 30 and 45 years based primarily on skeletal maturation, the pubic symphysis and the auricular surface. A wider age range was given as 25-45 years. Stature was calculated as 1.73m (range 1.70-1.76m) by measuring the left femur. Ancestry was assessed taking into account a number of traits and these were most consistent with a 'White/Caucasoid' ancestry.

There was no observable degenerative joint disease nor infectious disease present (apart from dental caries) or trauma. It is possible that the slight pitting on the orbital roofs is diagnostic of *cibra orbitalia*. With regard to the dentition, dental caries was present on four teeth (4/23) and ante-mortem tooth loss was evident (4/29). Enamel hypoplasia was also present (4/18 teeth observed). Three third molars were either not formed (agenesis) or unerupted. As unique identifying features the upper central incisors appear to be worn lingually.

Most of the damage present on the skeleton appears to be post-mortem. However, a craniotomy had been performed opening the entire cranial vault. In addition, the fourth cervical vertebra (C4) was also cut, most likely as a result of dissection or autopsy.

The lower left second molar was submitted for isotope analysis. Craniofacial reconstruction was undertaken for this skull under the direction of Professor Caroline Wilkinson (Liverpool).

SKELETON BI17-A8

The recovered bone elements from this individual comprised over 75% of the skeleton. Originally the upper half of the skeleton (torso, most vertebrae, upper limbs, skull) was recovered as A8, however after anthropological analysis the lower vertebrae, pelvis and lower limbs of BI2014-A2 were attributed to this individual. The additional left foot bones from BI2014-A1 were also attributed to this individual. This attribution was confirmed through articulation between vertebrae, biological profile (primarily age-at-death), long bone dimensions (stature) and complemented with taphonomic observations. A small number of hand and foot bones were missing, as are sections of both fibulae.

The skeleton was well preserved with weathering (erosion of the cortical bone surface) present overall as Grade 2. There is some post-mortem (taphonomic) damage throughout the skeleton. All the bones appear to be from the same individual. There was no duplication or any inconsistencies with age or sex that may suggest more than one individual.

The individual was male as assessed from pelvic traits; a number of traits on the skull were ambiguous however. By assessing skeletal maturation the long bones, the vertebrae and pelvic bones do not show complete fusion in all aspects and therefore a likely age of 18-21 years (or wider age range 17-25 years) is likely. Stature was calculated as 1.52m (range 1.49m-1.55m) by measuring the left femur. Ancestry was not assessed.

A bony spur (5mm wide and projecting c 2mm outwards) was present medially on the shaft of the distal right humerus. One possible diagnosis is soft tissue injury (*myositis ossificans*). A bony spur (5mm wide and projecting c 2mm outwards) was present medially on the shaft of the distal right humerus. One possible diagnosis is soft tissue injury (Both femora present bowing (anterior-posterior) and there is slight bowing (medio-lateral) on the tibiae. Infectious lesions are present in both tibiae, characterised by periostitis which was active (woven bone) prior to death. There was no *cibra orbitalia* or any other apparent condition. With regard to the dentition, dental caries was present on some teeth (13/24) and ante-mortem tooth loss was evident (6/30). Enamel hypoplasia was present on nine teeth (9/9). Periapical cavities were present at the sites of upper first right premolar, upper right central incisor and upper left first molar. Moderate calculus was observed, especially on the incisors. As unique identifying features there is some rotation on the lower central incisors.

Most of the damage present on the skeleton appears to be post-mortem. However, there were a number of wet bone fractures on rib shafts. These bone fractures seemed to have occurred after death but where the bones have maintained the elastic property for some time.

The lower right second molar was submitted for isotope analysis. The lower right second premolar was also sampled as the second molar had a carious lesion. The decision was left with the isotope laboratory.

DISARTICULATED AND UNSTRATIFIED BONES

In addition to the above individuals, there was a quantity of human remains that were labelled as either 'U/S' (unstratified) or recovered from Areas B, D and E. Below is a summary list of what was found:

- Area B: left humerus, radius and ulna, right scapula.
- Area B?: atlas, fragment of left scapula
- Area D: right scapula
- Area E: male left innominate (os coxae)

- U/S: cranium, frontal and left parietal, mandible fragment, four teeth (upper premolar, two incisors and third molar), body of hyoid, four cervical vertebrae, three thoracic vertebrae, two lumbar vertebrae, left first rib, three left ribs, left clavicle, right scapula, scapula fragment, right humerus, left humerus, two right ulnae, left radius, two metacarpals, proximal hand phalanx, right femur, left femur, left fibula, left talus, left calcaneous, right metatarsal.

The above appear to belong to adolescent/adult individuals. Further information on each bone is contained in the laboratory recording forms and is available on request.

3.7.1. ISOTOPE RESULTS

Individuals sampled for isotope analysis were BI2014-A4, BI17-A5, BI17-A6 and BI17-A7. The skeletons sampled were mainly selected based on the recent excavation campaign, those with minimal if any additional bones, the most complete skeletons and any that may have any special features such as a craniotomy.

Isotopes d13C, d15N, d18O and 87Sr/86Sr. The Oxygen and Nitrogen stable isotopes derived from long bone samples (femur, humerus) and ribs and were used primarily to infer diet; whilst the latter two, Oxygen and Strontium, derived from tooth sampled and were analysed primarily to investigate provenance. Whilst the bone provides an average of the latter 5-10 years of life, the dental samples provides a record of childhood.

The results of these analyses are attached as an Appendix to this report.

Diet

All four individuals have statistically identical d13C values. However, there are 2 distinct pairs in terms of d15N: A4 and A7 are different to A5 and A8, but there is no difference within these pairs. A5 and A8 have typical 'terrestrial' signatures, and have nothing to indicate they had marine or freshwater protein in their diet or in any significant quantities.

Individuals A4 and A7, however, clearly have N values which would likely result from a food chain with more steps in it than the terrestrial food web, and in this case it is more likely to be marine protein.

Provenance

It seems that the different values may indicate that the four individuals came from different backgrounds.

From the O results, it seems that there were two individuals from outside UK geography and give more continental European signals. These are individuals A5 and A7.

In terms of the Sr data, individuals A4 and A5 had similar, but not identical values; whilst A7 and A8 both had distinctly different values. This supports the data from the d13C, d15N and d18O analysis which, when considered all together, indicates that all 4 individuals may have been born/grown up in different regions to each other.

4. Summary and Discussion of the Anthropological Analysis

The skeletal remains of a minimum number of nine individuals were analysed. The minimum number of nine was estimated by taking into account the discrete burials but also any repeated bone elements taking into account the disarticulated unstratified remains. Amongst the most repeated bones are the femora, the humeri and parts of the skull. A number of additional skeletal elements, unstratified remains and bones from certain graves were attributed to certain individuals based on visual pair matching, mechanical fits, articulation, biological profile, dimensions and taphonomy. For example, the majority of bones labelled as A2 were attributed to skeleton BI17-A8.

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The incomplete nature and degree of preservation of several skeletal elements limited the anthropological information that could be obtained with regard to the biological profile and palaeopathological analyses. Nevertheless, the estimation of sex indicated males or possibly male individuals, many of whom were young adults. Stature range varied between individuals, with an average of 1.70m. Where possible, ancestry was assessed and the individuals analysed appear to show traits which are more characteristic of 'White/Caucasoid' individuals. The most common pathological conditions were dental, with poor oral hygiene and poor diet resulting in a high prevalence of 32% (45/186) of teeth with caries, in addition to those which may have been lost during life. Peri-mortem trauma was absent and healed trauma was not prevalent. It is difficult to infer any further from the small sample size regarding infectious disease or metabolic conditions. Of interest were two skeletons with clay pipe notches and one skeleton with a craniotomy, although other dissection or autopsy cut marks were evident.

Table 1 below provides a summary including a number of selected observations.

Table 1. Summary information for each skeleton analysed.

| Skeleton | Completeness | Age | Sex | Stature (mean) | Observations |
|-----------------|---------------------|-------------|------------|---|---|
| BI2014-B | >75% | 25-45 years | Male | 1.73m | Autopsy cuts on ribs?; Dental pathology |
| BI2014-C1 | 50-75% | 17-20 years | Male? | 1.61m | <i>Cribrum orbitalia</i> |
| BI2014-C2 | 50-75% | >25 years | Male | 1.75m | Fractured (healed) right clavicle; Clay pipe notch (left side of mouth) |
| BI2014-A1 | 25-50% | 30-50 years | Male | 1.66m | Fusion of left talus and calcaneous; additional bones belong to A5 and A2. |
| BI2014-A2 | | | | Mostly relates to skeleton BI17-A8 (see results for this skeleton below). | |
| BI2014-A4 | 50-75% | 25-35 years | Male | 1.83m | Additional bones present; Os acromiale present; Clay pipe notch. Femur, rib and tooth submitted for isotope analysis. |

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| | | | | | |
|---------|--------|-------------|------|-------|--|
| BI17-A5 | 50-75% | 17-21 years | Male | 1.86m | Bones from A2 attributed to this individual; Schmorl's Nodes present; Dental pathology. Femur, humerus, rib and tooth submitted for isotope analysis |
| BI17-A6 | 25-50% | 20-25 years | Male | 1.69m | Schmorl's Nodes. |
| BI17-A7 | >75% | 30-45 years | Male | 1.73m | Craniotomy present. Femur, humerus, rib and tooth submitted for isotope analysis |
| BI17-A8 | >75% | 18-21 years | Male | 1.52m | Active periostitis on tibia, myositis ossificans, bowing of lower limb bones. Humerus, rib and tooth sampled for isotope analysis. |

Skeleton BI17-A7 with the craniotomy will be further studied to understand the dissection techniques, purpose of the craniotomy, etc. In the nearby burial ground of the Royal Naval Hospital Haslar in Gosport (1753-1826), a total of two individuals out of 69 had evidence for craniotomies (C. Willis, pers. comm. 2017). At the burial ground of the Royal Hospital Greenwich (1749-1856), four skeletons out of 107 had craniotomies (Boston et al. 2008).

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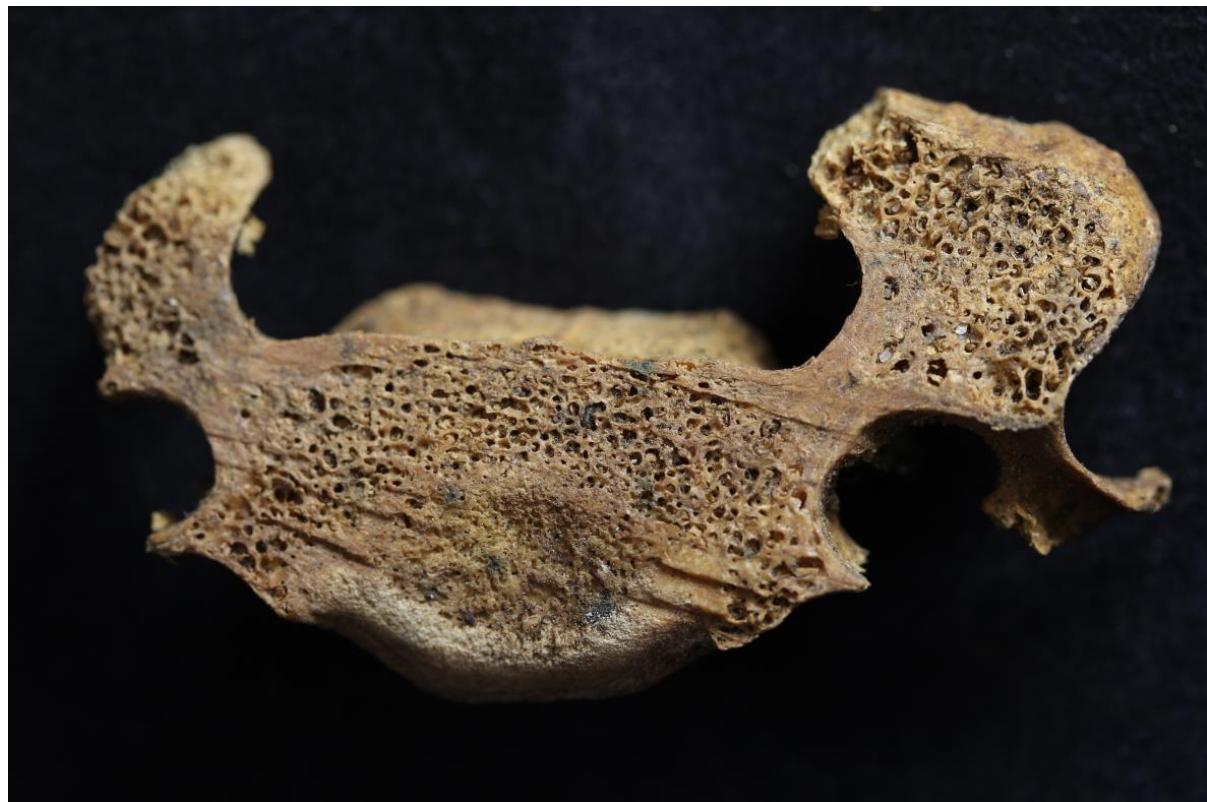
2. BI2014-A4. Clay pipe notch on the left side of the dentition.



3. Schmorl's Nodes (depressions) on the inferior surfaces of the vertebral bodies of three thoracic vertebrae. Skeleton BI17-A5



4. Evident craniotomy on BI17-A7



5. Evident cut through cervical vertebrae after dissection/autopsy. BI17-A7

Appendix One: Bone terminology

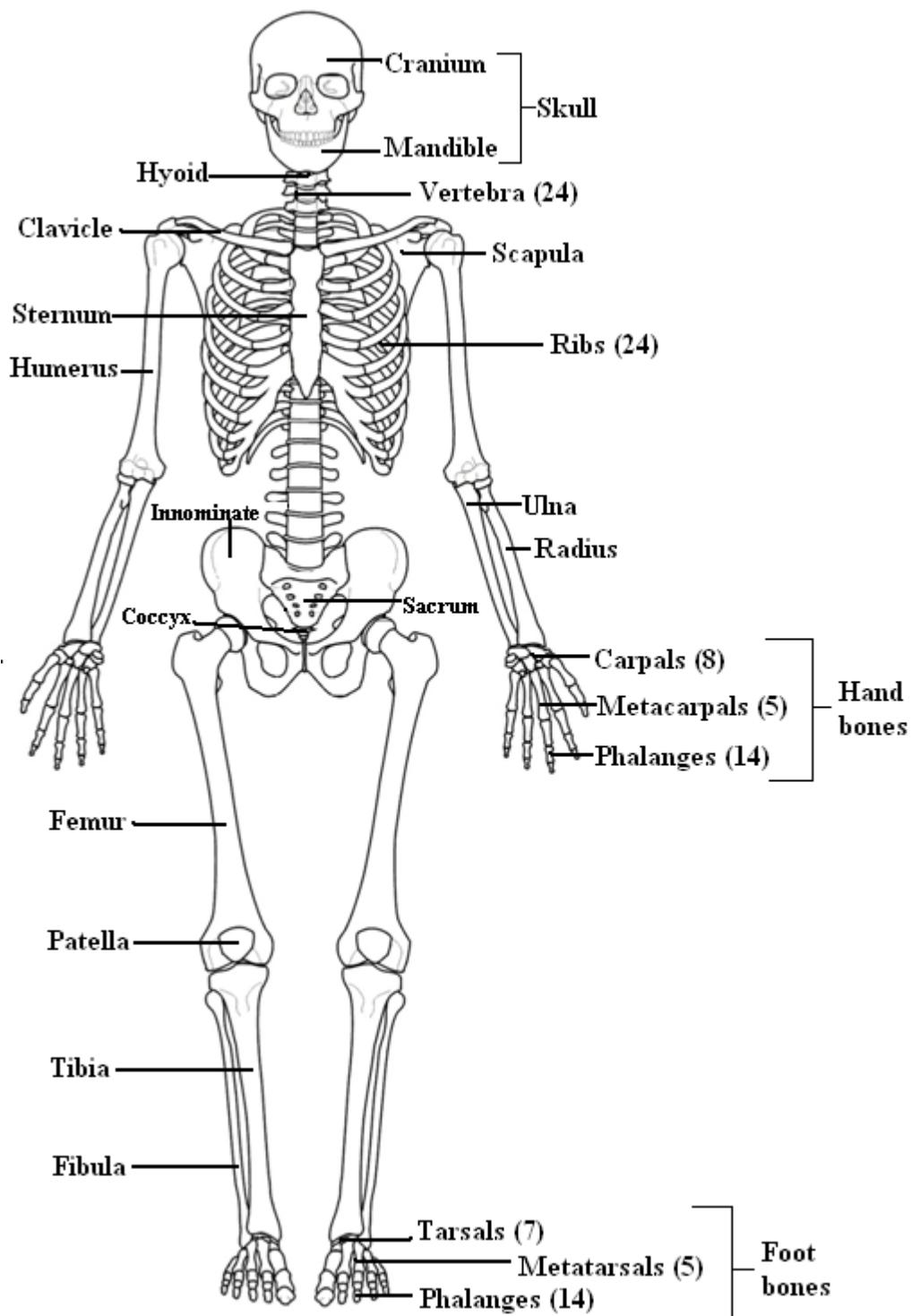


Fig 1 The adult human skeleton

Appendix Two: Isotope data

Carbon and Nitrogen

| Sample | starting weight (mg) | yield (mg) | % yield | d13C | d13C | ave d13C | d15N | d15N | ave d15N | CN | CN | Ave CN |
|--------|----------------------|------------|---------|------|------|----------|------|------|----------|----|----|--------|
|--------|----------------------|------------|---------|------|------|----------|------|------|----------|----|----|--------|

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| | | | | | | | | | | | | | |
|-----|---------|-----|-------|------|--------|--------|--------|-------|-------|-------|-----|-----|-----|
| A4F | drilled | 500 | 28.8 | 5.8 | -20.38 | -20.34 | -20.36 | 12.03 | 12.26 | 12.15 | 3.2 | 3.2 | 3.2 |
| A4R | crushed | 520 | 106.0 | 20.4 | -20.09 | -20.02 | -20.06 | 12.30 | 12.29 | 12.30 | 3.3 | 3.3 | 3.3 |
| A5F | drilled | 490 | 31.6 | 6.4 | -19.97 | -19.91 | -19.94 | 10.30 | 10.03 | 10.17 | 3.2 | 3.2 | 3.2 |
| A5H | drilled | 520 | 23.6 | 4.5 | -19.99 | -19.66 | -19.83 | 9.49 | 9.63 | 9.56 | 3.2 | 3.2 | 3.2 |
| A5R | crushed | 490 | 91.7 | 18.7 | -19.64 | -19.55 | -19.60 | 10.03 | 10.12 | 10.08 | 3.2 | 3.2 | 3.2 |
| A7F | drilled | 490 | 29.2 | 6.0 | -19.96 | -20.16 | -20.06 | 12.73 | 12.68 | 12.71 | 3.2 | 3.2 | 3.2 |
| A7H | drilled | 500 | 33.2 | 6.6 | -20.10 | -20.14 | -20.12 | 12.53 | 12.66 | 12.60 | 3.3 | 3.3 | 3.3 |
| A7R | crushed | 510 | 78.9 | 15.5 | -20.03 | -20.10 | -20.07 | 12.56 | 12.51 | 12.54 | 3.3 | 3.3 | 3.3 |
| A8H | drilled | 510 | 34.2 | 6.7 | -20.06 | -20.00 | -20.03 | 9.87 | 9.85 | 9.86 | 3.3 | 3.2 | 3.3 |
| A8R | crushed | 500 | 98.0 | 19.6 | -19.72 | -19.74 | -19.73 | 9.63 | 9.64 | 9.64 | 3.2 | 3.2 | 3.2 |

Oxygen

Dental tooth enamel carbonate oxygen interpretation

| Measured carbonate values | | | | convert to SMOW scale COPLEN 1988 d18O SMOW | Phosphate equivalent BRYANT et al 1996 d18O SMOW | Phosphate equivalent Chennery et al 2012 d18O SMOW | calculated drinking water from phosphate DAUX 2008 d18O SMOW | calculated drinking water from phosphoate POLLARD d18O SMOW | calculated drinking water Chennery et al 2012 eq6 d18O SMOW | calculated drinking water Chennery et al 2012 eq4 d18O SMOW | |
|---------------------------|---------|---|----------|---|--|--|--|---|---|---|------------|
| Sample | d13 C | ± | d18O PDB | ± | | | | | | | |
| PWD RM1 | -11.511 | | -5.37 | | 25.37 | 16.74 | 16.50615 653 | -7.94 | -7.12 | -8.289318 6 853 | 8.68701224 |

| | | | | | | | | | | | |
|---------|---------|-------|------------|-------|-------|-------|-----------------|--------|--------|--------|--------------|
| a4-1019 | -12.632 | 0.009 | -5.2641376 | 0.011 | 25.48 | 16.85 | 16.61880 526 | -7.78 | -6.92 | -8.12 | -8.492097859 |
| a5-938 | -12.546 | 0.011 | -9.1406218 | 0.058 | 21.49 | 12.93 | 12.49381 788 | -13.81 | -14.30 | -14.47 | -15.62950093 |
| a7-1020 | -13.283 | 0.015 | -7.1954362 | 0.034 | 23.49 | 14.89 | 14.56370 024 | -10.78 | -10.59 | -11.28 | -12.04801489 |
| a8-1059 | -12.844 | 0.006 | -5.4139199 | 0.008 | 25.33 | 16.69 | 16.45942 115 | -8.01 | -7.20 | -8.36 | -8.767877763 |

Strontium

Summary

Sample Sample ID 87Sr/86Sr 2σ RSD
 054-A4 A4 0.709353741 0.000441304 0.031106052
 056-A5 A5 0.709307191 0.0004613 0.032517641
 060-13 A7 0.709648122 0.000233381 0.016443411
 062-A8 A8 0.709974403 0.000603927 0.042531633

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Annex 4: Holdings of Aerial Photographs by Historic England (was English Heritage)



ENGLISH HERITAGE
ENGLISH HERITAGE
Air Photographs

Full single listing - Verticals, Standard order

Customer enquiry reference: 84652

| Sortie number | Library number | Frame number | Centre point | Run | Date | Scale 1: | Film held by |
|-------------------|----------------|--------------|--------------|-----|-------------|----------|--------------|
| RAF/106G/UK/1104 | 145 | 6010 | SU 621 011 | 1 | 04 JAN 1946 | 5000 | NMR |
| RAF/106G/UK/1104 | 145 | 6011 | SU 620 009 | 1 | 04 JAN 1946 | 5000 | NMR |
| RAF/106G/UK/1104 | 145 | 6012 | SU 619 006 | 1 | 04 JAN 1946 | 5000 | NMR |
| RAF/106G/UK/1104 | 145 | 6013 | SU 619 003 | 1 | 04 JAN 1946 | 5000 | NMR |
| RAF/106G/UK/1322 | 313 | 5004 | SU 619 002 | 16 | 28 MAR 1946 | 4800 | MOD |
| RAF/3G/TUD/UK/163 | 315 | 5104 | SU 612 004 | 3 | 20 APR 1946 | 1000 0 | NMR |
| RAF/3G/TUD/UK/162 | 342 | 5089 | SU 623 014 | 2 | 20 APR 1946 | 1009 9 | NMR |
| RAF/3G/TUD/UK/162 | 342 | 5090 | SU 616 013 | 2 | 20 APR 1946 | 1009 9 | NMR |
| RAF/3G/TUD/UK/162 | 342 | 5094 | SU 617 000 | 3 | 20 APR 1946 | 1009 9 | NMR |
| RAF/3G/TUD/UK/162 | 342 | 5095 | SU 623 001 | 3 | 20 APR 1946 | 1009 9 | NMR |
| RAF/3G/TUD/UK/162 | 342 | 5096 | SU 629 002 | 3 | 20 APR 1946 | 1009 9 | NMR |
| RAF/CPE/UK/1749 | 468 | 4029 | SU 614 010 | 13 | 21 SEP 1946 | 9800 | MOD |
| RAF/CPE/UK/1749 | 468 | 4030 | SU 621 009 | 13 | 21 | 9800 | MOD |

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| | | | | | SEP 1946 | | |
|-----------------|------|------|------------|----|-------------------|------|-----|
| RAF/CPE/UK/1749 | 468 | 4031 | SU 629 008 | 13 | 21 SEP 1946 | 9800 | MOD |
| RAF/CPE/UK/1768 | 484 | 3065 | SU 622 010 | 4 | 07 OCT 1946 | 9840 | NMR |
| RAF/CPE/UK/1768 | 484 | 3066 | SU 618 015 | 4 | 07 OCT 1946 | 9840 | NMR |
| RAF/CPE/UK/1768 | 484 | 4014 | SU 618 013 | 13 | 07 OCT 1946 | 9840 | NMR |
| RAF/CPE/UK/1977 | 584 | 5068 | SU 623 007 | 5 | 11 APR 1947 | 4800 | FDR |
| RAF/CPE/UK/2463 | 766 | 5064 | SU 622 005 | 5 | 26 FEB 1948 | 5000 | NMR |
| RAF/CPE/UK/2463 | 766 | 5065 | SU 619 005 | 5 | 26 FEB 1948 | 5000 | NMR |
| RAF/CPE/UK/2463 | 766 | 5066 | SU 616 005 | 5 | 26 FEB 1948 | 5000 | NMR |
| RAF/CPE/UK/2463 | 766 | 5112 | SU 622 008 | 7 | 26 FEB 1948 | 5000 | NMR |
| RAF/CPE/UK/2463 | 766 | 5113 | SU 618 008 | 7 | 26 FEB 1948 | 5000 | NMR |
| RAF/CPE/UK/2463 | 766 | 5142 | SU 616 009 | 8 | 26 FEB 1948 | 5000 | NMR |
| RAF/CPE/UK/2463 | 766 | 5143 | SU 618 009 | 8 | 26 FEB 1948 | 5000 | NMR |
| RAF/CPE/UK/2463 | 766 | 5144 | SU 619 009 | 8 | 26 FEB 1948 | 5000 | NMR |
| RAF/CPE/UK/2463 | 766 | 5145 | SU 621 009 | 8 | 26 FEB 1948 | 5000 | NMR |
| RAF/CPE/UK/2463 | 766 | 5174 | SU 622 005 | 11 | 26 FEB 1948 | 5000 | NMR |
| RAF/CPE/UK/2463 | 766 | 5175 | SU 619 005 | 11 | 26 FEB 1948 | 5000 | NMR |
| RAF/CPE/UK/2463 | 766 | 5176 | SU 616 006 | 11 | 26 FEB 1948 | 5000 | NMR |
| RAF/82/766 | 1427 | 308 | SU 624 008 | 10 | 21 APR 1953 | 5000 | MOD |
| RAF/82/766 | 1427 | 309 | SU 620 008 | 10 | 21 APR | 5000 | MOD |

Rat Island 2017 Excavations: Exercise Magwitch

| | | | | | 1953 | | |
|--------------|------|--------|------------|----|-------------------|-----------|-----|
| RAF/82/766 | 1427 | 310 | SU 615 008 | 10 | 21 APR 1953 | 5000 | MOD |
| RAF/82/1006 | 1520 | 359 | SZ 618 992 | 45 | 31 AUG 1954 | 1500 0 | NMR |
| RAF/82/1006 | 1520 | 360 | SZ 605 996 | 45 | 31 AUG 1954 | 1500 0 | NMR |
| RAF/82/1006 | 1520 | 359 | SU 627 017 | 53 | 31 AUG 1954 | 1500 0 | NMR |
| RAF/82/1006 | 1520 | 360 | SU 616 022 | 53 | 31 AUG 1954 | 1500 0 | NMR |
| BKS/B4566 | 2409 | 160374 | SU 631 006 | 1 | 15 JUN 1971 | 1000 0 | BKS |
| BKS/B4566 | 2409 | 160375 | SZ 631 999 | 1 | 15 JUN 1971 | 1000 0 | BKS |
| BKS/B4566 | 2409 | 160384 | SZ 612 999 | 2 | 15 JUN 1971 | 1000 0 | BKS |
| BKS/B4566 | 2409 | 160385 | SU 612 006 | 2 | 15 JUN 1971 | 1000 0 | BKS |
| RAF/58/2152 | 2539 | 38 | SU 613 023 | 7 | 29 APR 1957 | 1500 0 | MOD |
| RAF/58/2152 | 2539 | 39 | SU 623 022 | 7 | 29 APR 1957 | 1500 0 | MOD |
| RAF/58/2152 | 2539 | 40 | SU 633 022 | 7 | 29 APR 1957 | 1500 0 | MOD |
| RAF/540/1490 | 2848 | 70 | SU 618 006 | 16 | 03 DEC 1954 | 8000 | NMR |
| RAF/540/1490 | 2848 | 71 | SU 627 007 | 16 | 03 DEC 1954 | 8000 | NMR |
| RAF/540/453 | 3193 | 3411 | SU 624 009 | 9 | 05 APR 1951 | 5000 | NMR |
| RAF/540/453 | 3193 | 3412 | SU 621 009 | 9 | 05 APR 1951 | 5000 | NMR |
| RAF/540/453 | 3193 | 3413 | SU 618 009 | 9 | 05 APR 1951 | 5000 | NMR |
| RAF/82/982 | 3959 | 4 | SU 626 007 | 2 | 10 AUG 1954 | 1000 0 | NMR |
| RAF/82/982 | 3959 | 5 | SZ 626 997 | 2 | 10 AUG 1954 | 1000 0 | NMR |

Rat Island 2017 Excavations: Exercise Magwitch

| | | | | | | | |
|-----------------|------|------|------------|----|-------------------|-----------|-----|
| RAF/82/982 | 3959 | 9 | SU 630 003 | 3 | 10 AUG 1954 | 1000 0 | NMR |
| MAL/67081 | 4641 | 203 | SU 630 018 | 3 | 26 AUG 1967 | 1100 0 | NMR |
| MAL/67081 | 4641 | 204 | SU 621 018 | 3 | 26 AUG 1967 | 1100 0 | NMR |
| MAL/67081 | 4641 | 205 | SU 612 019 | 3 | 26 AUG 1967 | 1100 0 | NMR |
| MAL/67082 | 4642 | 1 | SZ 623 999 | 1 | 26 AUG 1967 | 1100 0 | NMR |
| MAL/67082 | 4642 | 2 | SU 633 000 | 1 | 26 AUG 1967 | 1100 0 | NMR |
| RAF/106G/UK/491 | 4959 | 5101 | SU 622 011 | 6 | 08 JUL 1945 | 4000 | MOD |
| RAF/541/T/51 | 5063 | 3015 | SZ 628 999 | 2 | 12 OCT 1950 | 1033 3 | FDR |
| RAF/541/T/51 | 5063 | 3016 | SZ 621 999 | 2 | 12 OCT 1950 | 1033 3 | FDR |
| RAF/541/T/51 | 5063 | 3017 | SU 615 000 | 2 | 12 OCT 1950 | 1033 3 | FDR |
| RAF/541/T/51 | 5063 | 4022 | SU 627 017 | 8 | 12 OCT 1950 | 1033 3 | FDR |
| RAF/541/T/51 | 5063 | 4023 | SU 621 017 | 8 | 12 OCT 1950 | 1033 3 | FDR |
| RAF/541/T/51 | 5063 | 4024 | SU 615 018 | 8 | 12 OCT 1950 | 1033 3 | FDR |
| RAF/58/1892 | 6236 | 8 | SU 622 005 | 3 | 14 OCT 1955 | 4000 | FDR |
| RAF/58/1892 | 6236 | 9 | SU 622 007 | 3 | 14 OCT 1955 | 4000 | FDR |
| RAF/58/1892 | 6236 | 10 | SU 621 009 | 3 | 14 OCT 1955 | 4000 | FDR |
| RAF/58/1892 | 6236 | 17 | SU 618 011 | 4 | 14 OCT 1955 | 4000 | FDR |
| RAF/58/1892 | 6236 | 18 | SU 621 010 | 4 | 14 OCT 1955 | 4000 | FDR |
| RAF/58/1892 | 6236 | 19 | SU 624 010 | 4 | 14 OCT 1955 | 4000 | FDR |
| RAF/82/983 | 8134 | 16 | SU 626 003 | 13 | 11 AUG | 1000 0 | NMR |

Rat Island 2017 Excavations: Exercise Magwitch

| | | | | | 1954 | | |
|------------|-------|------|------------|----|-------------|------|-----|
| RAF/NLA/45 | 8629 | 5050 | SU 620 003 | 16 | 12 SEP 1942 | 5000 | FDM |
| OS/88275 | 13366 | 282 | SU 622 002 | 9 | 30 SEP 1988 | 5500 | NMR |
| OS/88275 | 13366 | 283 | SU 622 006 | 9 | 30 SEP 1988 | 5500 | NMR |
| OS/88275 | 13366 | 284 | SU 622 011 | 9 | 30 SEP 1988 | 5500 | NMR |
| OS/88275 | 13366 | 288 | SU 614 013 | 10 | 30 SEP 1988 | 5500 | NMR |
| OS/88275 | 13366 | 289 | SU 614 008 | 10 | 30 SEP 1988 | 5500 | NMR |
| OS/88275 | 13366 | 290 | SU 614 004 | 10 | 30 SEP 1988 | 5500 | NMR |
| MAL/83023 | 14214 | 68 | SU 617 006 | 5 | 25 AUG 1983 | 5000 | NRA |
| MAL/83023 | 14214 | 69 | SU 622 003 | 5 | 25 AUG 1983 | 5000 | NRA |
| OS/96534 | 15136 | 1 | SU 621 012 | 1 | 20 APR 1996 | 7900 | NMR |
| OS/96536 | 15138 | 119 | SU 624 014 | 3 | 20 APR 1996 | 7700 | NMR |
| OS/96536 | 15138 | 120 | SU 619 014 | 3 | 20 APR 1996 | 7700 | NMR |
| OS/96536 | 15138 | 121 | SU 614 014 | 3 | 20 APR 1996 | 7700 | NMR |
| OS/96536 | 15138 | 128 | SU 615 005 | 4 | 20 APR 1996 | 7700 | NMR |
| OS/96536 | 15138 | 129 | SU 620 005 | 4 | 20 APR 1996 | 7700 | NMR |
| OS/96536 | 15138 | 130 | SU 625 005 | 4 | 20 APR 1996 | 7700 | NMR |
| OS/00912A | 15717 | 252 | SU 625 015 | 6 | 17 FEB 2000 | 7000 | NMR |
| OS/00912A | 15717 | 253 | SU 620 014 | 6 | 17 FEB 2000 | 7000 | NMR |
| OS/00912A | 15717 | 254 | SU 615 015 | 6 | 17 FEB 2000 | 7000 | NMR |

Rat Island 2017 Excavations: Exercise Magwitch

| | | | | | | | |
|---------------------------------|-------|----------------------------------|---------------------|-------------|------------------|----------------------|-----|
| OS/00912A | 15717 | 338 | SU 625 005 | 8 | 17 FEB 2000 | 7000 | NMR |
| OS/00912A | 15717 | 339 | SU 620 005 | 8 | 17 FEB 2000 | 7000 | NMR |
| OS/00912A | 15717 | 340 | SU 615 005 | 8 | 17 FEB 2000 | 7000 | NMR |
| OS/01144 | 15777 | 170 | SU 625 006 | 10 | 02 JUL 2001 | 5300 | NMR |
| OS/01144 | 15777 | 171 | SU 621 006 | 10 | 02 JUL 2001 | 5300 | NMR |
| OS/01144 | 15777 | 172 | SU 616 006 | 10 | 02 JUL 2001 | 5300 | NMR |
| OS/01144 | 15777 | 309 | SU 614 010 | 22 | 02 JUL 2001 | 5300 | NMR |
| OS/01144 | 15777 | 322 | SU 623 002 | 24 | 02 JUL 2001 | 5300 | NMR |
| OS/69356 | 20230 | 1 | SU 628 019 | 1 | 16 JUL 1969 | 1500 0 | NMR |
| OS/69356 | 20230 | 2 | SU 623 007 | 1 | 16 JUL 1969 | 1500 0 | NMR |
| OS/69356 | 20230 | 3 | SZ 619 994 | 1 | 16 JUL 1969 | 1500 0 | NMR |
| OS/69356 | 20230 | 10 | SZ 619 993 | 2 | 16 JUL 1969 | 1500 0 | NMR |
| OS/69356 | 20230 | 11 | SZ 621 998 | 2 | 16 JUL 1969 | 1500 0 | NMR |
| OS/69356 | 20230 | 12 | SU 624 001 | 2 | 16 JUL 1969 | 1500 0 | NMR |
| OS/69356 | 20230 | 13 | SU 627 005 | 2 | 16 JUL 1969 | 1500 0 | NMR |
| OS/72150 | 20640 | 25 | SU 616 009 | 3 | 02 JUN 1972 | 1000 0 | NMR |
| OS/72150 | 20640 | 26 | SU 625 008 | 3 | 02 JUN 1972 | 1000 0 | NMR |
| ADA/721 | 27378 | 4 | SU 635 010 | 1 | 23 DEC 1996 | 1400 0 | NMR |
| ADA/721 | 27378 | 5 | SU 627 002 | 1 | 23 DEC 1996 | 1400 0 | NMR |
| ADA/721 | 27378 | 6 | SZ 619 994 | 1 | 23 DEC 1996 | 1400 0 | NMR |
| <i>Obliques</i> | | | | | | 31 | |
| Library and Frame Number | | Photo Ref (NGR and Index) | Original No, | Date | Film Type | Map Reference | |
| RAF 30054/PFFO-0147 | | SU 6200/19 | 540/317 | 22 Apr 1950 | B&W 8x7" | SU 620007 1 | |
| | | | | Total | | | |

Annex 5: Hampshire HER entries for Burrow Island

| HER Number | Record | Summary |
|------------|-------------------|--|
| 19264 | Fort James | A Strong Late 17th Century redoubt sites on Burrow Island (alternatively known as Rat Island) in Portsmouth Harbour |
| 66023 | Human Remains | Human remains identified at Burrow Island (NB this is the initial record made in 2014 by the authors of this report) |
| 19266 | Iron slag | Pieces of iron slag were found on the shore of Burrow Island 1955 |
| 53078 | Rough stone wall | Rough stone wall or infill comprising rough irregular chunks of limestone. Held together with coarse sandy mortar |
| 19267 | Clay crucible | Clay crucible, weight about 1 cwt, probably Medieval or later, found on the shore of Burrow Island 1955 |
| 19265 | Building material | Miscellaneous building material - brick, tile, Binstead stone - is visible in the cliffs and on the shore of Burrow Island. No foundations could be traced. 1955 |