

# **Excavation and survey at Hackness Battery, South Walls, Orkney**

## **Data Structure Report**

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## Contents

1. Introduction
2. Historical Background
3. Objectives and Strategy
4. Method
5. Results
6. Discussion

## Bibliography

- Appendix 1 Matrices  
Appendix 2 Context descriptions and archive inventory  
Appendix 3 Finds inventory and illustrations  
Appendix 4 Geophysical Survey

- Illustrations Figure 1 Site and trench location  
Figure 2 The magazine  
Figure 3 The gun platform  
Figure 4 A profile of the rampart  
Figure 5 Sections

## *Summary*

*An archaeological investigation, involving geophysical survey and excavation, at Hackness Gun Battery identified a well preserved series of structures and deposits relating to the structural development of the monument. The fragmentary remains of the 1815 battery were found beneath the 1866 structure. The magazine and shifting room were fully excavated and found to be well preserved. Although heavily robbed of stone, the gun platform also proved to be well preserved and limited investigation identified the 1815 rampart and part of a possible earlier gun platform. Further investigation included excavation of the surrounding perimeter ditch and investigation as to the nature of the magazine drainage system. Geophysical survey identified two previously unknown structures in addition to numerous service trenches of varying dates and functions.*

## 7. INTRODUCTION

An archaeological investigation was undertaken at Hackness Gun Battery in November 1997 by Headland Archaeology Ltd. The work was commissioned by Historic Scotland who also funded the investigation. It is proposed by Historic Scotland to consolidate the site and present it to the public. The archaeological investigation was intended to provide vital information necessary to reconstruct the battery as it would have looked in 1866.

## 2. HISTORICAL BACKGROUND

Hackness Battery, together with the associated Martello towers at Hackness and Crockness, was constructed between 1813 and 1815 to guard the convoy anchorage at Longhope against the raids of American privateers. The battery was originally intended to be constructed alone but on the recommendations of Major Smyth, who planned the structure at the request of the Admiralty, the two towers were added to protect the battery from land assault.

Situated east from the point of Hackness, the battery commands the approaches to Longhope from the Pentland Firth via Switha Sound and Cantish Sound (Fig. 1). There is less than a mile of water between the battery and the shore of Flotta to the north east, a distance well within the range of 24-pounder cannon. The rear of the battery was protected by the Hackness Martello Tower situated 150 m to the south east. The Crockness Martello Tower covered the northern approach to Longhope via Gutter Sound or Weddel Sound. When firing south, the Crockness gun would also have provided an overlapping fire to assist the guns on the Hackness side of Longhope. Taken jointly the three fortifications formed a formidable defence against any seaborne attack.

The Battery, which was built by Lieutenant Skene, originally comprised eight 24-pounder guns *en barbette* mounted in V-formation on timber traversing carriages allowing the entire width of the sound to be covered. A report dated 1<sup>st</sup> August 1815 by a Lieutenant Colonel Morshead describes the battery as “mounting eight 24-pounder guns upon traversing platforms, constructed with an earthen parapet, having an interior retaining wall, banquette and curbs for the tracks founded in stone and cast iron racers”. Behind the cannon was the soldiers’ barrack room and store and behind that the magazine, a small rectangular structure with a brick vaulted roof, sunk below ground and protected by a bank. The springs of the brick arch still survive and at one time there was a timber floor, a common feature in a magazine as it prevented sparking if an object was dropped on the floor. The structure could hold 350 barrels of powder. A porch and door were situated on the north east. The descent into the sunken area was by a flight of steps near the southern corner of the rear, or south west side.

In 1866 the defences at Hackness were remodelled in response to a perceived threat from Fenians based in America. Four 68-pounder cannon firing through embrasures replaced the 24-pounders. An ammunition store was added behind the salient of the rampart and separate accommodation was added to the barrack for the use of NCOs. Other new buildings included a guard house, officers quarters, a cookhouse, stores and ablutions block and a separate latrine block. An additional magazine was constructed around 1892 when the 68-pounders were used for the first time by the Orkney Volunteer Artillery. The battery was manned during WWI by the naval personnel who operated the boom defence guarding one of the entrances to Scapa Flow but it was not used during the WWII defence of Orkney.

### **3. OBJECTIVES AND STRATEGY**

The objectives, as stated in the Project Outline supplied by Historic Scotland, were to document more precisely the structural evolution of the battery and to obtain details of its construction and surface finishing to assist in conservation and restoration of the Battery as it would have appeared after the 1866 refurbishment. The Project Outline identified seven principle tasks that needed to be undertaken to achieve this objective:

- A Complete excavation and recording of the demolished magazine and its surrounding earthwork.
- B Detection and recording of the routes of all service pipes, ducts and trenches.
- C Excavation of a trench through the backfilled outflow drain from the magazine to confirm the presence of a ceramic pipe and record its original profile.
- D Excavation of the east gun platform to determine its state of preservation and details of surfacing and construction.
- E Excavation of five trenches through the outer ditch to determine its profile and to assess the significance of organic remains, if present.
- F Compilation of a detailed catalogue of artefacts previously stored on the site.
- G Excavation of a shallow trench across the glacis and ditch (if present) of the 1866 rampart to determine its original profile

Each trench was given the code of the objective it was set to achieve e.g. the gun platform trench was labelled Trench D after objective D and there is no Trench B as this objective was achieved through geophysical survey.

### **4. METHOD**

#### *4.1 Desk assessment*

In advance of the fieldwork the project's military historian, John Guy, prepared a detailed account of the documentary evidence of the structure of the battery. This was used in the field to guide the day-to-day excavation process. John Guy also visited the site in the later stages of the work to assess the results of the excavation and advise on their interpretation.

## 4.2 *Geophysical Survey*

In order to recover a plan of the route of all service pipes, ducts and trenches (including modern, redundant and removed water pipes, drains and electricity cables) the entire site was subjected to geophysical survey. Both gradiometry and resistivity were used to enhance the overall view of the site and its development.

## 4.3 *Excavation*

Two areas and seven long trenches were excavated in accordance with the Project Outline prepared by Historic Scotland. All investigation of archaeological horizons/features was by hand with cleaning, inspection and recording both in plan and in section/elevation. The stratigraphy of all excavated areas was fully recorded. Once excavated the site was inspected by John Guy in order to assist with site interpretation. All excavated areas were backfilled and fully reinstated with the exception of Trenches A and D. Spoil from these trenches was neatly stored at locations agreed with Historic Scotland and the caretaker Mr Cload.

## 4.4 *Artefacts*

All artefacts, including objects previously stored on site, were catalogued and drawn where appropriate.

# 5. RESULTS

The trenches were located as per the plan provided with the Project Outline (Fig. 1). These were as follows:

## 5.1 *The Magazine (Trench A)*

*Trench A* completely exposed the remains of the magazine and its surrounding earthwork (Fig. 2). The earthen bank was shown to be largely intact with the exception of the north bank which has partially been removed by John Cload. The structure was set into a large, roughly square cut with sharply sloping regular sides and a flat base (071). The upcast from the pit was used to construct a bank (077) which enclosed the structure on three sides; north west, north east and south east. Access was via two sets of steps built into the south west side of the cut. The steps were largely destroyed but appeared to have been originally constructed of sandstone and mortar. The southern set (072) consisted of two parallel walls built into a cut in the south west side of the construction cut with parallel sandstones slabs laid between. The second set of steps (073) were identical in construction although the base step was still in situ and showed signs of wear. A number of stone slabs were laid at the front of these steps to form a crude surface.

The structure of the magazine consisted of a rectangular building constructed of large sandstone walls bonded with mortar (018, 022, 023, 075). The floor, which would originally have been constructed of timber, was supported by a step at the base of the external walls and two north east to south west aligned dwarf walls (020, 021). The structure was covered internally by a brick built vault (019, 076). A number of sockets for a timber interior panelling were evident in the fabric of the interior wall (Fig. 3). Externally the structure is likely to have had a pitched roof although no evidence for this survives (John Guy *pers. comm.*). A number of holes were drilled at intervals along the outside of the walls and these originally held an iron strip which was part of a lightning conductor. Part of the lightning conductor was found at the base of the north west wall and the earth cable was found by the east corner. The conductor passed any electricity generated by lightning to the shore via a trench which passed out through the gates (J Cload *pers. comm.*).

The main walls for the structure were constructed of sandstone blocks bonded by mortar and rendered externally with a gritty grey plaster. The south west and north east walls (023, 075), which were 0.6 m thick, were narrower than the north west and south east walls (018, 022) which were 0.85 m thick. Two vents were constructed in the base of the north east wall. These were designed to ventilate the magazine by allowing air to circulate beneath the wooden floor. The door was situated in the north east wall and opened out into the shifting room.

The shifting room comprised an internal area of 3.8 m by 1.5 m and was constructed of sandstone walls bonded with mortar (024). The shifting room was added after the initial construction of the magazine as evidenced by the external rendering of the magazine wall which was enclosed by the construction of the shifting room. Iron grills were built into the north west and south east walls presumably to allow ventilation.

The entire structure was surrounded by a drain (074) which left the magazine from the east corner. Surrounding the magazine the drain consisted of a shallow cut against the base of the external walls which was packed with rubble. At the east corner the drain was stone built and fed into a large, brown, ceramic pipe. A hole was cut through the east corner of the building which would also have allowed the interior of the magazine to drain.

The magazine was radically altered by the Cload family during the 20<sup>th</sup> century. The vaulted roof was demolished and the magazine building converted into a chicken coop. The north west side of the construction cut was infilled to allow improved access to the latrine block which now serves as a tractor garage. The north west bank was also removed for use as surfacing material for the road between the martello tower and the gun battery. A stone structure built into the north corner served as an inspection pit for Mr Cload's car. An air raid shelter (026) was constructed into the south east bank during WWII. A further dry stone wall (025) was constructed against the outer face of the south east side of the construction cut. This served as a revetment for a wheel barrow run which was built into the south east bank.

## 5.2 *The Magazine Outflow Drain (Trench C)*

*Trench C* was cut across the supposed position of the backfilled outflow drain from the magazine in order to record its profile and determine whether it contained a ceramic pipe. The trench was extended to the east in order to investigate a large linear depression which ran from the corner of the magazine to the boundary wall. The topsoil (001) overlay a layer of compact reddish brown gravel (002) which appeared to have been removed from the local beach. This material is likely to have served as the surface of the yard of the 1866 battery. Beneath this gravel surface a linear feature was identified crossing the trench at a right angle corresponding with the surface depression. This feature was filled with tightly packed cobbles (010) which appeared to form a surface or possibly a path. The cobbles were removed to reveal a shallow regular cut (011) which was in the correct position for the magazine drain. However, no evidence was recovered for the existence of any drainage system and the feature was too shallow to have served as a drain for the magazine. A mortar and rubble surface (013) was truncated by the linear feature. This surface is likely to have served as the yard surface for the 1815 battery. Beneath the mortar surface was a layer of mid reddish brown sandy silt loam (029) interpreted as the original ground surface. This deposit was excavated and a number of sondages excavated into the natural in order to determine whether it was redeposited.

No evidence was recovered for the existence of the drain although the surfaces of both the 1815 and 1866 batteries were identified. The shallow linear feature identified at the centre of the trench may represent an abortive attempt to construct the drain in the position originally planned. An alternative, and as yet unknown, route was chosen for the drain. It is possible that the drain may have been constructed beneath the later latrine block. The excavation of the magazine indicated that the drain (074) left through the east side (Fig. 2). The geophysical survey supported this view (Appendix 4).

## 5.3 *The Gun Platform (Trench D)*

*Trench D* was located to expose the east gun platform and allow its state of preservation to be determined (Fig. 4). The trench was excavated down to the 1866 surface with a number of small sections excavated to investigate pre-1866 structures.

### *The 1815 Battery*

The earliest feature identified in the trench was the base of the original internal retaining wall (005) for the 1815 rampart. This was reused as the foundation for the 1866 rampart wall. The wall was constructed of yellow sandstone slabs internally faced and bonded with mortar. The external face was concealed by the rampart. The wall was demolished in advance of the 1866 refurbishment. The bases of two further structures (080, 081) were also identified abutting the rampart wall at right angles. These consisted of rubble and mortar and, due to heavy truncation, it was not clear whether they originally formed additional walls or represented the remnant surface of an 1815 gun platform. An unusual stone structure was identified adjacent to the rampart wall. This consisted of a stone box (078) which was rectangular in plan, measuring 0.9 m by 1 m and 0.35 m in depth. It was constructed of sandstone blocks bonded with yellow mortar and was rendered internally. Two iron objects,



possibly posts were identified at the south corner of the structure. These were left *in-situ*. The box was filled with grey sand and gravel which is likely to have derived from the surface laid over the entire battery during the 1866 refurbishment. A well constructed mortar surface (006) was identified in the south corner of the trench. This was also attributed to the 1815 battery and may represent an intact fragment of the surface of the initial gun platform. A pair of parallel curvi-linear walls, (085 and 086) may have formed part of the 1815 gun racer although they were heavily truncated. A further wall (087), also constructed of sandstone bonded with mortar, was heavily truncated and remains of unknown function.

### *The 1866 Refurbishment*

The 1866 refurbishment of the battery completely remodelled the gun platforms. The rampart wall was demolished and rebuilt with embrasures. A thin layer of beach gravel (008) was laid to form a surface over the entire gun platform. Within this gravel surface two parallel curvi-linear trenches were excavated to take the stone foundations for the iron racers which would have carried the wooden carriages for the guns. Both trenches were robbed out although the rear tracer trench (066) was partially intact at the northernmost end. The original base fill of this trench consisted of coarse sandstone chippings (067) which would have acted as a bedding for the racer foundations (Fig. 5). The remainder of the trench was badly disturbed by the robber trench which had removed both the racer and its stone foundations. The robber trench (068) measured 9.8 m in length, 1.15 m in width and 0.5 m at maximum depth, and was filled with a mixture of sandstone rubble and gravel in a matrix of dark brown clay loam (069). The front racer was completely removed by a second robber trench (083). This measured 4.5 m in length, was of similar dimensions to the rear racer and was filled with a mixture of sandstone rubble and gravel in a matrix of dark brown clay loam (082). A shallow narrow gully (088) may mark the position of a stone kerb shown on the 1866 Ordnance plan of the battery.

Once the battery went out of use a thin layer of dark brown clay loam (009) accumulated over the surface. The most recent feature in Trench D was an L-shaped flagstone surface (003) which served as the base of a chicken coup (J Cload *pers. comm.*).

### *5.4 The Outer Defensive Ditch (Trenches E/1 to E/5)*

Five trenches were excavated across the outer defensive ditch in areas predetermined by Historic Scotland (Fig. 1). The ditch was identified in all trenches and in four it proved to be well preserved.

Trench E/1 was located on the south west side of the battery gate. The topsoil (030) was removed to reveal a rubble field drain (031) which was constructed by John Cload (J Cload *pers. comm.*). At the south east end of the trench, the drain cut a crude surface (045) constructed of stone slabs and angular rubble. At the north west end of the trench the drain cut a well constructed and still functioning culvert (032), 1.6 m wide by 0.35 m deep, which was built into the original ditch (057). This box culvert was not excavated but could be seen to be constructed with angular rubble sides and large shale slab capstones.

Trench E/2 was located at the north east end of the south east wall. The topsoil directly

overlay the capstone of a culvert (084). The culvert was not excavated as it was still functioning and appeared to be carrying raw sewerage. The culvert was built into the defensive ditch of the battery. The fill of the ditch consisted of dark brown silty clay loam (044) and the cut (034) remained un-excavated.

Trench E/3 was cut across the ditch at the north end of the west wall. A concentration of rounded stones within a matrix of gritty pale brown silty sand (043) overlay the natural on the inside edge of the ditch and may have served as a foundation for the boundary wall. The ditch cut (041) was V-shaped in profile with a slightly rounded base and measured 1.9 m wide by 0.7 m deep. The primary silting deposit consisted of pale brown silty clay (064). A stone culvert (051) cut the primary fill. This was capped with large flagstones with walls constructed of angular rubble. The culvert was replaced, and partially destroyed, by the insertion of a large brown ceramic pipe (058) identical to that excavated at the magazine. The pipe was sealed by a deposit of mid brown silty clay loam (059) which was overlain by a deposit of mid greyish brown silty loam (042), the final fill of the ditch.

Trench E/4 was located at the south end of the west wall adjacent to the latrine block. The ditch cut (049) was again identified and measured 1.8 m wide by 0.65 m deep. In profile the ditch was V-shaped with a flat base. A culvert (060) constructed of vertical slabs capped with flagstones was built into the base of the ditch. A deposit of mid brownish grey silty sand (065) was contained by the culvert. The culvert was sealed by redeposited natural light brownish yellow silty clay (061). The uppermost fill of the ditch consisted of a deposit of mid greyish brown silty clay loam (048). The feature lay directly beneath the topsoil (047).

Trench E/5 was located centrally against the rear wall of the battery. The best preserved section of the ditch was recorded in this trench (Fig. 6). The cut (055) measured 2.5 m in width by 0.5 m in depth and, in profile, was V-shaped with a flat base. The primary fill (062) consisted of greenish brown silty clay. The secondary fill (054), which consisted of loose cobbles in a matrix of reddish brown silty loam, was likely to have served as a simple drain or soak-away. The cobbles were sealed by a deposit of grey brown silty clay (053) which also overlay the upcast from the original excavation of the ditch; a deposit of mid reddish brown silty clay (063). The feature lay directly beneath the topsoil (052).

### 5.5 *The Glacis (Trench G)*

*Trench G* was positioned to investigate the rampart, ditch and glacis in order to determine the original profile of the 1866 defences (Fig. 7). The trench revealed a built up embankment 2.5 m high and 8 m wide which was surfaced with beach gravel (035). The original profile of the bank had been disturbed by the Cload family at the point of investigation (J Cload *pers. comm.*). The original profile would have had a level gravel surface at the top approximately 7 m wide, which sloped away sharply towards the sea.

The bank was constructed of redeposited subsoil, topsoil and rubble (036). The original topsoil (038) was sealed by the bank. The bank was retained by a large mortared stone wall on the internal side. No evidence for a ditch or glacis was recovered and it would appear that the 1866 plan showing this was produced in advance of the refurbishment which, presumably, was never completed.

## *5.6 Geophysical Survey*

The results of the geophysical survey are fully described in Appendix 4 although a brief summary is included here.

The overall survey was successful in locating the main service trenches, although the gradiometer was impeded by the profusion of metal objects in the topsoil.

The survey revealed a possible alternative drainage line from the magazine which ran from the east corner of the bank towards the south east where it joined the drain in the perimeter ditch.

Three anomalies of probable anthropogenic origin were identified in front of the rampart (Appendix 4, Fig. 7, Anomalies L, M and O). Anomaly L consists of four linear features running towards the sea which are likely to represent drainage ditches. Anomaly M consists of two well defined circular structures. The larger, approximately 8 m in diameter, lies directly in front and at the apex of the battery banking. Anomaly O consists of a possible corner to a structure.

## **6. DISCUSSION**

In general the objectives of the investigation were achieved.

The magazine was completely excavated, planned and recorded. It was found to have been partially demolished, first by the construction of the additional building to the north east which led to the destruction of the shifting room, and second by the remodelling of the structure by the Clodds for agricultural purposes over the years. The north east bank was also partially removed. The ground plan of the structure does, however, survive and could quite easily be reconstructed. On both the 1815 and 1866 Ordnance plans of the battery only one set of steps are illustrated. Excavation identified a second set. In original form the walls and vault of the building would have been covered internally by timber panelling to avoid the risk of sparking, and the floor was also of timber. For the same reason brass or copper would have been the only metal used within the structure. A pitched roof would have covered the vault. Together with the bank, the substantial structure was intended to protect the powder from seaborne artillery.

It was also important to keep the powder dry. The entire structure was surrounded by a rubble drain which was culverted at the east corner where it left the magazine trench. A hole was also cut in the east corner of the building in order to allow any moisture in the interior of the structure to drain. The floor was raised on dwarf walls to allow air to circulate, and air circulation was further enhanced by the insertion of two vents in the north east wall.

The majority of service trenches have been identified through geophysical survey although several of these have been inserted recently by the Clodd family. The location and nature of these services is discussed in Appendix 4 although in general terms it would appear that the ditch surrounding the battery was intended to serve as a drain in addition to any defensive function. In fact this became its prime function as it was initially culverted and subsequently

the culvert was replaced with a ceramic pipe. A probable well was located against the south east wall (Appendix 4, Fig. 7, Anomaly B2). Internal drainage trenches linked into the external ditch. Several service trenches are also visible on the 1866 Ordnance map of the site and some of these correspond with the position of geophysical anomalies. These include a trench running from the east corner of the cookhouse to the perimeter wall and a number of trenches running parallel to the rear of the rampart. A well was also identified on the 1866 map and the geophysical survey outside the south east perimeter wall.

The outflow trench for the magazine was not located in trench C. A drain was identified in Trench A heading away from the east corner of the magazine building and it is possible that this follows a much different course than previously documented. The geophysical survey identified a linear anomaly running from the magazine towards the east (Appendix 4, Fig. 7, Anomaly C?, C1 and C2). An abortive attempt at the construction of the drain in the location planned by the Ordnance was identified in trench C. Part of the objectives of the excavation of trench C was to identify whether the drain held a ceramic pipe. Excavation of the magazine demonstrated that the stone drain surrounding the magazine was channelled into a ceramic pipe suggesting that the outflow drain from the magazine was probably also piped.

The east gun platform was completely exposed to 1866 level. A number of sondages cut through this level demonstrated the existence of earlier structures which are likely to represent an 1815 gun platform. The 1815 structures were, however, difficult to interpret due to their fragmentary nature and the limited area exposed. In particular a curious internally rendered stone box remains unexplained. However, the remains of the original rampart wall were found to be present and reused as the foundation for the 1866 rebuild. The 1866 gun platform was fully exposed and found to have been extensively robbed out. The front and rear racer trenches were identified and excavated. The dimensions of these trenches and distance between them will allow the exact nature of the guns and carriages to be determined. A curious gully at the rear of the platform is interpreted as the remains of the kerb illustrated on the 1866 Ordnance map.

The perimeter ditch was located and excavated in all five trenches. It would appear that the ditch was not open for any substantial period of time and that it served a dual purpose of defensive and drainage. The best preserved section of the ditch was excavated at the rear of the battery where the upcast from the ditch was still present. Here it was V-shaped in profile and from the base of the ditch to the top of the wall measured 2.15 m. The fill of the ditch was organically rich and included the leather sole of a shoe and a large variety of macroplant remains.

In addition to the artefacts previously stored on site, a number of additional objects of varying dates were also recovered during the excavation including objects dating to both world wars. These are catalogued and where appropriate illustrated in Appendix 3.

The investigation of the rampart found no evidence of a glacis or ditch and it would appear that the rampart was constructed from material excavated from the location of the gun platforms which explains the present topography. The 1866 Ordnance map of the site shows a rampart fronted by a glacis again suggesting that the Ordnance map was a plan for remodelling and not a record of what was done.

## 7. SYNTHESIS

The investigation identified a complex sequence of structural activity which continued until recent times through the activities of the Cload family. The plans reproduced by Fereday were obviously produced before the structure was built and are not an accurate representation of the structure after it was completed.

The original 1815 gun battery is largely intact and preserved although the gun platforms were almost completely destroyed by the 1866 refurbishment. In addition to the magazine, fragmentary surfaces and structures were identified which may relate to the primary building phase. It appears that mortar was used extensively as surfacing material as identified in the magazine, Trench C and Trench D. An additional set of steps was identified at the rear of the magazine although it is unclear when these were constructed. The outer defensive ditch was best preserved on the south side of the battery. Here the ditch was very regular and V shaped with a flat base. A remnant bank survived outside the ditch and the battery wall was constructed on the inside lip of the ditch.

The 1866 battery is intact although the racers for the guns have been removed from the excavated gun platform. The exact location of the racers can be easily identified as large depressions where the granite foundations have been removed. In addition the locations of the racers on the remaining platforms were located through geophysical survey. The general surface of the battery was replaced in 1866 with gravel taken from the local beach. The gravel was quite fine grained and, when compacted, made an excellent, well drained surface. This surface was identified in all areas excavated within the walls of the battery with the exception of the magazine.

A number of additional structures were identified by the geophysical survey. These include the circular structure in front of the rampart and, adjacent to it, the corner of a possible rectangular structure. These are of unknown function and did not exist in the lifetime of John Cload (J Cload *pers. comm.*). Further investigation of these structures may enhance the restoration of the battery.

A more extensive excavation of the area of the gun platforms would provide useful information regarding the 1815 battery. Furthermore the insertion of new racers and gun carriages may have a detrimental effect on the remains of the 1815 gun platforms and, as a precautionary measure, it would be advisable to completely excavate the platforms in advance of restoration.

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