

# **Monumental Misjudgements?**

## **Early Conservative Interventions and their Impact on Orcadian Neolithic Sites**

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All errors and omissions remain my own.

## ABSTRACT

The contemporary experience of visiting many Neolithic sites in Orkney is dominated by the physical manifestations of early conservative interventions; the most striking of these being a series of cover-houses, installed over chambered tombs to ensure their protection from the elements. These shelters range in scale from small concrete domes enclosing the interior of the monuments (such as that over the Knowe of Yarso, depicted in the cover image), to a vast free-standing steel enclosure (see Figure A1 below). Yet despite their dominant forms, these constructions remain curiously little discussed in academia, and specialist sources must be consulted to establish even a date of installation.

The current work therefore aims to illuminate these ventures, and to examine the wider suite of consolidation works involved in their installation, plus the motivations and historical context by which they were stimulated. The impact of these interventions will then be considered by examining their effect upon i) the archaeology as a scientific resource, ii) the current condition of the sites, and iii) the contemporary experience of their visitation.



Figure A1: Free-standing protective steel enclosure over Midhowe, with elevated gangways from which to view the interior of the tomb.

# CHAPTER 1. INTRODUCING THE STUDY

## The Archaeology of Orkney: A Geographical and Historical Context

The Orkney archipelago comprises some sixty-seven islands<sup>1</sup> scattered astride latitude 59°N<sup>2</sup>, off the northern tip of Scotland (Figure 1.1). Situated at the junction of the Atlantic Ocean and the North Sea, its climate is one of extremes, and further exaggerated by the limited daylight of winter months (only c.6 hours in December), and correspondingly light summers<sup>3</sup>. With approximately 570 miles of coastline<sup>4</sup>, the sea dominates the isles<sup>5</sup>.

Orkney's low-lying fertile soils, well-spaced rainfall and long growing-season first supported a farming community around 5500 years ago, and the lack of substantial tree-cover stimulated those and ensuing generations to construct their architecture primarily of local stone<sup>6</sup>. The majority of the islands are composed of high quality Middle Old Red Sandstone<sup>7</sup> (Figure 1.2), the strata of which readily cleaves to form regular slabs, or 'flagstones', which lend themselves to the construction of highly sophisticated architectural forms<sup>8</sup>. The abundance and durability of this natural stone has aided the exceptional preservation of each stage of the Orcadian human past, with those remains from the Neolithic offering some of the richest sources anywhere in Britain for understanding the period<sup>9</sup>.

---

1 Wickham Jones, 2007: 1

2 Davidson and Jones, 1985: 10

3 Hedges, 1984: 10; Wickham Jones, 2007: 8

4 Towrie, 2014

5 Hedges, 1984: 10

6 Wickham Jones, 2007: 3, 20

7 with the exception of Hoy which is of the Upper Old Red Sandstone

8 Davidson and Henshall, 1989: 8; Hedges, 1984: 11; Hyslop, Albornoz-Parra, Maxwell, McMillan and Walsh, 2006: 26; Maxwell, 1992: 28; Wickham Jones, 2007: 3, 20

9 Renfrew, 1985: 1; 2005b: xxi



Figure 1.1: Map of Orkney in its wider geographical context, Image courtesy of Ordnance Survey, 2014

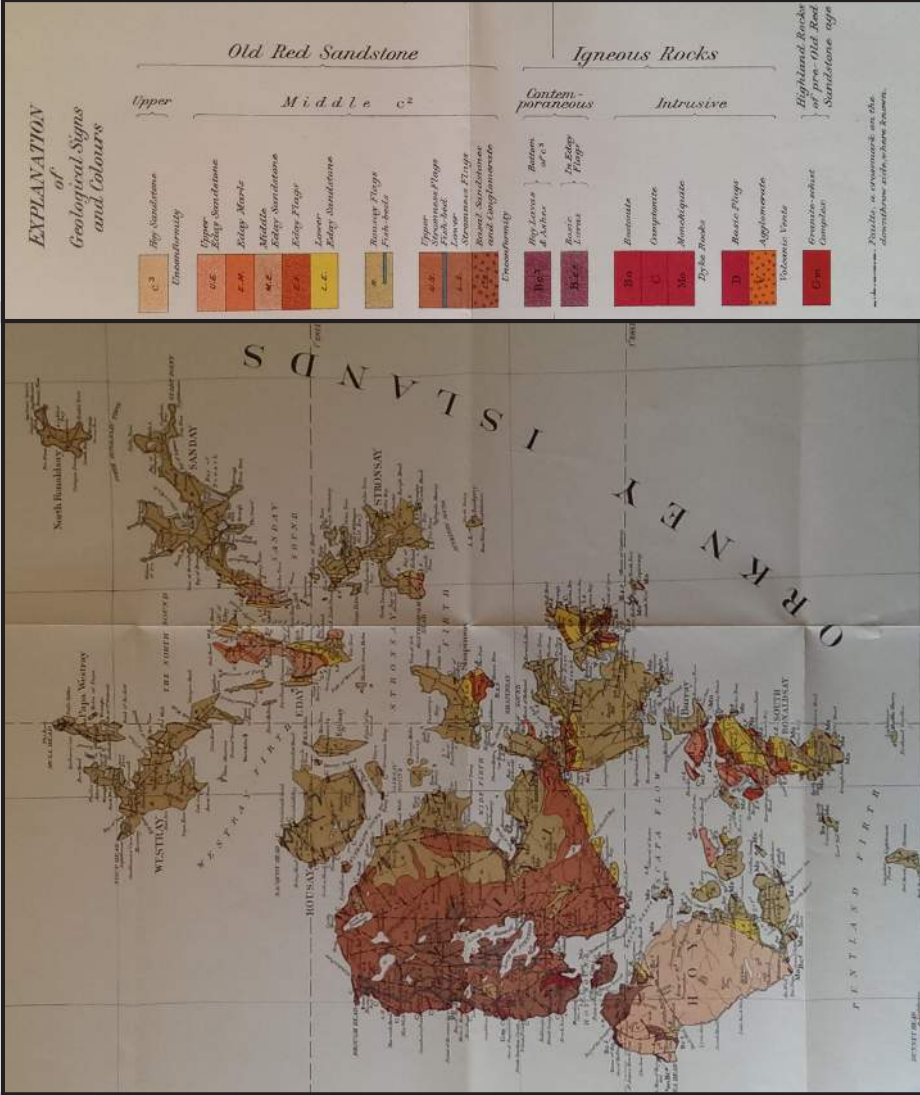


Figure 1.2: Geological Map of Orkney and Key: Image courtesy of Ordnance Survey, 1935

In recent years the archipelago has not supported a particularly large population, and the low density of people to land allows vast expanses of countryside to remain free from the encroachment of building. In such a rural environment the economy tends to be agriculturally based, but the predominance of low-intensive arable farming presents relatively little disturbance to the land<sup>10</sup>. As such, the high visibility of archaeological remains within the Northern Isles is without parallel elsewhere in Britain<sup>11</sup>, and has long attracted inquisitive observers to their shores<sup>12</sup>.

Aside from a colourful history of what might be described as “antiquarian dabbling”, the Neolithic sites have here been subject to three main periods of attention of a perhaps more ‘academic’ nature. These being the work of Petrie, Farrer, Hebden and Thomas between 1849 and 1869, who variously excavated sites including Wideford Hill, Maeshowe, Quoyness and Holm of Papa Westray South, recording their findings to variable degrees<sup>13</sup>. The current study is, however, primarily concerned with the second phase of intense investigation which occurred largely between 1928 and 1941, as stimulated by the works of the Royal Commission on Ancient Monuments in 1928-1937, in preparation of their Inventory of the of the monuments of Orkney<sup>14</sup>. This period saw the exposure of the majority of the sites discussed herein, and their preparation for public visitation by Her Majesty’s Ministry of Works [henceforth HMMOW], including the second phase of investigation at Skara Brae by Childe starting in 1927, Walter Grant’s excavation of Midhowe, Knowe of Yarso, Blackhammer and Taversoe Tuick in the 1930s, and H.E. Kilbride-Jones’ examinations of Wideford in 1935<sup>15</sup> <sup>16</sup>.

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10 Davidson and Jones, 1985: 34; Hedges, 1984: 12; Richards, 2005: 7

11 Richards, 2005: 7

12 e.g. various antiquities of Orkney, including the rock-cut Dwarfie-Stane, were described in Joannem Ben’s *Descriptio Insularum Orchadiarum* of 1529 (Card, 2005a: 40)

13 Davidson and Henshall, 1989: 6

14 Eventually published after the war in 1946, (Card, 2005a: 44; Davidson and Henshall, 1989: 6-7)

15 Davidson and Henshall, 1989: 6-7; Hedges, 1984: 26

16 Certain sites were ‘re-excavated’ following earlier, sometimes partial, investigation, including Holm of Papa Westray South in 1849, Unstan in 1884, Cuween in 1901, (Card, 2005a: 42; Davidson and Henshall, 1989: 6)

The third and final period of intrusive investigation comprises the ongoing work undertaken since the 1970s. Exceptionally for such a small region, there are currently four active excavations on Orcadian Neolithic sites<sup>17</sup>, through which our knowledge of the period continues to expand.

17 These being ORCA at the Ness of Brodgar on Mainland, EASE Archaeology at the Links of Noltland on Westray, Bradford University at Knowe of Swandro on Rousay, Manchester University at Smerquoy on Mainland, and the recently completed works awaiting publication at Braes of Ha'breck on Wyre by ORCA, Green on Eday by BEVARs, and the small scale works at Muckquoy on Mainland by Manchester University. To these we might also add the somewhat 'unofficial' ongoing excavations at Banks tomb on South Ronaldsay



Figure 1.3: Location Map of Sites Mentioned in Text, Based on image courtesy of Ordnance Survey, 2014

## Introducing the study

The current work aims to examine a suite of early conservative interventions undertaken in Orkney by HMMOW as they prepared a number of Neolithic sites for presentation to the public during a twenty-year period from 1929 to 1949. This subject has remained curiously absent from academic discussion to date, but given the wealth of contemporary archaeology coming to light in the present<sup>18</sup>, now seems a prudent time to re-visit these interventions and consider their success in conserving archaeological remains.

The primary sites discussed include the settlement of Skara Brae, plus a range of tombs of different configurations: Unstan, Cuween and Wideford on Mainland Orkney, Midhowe, Knowe of Yarso [henceforth Yarso], Blackhammer and Taversoe Tuick on Rousay, and Holm of Papa Westray South [henceforth HoPW] on the Holm of Papa Westray. Further other contemporary sites will be mentioned throughout the text (see Figure 1.3 for their locations), but it is with this core group of monuments that this discussion is primarily concerned.

The overall aim of the thesis could thus be defined:

To consider the lasting impact of Her Majesty's Ministry of Works conservative interventions on Neolithic sites in Orkney between 1929 and 1949

Which will be achieved through the following objectives:

- i) Determine the nature and extent of these works,
- ii) Situate these within a chronological and philosophical context,
- iii) Assess the remains in the present in terms of:
  - a. Their current condition,
  - b. The experience of visitation,
  - c. The fabric as an archaeological resource

The whole will be situated within a wider discussion on the moral and historical development of conservation, its practical applications, and the need for preservation.

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18 Decisions regarding the presentation and conservation of which will be imminently required

## Methodology

Since these interventions have remained largely absent from academic literature, it was necessary to consult primary sources – both by inspecting the monuments themselves, and accessing the original HMMOW records relating to the works. These files, held in the National Archives of Scotland in Register House, largely comprise handwritten notes sent back and forth between the Inspectors, architects and, in certain instances, the landowners or archaeological experts involved, as they discussed the requirements and possible solutions for the stabilisation of each monument. The articles deemed to be of relevance were transcribed (Attached in Appendix X), and for ease of reference, each individual document (e.g. each letter or memorandum) has been assigned a unique reference code (e.g. SB1) which will be cited when the source is referred to within this thesis, in addition to a page number (e.g. AX13) expressing its location within Appendix X. The documents are grouped according to their original ‘file’ number in the archives (e.g. MW-1-358), and where a word was not readily decipherable it has been expressed with either ‘XXX’ or followed by a bracketed question mark: (?).

It should be noted that there was a huge discrepancy in the level of detail between these files; for certain of the sites discussed (most notably Skara Brae) there were multiple folders available, laden with reports, drawings and photographs, yet for other sites (such as Cuween) there was little more than a legal Scheduling Document available for consultation. As the transcribed records reveal, these discussions largely involved the same core group of individuals who were apparently responsible for overseeing the whole suite of works undertaken in Orkney during this period. As such, we may reasonably suppose that the philosophies and logic that informed the works undertaken at the well documented sites were also applicable to those interventions for which records are lacking.

Having acquired this foundation of information, further research was conducted in order to situate the works within a wider historical and theoretical discussion. Publically available sources were consulted at various archives, and information sought from a

range of experts both via email and interview. Advantage was also taken of condition surveys previously undertaken by the author at certain of these structures as part of a preliminary study, and having acquired historic photographs the relevant sites were later revisited in order to assess changes and verify certain details.

## **Project Overview**

Through examination of primary sources it was possible to establish a chronology of development for the various design approaches employed in erecting protective covers over these Neolithic structures (Chapter 2). Having done so, the works were then situated within a wider historical context of conservation thought and intervention, including the use of reinforced concrete within its broader context of development (Chapter 3). The full extent of associated consolidation works was then revealed through a discussion framed by key themes in conservation practice, through which it was possible to assess the impact of the interventions on the archaeology as a scientific resource (Chapter 4). The current condition of the monuments was then examined in comparison with historic photographs, and in light of structural and environmental data recently acquired from contemporary sites (Chapter 5), before examining the experience of visiting these monuments in relation to phenomenological theories, presentation requirements, and the need to avert damage through over visitation (Chapter 6). In light of all of the above, the success and lasting effects of the interventions were then considered (Chapters 7 and 8).

NOTE: Rather than being encumbered by academic typologies and classifications, for the purposes of the current discussion it is enough to note that this study examines a range of Neolithic sites with different architectural configurations<sup>19</sup>. Most of those discussed are chambered tombs, while Skara Brae is a contemporaneous domestic settlement<sup>20</sup>; their diversity of forms are unified in belonging to the same epoch<sup>21</sup>.

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19 This is not the forum in which to discuss the differences between the stalled cairns of Orkney-Cromarty type, and those with built-in side-cells variously termed Maeshowe type or Quanterness-Quoyness, or their associated material culture, for which the reader is referred to Davidson and Henshall, 1989.

20 The earliest occupation being around 3100bc (Historic Scotland, 2000: 25)

21 The Neolithic in Orkney is considered to span about 1500 years, from the mid-4<sup>th</sup> millennium to c2000bc (Card, 2005b: 47; Hedges, 1984: 31)

## CHAPTER 2:

# THE ROLE HER MAJESTY'S MINISTRY OF WORKS AND A CHRONOLOGY OF THEIR INTERVENTIONS

### The Role of Her Majesty's Ministry Of Works

The role of HMMOW seems to be little documented, and their actions scarcely discussed beyond their own archival records, but contemporary newspaper articles helped to illuminate certain of their functions and responsibilities in relation to archaeological remains.

Where a site was deemed to hold sufficient importance or interest, it would be taken into the guardianship of HMMOW who would then be responsible for ensuring that access to its form be provided, and that it be preserved and protected from destruction by the elements. Such works of conservation and stabilisation were conducted in accordance with the Ancient Monuments Board, with excavation only taking place where necessary to reveal the nature of the monument, or where conservation work demanded it<sup>22</sup>, as was the case with the large-scale excavations at Skara Brae<sup>23</sup>. A primary reason for landowners passing over monuments to care was to ensure that they be “properly preserved”<sup>24</sup> by the actions of HMMOW, with one approach for Orcadian sites being the erection of a protective cover over the remains.

### A Brief Chronology of Cover House Development

Scrutiny of the HMMOW records has allowed a basic timeline to be constructed (Figure 2.1), detailing the year of installation or design for certain of the cover houses over Neolithic remains in Orkney, and facilitating, therefore, the establishment of a basic chronology of their development. This data was not available for all sites.

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22 Marwick, 1934: 8

23 Childe, 1928; as a representative of the Society of Antiquaries of Scotland, Childe was invited by the Ministry of Works to oversee the excavations, soon after the site was placed in their guardianship in 1924 (Card, 2005a: 42)

24 P20, AX12; see too M28, AX8; and U1, AX24

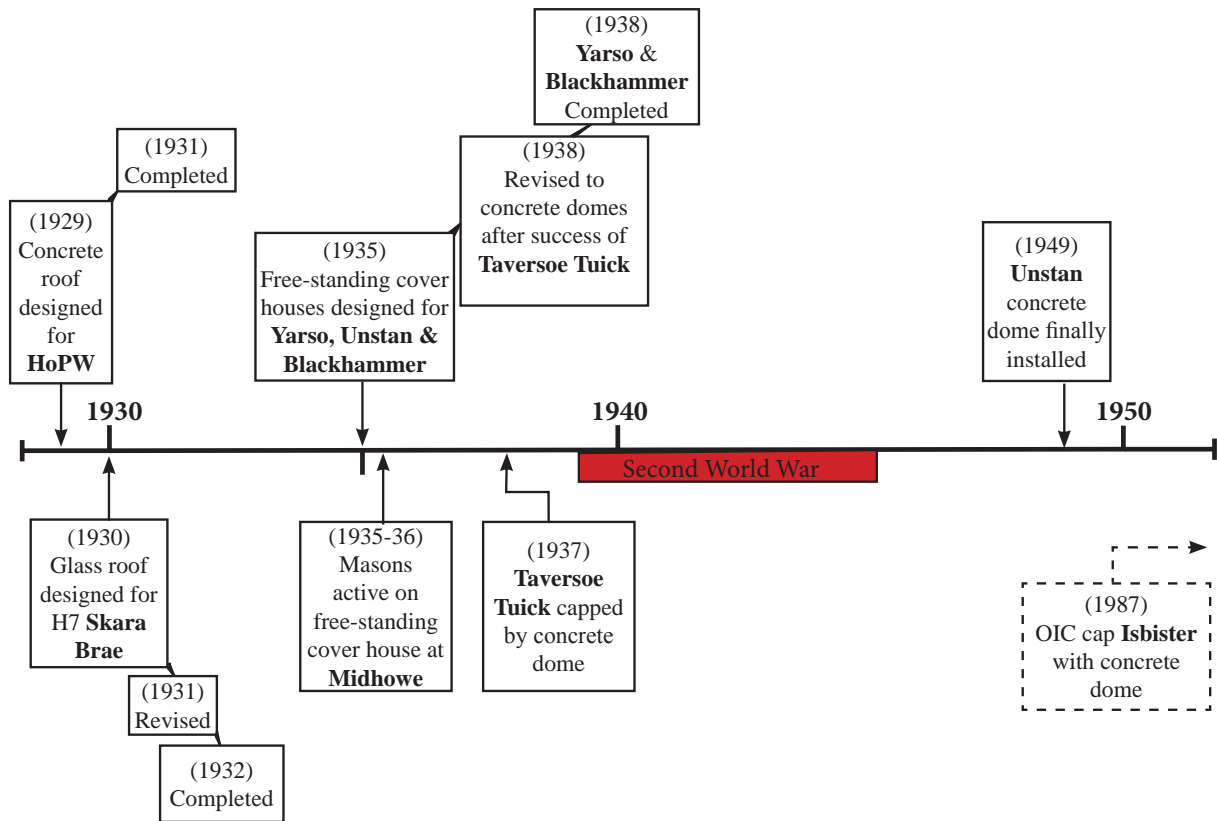


Figure 2.1: Timeline of the Chronological Development of the Cover Houses, Compiled from data within the HMMOW files

It is of note that the first structure to be roofed by HMMOW is also the most “remote and difficult to access”<sup>25</sup> of the group; Holm of Papa Westray South [henceforth HoPW] is a chambered tomb located on the small uninhabited islet of Holm of Papa Westray. As depicted in the neighbouring plan of 1929, (Figure 2.2) it was ultimately capped by a flat reinforced concrete roof, applied atop the original walling which bears quite an irregular profile, suggesting that they were consciously “leaving the ruined wall tops to tell their own story”<sup>26</sup>. These works were complete by November 1931<sup>27</sup>, with access provided via hatch and ladder through the new roof.

25 P21, AX12

26 P4, AX9

27 P11, AX10

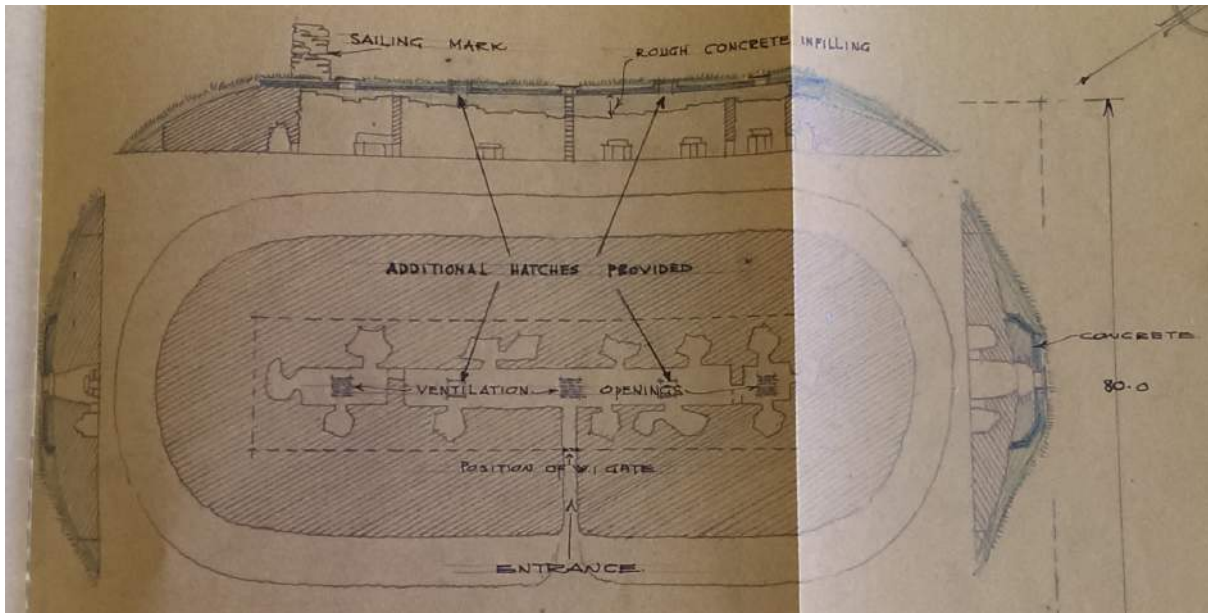


Figure 2.2: HMMOW Design proposal for concrete roof over Holm of Papa Westray South, dated 1929, Image courtesy of National Archives

The reinforced glass covering in place by 1932 over House 7 of Skara Brae<sup>28</sup> was an exceptional design amongst the interventions, and had previously undergone a series of revisions to reach the form finally adopted; from a pitched roof of reinforced glass (Figure 2.3)<sup>29</sup>, to a flat roof with central drainage (Figure 2.4), or drainage provided around the circumference (Figure 2.5), to the design of 28/7/1931 (Figure 2.6) that was ultimately implemented, which had movable hatches to be opened daily for ventilation. Here glass was utilised in order to withdraw from the elements what was considered to be not only the finest structure in the whole village<sup>30</sup>, but “the most perfect prehistoric structure of a purely domestic character in Europe”<sup>31</sup>, whilst still allowing the interior within to be viewed. Indeed as early as 1929 it had been planned to make the whole settlement “readily visible without the necessity of crawling through passages”<sup>32</sup>, i.e. offering visual access down into the structures from above, rather than bodily access. It should be noted that a roof encompassing the whole settlement was considered on a number of occasions<sup>33</sup>, but ultimately rejected due to the difficulty of achieving a solid foundation<sup>34</sup>.

28 Watt, 2009b: 2.4

29 referred to in SB35 AX20

30 SB11, AX15

31 Childe, 1931

32 SB13, AX15

33 (not necessarily of glass), see SB1, SB3, AX13; SB33, AX19; SB34, SB36, SB37, AX20; SB38, AX21

34 SB46, AX22, see too SB37, AX20

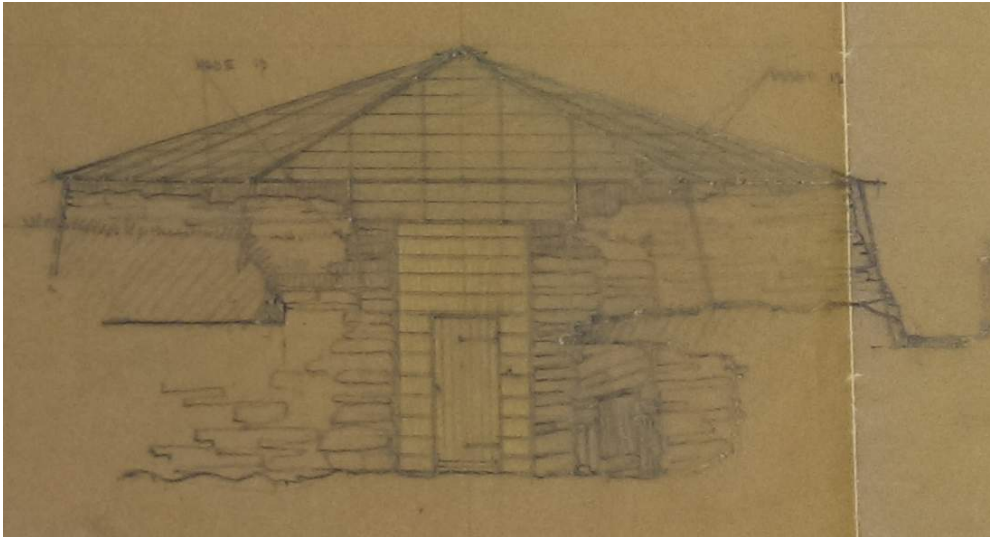


Figure 2.3: Left:  
HMMOW Design proposal for pitched reinforced glass roof over House 7 of Skara Brae, No Date, but referred to in SB35, AX20 of 17/5/1930,  
Image courtesy of National Archives

Figure 2.4:  
Right:

HMMOW Design proposal for flat glass roof with central drainage, over House 7 of Skara Brae, Dated 2/6/1930, Image courtesy of National Archives

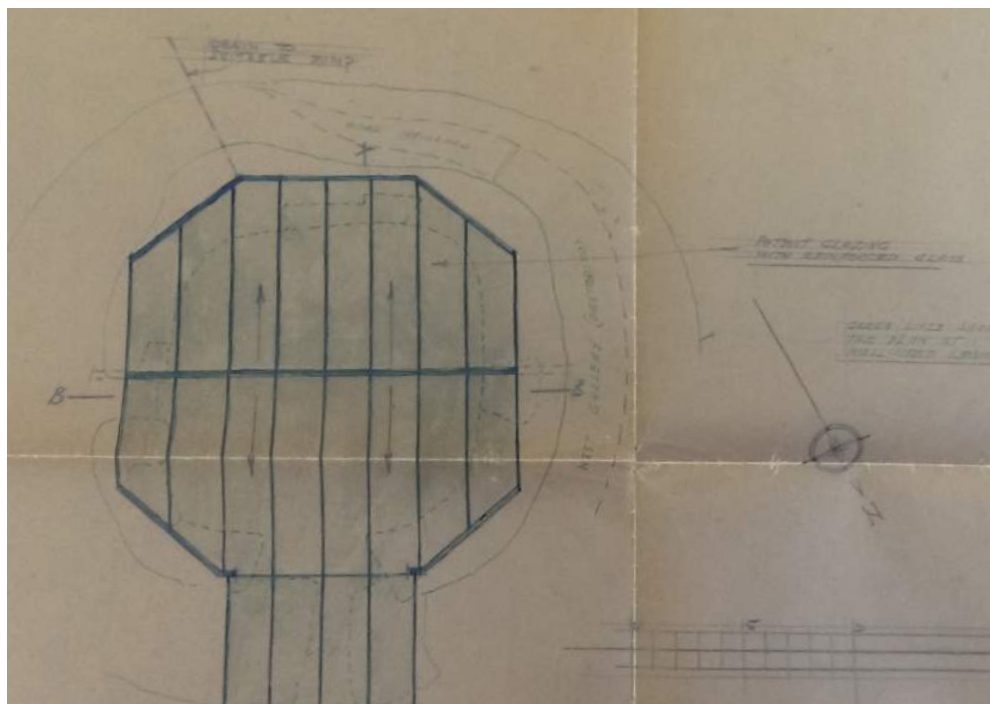
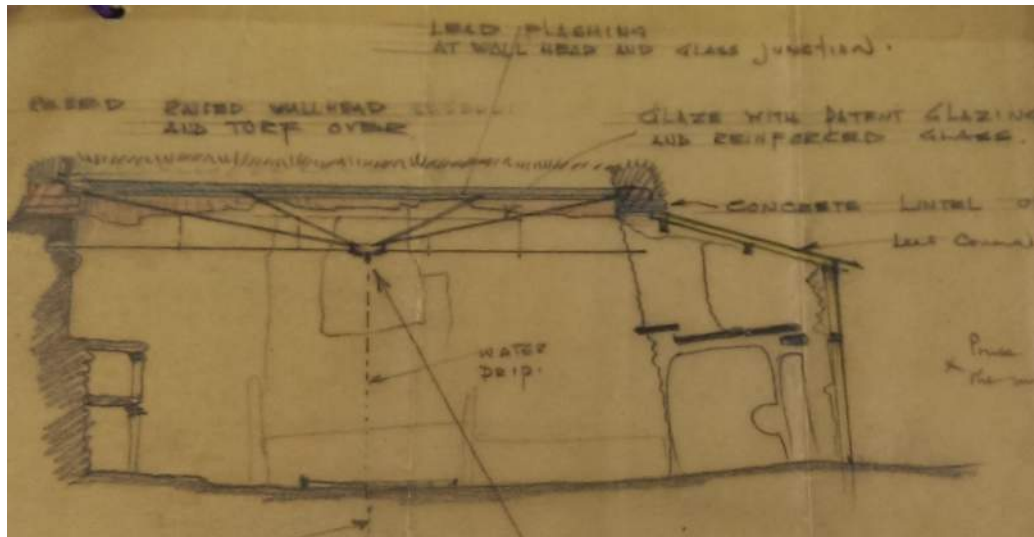


Figure 2.5: Left:  
HMMOW Design proposal for flat glass roof over House 7 of Skara Brae, with drainage around the circumference, Dated 07/1930,  
Image courtesy of National Archives

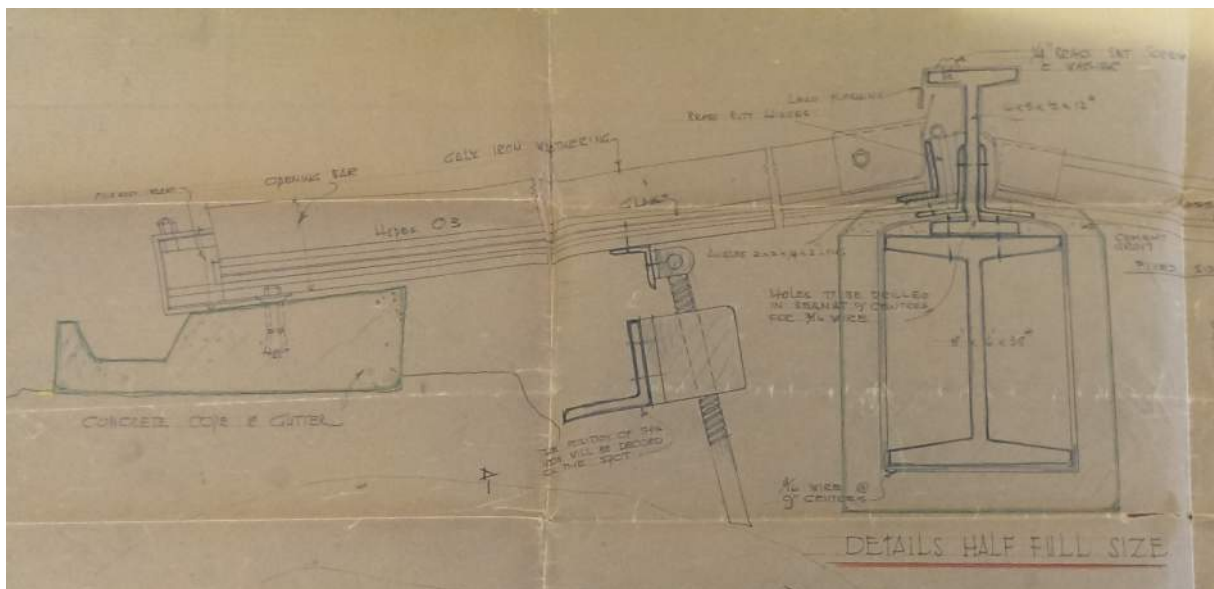
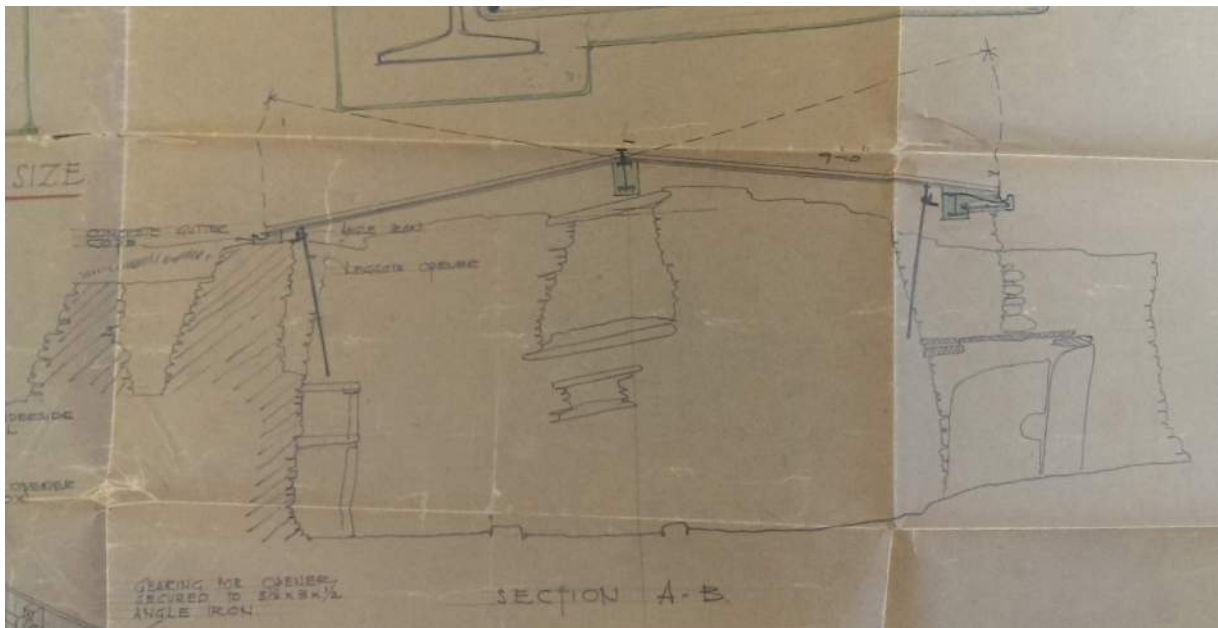


Figure 2.6a-b: Above: HMMOW Design proposal for glass roof with opening hatches over House 7 of Skara Brae, comprised of steel joists with a covering of patent glazing and reinforced glass, plus detail of associated mechanism, Dated 28/7/1931, Image courtesy of National Archives

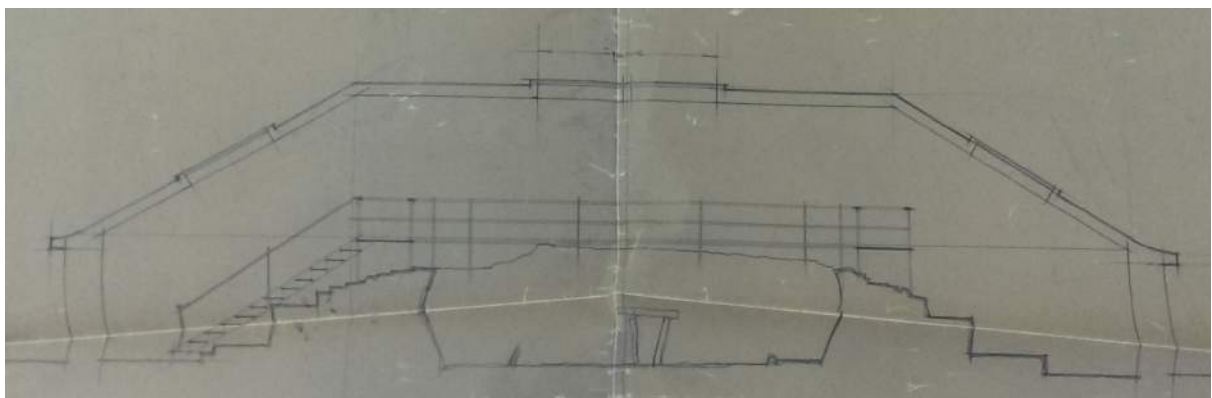


Figure 2.7: Above: HMMOW Design proposal for free-standing cover house with elevated gangways over Unstan, No Date, Image courtesy of National Archives

At this point a further suite of cover houses were designed which offered elevated positions from which to view the Neolithic tombs, without physical access to their interiors. Unexecuted plans survive for this stage in the design development of Unstan, (Figure 2.7) which show that it was intended that the whole cairn be enclosed by a free-standing structure, with an elevated gangway above the remains<sup>35</sup>.

35 It is this plan which is presumably referred to in U11, AX25

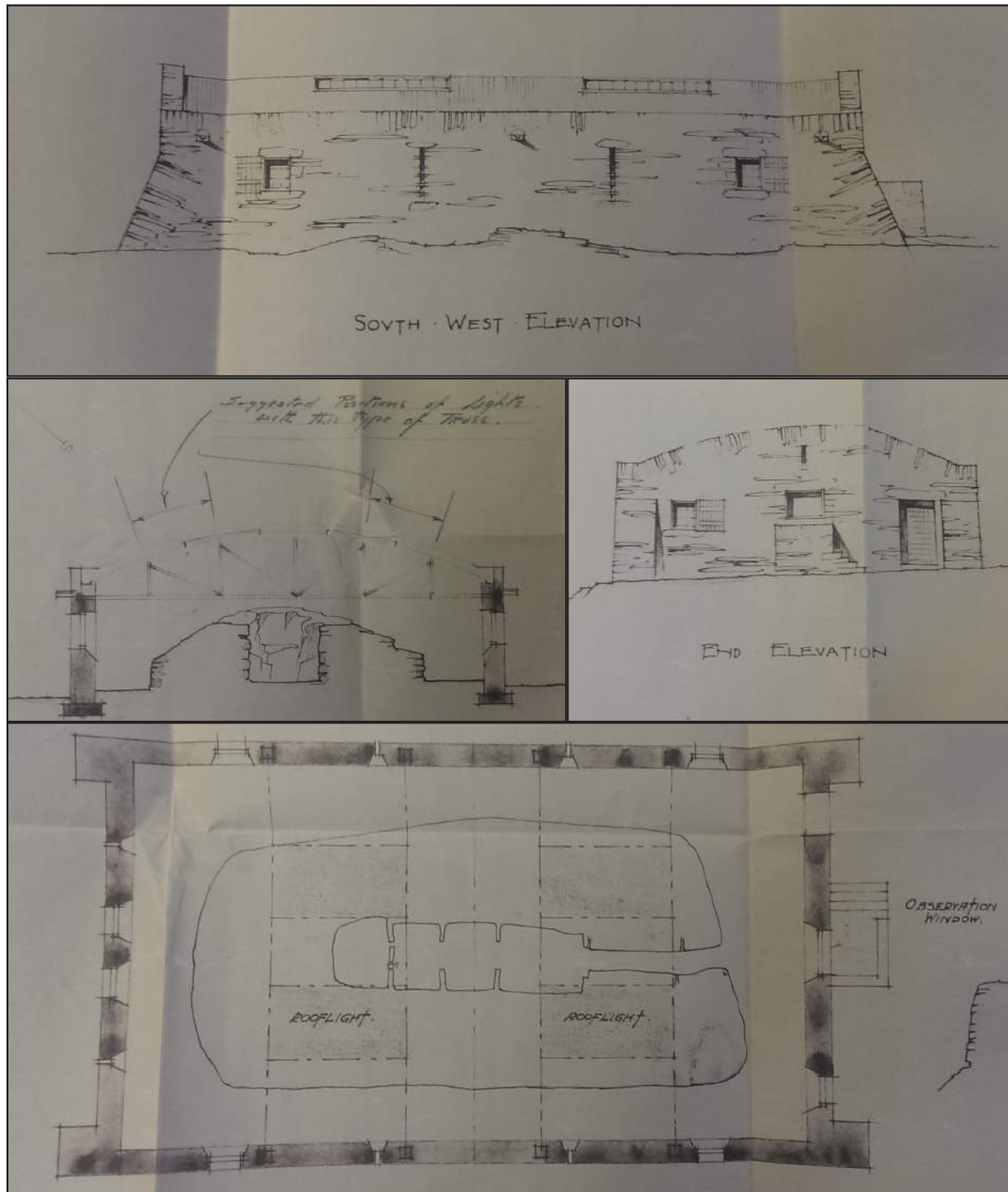


Figure 2.8a-d: HMMOW Design proposal for free-standing cover house over the Knowe of Yarso, Dated 1935, [Note similarity with Midhowe as finally executed in Figure 2.9a-e]. It shows the walls to be built "in stone ....quarried from the rock out-crops adjoining the site... built semi-dry as is the local practice", for the roof "steel trusses are proposed and the roof coverings should be of Robertsons Protected Metal Sheetting. Fixed sheet lights would serve to light the building and the openings in the walls would be furnished with netted metal grilles and a metal sparred Entrance Gateway to give natural thro-ventillation" - See Y3, AX28, Image courtesy of National Archives

A similar design exists for the Knowe of Yarso from 1935 (Figure 2.8a-e) which again details a masonry cover house set back from the original remains, and topped with a steel-trussed roof.

No specifications are given for the positioning of the galleries on this drawing but it should be noted how remarkably similar this unexecuted design is to the enormous structure that was erected over Midhowe<sup>36</sup> (Figures 2.9 below and overleaf), with masons active on the latter job in 1935-1936<sup>37</sup>.

36 (for which no plans were available)

37 Y3-Y4, AX28

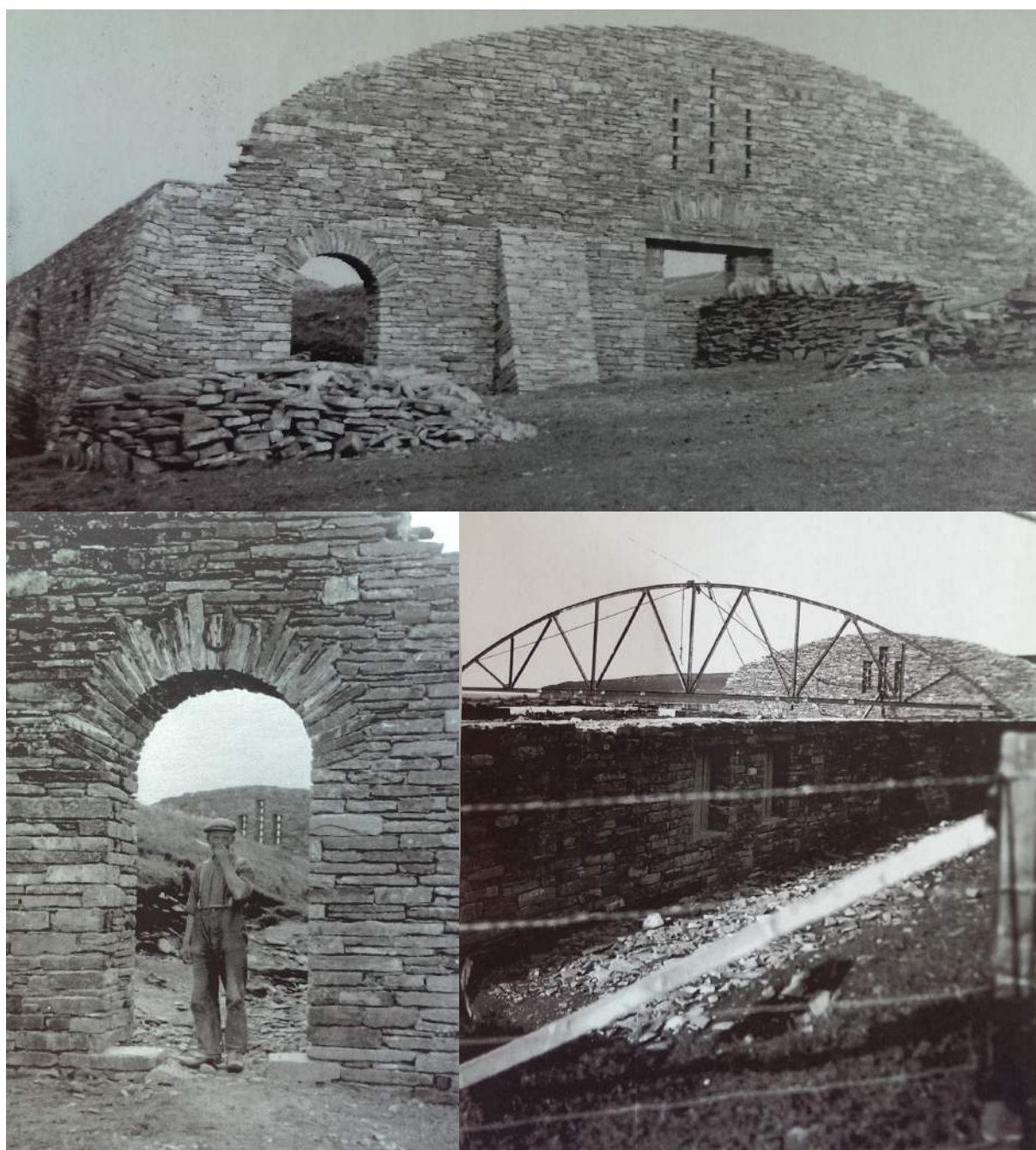


Figure 2.9a-e: This and following page: Images of Midhowe cover house under construction, Undated but likely between 1935-1936

Top, and bottom right images: Courtesy of Orkney Library Photographic Library Archives

Bottom left image: Courtesy of RCAHMS photographic archive



Figure 2.9a-e: This and previous page: Images of Midhowe cover house under construction, Undated but likely between 1935-1936

Top Image: Courtesy of RCAHMS photographic archive

Bottom Image: Courtesy of Orkney Library Photographic Library Archives

Whilst relevant drawings were unavailable, it is known that the upper storey of Taversoe Tuick was capped by a reinforced concrete roof in 1937<sup>38</sup>, taking the form of a skylit curving dome directly on top of the circular chamber (Figure 2.10). It was following the perceived success of the technique here employed<sup>39</sup> (and presumably it's flat-topped predecessor at HoPW), that the designs for Blackhammer and Yarso were amended to be capped by similar concrete forms. These were installed at both sites in 1938<sup>40</sup>, [although substantial later amendments were made at Blackhammer – see Chapter 5], with entrance to Blackhammer provided via an entrance hatch and low ladder aligned with the original passage. The plans for Yarso (Figure 2.11) are not quite as executed, since the intended timber extension to the south east (allowing the elaborate external walling to be viewed on this side) was ultimately executed in concrete, creating a pre-tomb antechamber which is accessed through a full-height door.



Figure 2.10: The upper storey of Taversoe Tuick was capped by a reinforced concrete dome with a circular skylight in 1937

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38 Cf. Y6, AX29

39 B6, AX1; Y6, AX27

40 B8, AX2; Y12. AX30

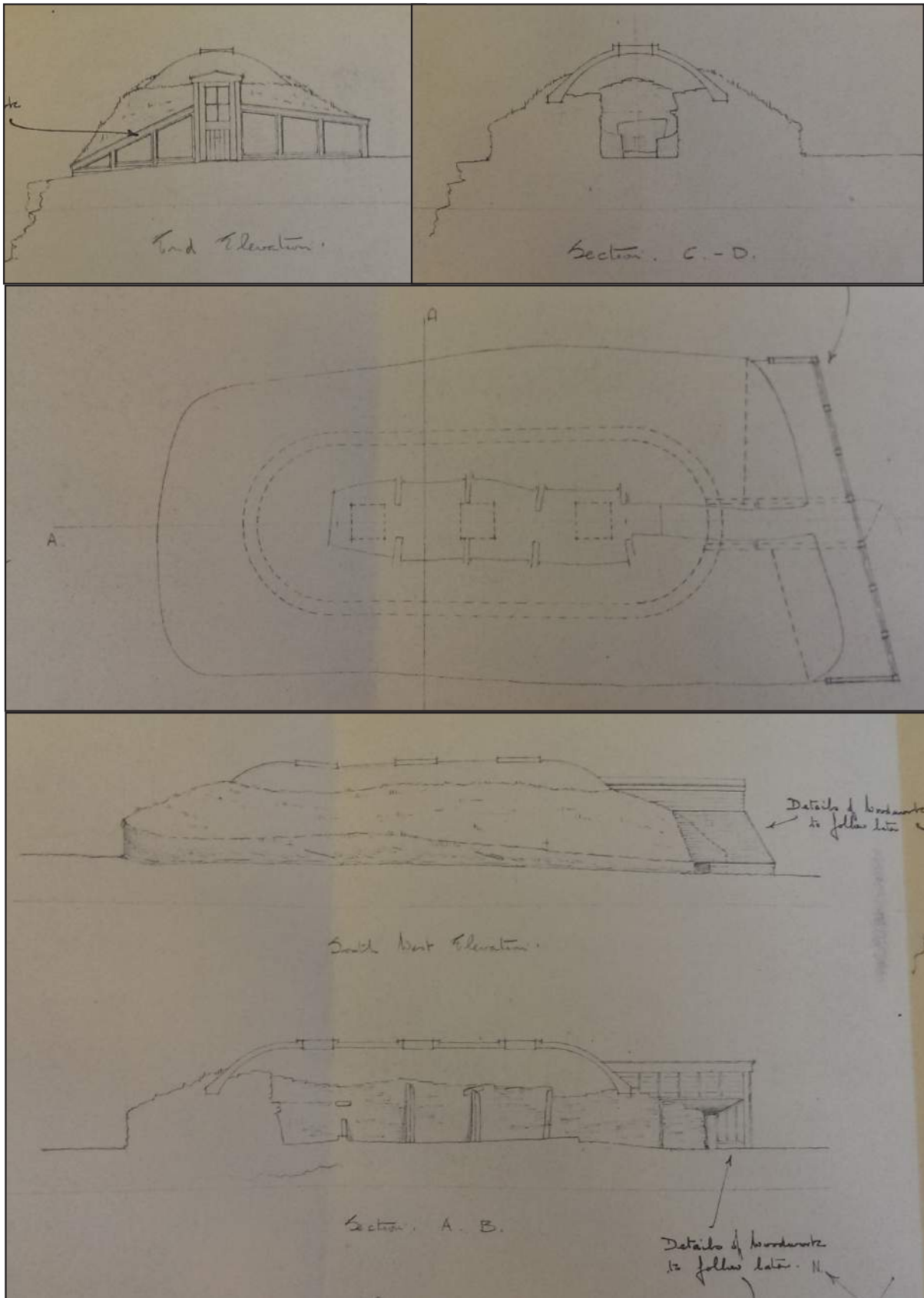


Figure 2.11: HMMOW Design proposal for reinforced concrete capping atop Knowe of Yarso, Dated 1938, Image courtesy of National Archives

Finally, following a hiatus presumably necessitated by the Second World War, Unstan was finally capped with the reinforced concrete “saucer dome with top light[s]”<sup>41</sup> that we see today (Figure 5.1), its design apparently revised after March 1936<sup>42</sup>. It takes a form very similar to its counterparts on Rousay, though with rather loftier proportions (partly due to the greater height of the walling here than e.g. Yarso or Blackhammer), with the underside of the dome having been whitewashed, creating a far lighter form.

From other sources we are also able to determine that having been taken into Guardianship in 1934<sup>43</sup> the masonry roof of Cuween was a restoration installed by HMMOW<sup>44 45</sup>, and that the lintel stones of the roof of Wideford were reset in 1934<sup>46</sup>, with its associated concrete-set entrance hatch and ladder installed at an unknown date. Similarly, the stone roof of Quoyness was reinstated at a point following Childe’s excavations in 1952<sup>47</sup>.

## Materials, Technique and Motivations

In reflecting upon the progression and development of the HMMOW interventions it is interesting to consider the cases of Blackhammer, Yarso and Unstan for which the conscious decision was made to abort early plans to protect them in their entirety “as complete ruined structures”<sup>48</sup> (i.e. including their external cairns) and instead opt for smaller-scale operations in which the exteriors were simply turfed to a particular height, and the central chamber topped by a concrete dome<sup>49</sup>. This could be considered to reflect a value judgement in which the exterior formation of the tombs were considered of lesser importance than their interiors, but records do suggest that these were revisions driven by economics rather than design<sup>50</sup> – the total cost of

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41 U16, AX26

42 U12, AX26

43 Davidson and Henshall, 1989: 112

44 RCAMS, 1946: 97-98

45 Note, this later had a fibreglass roof installed over its top in 1973: Davidson and Henshall, 1989: 112

46 See W2, AX27

47 Davidson and Henshall, 1989: 155

48 M2, AX3 – Note this statement is made in reference to early plans for Yarso, Unstan and Midhowe

49 See Y6, AX29

50 Cf. U12, AX26; Y8, AX29

covering Midhowe being £2545<sup>51</sup> (a sizeable sum in 1936) as opposed to the £350 estimated for the smaller-scale of works in concrete at Blackhammer<sup>52</sup>.

Whilst such practical records are generally scanty, we do have some detail regarding the method of construction employed; the roof of Blackhammer, designed in consultation with structural engineers<sup>53</sup>, was constructed of reinforced concrete ‘6” thick’<sup>54</sup>. Its Neolithic wall heads were cleaned to permit the foundation for the dome, shuttering made and set in position and steel reinforcement rods, dispatched from Leith, were then positioned and the concrete added. The formwork was removed once the concrete had fully set, and the outer shell turfed at this point<sup>55</sup>. Such cappings were apparently considered to be a straightforward “piece of elementary construction”<sup>56</sup> [in relation to Blackhammer this was apparently misguided – again see Chapter 5], and the resulting outward appearance of the domes thought to be inconspicuous and “in harmony” with their monuments below<sup>57</sup>, the whole clad in turf or heather<sup>58</sup> permitting a “natural outline”<sup>59</sup> (Figure 2.12).

We are also afforded some insight into the choice of materials used. Within the HMMOW records, concern is explicitly articulated that the restoration of prehistoric forms using original or locally sourced stone could lead to future difficulties<sup>60</sup>: “it becomes increasingly difficult to distinguish original work from replacements, especially when the replacements are made with the old materials”<sup>61</sup>. Hence we see that there were actually two proposals for the roofing of HoPW with an alternative in which the walls were built up in stone unexecuted (Figure 2.13) and instead the rough concrete of the successful design (Figure 2.2) was consciously employed “to prevent new work being confused with old”<sup>62</sup>.

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51 M21, AX7; This figure includes the considerable body of staff involved – see comment in Y4, AX28

52 B3, AX1

53 B11, AX2

54 B3, AX1

55 B11, AX2; Exactly the same process is described at Yarso: Y12, AX30

56 Y11, AX29; see too Y10, AX29

57 B2, AX1

58 B3, B4, AX1;

59 Y11, AX29

60 P16, AX11

61 P2, AX9

62 P17, AX11



Figure 2.12: The mound of Unstan pre-installation of the HMMOW concrete dome, and now. Their forms were thought to be “inconspicuous” and “in harmony” with their monuments below. Top image courtesy of RCAHMS CANMORE archive, no date

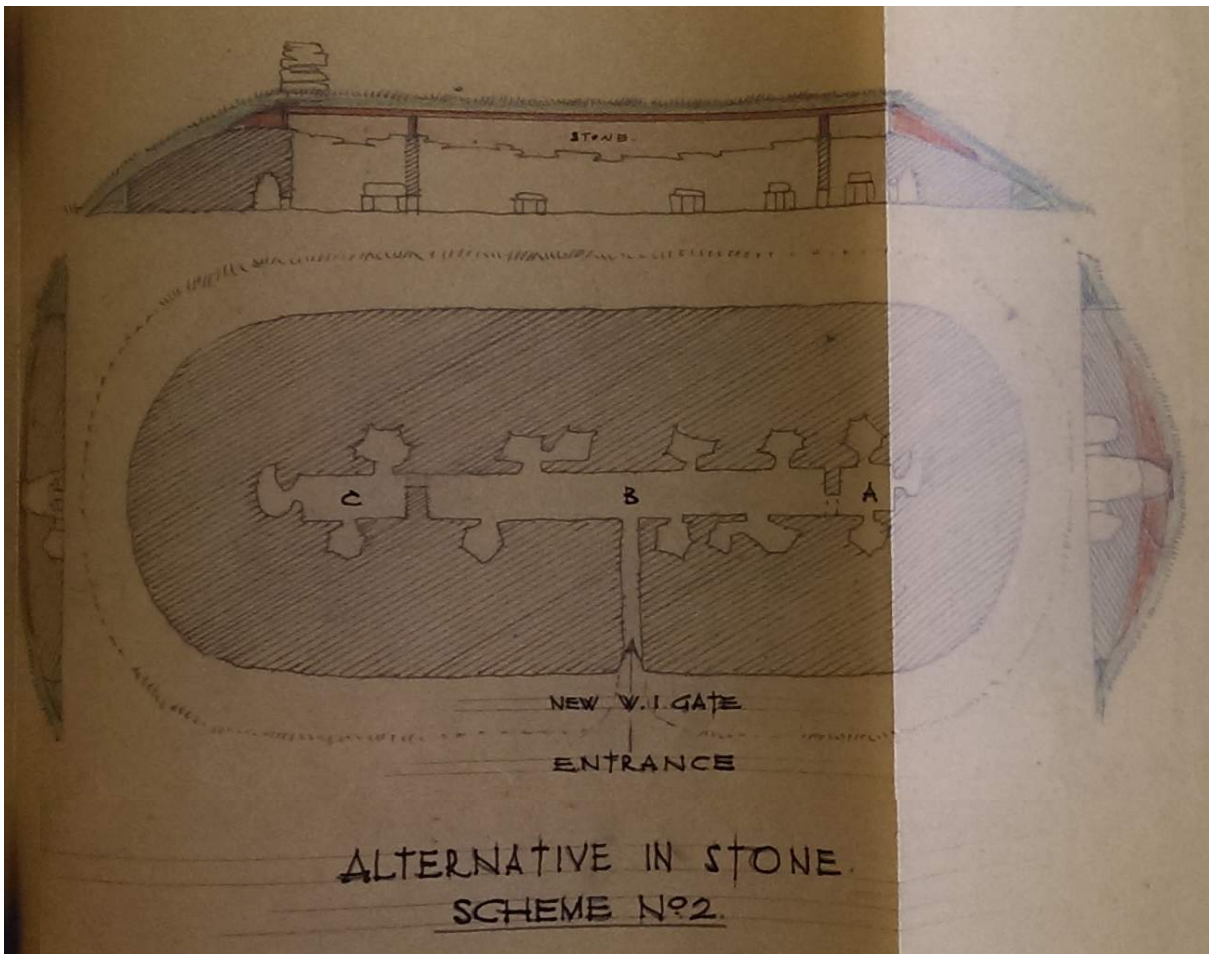


Figure 2.13: HMMOW Design proposal for roof over Holm of Papa Westray South, with walls built up in stone, Dated 1929 with caption “new wall face to be kept back from original wall faces”, Image courtesy of National Archives

It was apparently this same motivation of distinguishability that prompted the use of modern materials in the roofing of House 7 at Skara Brae. Here, (and, we may deduce, at the other sites here discussed) it was deemed “essential to refrain from constructing a type of roof which might give the uninstructed visitor the impression that [it] ...had been used originally”<sup>63</sup>, the advantage of instead using contemporary materials was that “no-one [could] regard it as being anything but modern”<sup>64</sup>. By the same logic, the supporting walls for the modern roof of House 7 were “carried up well back from the inner face”<sup>65</sup> so as to “make a distinction”<sup>66</sup> from the original masonry, with any further modern rebuild or “patching”<sup>67</sup> supposedly demarcated by the placement of lead ribbon at the interface between the two<sup>68</sup> (Figure 2.14).

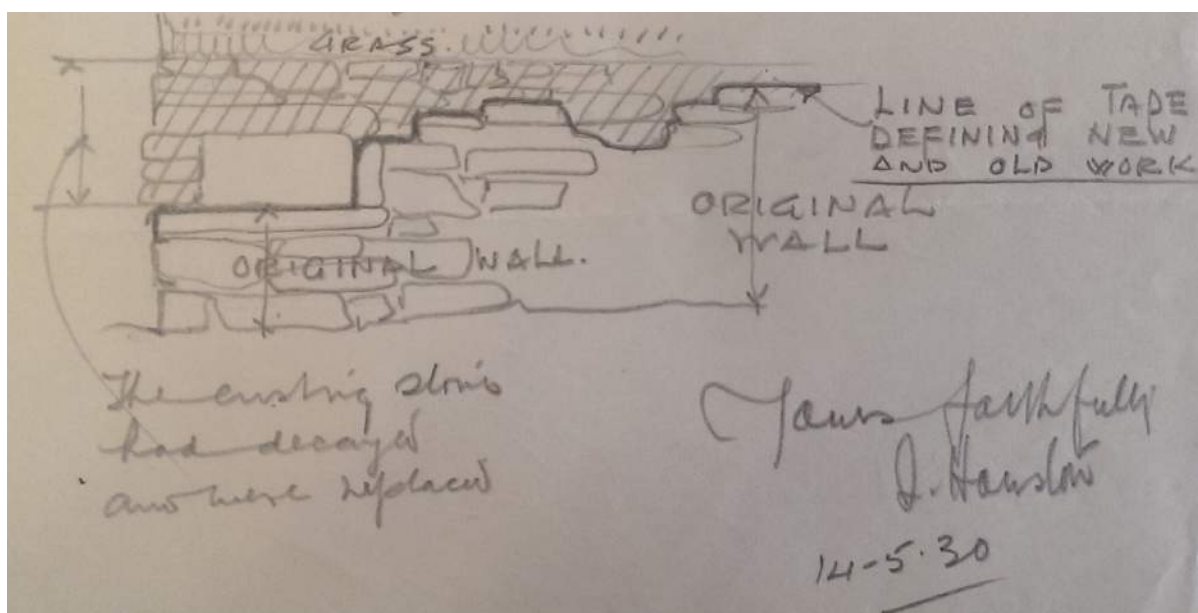


Figure 2.14: HMMOW Sketch detailing inclusion of delta-metal tape at interface between original walling and modern rebuild at Skara Brae, Dated 14/5/1930, Image courtesy of National Archives

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- 63 SB2, AX13
  - 64 SB2, AX13, emphasis added
  - 65 SB1, AX13; see too SB33, AX19
  - 66 SB42, AX21
  - 67 SB33, AX19
  - 68 SB15, SB16, AX16; SB34, AX20; SB45, SB46, AX22; SB49, AX23

## Motivation

At a basic level, it seems these conservation works were prompted by a desire to safeguard these prehistoric structures from disintegration or collapse caused by exposure<sup>69</sup> to the “rigorous Orkney climate”<sup>70 71</sup>. Several of the files suggest that their authors felt a sense of responsibility to ensure the protection and longevity of these forms<sup>72</sup>, and that there was a real sense of urgency in doing so<sup>73</sup>. There was initially a certain reluctance to roof House 7 of Skara Brae<sup>74</sup>, yet the perceived “absolute necessity”<sup>75</sup> of protecting its interior from the weather was such, that it was deemed to be justifiable to “sacrifice [the] general appearance”<sup>76</sup> of the wider site in the name of its preservation.

They were clearly also motivated by concerns for facilitating ongoing and safe public access to the structures, allowing their inspection by all interested parties<sup>77</sup>, even if this be by purely visual means, for the sake of protecting of the monument<sup>78</sup>. But it seems that there were equally political considerations, of avoiding any criticism of the Department<sup>79</sup> to be made by the public<sup>80</sup> or archaeological experts<sup>81</sup>. As aforementioned (Chapter 1) the works were to some degree stimulated by the preparation of the RCAMS inventory of monuments, and we note the letter from Walter Grant in regards to Taversoe Tuick, stating that “The commission’s report is being held up because

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69 M1, AX3

70 As referenced in 16 of the sources consulted: M1, M2, AX3; M5–M8, AX4; M29, AX8; P4, AX9; Q2, AX12; SB3, AX13; SB5, AX14; SB15, AX16; SB22, AX17; SB38, AX20; Y5, AX28; Y11, AX29; Y13-Y14; AX30

71 Alongside the need to complete works before the onset of the bad weather of the winter: M13, AX5; M19, AX7; P12, AX10; SB1, AX13; SB15, AX16; Y15, AX30

72 M2, AX3; SB7, AX14; SB19, AX16

73 E.g. at Midhowe: “immediate work required....essential that this should be done as soon as possible” (M1, AX3), “proposal should be discussed....at the earliest possible moment...work must be done without delay” (M2, AX3); Also Unstan: U15, AX26; and Yarso: Y14, AX30

74 See particularly SB5, AX14; SB15 AX16

75 SB2, AX11, see too Childe, 1931

76 SB3, AX11

77 i.e. not only archaeologists but the general public Y5, AX28; see too B11, AX2; M19, AX7; SB25, AX18; U10, AX25

78 As at Midhowe: M6, AX4; M10, M11, M13, AX5; M23, AX7; M25, AX8; and Skara Brae: SB6, AX14; SB13, AX15

79 M2, AX3

80 U10, AX25

81 M19, AX7

of the present impossibility to describe the above mentioned cairn<sup>82</sup>. But as the following chapter will examine, external influences within their context of installation may also have been relevant.

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82 (Taversoe Tuick, which at the time lacked a rooflight) B7, AX2

## CHAPTER 3. CONTEXT AND INFLUENCE

### **The Interventions within the Context of the History of Conservation**

It should not be forgotten that these works were taking place at a point when the science of conservation was still in its relative infancy, and archaeology had only recently been acknowledged as a scholarly discipline rather than the pursuit of treasure hunters, or the hobby of wealthy gentlemen<sup>83</sup>. The development of the two disciplines is closely interlinked, as it became necessary to preserve the remains of the past in order to facilitate their ongoing study<sup>84</sup>.

Dependent upon the observer's age or nationality<sup>85</sup>, the history of contemporary conservation principles could be seen as originating in 1816 with Antonio Canova's refusal to restore fragmentary classical Greek sculptures<sup>86</sup>. Based on the belief that the incomplete state should prevail since the style of the original artists could not be improved, this refusal kindled the principle of 'authenticity', now intrinsic to conservation theory<sup>87</sup>.

This stage in the early nineteenth century saw an increased interest in the field of archaeology, as driven by preeminent German and British scholars of the time<sup>88</sup>. It was this scientific archaeological approach to the past, coupled with nationalistic revival which fuelled Eugène Emmanuel Viollet-le-Duc's (1814-79)<sup>89</sup> restorations of the 19<sup>th</sup> century<sup>90</sup>. His works sought to create stylistic unity within historic buildings, removing later additions<sup>91</sup> to reinstate a completeness of form<sup>92</sup>, even where no evidence of the

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83 Kienzle, 1998: 67, 92

84 Kienzle, 1998: 93

85 Ashley-Smith, 2009: 7

86 Richmond and Bracker, 2009: xvi

87 Richmond and Bracker, 2009: xvi

88 Aslan, 2008: 64

89 Fleming, Honour and Pevsner, 1999: 610

90 Philippot, 1982: 368

91 Orbaşlı, 2008: 17

92 Jokilehto, 2006: 151

original state were actually available<sup>93</sup> <sup>94</sup>. He recommended improving the structure wherever possible, increasing strength and bettering the quality of the materials<sup>95</sup>, but whilst his theoretical influence was far reaching<sup>96</sup>, his principles saw few applications on any large scale<sup>97</sup>.

Where implemented, Viollet-le-Duc's works received such criticism for falsification<sup>98</sup> and for the destruction of historical authenticity<sup>99</sup>, that ultimately it spurred the formation of the 'anti-restoration movement'<sup>100</sup> in the latter half of the nineteenth century<sup>101</sup>, and with active support from John Ruskin, William Morris founded the Society for the Protection of Ancient Buildings in 1877<sup>102</sup>, aka the 'anti-scrape party'<sup>103</sup>. Through their Manifesto, Morris was amongst the first persons to articulate many of the essential philosophies which have informed the principles of modern conservation today<sup>104</sup>. Hence restoration was deemed the destruction of authenticity<sup>105</sup>; ancient structures were to be regarded as a whole, complete with any later additions or alterations, all of which were to be conserved materially<sup>106</sup> through a process of maintenance and conservative repair<sup>107</sup>.

Camillo Boito (1836-1914)<sup>108</sup> expressed similar sentiments, regarding ancient monuments as documents that reflected their history through all of their parts<sup>109</sup>, which ought to be equally respected<sup>110</sup>. The guidelines for the restoration of ancient monuments that he presented in a paper to the Third Congress of Engineers and

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93 Munoz Vinas, 2009: 47-48

94 A similar aspiration for unity of style may be noted in Gilbert Scott's work on English churches, Orbaşli, 2008: 17

95 Jokilehto, 2006: 152

96 Jokilehto, 2006: 140

97 Calderini, 2008: 32

98 Feilden, 1979: 7

99 Jokilehto, 2006: 174; Munoz Vinas, 2009: 48

100 Jokilehto, 2006: 18

101 Orbaşli, 2008: 17

102 Jokilehto, 2006: 184; Rée, 2009: 1

103 Rée, 2009: 2

104 Feilden, 1979: 7; Orbaşli, 2008: 19

105 Rée, 2009: 2

106 Jokilehto, 2006: 185

107 Orbaşli, 2008: 19

108 Fleming, Honour and Pevsner, 1999: 61

109 Aslan, 2008: 24; Calderini, 2008: 27

110 Jokilehto, 2006: 203

Architects, in Rome 1883, were eventually adopted by the Ministry of Education and became the first modern Italian charter, and the primary reference for philological restoration<sup>111</sup>. He recommended only minimal restoration, advising that all new additions should be clearly contemporary in style, and marked through the use of different materials or simplified forms, as with the Colosseum and triumphal arches of Rome<sup>112</sup>. Interventions were to be dated and well documented, with the relative position of fragments uncovered by excavation recorded with the utmost care<sup>113</sup>.

These principles were further consolidated through the writings and teachings of Gustavo Giovannoni<sup>114</sup> (1873-1947<sup>115</sup>), the most direct disciple of Boito<sup>116</sup>, who emphasised scientific<sup>117</sup> yet restrained restoration<sup>118</sup>. He assisted in the edition of the Athens Charter of 1931<sup>119</sup>, which articulated a trust and enthusiasm towards the judicious use of reinforced concrete in conservative interventions<sup>120</sup>.

## Practical Context

Within this fleeting history of the discipline we see many themes emerge which are relevant to the interventions in question, and we also note the formation of many of the key principles that govern good conservation practice today (more on which in Chapter 4). But it is challenging to position these works within a precise theoretical framework due to their unique nature – as incomplete structures exposed by excavation, the Neolithic buildings do not have quite the same conservation requirements as functioning historic structures. But nor are they typical of the archaeological sites from this period seen elsewhere in Britain; outwith Orkney there are very few examples of Neolithic (or indeed prehistoric) architectures that survive to such heights, and there has therefore not been a common need to develop strategies for their roofing.

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- 111 Aslan, 2008: 24; Jokilehto, 2006: 201  
112 Jokilehto, 2006: 202; see too Aslan, 2008: 24-25  
113 Jokilehto, 2006: 202  
114 Aslan, 2008: 26  
115 Jokilehto, 2006: 219  
116 Calderini, 2008: 27  
117 Meraz Avila, 2008: 280  
118 Munoz Vinas, 2009: 48  
119 Meraz Avila, 2008: 280  
120 Calderini, 2008: 28; ICOMOS, 1931: Conclusion IV

We do, however, know that works of consolidation were carried out in Orkney by this group's professional predecessors within HMMOW. In the early years of the twentieth century, they were responsible for the re-erection and setting in concrete of a large number of standing stones in what is now the World Heritage Area (see Chapter 4), with surface fractures pointed in cement or mastic<sup>121</sup>. This clearly set a precedent for works of anastylosis and consolidation, but it has regrettably not been possible to find any further sources to illuminate similar conservation works enacted elsewhere in the UK. Indeed it appears that it is not only in Orkney that records of early interventions are today found to be inadequate<sup>122</sup>, and this is perhaps particularly true of those involving reinforced concrete elsewhere in Europe at this time, published accounts of which tend to be scanty and sketchy<sup>123</sup>. Hence it has been out-with the scope of the current work to consider in detail other contemporary European approaches<sup>124</sup>, but we may briefly consider a notable case study for which limited information is available published in English.

Extensive reconstruction and conservation works were undertaken using stone and reinforced concrete at the Palace of Minos at Knossos between 1900 and 1930, under the direction of Arthur Evans<sup>125</sup>. These works were subtly different from those discussed in Orkney, since rather than being concerned with ongoing public access, they presented an interpretation of how the Minoan site was believed to have formerly looked<sup>126</sup>; a "multi-storey concrete vision of the past"<sup>127</sup>. But in so doing, they did also protect the historic fabric from exposure to the elements<sup>128</sup>.

There are certain parallels with the Orcadian sites in that the archaeology itself has been the subject of intensive academic study, but the later reconstruction or conservation works receive little attention beyond the acknowledgement that they occurred, and

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121 See RB1-RB5, AX35-AX36

122 cf. Stanley-Price, 1995: 76

123 Calderini, 2008: 32

124 E.g. it is known that a wealth of conservation works were undertaken on megalithic graves in Denmark at the beginning of the twentieth century, but short of a limited discussion regarding consolidation in the 1990s, (see Dehn and Hansen, 1990), there is a lack of material relating to such works published in English

125 Kienzle, 1998: 5

126 Kienzle, 1998: 383

127 Papadopoulos, 1995: 108

128 Kienzle, 1998: 44; 327

that the results are controversial<sup>129</sup>. Knossos is important in reminding us to consider that the works here undertaken were actually not just the products of one individual's vision, but were also affected by wider influences including financial restrictions, the many staff involved (including here three architects at different periods<sup>130</sup>), and the availability of skills and materials<sup>131</sup>.

The concrete domes installed over Orcadian sites are apparently dissimilar from the works at Knossos in that they were not an attempt to recreate an architectural configuration as it was thought to have been in the past. And yet, the fact that they were not simply capped by a flat, boxed or pitched roof does prompt us to consider that they were at least meant to give an impression of the volumes and spatial arrangement created by the corbelling, albeit in a streamlined way. Whilst at Knossos the subsequent aging of the reconstructions have in places made them indistinguishable from the original excavated structures<sup>132</sup>, the same could not be said of the concrete domes.

In considering the Knossos interventions which slightly predated those in Orkney, we may wonder to what extent contemporaneous approaches proved to be a stimulus for one other. And whilst direct connections cannot be suggested, it does seem likely that the inspectors of HMMOW would have been aware of the works at Knossos<sup>133</sup>, but they do seem to have been driven by rather different agendas – the works at Knossos were the physical manifestation of a vision of antiquity, whilst those in Orkney were apparently concerned instead with stabilisation, access and protection (see again Chapter 1).

Attempts to identify earlier interventions that might have provided the stimulus or precedent for the Orcadian works have proved to be unsuccessful, but this is not to suggest that they didn't exist. However, it might also be the case that the unrivalled opportunity to work with such well-preserved forms was seized in Orkney as platform upon which to develop fresh approaches. This does seem to be an exceptionally active period for the Department, with a large body of staff engaged<sup>134</sup>, and we might

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129 Kienzle, 1998: 53

130 Kienzle, 1998: 5

131 Kienzle, 1998: 47

132 Kienzle, 1998: 41

133 (Since we know that Evans was academically active in Britain: Kienzle, 1998: 327)

134 Cf. Y2, AX28

consider that the works were here used as a chance to realise creative solutions to the problems of preservation and presentation, and create training and development opportunities for the staff involved in doing so. In files relating to the conservation works at Midhowe it was written that “Orkney is the best field we have of undisturbed prehistoric monuments and we should grasp every opportunity to instruct our own people and develop their knowledge in this branch of the Departments work”<sup>135</sup>. It seems highly probable that the cover houses were simply the creative products of the age of their installation; design solutions developed to peculiarly Orcadian problems, using the latest developments in knowledge, techniques and materials available.

But did they have a far-reaching influence? Apparently not. It would appear that with the outbreak of WWII there was little publicity or discussion of these conservative interventions, and that they largely slipped under the radar of academic attention. The creation of cover houses does not seem to have become common practice (perhaps partly due to initial lack of funds or man power, or the shortage of post-war steel<sup>136</sup>) and the current author could recall only two further Scottish examples<sup>137</sup> of prehistoric structures now roofed by reinforced concrete domes, these being Cairnpapple Hill in West Lothian and the Grey Cairns of Camster in Caithness<sup>138</sup>, both of which were installed by HMMOW at a significantly later date (the former in 1949<sup>139</sup>, and the latter at an unknown date after June 1966<sup>140</sup>). Further afield we might look to Minissi’s protective enclosures over the mosaics at the Villa Romana del Casale in Piazza Armerina, which were comprised of translucent plastic panels over a lightweight metal frame. Like the roof of House 7 of Skara Brae these were a conscious attempt to form new spaces, rather than a reconstruction<sup>141</sup>, and regrettably had similar environmental effects<sup>142</sup>. But it would seem entirely misguided to suggest that this example was in any way influenced by the works on a remote Scottish archipelago, which were seemingly little discussed.

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135 M30, AX8

136 Historic Scotland, 2014a: 13

137 i.e. excluding Orkney

138 To which we might add the slightly later concrete-capped souterrain at Castlelaw, Midlothian

139 Barclay and Grove, 2007: 12

140 See GC10, AX34 in which works have not yet been undertaken

141 Stanley-Price, 1995: 73

142 i.e. fluctuating temperatures and relative humidity, which prompted cyclical dissolution and crystallisation of soluble salts, Stanley-Price, 1995: 79

It is, however, more realistic to suggest they did have a direct influence a little closer to home where the legacy of the concrete domes apparently continued.

Fifty-six years after the installation of the first in situ reinforced concrete capping at HoPW, the same approach was employed in 1987 to protect the Neolithic chambered tomb of Isbister on South Ronaldsay, following its gradual excavation begun in the 1950s<sup>143</sup>. Photographs survive from this process (Figure 3.1), revealing the method of installation in which the same materials<sup>144</sup> employed by HMMOW were utilised in a remarkably similar configuration.

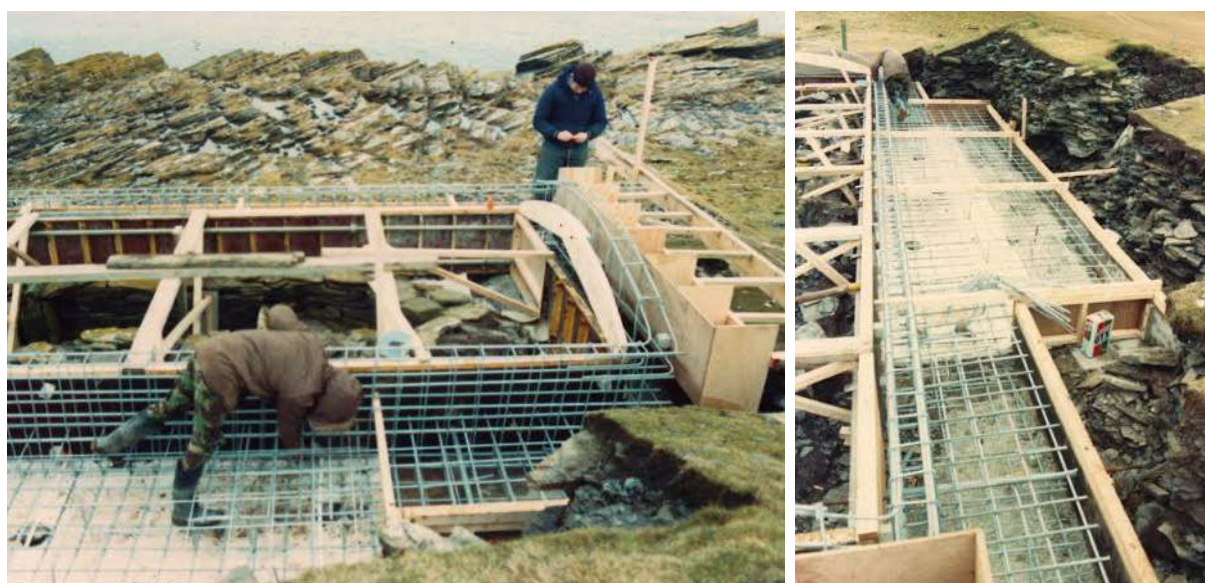


Figure 3.1: Reinforced concrete dome of Isbister under construction in 1987, Image courtesy of Rob Thomson

A form was here erected which closely followed the HMMOW precedent, and successfully facilitated visitor access for many years. It now, however, presents an interesting case study having recently required urgent structural works (see Chapter 5).

The late installation of the roof at Isbister may prompt us to question why this approach was here again employed – had the reinforced concrete dome simply become the accepted way to protect Neolithic structures, with ample precedent elsewhere on the isles? Was the permanence of material genuinely considered to be the best possible

143 Watt, 2012

144 Although, being constructed after 1945 we would consider this “modern” concrete, Historic Scotland, 2014b: 2

solution for ongoing ease of access? Or could it have been a pragmatic concern regarding perceived economic durability, or improved visitor safety relative to purely drystone construction?

Perhaps it is now challenging for us to comprehend the faith that was previously put in concrete as an indestructible building material, and this is particularly true of the initial HMMOW interventions which occurred at a stage when this confidence was apparently unflinching. But even as late as the 1980s, academic sources were explicitly recommending the use of reinforced concrete to re-roof exposed prehistoric structures<sup>145</sup>. It is worth here briefly examining the development of the use of concrete in such works, the relevance of which to the HMMOW interventions will be revisited in Chapters 6 and 7.

## **The Use of Reinforced Concrete in the Context of its Development**

Indeed, nowadays we might consider reinforced concrete to be a curious choice of material for a conservative intervention, but we must be mindful of the context in which the initial HMMOW works took place in relation to the technical development of the material.

During the first half of the twentieth century reinforced concrete was employed extensively during the restoration of monuments, particularly in Italy and France<sup>146</sup>. Its flexibility in taking different forms<sup>147</sup>, strength in compression<sup>148</sup> and thermal capacity<sup>149</sup> were marketed as highly positive attributes, prompting an unlimited confidence in the building system<sup>150</sup>, and hence reinforced concrete soon became a highly popular means of construction<sup>151</sup>. It was promoted that for a relatively low initial cost<sup>152</sup>,

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145 (e.g. Thompson 1981: 54 who uses the works at Barclodiad y Gawres in Western Anglesey as a model example)

146 Calderini, 2008: 25-26, 32; Again this work is frustratingly little documented in English

147 Reinforced Concrete Association, 1961: 7

148 British Cement Association, 1999: 9

149 British Cement Association, 1999: 26; Thomson, G., 2009: 2

150 Calderini, 2008: 25; Stirling, 2001: 29, 32

151 Orbaşlı, 2008: 130; Stirling, 2001: 35

152 Reinforced Concrete Association, 1961: 1

highly durable irregular or unusual forms could be rapidly created<sup>153</sup>, offering long-term performance with minimal maintenance requirements<sup>154</sup>, and with the ‘Code of Practice for the Use of Reinforced Concrete’ published in 1933<sup>155</sup>, it was the material *à la mode*.

Initially its use in consolidation was legitimised and encouraged by philological restoration theories which emphasised the need for recognisability of interventions<sup>156</sup>; such modern materials, in standing out and contrasting with original constructions, were a testimony to their epoch of installation<sup>157</sup>. But this was also a period in which concepts of safety and quantifiable parameters were key<sup>158</sup> and it seems likely that the tools of the science of engineering did not readily lend themselves to understanding the physics of ancient dry-stone masonry (in which it is often the shape and geometry of the form that provides the stability, rather than its component parts<sup>159</sup>) and hence faith was instead put in a new ‘predictable’ material favoured by engineers<sup>160</sup>. But as Chapter 5 will reveal, the effects were not always as predictable as first thought.

Through this brief examination of the history of the development of both conservation thought and the use of reinforced concrete in interventions, it has been possible to situate the HMMOW works within a historical and philosophical context. We might now consider the roofing interventions and further associated consolidation works to assess their impact upon the structures as an archaeological resource.

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153 Reinforced Concrete Association, 1961: 7  
154 Kienzle, 1998: 287; Thomson, G., 2009: 2  
155 By the Building Research Board: Griffin, 2013: 7  
156 Calderini, 2008: 25-26  
157 Calderini, 2008: 27, 55  
158 Calderini, 2008: 25  
159 Orbaşlı, 2008: 130  
160 Calderini, 2008: 30

## CHAPTER 4:

### CONSIDERING THE WORKS IN LIGHT OF CURRENT CONSERVATION THINKING

In considering the conservation of an ancient remain, one must always be mindful of the primacy of the archaeological database, and the link to the past that the built fabric provides<sup>161</sup>. This is perhaps particularly true of prehistoric structures for which no documentary evidence exists; their physical fabric instead becoming the primary source of information for their study<sup>162</sup>. Archaeological remains are a finite, vulnerable and non-renewable resource<sup>163</sup>, and if compromised or destroyed, the surviving remains of the past cannot be reinstated<sup>164</sup>. We are therefore obliged to protect the archaeological record<sup>165</sup>, and conservative interventions must not impede future attempts to access all of the evidence incorporated within the remains<sup>166</sup>.

This is now controlled and guided through a range of charters governed by key themes which emerged through the historical development previously discussed (Chapter 3), against which it might be interesting to consider these interventions, and the details of associated stabilisation works brought to light through examining the HMMOW records, and their collective effects on the remains as an archaeological resource.

#### RECOGNISABILITY

The now accepted dictum that any alteration to historic fabric should be clearly distinguishable as a contemporary addition so as not to falsify the artistic or historic evidence<sup>167</sup>, was advocated in the 19<sup>th</sup> century by John Ruskin and the SPAB<sup>168</sup>. These

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161 Breeze, 23-34; Moe 200: 277

162 Orbaşlı, 2008: 40, 42; Thompson, 1981: 52

163 Darvill 2002: 300; de la Torre and Mac Lean 1995: 11; Dingli 2006: 219; Downes and Wickham Jones 2005: 106; Drewett 1999: 76; Feilden, 1979: 7; Feilden and Jokilehto, 1998, 20; Holtorf 2008: 125; Mcmanamon 2008: 457; Pollard 2006: 393; Skeates 2000: 62; White 2007: 247; see too Laussane Charter and SHEP: ICOMOS, 1990: Article 2; Historic Scotland, 2011b: Article 2.5

164 de la Torre and Mac Lean 1995: 5

165 Sivan, 1995: 52

166 Feilden, 1994: 6

167 Earl, 2003: 108; Orbaşlı, 2008: 54; Tampone, 2009: 273) See too Appleton, Burra and Venice Charters: ICOMOS, 2000: Article 6; 2013: Article 22.2; 1964: Article 12

168 Orbaşlı, 2008: 19, 59, 62;

principles of constructional honesty and legibility of intervention, censured fakery, pastiche or misleading alterations<sup>169</sup>, and encouraged instead the use of readily visible or ‘honest’ repairs<sup>170</sup>. With the application of such an approach, modern interventions were to be made explicit<sup>171</sup>, with new tissue neither aged nor disguised<sup>172</sup>.

Hence it is now generally recommended that any protective structures be wholly contemporary in their design and construction<sup>173</sup>, and this was certainly true of the actual HMMOW cover houses<sup>174</sup>. We also find intelligibility in the selection of materials employed for consolidation works undertaken in parallel at Skara Brae, (whether reinforcement of stone by metal sheeting<sup>175</sup>, the use of cement grouting (see Figure 4.1 overleaf), or the creation of a rough concrete retaining wall<sup>176</sup>) which in many instances are clear in allowing us to discern where such modern intervention has occurred<sup>177</sup>. The same can be said of the examples where ‘substitution’ has taken place<sup>178</sup>, with concrete lintels employed within the passages of Skara Brae<sup>179</sup>, and planned for the roofing of side cells at HoPW<sup>180 181</sup>. If a conservative intervention, on any scale, reflects the state of present knowledge and is unmistakably in the spirit of its time of installation in this way, it ensures historic continuity<sup>182</sup> and successfully creates a dialogue between past and present. But these actions were not always made so explicit in the field, and it is likely that it was not just at Skara Brae that loose stones were “secretly bedded in cement”<sup>183</sup>, as we know was still the practice with

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169 Aslan, 2008: 51

170 Orbaşlı, 2008: 59

171 Chitty, 1999: 87

172 Marston Fitch, 1982: 320; Orbaşlı, 2008: 59

173 Marston Fitch, 1982: 317

174 i.e. the concrete, steel and glass covers, rather than the masonry roofing over Cuween, Wideford and Quoyness

175 SB28, AX18; SB30, AX19; SB32, AX19; see too SB38, AX21

176 SB28, AX18

177 Watt, 2009b: 3.3

178 See Feilden, 1994: 9; Feilden and Jokilehto, 1998: 72

179 SB30, AX19

180 P18, AX11

181 This was certainly implemented at Skara Brae, but it was not possible to inspect the cells at HoPW for the purposes of this project

182 Aslan, 2008: 56, 71-72

183 SB24, AX17

HMMOW as late as 1966 at the Grey Cairns of Camster<sup>184</sup>. It seems probable that works were undertaken which are now less than obvious.

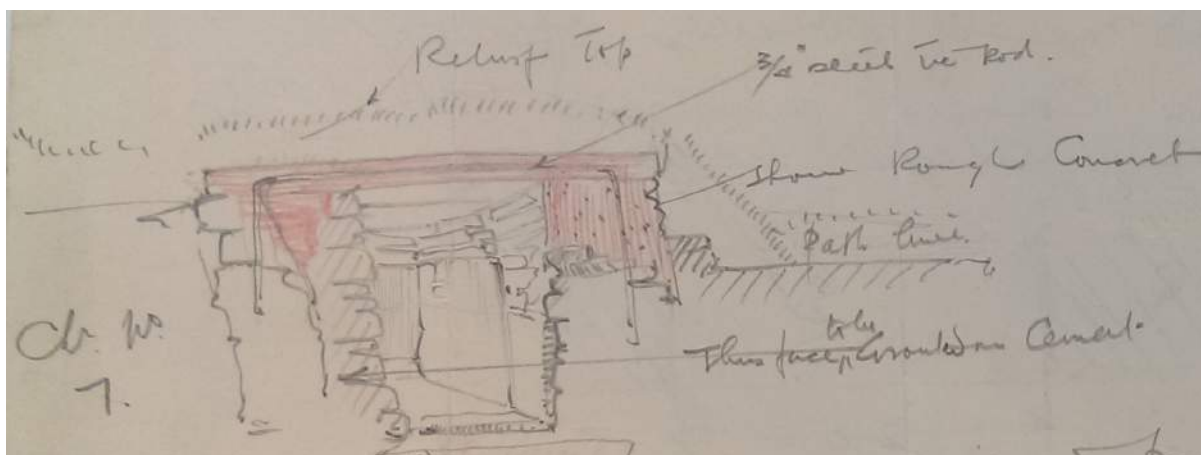


Figure 4.1: Sketch diagram of proposed consolidation works to west of House 7, Skara Brae, bottom right reads “This face to be grouted in cement”, Image courtesy of National Archives

At Blackhammer it was stated that the installation of the concrete cover would cause “little disturbance” to the existing masonry<sup>185</sup>, yet we know that the walls required “preliminary conservation work”<sup>186</sup> in order to reach this stage. Scrutiny of the HMMOW records revealed a certain level of consolidation to be commonplace across most of the sites here mentioned – whether vague references to “securing loose and displaced stones”<sup>187</sup>, “strengthen[ing] the walls”<sup>188</sup>, and “securing of the dry built masonry”<sup>189</sup> to explicitly stating that orthostats had been “reset, anchored in cement, and thin cracks and defects thin pointed”<sup>190</sup>. Many of these works are imperceptible, at least to the untrained eye, but their permanence may hinder future investigative works.

## REVERSIBILITY

Based on the knowledge that effective conservation of historic structures is a process and not a finite act<sup>191</sup> it is now largely accepted that alterations should be reversible wherever possible so as not to jeopardize the possibility for forthcoming interventions,

184 See GC10, AX34

185 B2, AX1

186 B6, AX1 but see too B5, AX1

187 As at Unstan, U3, AX24, see too P2, AX9

188 SB26, AX18

189 SB9, AX15

190 As at Midhowe, M5, AX4

191 Stirling, 2001: 238

as technology and knowledge further advance<sup>192</sup>. The Appleton Charter of 1983 recommended the use of reversible processes in order to allow “the widest options for future development, or the correction of unforeseen problems”<sup>193</sup>, hence any work undertaken should have the capacity for removal with minimal damage to the fabric or structure<sup>194</sup>. This was clearly a flaw in the application of cement and reinforced concrete directly onto ancient fabric in the interventions discussed, as it does not readily permit removal. Indeed in reference to the known areas of consolidation at Skara Brae using concrete and cement-based mortar it has recently been said that “the retention of this material and its long-term damage to the individual stones seems...to be preferable to the damage caused in its removal”<sup>195</sup>. Equally, in the RCAMS inventory of 1946 regarding HoPW, it was written that, due to its capping “there is therefore now no means of determining whether the entire structure is built in dry-stone masonry or not”<sup>196</sup> since “the outward features of the cairn are no longer recoverable”<sup>197</sup>. This information has hence been irretrievably lost.

## RECORDING

Even if we cannot ensure the eternal preservation of remains, we have a scientific and ethical obligation to create the best possible record of their form<sup>198</sup>. It should be remembered that, with few exceptions, any building will generally outlive its conservators<sup>199</sup>, and the difficulty of deciphering the works undertaken by HMMOW has reiterated the importance of thorough documentation. Comprehensive recording before, during and after any intervention is imperative in order to allow future generations to understand that which has previously occurred<sup>200</sup>, and to question the interpretations and processes involved<sup>201</sup> in light of contemporary ideas and

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192 Bridgwood and Lennie, 2009: 289; Feilden 1994: 5

193 ICOMOS, 1983: Articles 6-7; see too Burra Charter: ICOMOS, 2013 Article 6, and Doehne and Price, 2010: 55)

194 Bridgwood and Lennie, 2009: 289

195 Watt, 2009b: 3.3

196 RCAMS, 1946, 186

197 RCAMS, 1946, 188

198 Doehne and Price, 2010: 56; Price 2000: 228

199 Feilden, 1979: 30

200 Feilden, 1979: 30; 1994: 7; Stanley-Price, 2009: 42; See too SHEP plus Venice, Laussane, Appleton and Burra Charters: Historic Scotland, 2011b: 1.15d; ICOMOS, 1964: Article 16; 1990: Article 4; 1983: Article 6; 2013: Article 32.1

201 Feilden and Jokilehto, 1998: 70; Western 2010: 87

technology<sup>202</sup>. This should also involve recording the state in which the remains were inherited<sup>203</sup>, particularly detailing those parts of the structure that will cease to be visible once works are completed<sup>204</sup>. We see that this was a concern at Unstan where it was instructed that prior to the commencement of any work, “the entire mound [was] to be stripped of earth and turf and a survey and photographic record made”<sup>205</sup>, but the same conscientious documentation was apparently not in operation during the works themselves<sup>206</sup>. We now endeavour to accurately and consistently record all interventions<sup>207</sup> from documenting and justifying the decisions and actions taken, to detailing the methods and materials employed in every stage of treatment<sup>208</sup>, but lacking such detailed records for the interventions in question, we are forced to make observations in the field and deductions from the limited information available.

We are at least able to determine that anastylosis occurred at both Wideford<sup>209</sup> and Unstan<sup>210</sup>; anastylosis involves the re-erection of fallen or scattered elements in order to make a form more comprehensible<sup>211</sup>, but it is now specified that attempts to replace fabric should always be based on verified evidence<sup>212 213</sup>. Since the Inspectors involved were adamant that fallen stonework would be replaced only “if the former position of any stone [could] without any sort of doubt be verified”<sup>214</sup>, we must hope that this was indeed the case in these instances. Yet it does seem that a certain level of rebuilding

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202 Western, 2010: 87

203 Keck, C., 1982: 27

204 Orbaşlı, 2008: 97

205 U16, AX26, see too U4, AX24

206 Or if such records were made and survive, they are not publicly available

207 Feilden, 1979: 52; Feilden and Jokilehto, 1998: 70; Orbaşlı, 2008: 97

208 Feilden, 1994: 6-7; Plenderleith, 1982a: xx

209 “the re-setting of fallen stones from the upper courses of the large chamber and the laying of lintel stones which had fallen within this cell” (W2, AX27)

210 “reset and consolidate certain parts of the drystone building of the structure, which have slipped out of position in recent years” (U7, AX25); “fallen stones reset” (U9, AX25); “all new parts which have fallen within the last forty years were reset” (U10, AX25); “fallen stonework adjusted in 1935” (U13, AX26)

211 Tomaszewski, 2008: 228

212 Aslan, 2008: 25; Earl, 2003: 71, 136-137; Feilden, 1994: 9-10; 1979: 32-33; Feilden and Jokilehto, 1998: 63; Orbaşlı, 2008: 54; Philippot, 1982: 379

213 ICOMOS, 1931: Conclusion VI;

214 Emphasis original to source, made in reference to works at HoPW P4, AX9 see too P9 and P10, AX10

did take place<sup>215</sup>. We read of plans at Skara Brae to “make good breaches in [the] face of [the] interior wall”<sup>216</sup>, for the “cleaning down and rebuilding of wall tops”<sup>217</sup> and that “a trifling amount of rebuild”<sup>218</sup> had been executed. Since this essentially equates to building anew in an attempt to return the structures to a level of completeness or legibility, we might consider this to be reconstruction or restoration<sup>219</sup>; endeavours which are now largely discouraged<sup>220</sup> due to the potential to obscure or destroy evidence<sup>221</sup>. This is particularly interesting, since in reference to reconstructions undertaken at Skara Brae prior to his involvement with the site<sup>222</sup>, Childe notes that they were “quite indistinguishable from the original work, and cause[d] considerable confusion to students visiting the site.”<sup>223</sup> His solution was the aforementioned metal tape of demarcation between old and new masonry (Figure 2.14), but whilst he stated that this had “been very successfully adopted”<sup>224</sup>, no such ribbon is now readily visible<sup>225</sup>. Perhaps, as it was intended to be laid “as the work progresse[d]”<sup>226</sup>, the tape was positioned within the wall fabric, but in that case it would only be detected upon the dismantling of the structures. This would, however, be curious considering it was intended for “students of architecture to be able to distinguish readily original building”<sup>227</sup>. It may be that this was never undertaken, or was subsequently removed.

The recent World Heritage Site Management Plan does state, that where parts of the settlement have been lost or reconstructed during early interventions “there is sufficient information to identify and interpret the extent of such works”<sup>228</sup>. But even

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215 Whether this be through anastylosis or building completely anew

216 SB30, AX19

217 SB29, AX18

218 Childe, 1931

219 See Feilden and Jokilehto, 1998: 63; Keck, C., 1982: 26; Sivan, 1995: 52; Stanley-Price, 2009: 37, 41-42

220 Stanley-Price, 2009: 33

221 Stanley-Price, 2008: 38, 259; Sullivan, 1995: 19

222 The northern wall of House 1 and its associated features having been lost to the sea after exposure

223 Childe, 1931

224 Childe, 1931

225 C.f. Watt, 2009b

226 SB49, AX23

227 SB15, AX16

228 Historic Scotland, 2014d: 17, 65

if that is considered to be true of Skara Brae<sup>229</sup>, the same could not necessarily be said of contemporary works on other sites which seem to have been entirely under documented.

Indeed it would appear that the localised rebuilding of Orcadian monuments was perhaps more widespread than one might imagine<sup>230</sup>. Marked on certain of the section drawings included in Davidson and Henshall's 1989 authoritative book on Orcadian chambered tombs, are areas of rebuild which seem to have been little documented in the original files<sup>231</sup>, including at Cuween<sup>232</sup> where the HMMOW file from November 1932 notes of the tomb simply that "the structure is complete"<sup>233</sup>. Davidson and Henshall also state that the upper part of the cairn of HoPW was raised to accommodate the concrete roof<sup>234</sup>, and of the passage it is written that "the extent of the reconstruction in 1931 and the evidence on which it was based have not been recorded"<sup>235</sup>.

The consequences of this lack of recording can be very real. During the surveys that inform Chapter 5, a discrepancy in condition was identified between two adjoining areas of stonework in the interior of Unstan, with the resulting conclusion drawn that a mechanism of deterioration was causing the disaggregation of stone in one area, but was not affecting its neighbour (Figure 4.2). Subsequent examination of early post-excavation photographs revealed, however, that the seemingly undamaged area was actually erected several millennia later, as a section of modern rebuild by HMMOW following the exposure of the tomb (Figure 4.3). This example goes some way to illustrate the importance of fully documenting conservative interventions for the benefit of future generations, since remedial action might have been recommended for the apparently damaged area. In reference to this work the HMMOW files simply state that the "small mural cell [was] made good", but also that "the entrance passage [was] restored"<sup>236</sup>, the extent of which is also revealed through a contemporary photograph (Figure 4.4).

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229 And the current author is inclined to disagree that this is so

230 Thomson, R., 2012

231 It is not clear whether such information was acquired from particular sources, or the result of well-trained eyes experienced at identifying prehistoric forms

232 p113

233 C2, AX3

234 Davidson and Henshall, 1989: 121

235 Davidson and Henshall, 1989: 122

236 U14, AX26

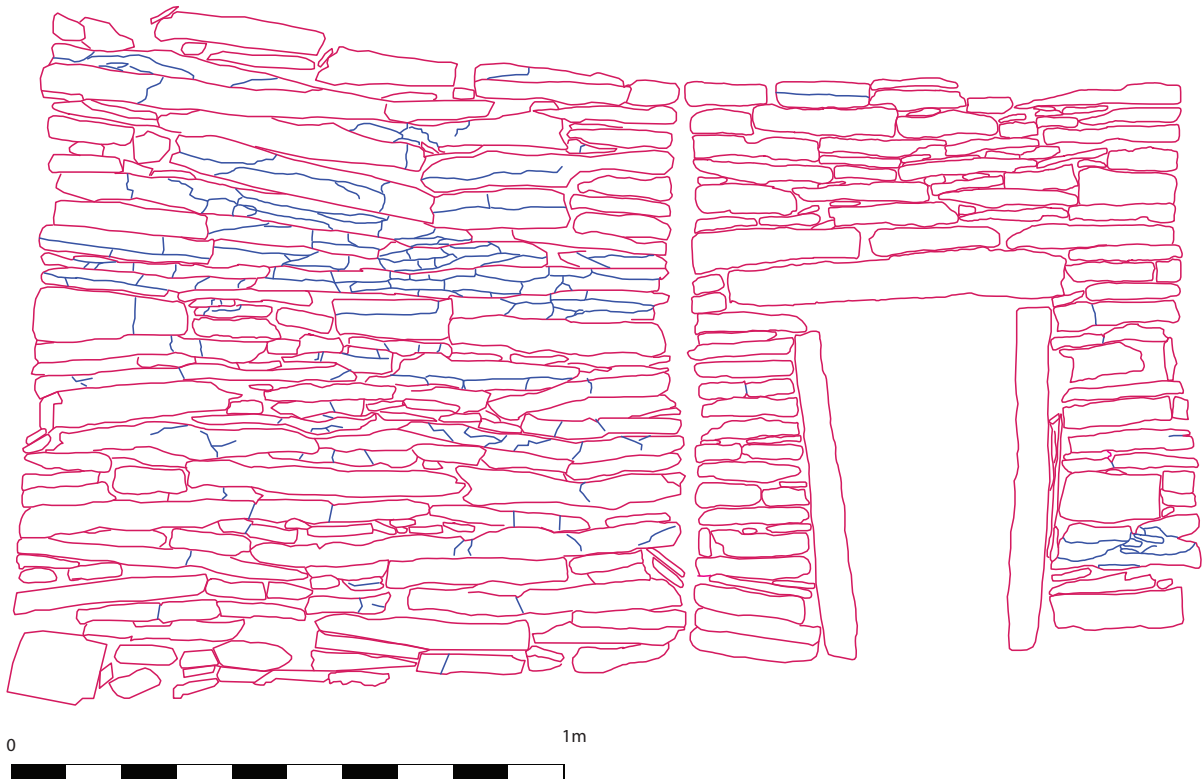


Figure 4.2: Scaled partial elevation drawing detailing two neighbouring areas of walling in very different condition, in southwest internal wall of Unstan either side of orthostat-slot. Blue lines denote cracking. In light of the image below, it was determined that the majority of the stonework around the cell opening was rebuild, hence its notably better condition.



Figure 4.3a & b : Before the “small mural cell was made good”, and condition now: red line shows line of rebuild,  
 Top Image Courtesy of RCAHMS photographic archive, No Date



Figure 4.4a-c : Before the “entrance passage was restored” and the roof installed, compared with the passage configuration and roofing now

Top Left Image Courtesy of RCAHMS photographic archive, No Date



## PATINA AND MULTI-PHASING

Most historic structures will naturally represent different phases of repair and modifications such as this, as they are adapted and added to over time<sup>237</sup>, and this is true also of archaeological sites, where multiple phases of development may be evident<sup>238</sup>. The notion of preserving buildings complete with this visible “patina of age” appeared in the writings of Ruskin, Morris and Riegl, and prevails still in the ICOMOS guidelines<sup>239 240</sup>. Conservators and archaeologists might attempt to preserve and make legible the histories of action and transformation of a structure as it has evolved to the present day<sup>241</sup>, revealing its phasing so that it may be seen as an archaeological palimpsest<sup>242</sup>. We see an example of this at Blackhammer, where later walling relating to secondary phasing remains projecting into the interior (see plan on Condition Survey, Appendix Z). Yet a conflict may arise when later accretions obscure an aspect of the structure’s original fabric or design, albeit whilst evincing the varied life-history of the monument<sup>243</sup>. The Venice Charter states that it may be acceptable to remove any additions that distort or obliterate the fabric, or which are deemed to detract from the cultural significance of the remains<sup>244 245</sup>. By the same logic we see the selective removal of a platform relating to the later broch-period phasing of Midhowe<sup>246</sup> apparently in order to make the monument more legible.

We might therefore feel better equipped to assess what impact the works undertaken have had on the remains as a source of scientific information, and to consider this it is worth briefly contemplating understandings of authenticity.

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237 Earl, 2003: 97; Jokilehto, 2006: 2; Orbaşlı, 2008: 3, 54-55, 58; Philippot, 1982: 371; Thompson, 1981: 31)

238 Orbaşlı, 2008: 47; Thompson, 1981: 21

239 Feilden and Jokilehto, 1998: 68: 8.2.1; see too Yaneva, 2010: 18-19

240 ICOMOS, 1931: Conclusion I; 1964: Article 11; 2000: Article 6; see too Feilden, 1994: 9 and Feilden and Jokilehto, 1998: 71: 8.2.3

241 Candee, 1982: 21

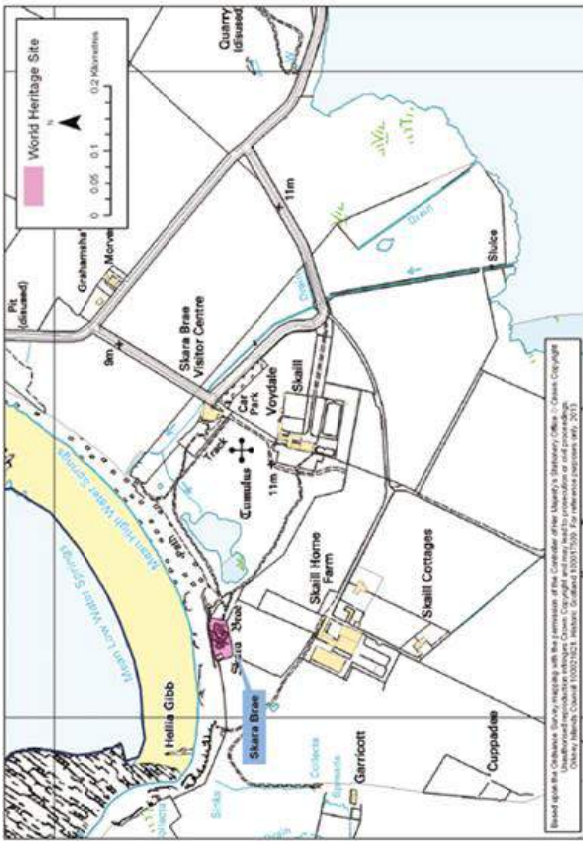
242 Bridgwood and Lennie, 2009: 15; Solli, 2000: 96; Tomaszewski, 2008: 230; Yaneva, 2010: 18

243 Earl, 2003: 102; Sullivan 1995: 19; Thompson 1981: 27

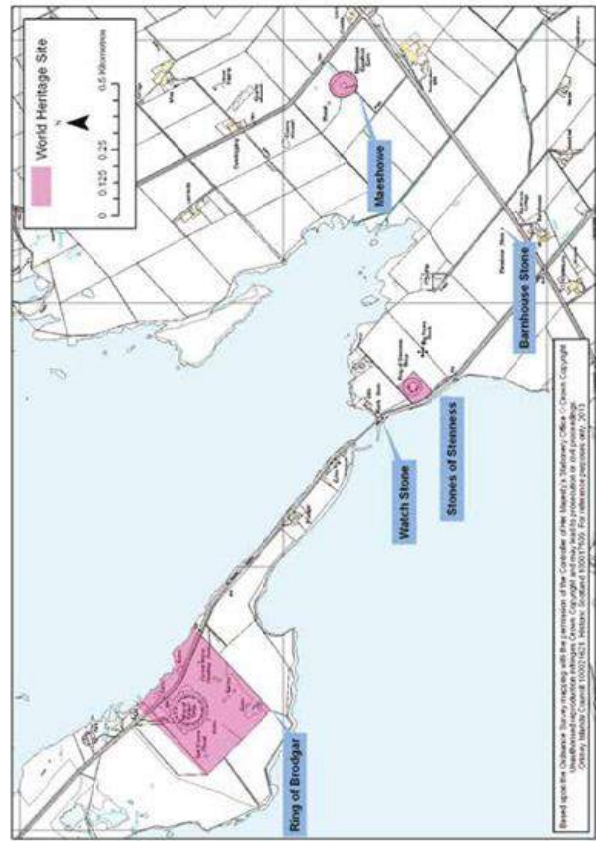
244 Feilden, 1979: 33; Orbaşlı, 2008: 55; Philippot, 1982: 371

245 ICOMOS, 1964: Article 11; see too Feilden, 1994: 9

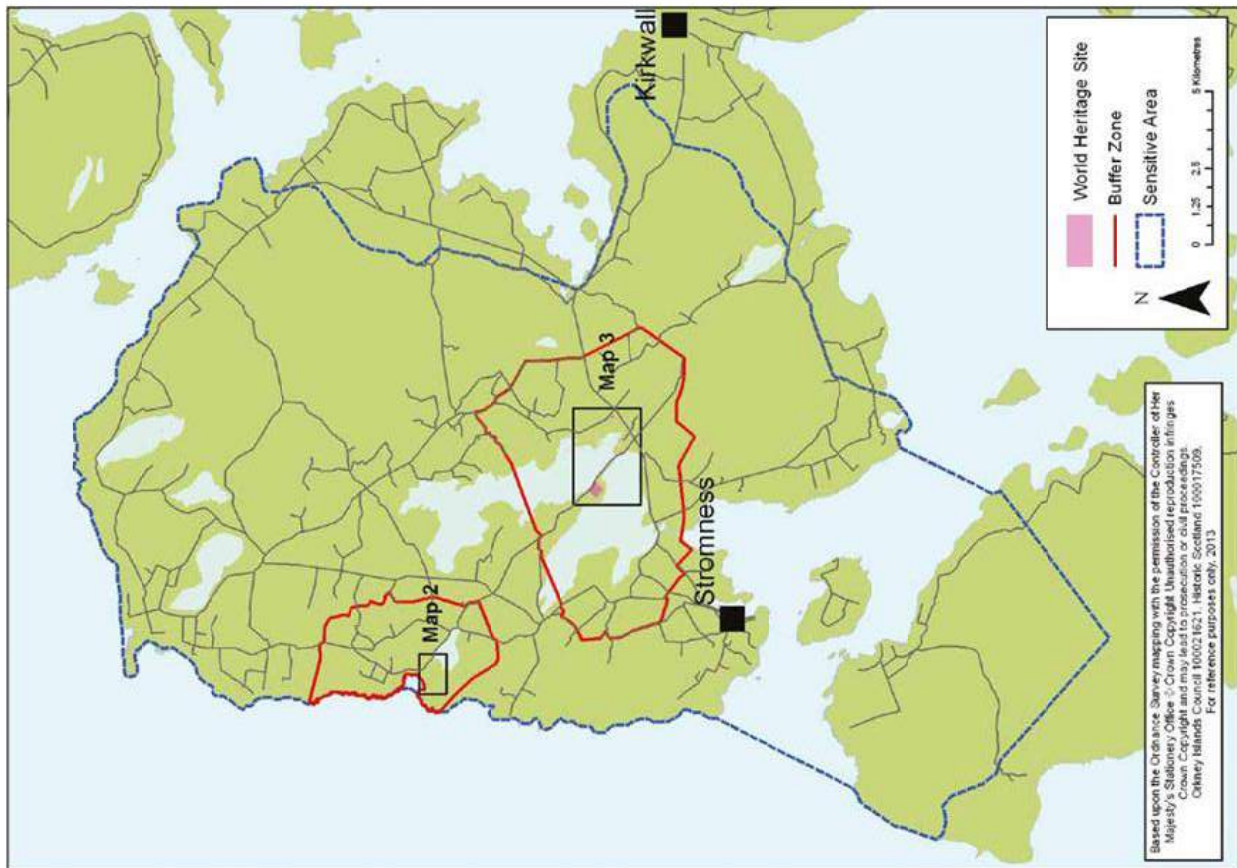
246 M5, AX4



Map 2: Skara Brae, Bay of Skail, north-west Mainland



Map 3: Brodgar-Stennes area, the Ring of Brodgar, Stones of Stennes and Maeshowe



Map 1: The World Heritage Site, the Buffer Zone, and the Sensitive Area

Figure 4.5: Boundaries of the World Heritage Site and buffer zone, Images courtesy of Historic Scotland, 2014d: 7-8

## AUTHENTICITY AND THE WORLD HERITAGE SITE

The notion of authenticity, or “a sense of truthfulness”<sup>247</sup>, may be used in relation to materials, form, technique or setting<sup>248</sup>, but the perceptions of which are relative to the individual<sup>249</sup>. The ability to appreciate the authenticity of past remains is hence dependent upon the observer and not the observed<sup>250</sup> and this can be nicely illustrated by briefly considering perceptions of authenticity in relation to the Orcadian World Heritage Area.

In 1999 The Heart of Neolithic Orkney was inscribed as a World Heritage Site, comprising Maeshowe, Skara Brae, the Stones of Stenness, the Ring of Brodgar and various neighbouring standing stones and burial mounds<sup>251</sup> (Figure 4.5), based on the criteria that they:

- i. Represent masterpieces of human creative genius,
- ii. Exhibit an important interchange of human values,
- iii. Bear a unique testimony to a culture which has disappeared, and
- iv. Are an outstanding example of monuments which illustrate a significant stage in human history.<sup>252</sup>

The nomination document stresses that all of the monuments included are considered to have authenticity and integrity, having benefitted from varying degrees of restoration “in the sense employed in the Venice Charter”. The previous re-erection of fallen stones is described as anastylosis, with consolidation and replacement having been employed only “where essential for conservation”. It is emphasised that in early interventions “authentic materials were used wherever possible”, or failing this, “material of a similar origin and character”, but throughout, “new work was distinguished from old”<sup>253</sup>.

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247 Jokilehto, 2008: 186; see too 2009: 79

248 Orbaşlı, 2008: 52

249 Brajer, 2009: 85

250 Stanley-Price, 2009: 43

251 Downes, 2005: 20

252 Downes, 2005: 21

253 Historic Scotland, 2000: 9

The Neolithic settlement of Barnhouse seen today is entirely reconstructed<sup>254</sup> (Figure 5.12) as based on evidence gained through excavation; the original walls having been largely destroyed by ploughing<sup>255</sup> prior to its discovery in 1984<sup>256</sup>. Since that which is currently visible does not represent “authentic structures”, it was consciously excluded from the nomination for World Heritage status, despite the site’s close relationship with neighbouring monuments<sup>257</sup>. The same is true of Unstan, which despite its physical proximity to the monuments within the core WH group, is included only within the Buffer Zone. Yet Maeshowe, which is included in the WHS proper, also has a concrete capping, but unlike that at Unstan it is imperceptibly sandwiched between masonry and turf. Perhaps the decision to include or omit certain sites is more a question of the visibility of intervention, rather than purely authenticity as the nomination suggested.

There are inevitably further considerations that informed this decision<sup>258</sup>, and whilst World Heritage Status may only be accorded to the most exceptional examples of built or natural heritage<sup>259</sup>, this still gives us insight into certain wider value judgements. It seems that the visible interventions at Maeshowe in being considered “antiquarian and archaeological in nature”<sup>260</sup> are seen to hold a certain worth in their own right, yet the HMMOW roofing of Unstan with its familiarly modern materials are simply too recent to hold comparable value.

But in light of this, can we then consider the sites (in the forms in which we have inherited them), to be “authentic”? This largely depends upon the observer’s definition of authenticity – if it is understood as defining “original” fabric, then all of the interventions would surely be deemed inauthentic, and the use of concrete, cement and steel also entirely inappropriate in otherwise dry-stone constructions. But if authenticity is instead defined as the history of the form being conveyed through its physical fabric<sup>261</sup> then the blatantly modern roofing could be considered to be highly authentic, whilst the concealed or imperceptible areas of rebuild and consolidation clearly less so. But how does this impact upon the value of the remains as an archaeological resource?

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254 Hartley, 1993

255 Garnham, 2004: 73; Wickham Jones, 2007: 24-25

256 Card, 2005b: 52

257 Historic Scotland, 2000: 30

258 E.g. perhaps the precise date of Unstan in relation to the other sites, or that this would involve the designation of a wider area

259 Historic Scotland, 2014d: 15;

260 Historic Scotland, 2014d: 17, 65

261 Richmond and Bracker, 2009: xvi

## The Remains as an Archaeological Resource

Modern conservation principles have here been used as a frame of reference against which to consider and discuss the HMMOW works from a contemporary perspective. It was not intended to assess the extent to which these works actually comply with these standards<sup>262</sup> since they belong to a different era.

Through exploring these key themes we can consider the remains, as they were inherited by us, complete with modifications, and think about their worth now as an archaeological resource.

Having revealed the extent of consolidation works it does seem that certain information has been irretrievably lost through the obscuring of features by materials which cannot be removed without sacrifice to the original fabric. It is equally regrettable that the interventions were not themselves better documented, since in particular instances challenges have now arisen in determining the extent of the works, and therefore what constitutes primary construction as opposed to modern rebuild. But generally speaking, the works as enacted have ensured the survival of the remains, and for the most part, have done so in a way that is recognisably modern. They are evidence of the most recent stage in the history of these monuments, regardless of what came before, and perhaps most importantly of all, these interventions have facilitated the safe ongoing access to, and therefore study of, the physical archaeology. “The first and most valuable source of information on any object is the object itself”<sup>263</sup>, and even the best records will never offer a substitute for the inspection of the original form. By this logic the interventions have actually enhanced the value of the remains as an archaeological resource in permitting their direct scientific study in the present and future, and as knowledge and technologies advance this will allow the original material to reveal further information<sup>264</sup>.

But is there reason to believe that the roofing is compromising the physical condition of the archaeology?

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262 In reference to which, see Kienzle, 1998: 67

263 Kienzle, 1998: 50

264 Orbaşlı, 2008: 52

## CHAPTER 5:

### THE CURRENT CONDITION OF THE MONUMENTS

#### The Surveys in Summary

Any structure of a great age often has a delicately poised equilibrium<sup>265</sup>, and may be vulnerable to various types of deterioration whether due to the natural ageing process, the actions of man<sup>266</sup>, or ravages from the environment<sup>267</sup>; all of which may act upon any weaknesses inherent in the building material<sup>268</sup>. Decay processes may alter not only the appearance of this material, but its coherence, strength and chemical behaviour<sup>269</sup>.

The longevity of a form is therefore governed by the nature of its material components<sup>270</sup>, and the character of the environment to which it is exposed<sup>271</sup>. In this instance, the environment refers to the range of physical, chemical and biological agents acting upon the material<sup>272</sup>, whether independently or collaboratively<sup>273</sup>. Hence, whilst stone is a naturally durable material<sup>274</sup>, this may be affected by a range of different factors, and its decay can take a number of forms<sup>275</sup>.

Site	Island	Roof Type
Blackhammer	Rousay	Concrete Dome
Cuween	Mainland	Masonry (& later fibreglass)
Midhowe	Rousay	Free-standing Steel Enclosure
Taversoe Tuick	Rousay	Concrete Dome
Unstan	Mainland	Concrete Dome
Yarso	Rousay	Concrete Dome
Wideford	Mainland	Masonry

Left: Condition Surveys were previously conducted at seven sites with different types of roofing interventions

265 Earl, 2003: 77

266 Including misguided conservative interventions

267 Jokilehto, 2006: 2; Keck, C., 1982: 25

268 Feilden, 1979: 10

269 Lewin, 1983: vii

270 Bullock, 1982: 136; Lewin, 1983: xi

271 Ertosun, 2012: 3; Keck, S., 1982: 327, 331; Lewin, 1983: xi

272 Keck, S., 1982: 331; see too Dowman, 1970: 5; Feilden, 1994: 2; Smith and Turkington, 2004: 5; Lewin, 1983: vii

273 Keck, S., 1982: 332

274 Graham, 2007: 11; Orbaşlı, 2008: 152

275 Doehne and Price, 2010: 2, 4

Condition Surveys were conducted at seven of the sites discussed (shown in the above table), as part of a preliminary study for this project<sup>276</sup>, the digitised field notes from which are appended at the end of this document with a discussion of why the observations are cause for concern within these structures (Appendix Z).

Based on purely visual observations, it was concluded that certain mechanisms of deterioration were active at these sites. Green algal growth was recorded on the interior stonework of all structures illuminated by a consistent light source, with colonisation notably more prevalent in those with concrete domes and skylights. In the darkened chambers of Wideford and Cuween, algal bloom was detected only in the entrance passages, whilst beneath the steel roof and opaque plastic sheet-lights at Midhowe it was largely confined to the horizontal surfaces of the floor and outer cairn, with limited growth upon the orthostats and walling. Despite the horizontal tidemarks on these uprights indicative of rising damp, the latter site was notably drier than its counterparts, with excess moisture having been visible in each of the enclosed tombs whether through puddling, condensation on the roof-lights, or walls which were physically dripping. Yet the efflorescence visible at each site was also cause to suggest that these moisture levels were fluctuating, since water was clearly evaporating from the stone enabling salts to crystallise. It was noted that this was particularly prevalent within the almost airtight structures, and it was suggested that the light admittance through the rooflights was causing daily fluctuations of temperatures, which in turn altered the Relative Humidity levels; the associated cycles of which were potentially particularly damaging since the moisture vapour was retained within the impermeable domes.

Ultimately it was suggested that the tombs capped by concrete roofs were in a worsened state due to the environmental conditions produced by these impermeable structures. The concrete appeared to be concentrating saturation within the original walling, preventing the natural breathability of drystone construction, with the light-wells permitting colonisation by photosynthetic organisms which further retained moisture within the already wet walls. Concern was also expressed that the moisture held within the walling would be subject to freeze/thaw action, the mechanical effects of which perhaps explaining the cracking of stonework observed at many sites.

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276 Ritchie, 2014

In essence, through the creation of adverse microclimatic conditions, it appeared that the concrete domes were contributing to the deterioration of the structures they were installed to protect, since the general condition of tombs with masonry or free-standing shelters was notably better. A further concern was that the mass of the concrete could potentially also be destabilising the corbelling, and crushing the stone beneath it.

It is here necessary to recognise that the various components of a building act as part of an integrated whole<sup>277</sup>, and that by working and functioning together, a change to one element may have far-reaching effects. It is therefore essential to first understand the nuances of the forces already at work within the structure prior to conservation work<sup>278</sup> and where new elements are introduced, they should be compatible in terms of strength and stiffness, permeability, and rates of expansion and contraction<sup>279</sup>. This was clearly not the case with the introduction of reinforced concrete, and the worry was therefore that it may have been creating greater structural issues through altering the dynamic behaviour of the masonry, and imposing new loads upon it<sup>280</sup>.

## **Substantiating the Theories: Recent Data from Neolithic Sites**

It is too easy, as a mere student of conservation, to make underqualified statements based on personal observations at these sites; to conclude that the visible algal growth and efflorescence upon stonework are evidence that the dense, sky-lit concrete domes are creating conditions that are damaging to the archaeology within. But is there actually proof that this is the case?

The current condition of the structures was assessed in relation to a handful of early photographs sourced from various archives in the hope that it would be possible to detect any changes affecting the areas depicted. Regrettably as the neighbouring images suggest (5.1-5.4), the level of detail was such that in the majority of cases it was not possible to determine whether significant deterioration had occurred to stonework in the intervening years, beyond the occasional area of delamination. - Or at least if there had been deterioration, it appeared to have been at a macro level and

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277 Feilden, 1979: 32; Feilden and Jokilehto, 1998: 70; Orbaşlı, 2008: 112

278 Kienzle, 1998: 367

279 Ertosun, 2012: 3; Feilden, 1979: 51; Orbaşlı, 2008: 137; Torraca, 1982: 154

280 See too Calderini, 2008: 26, 31; Kienzle, 1998: 365, 368



Figure 5.1a-d: Comparison of condition of stonework in Unstan between 1957 and now, revealed few changes, Top and Bottom Left Images courtesy of RCAHMS photographic archive



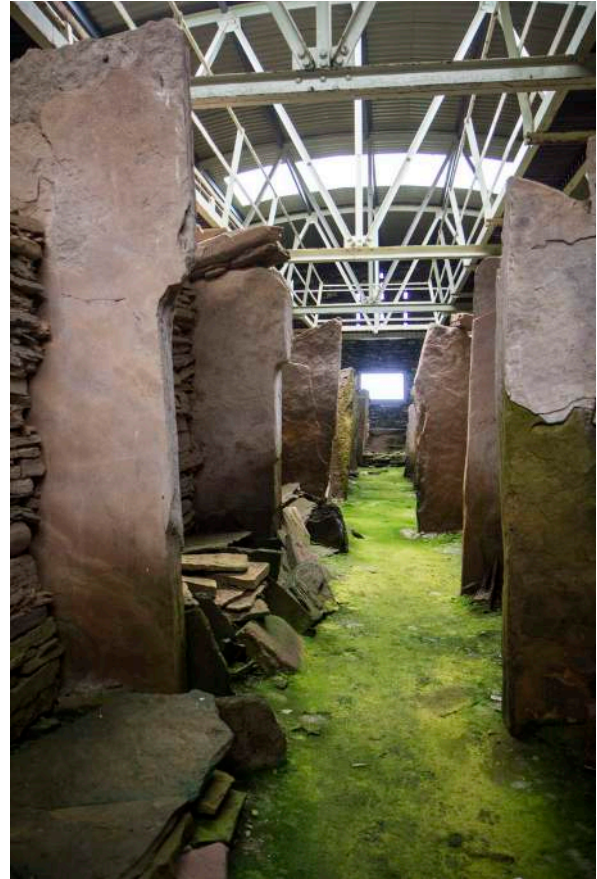


Figure 5.2a-b Above: : Comparison of condition of stonework in Midhowe, upon excavation and now, revealed few changes. Left Image: No Date, courtesy of Orkney Library Photographic Archive

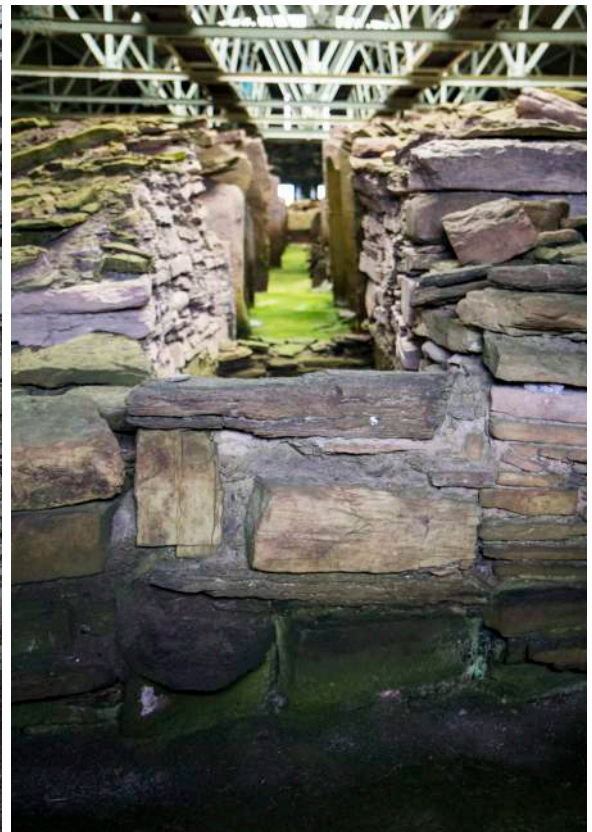


Figure 5.3a-b Above: Comparison of condition of stonework in Midhowe between 1956 and now, revealed few changes, Left Image courtesy of RCAHMS photographic archive, 1956

not readily obvious from afar. This venture proved to be inconclusive. It was therefore deemed necessary to consult more scientific resources in the hope of ascertaining quantifiable data through which to test these theories.



Figure 5.3a-b Above: Comparison of condition of stonework in Midhowe between 1956 and now, revealed few changes, Left Image courtesy of RCAHMS photographic archive, 1956



Figure 5.4a-b Above: Comparison of condition of stonework in Blackhammer between 1994 and now, revealed few changes beyond increased algal growth Left Image courtesy of RCAHMS photographic archive, 1994

## Structural Instability

As previously mentioned (Chapter 3), the reinforced concrete dome at Isbister recently required urgent structural works, which were implemented by Orkney Islands Council. Following concerns regarding the stability of certain elements within the tomb<sup>281</sup>, an extended period of monitoring<sup>282</sup> revealed that the measured distances between fixed points were increasing, and that the structure was therefore ‘dynamic’. It was determined that the probable cause of this structural movement was the crushing effect of the concrete cap, which was seemingly causing a slow collapse of the monument below<sup>283</sup>. A series of reinforcements were designed to support the structure, and enable safe ongoing access – these being a hollow metal-framed cube to reinforce the southwest cell<sup>284</sup> <sup>285</sup>, a gate to prevent access to its northwestern counterpart<sup>286</sup>, and two full height stainless steel vertical posts installed to support the concrete roof<sup>287</sup>.

The fact that the concrete cap was considered to be the primary cause of the structural problems at this site presents a curious paradox, since given the exposed location only 50m behind the cliff edge<sup>288</sup>, the structure would likely not have survived thus far without it<sup>289</sup> <sup>290</sup>.

The roof at Isbister therefore offers an interesting case study; its erection was not part of the HMMOWs suite of works, and yet its form was clearly based on their earlier interventions. As with any ancient form, there are likely to be other immeasurable factors which significantly contribute to its current instability, but even if the capping were not the sole cause of decay<sup>291</sup>, it is clearly exacerbating the effects in a very major way.

281 Namely an area of bulging stonework, the heavily cracked lintel over the southwest cell and the partially collapsed roof over its northeastern counterpart

282 Between 2009 and 2012, involving the positioning of stainless steel discs which were repeatedly surveyed around key areas

283 Thomson, R., 2012b; 2013c

284 Thomson, R., 2011a

285 allowing access through its centre, and attached with adjustable fixing pads

286 Thomson, R., 2013c

287 Installed 12<sup>th</sup>-15<sup>th</sup> of August 2013; Thomson, R., 2013c; 2013d;

288 Watt, 2012

289 Tom Hunter, pers. comm.

290 -significant erosion had occurred prior to excavations in the 1950s; RCAHMS, 2014

291 e.g. consider too natural settlement, Rob Thomson, interview with the author, June 2, 2014.

It would naturally be ill-advised to extrapolate directly from this case and to state that the same issues are definitely present at the other sites discussed, but we may legitimately note comparable forms of deterioration at the other tombs studied (namely cracks and bulges), and wonder if their causes bear similar origins. It may well be that Isbister is exceptional in its structural problems; its capping a product of a different age, its stonework a reflection of the particular geology on which it sits, or indeed the extended nature of its excavation. But equally, it could be that these issues are common to all of the tombs discussed (albeit perhaps to a lesser degree), and that they have simply not been subject to the same scrutiny in recent years; of receiving extended monitoring, and expert attention from a range of specialists. This is not to diminish the role played by those who do undertake careful observations at these sites, but it is surely the case that significant changes may occur which remain undetected by the human eye. At the very least, this case validates the notion that the application of a reinforced concrete roof can potentially cause structural issues within the ancient walling beneath it.

There has also been cause to suggest that the domes themselves may have had structural issues in the past. During the author's condition survey at Blackhammer it was noted that the concrete cover house bore rather different characteristics from the other examples examined (Appendix Z), and it was suggested that it had itself previously been subject to some form of intervention. An early photograph helps to reveal the extent of such works; in Figure 5.5a we see the concrete dome as initially installed – a barrel-vaulted form with the impression of the shuttering still visible. A recent photograph taken from almost the same position (Figure 5.5b) shows that the current manifestation of the roof has a smoother finish and far steeper sides which project deeper over the Neolithic wall heads. Whilst Historic Scotland have no record of this alteration having taken place, we can determine that it occurred at a point between the installation of the original roof in 1938<sup>292</sup> and a photograph taken in 1994 (Figure 5.4a) which shows the roof in its current form. We must here remember that the time of the initial installation of these domes was amidst an age of experimentation with the possible uses of reinforced concrete<sup>293</sup> and as a material in its relative infancy, it is likely that its properties and performance were not yet fully understood<sup>294</sup>.

292 B8, AX2

293 Calderini, 2008: 36

294 Griffin, 2013: 7; Historic Scotland, 2014a: 4; Stirling, 2001: 217

Without further detail we can only assume that this major alteration was necessitated by a serious structural flaw within the concrete dome, and note the heavy concentration of algal growth that has resulted directly beneath the deeper wall. But is there any proof that the roofs are actually creating the adverse microclimates in which algae thrive?



Figure 5.5a-c The dome at Blackhammer itself appears to have undergone modification, Image on Left shows the reinforced concrete dome as it was initially installed with a barrel-vaulted profile and the impression of the shuttering still visible. Image courtesy of RCAHMS CANMORE archive, No date. In contrast, the image on the right shows the current configuration of the roof having undergone substantial alterations, now with a smoother surface and far steeper sides which project deeper over the wallheads below

Below image shows the curve of the original dome still visible, with profile of later insertion beneath, working shot from Condition Survey in Appendix Z



## Environmental Conditions

A major obstacle in addressing this issue is the lack of extended environmental monitoring within these structures to date, and few of the sites discussed herein have received such attention beyond sporadic isolated readings. It was, however, possible to acquire the results from the long-term temperature and Relative Humidity monitoring thus far implemented at Isbister, Maeshowe and two structures within Skara Brae<sup>295</sup>. The data from these contemporary sites can illuminate a number of factors relevant to our other cases.

At Isbister<sup>296</sup> surface temperature, and relative humidity monitors had been installed<sup>297</sup> in order to determine the role played by moisture in the decay of stone<sup>298</sup>. For the purposes of the current work, data was only supplied for measurements recorded between August 2013 and February 2014 as plotted in the graph overleaf (Figure 5.6), which shows a high of 16°C and a low of 4°C, with relative humidity consistently damp and fluctuating between 100 and 75%. This is, however, representative of the levels recorded since January 2010<sup>299</sup>, and correspondence between Consultant Rob Thomson and OIC suggest that temperatures are consistently between 2-15°C, despite one particularly cold winter.

A more extensive data set was available for Maeshowe, and the above/below graphs (Figure 5.7a-b) plot the temperature and Relative Humidity levels recorded by two separate data loggers between the 11<sup>th</sup> of July 2012 and the 9<sup>th</sup> of February 2013. This is a sample graph, deemed to be broadly representative of the complete data set recorded over a 46 month period from the 21<sup>st</sup> April 2008 until the 9<sup>th</sup> of February 2013, which is available in full in Appendix Y. Throughout the full period of monitoring, levels consistently show a gradual change in internal temperature between early spring and winter, with daily fluctuations of around 2°C which directly correlate with the opening times of the monument. Whilst variable, Relative Humidity is consistently high, and for both RH and temperature levels we see variations between the readings taken by the two separate sensors positioned at different heights within the monument<sup>300</sup>.

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295 Generously supplied by Rob Thomson and Historic Scotland

296 The reinforced concrete dome having been installed in 1987

297 On the 12<sup>th</sup> of January, 2010 – see Thomson, R., 2010a

298 Thomson, R., 2009c

299 Rob Thomson, interview with the author, June 2, 2014

300 Thomson, R., 2007b; 2008b; 2009a; 2009b; 2010b

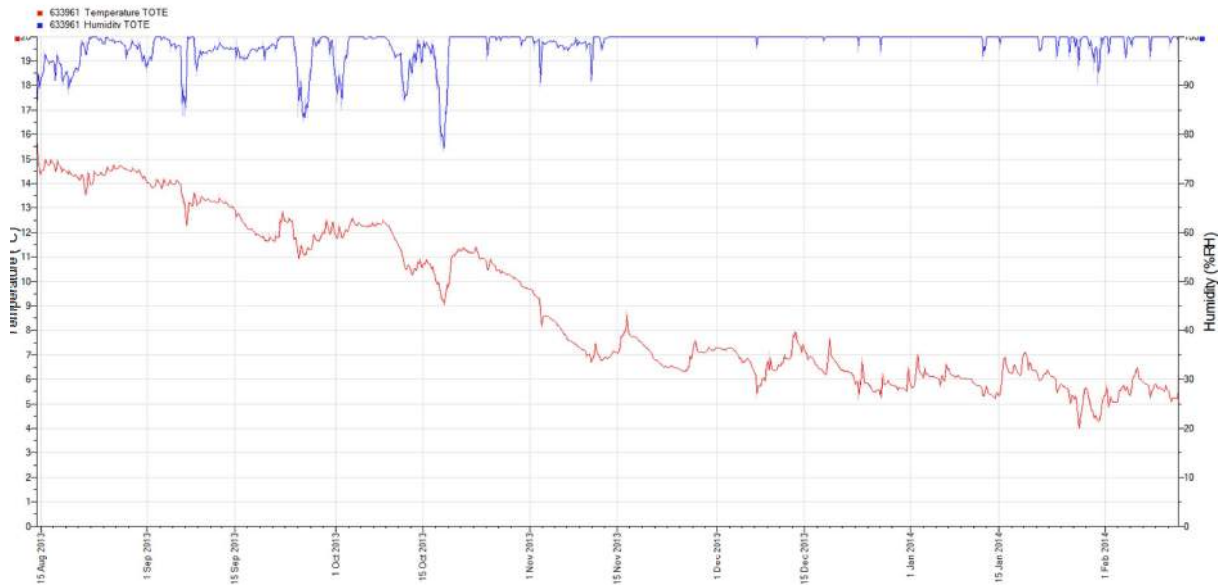
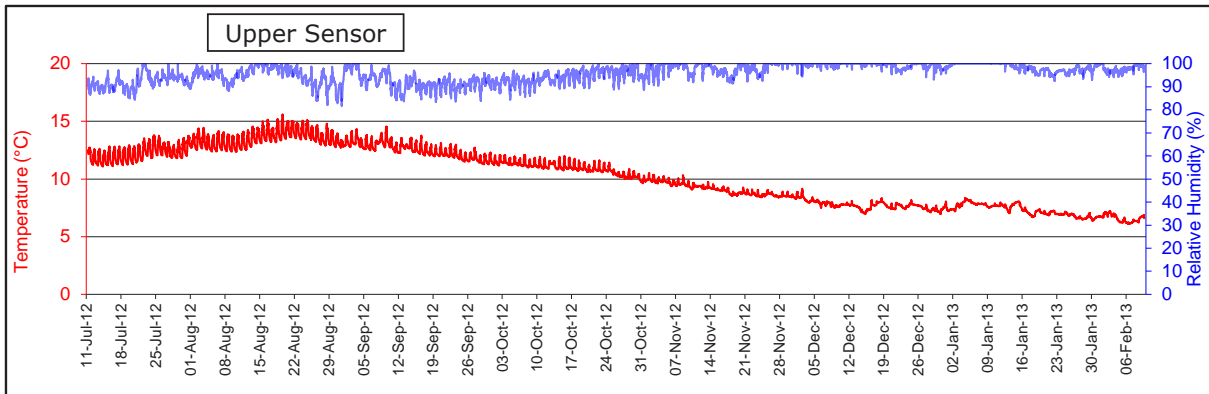


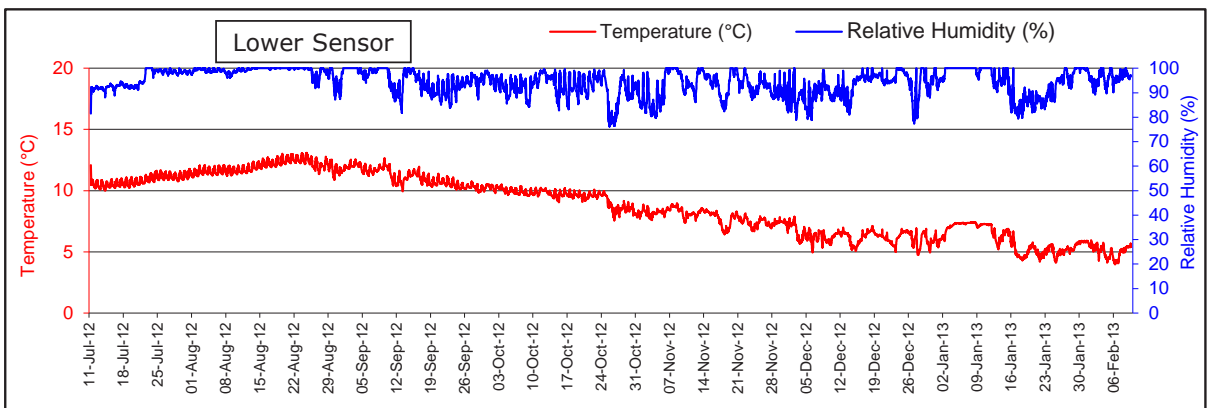
Figure 5.6 Above: Graph plotting environmental data from Isbister between August 2013 and February 2014, Temperature shown in Red, Relative Humidity in Blue, Data Courtesy of OIC

Figure 5.7a-b Below: Graphs plotting environmental data from an upper and lower sensor within Maeshowe between July 2012 and February 2013, Data Courtesy of Rob Thomson



**Statistical Summary of upper sensor (top graph)**

	<u>Mean</u>	<u>Minimum</u>	<u>Maximum</u>	<u>Range</u>
<b>T (°C)</b>	10.2	6.1	15.6	<b>9.5</b>
<b>RH (%)</b>	96	81	100	<b>19</b>



**Statistical Summary of lower sensor (bottom graph)**

	<u>Mean</u>	<u>Minimum</u>	<u>Maximum</u>	<u>Range</u>
<b>T (°C)</b>	8.8	4.0	13.1	<b>9.1</b>
<b>RH (%)</b>	94	76	100	<b>24</b>

Naturally each site should be treated as its own separate case, and Maeshowe is unique amongst this suite of monuments for numerous reasons<sup>301</sup>, many of which give rise to the very particular circumstances to which it is subject. For example, the variation in conditions recorded between the two sensors may be accounted for by the great height of the structure<sup>302</sup>, which is more than double that which survives for the majority of tombs discussed herein<sup>303</sup>. But while this is indeed an extreme case, it may prompt us to closer inspect the condition of stonework at the base of walling elsewhere, and whether it contrasts with that at a greater height where conditions are likely to be subtly warmer and more humid due to rising hot air.

Secondly, the dome of Maeshowe is enclosed without rooflights; having been initially penetrated from above<sup>304</sup>, the roof was repaired with Victorian mortared stonework, which was subsequently topped by a concrete roof by the HMOW between 1910-1913<sup>305 306</sup>. Therefore, aside from that which filters through from the entrance passage, the interior is lacking in natural illumination. Artificial lighting was introduced with the installation of electricity to the interior in 1985<sup>307</sup>, the utilisation of which may go some way to explain the fluctuating conditions associated with site opening hours. But this could equally be associated with the presence of visitors and resultant air movement<sup>308</sup>; conditions which are concentrated to particular periods since entry to Maeshowe is now restricted to organised tours at designated hours only, for reasons of conservation<sup>309</sup>.

Therefore, whilst Maeshowe is admittedly exceptional amongst these monuments in its height, use of electrical lighting, and concentrated footfall, this data is nonetheless useful in prompting us to consider that visitation itself may also affect environmental conditions at other sites, and to question whether these may vary even within the monuments themselves.

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301 Regrettably this piece lacks the scope to detail exactly why it is considered to be “perhaps the finest piece of Neolithic architecture in western Europe” (Card, 2005b: 53), for which the reader is referred to Davidson and Henshall, 1989: 37, 45-51; and Henshall, 1985: 96

302 Originally about 4.5m (Watt, 2009a: 1.1)

303 Davidson and Henshall, 1989: 20

304 As was the standard procedure for early excavations

305 Foster, 2000: 1

306 This was later repaired in 2005 (Watt, 2009a: 3.1)

307 Watt, 2009a: 3.1

308 Thomson, R., 2009b

309 Historic Scotland, 2000: 52, 55

We might then examine data gathered from House 7 of Skara Brae; the initial graph (Figure 5.8) shows the extreme fluctuations which occurred over a five month period in 2006 when it was still encased by the glass roof installed by HMOW in the 1930s, the lower graph (Figure 5.9) plots the more stable conditions recorded in 2008 following its replacement with a timber roof<sup>310</sup>, with the interior therefore no longer subject to solar thermal gain<sup>311</sup>. Once more we note the expected peak in temperatures during the summer months, and, following the amendments to the roof, a Relative Humidity level which is both high and stable throughout. Entry to House 7 is now only permitted in exceptional circumstances<sup>312</sup>, and it therefore largely remains dark, sealed and undisturbed – hence it lacks the daily fluctuations associated with visitors at Maeshowe. But this data becomes more meaningful when it is compared with that recorded from elsewhere in Skara Brae during the same periods – a logger positioned within the interior of unroofed House 1 (See Figure 5.10 for sample graph but again, see Appendix Y for full data).

Here we note that the archaeology is subject to extreme fluctuations of temperature and Relative Humidity, as it is exposed to the changing extremes of the Orcadian climate. We see a range of values from sub-zero temperatures (e.g. Jan 2012) to a maximum of 25.9°C (May 2012), and huge variation in RH from 37.6% (April 2012) to 100% (regularly).

For the current discussion this is meaningful, since the data for all three of the roofed structures show that they do not fall below freezing, and peak no higher than 16.6°C at Maeshowe. Therefore, despite their roofs being formed of different materials with varying mass (reinforced concrete at Isbister, mortared masonry topped with concrete at Maeshowe, and timber now atop House 7), we see that in each instance their mass seems to act as a year-round temperature buffer<sup>313</sup>, preventing the risk of frost damage to the stonework within<sup>314</sup>. Whilst variable, the enclosed structures also have notably lesser fluctuations in RH, which consistently remains above 90%<sup>315</sup> although at Isbister the fluctuations are a little more extreme.

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310 In July 2007, Watt, 2009b: Appendix E

311 Again the full suite of data is appended at the end of this document.

312 E.g. for purposes of academic study, for which permission must be sought from the District Architect

313 See Thomson, R., 2010c; 2014

314 Thomson, R., 2011a

315 (note however one inconsistency in December 2011 in House 7, and others which appear to be related to the installation of the data loggers)

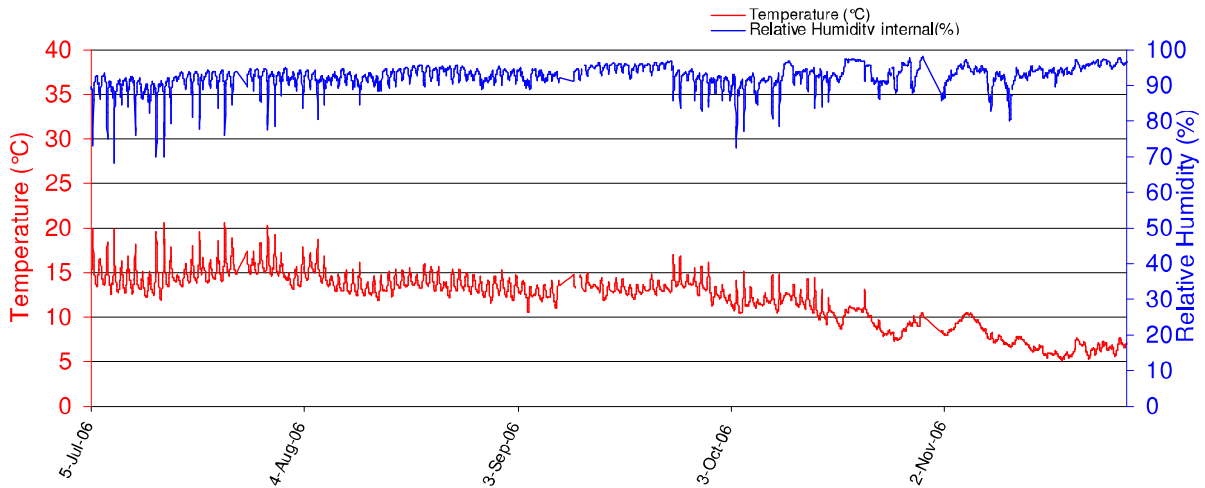


Figure 5.8: Graph plotting environmental data from within House 7 of Skara Brae in 2006 when the HMMOW glass roof was still in place, Data Courtesy of Rob Thomson

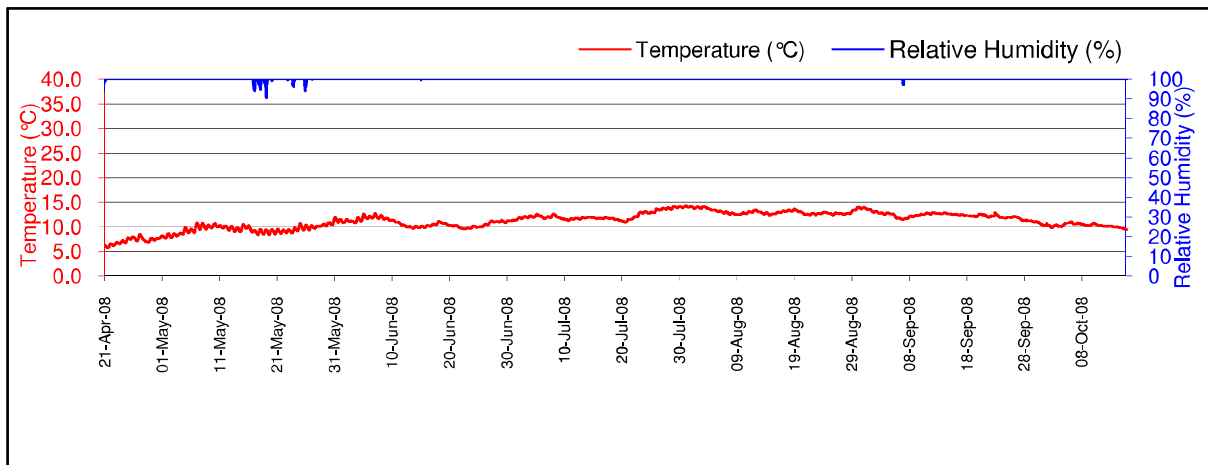
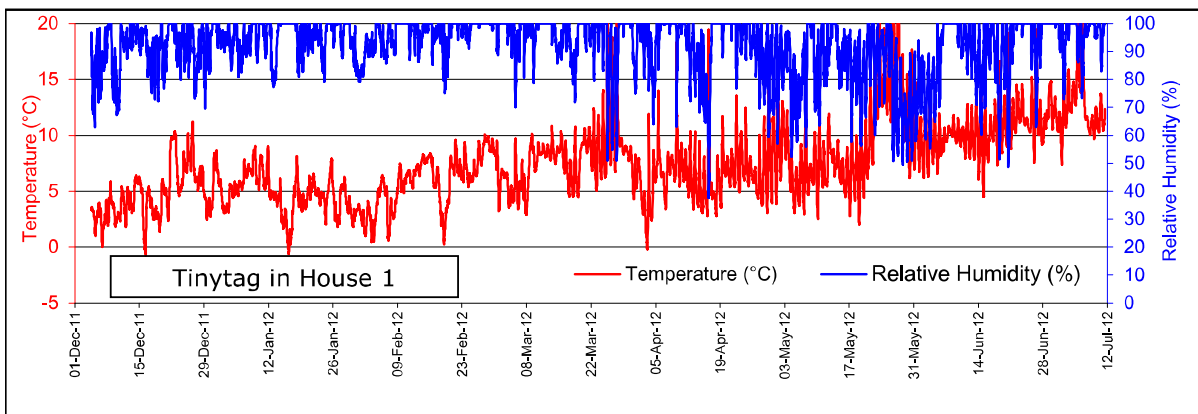


Figure 5.9: Graph plotting environmental data from within House 7 of Skara Brae in 2008 following the replacement of the original roof with one constructed of timber, Data Courtesy of Rob Thomson



<b>Statistical Summary of House 1</b>				
	<i>Mean</i>	<i>Minimum</i>	<i>Maximum</i>	<i>Range</i>
<b>T (°C)</b>	7.4	-0.7	25.9	<b>26.6</b>
<b>RH (%)</b>	91.7	37.6	100	<b>62</b>

Figure 5.10: Graph plotting environmental data from within exposed House 1 of Skara Brae between December 2011 and June 2012, Data Courtesy of Rob Thomson  
See Appendix Y for the full data set of which this is a part

It is suggested that it is the variability of RH which causes problems with the stone<sup>316</sup>, with salt damage resulting from these moisture cycles<sup>317</sup>. Consistently high and stable RH is usually beneficial in preventing salts from efflorescing<sup>318</sup>, so in theory we should see a great deterioration of stonework in House 1 in response to its environment. This structure has been exposed for a similar period at House 7, though without any protection, and yet whilst weathered, the stone is generally in a better state of repair than that in the previously extreme environment of House 7<sup>319</sup>. In this instance exposure to the elements does not appear to have been particularly harmful to the stone (as had been predicted in two HMMOW letters<sup>320</sup>), despite the variability of environmental conditions.

Yet personal observations made during annual excavations at the Ness of Brodgar<sup>321</sup>, detected disaggregation of stone even during six weeks of exposure. Similarly the reconstructed settlement of Barnhouse has deteriorated considerably since its construction in 1994 (Figure 5.12). To explain this discrepancy it could be suggested that a fundamental difference between Skara Brae and contemporary sites is the nature of the building stone employed. At the Ness of Brodgar, as within the interiors of the tombs discussed<sup>322</sup>, we see sharp-edged stones which have clearly been quarried for the purpose of construction. At Skara Brae the visible masonry has rounded edges, and while a recent Historic Scotland Condition Survey recorded this as being “due to exposure to wind and weather”<sup>323</sup> in recent times, (which is undoubtedly true to an extent), this feature is also detected in images of the structures upon their initial excavation (Figure 5.11). Therefore, if we assume that the building stone employed at Skara Brae was already weathered prior to its utilisation in construction (albeit even to a minor degree), it would therefore be significantly less vulnerable to post-excavation

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316 Thomson, R., 2011a

317 Doehne and Price, 2010: 28

318 Thomson, R., 2007b

319 Watt, 2009b, Appendix F

320 “little if any deterioration is likely to take place if the chambers are left open” (SB5, AX14); “the chambers would not suffer from exposure to any material degree for years to come” (SB6, AX14)

321 Another Late Neolithic site, also on Mainland Orkney

322 With the exception of Quoyness where the central chamber is recorded as being built of “mainly water worn stones” (Garnham, 2004: 125)

323 Watt, 2009b, Appendix F

environmental exposure than if it had been inserted into the wall freshly quarried<sup>324</sup>. As such, although it has been observed that its extended exposure has not been to the detriment of House 1 at Skara Brae, that is not to say that the same would be true if the tombs had been left unroofed.

This matter can of course not be categorically verified, but it can be conclusively said that with the examples discussed, enclosing the Neolithic architecture with a relatively solid form<sup>325</sup>, was to withdraw it from the extremes of the Orcadian environment, and therefore lesser fluctuations.



Figure 5.11: Early image of House 7 of Skara Brae during excavations in 1928,

Even having just been exposed the stonework looks notably rounded, perhaps suggesting that it was previously weathered prior to being used in construction. Image courtesy of RCAHMS photographic archive, 1928

Admittedly direct correlations cannot be drawn between these examples and the other sites thus far discussed, since “every site is unique, both in its present and past realities”<sup>326</sup>. But the data gathered from contemporary sites exposed to the same Orcadian climate offer a rare insight into forms for which we are otherwise lacking information. It is regrettable that extensive data is not available to compare the effects of the roof-lit concrete domes with other fully enclosed examples, since the data from Isbister is only partial. The conditions of the masonry-roofed construction of Cuween had previously been compared with those at concrete-capped Unstan, with greater fluctuations noted at the latter site<sup>327</sup>, but since this data was based on monthly averages rather than daily fluctuations<sup>328</sup>, it cannot be accepted unquestioningly<sup>329</sup>.

324 See P4, AX9; P11, AX10; SB15, AX16; SB38, AX21; SB49, AX23

325 As opposed to the previous glazing over House 7 of Skara Brae

326 Sivan, 1995: 52

327 Thompson, R., 2014: Interview with the author

328 Thompson, R., 2007a

329 The environmental results were not available for the purposes of the current work



Figure 5.12a-c: Barnhouse Settlement, As initially reconstructed in 1994, and its condition today with detail of deteriorated stonework. Top left image Courtesy of RCAHMS photographic archive, 1994

So whilst we are unable to conclude from this evidence whether the roof-lit concrete cover houses are indeed harming the archaeology beneath them as suggested, we can at least say with conviction that there is a known example of such a form creating structural issues for the form it was installed to protect. We might similarly deduce that any form of roof, other than glass, is actually likely to create a more stable environment than if the archaeology were left exposed to the elements, and we can also say conclusively that the cracking observed in the condition survey is unlikely to have been caused by freeze/thaw as was initially suggested, since these examples suggest that when roofed, the interior of the structures will not drop below 2°C.

The example of Blackhammer adds another interesting dimension to the history of these interventions, and it would be particularly useful to have ambient light level data from this and other roof-lit sites, and to compare this with the resultant RH and temperature levels. But even without such data we can surely conclude that it is due to the presence of moisture, and unfiltered light admittance through the roof-lights that photosynthetic algae is able to colonise these structures. And that this and the architectural configuration that results from these roofs come to have a very big effect on the way in which these sites are experienced in the present. Maeshowe also prompts us to consider the effects that we as visitors can have on the archaeology, and the following chapter will further examine the damaging effects of over-visitation and the need to withdraw visitors from the archaeological resource.

## CHAPTER 6: EXPERIENCING THE SITES

### Tourism and the Need to Withdraw Visitors from the Archaeological Remains

The first waves of mass tourism began in the 19<sup>th</sup> century<sup>330</sup> and have since been rapidly advanced by increased personal mobility<sup>331</sup>. With this has come the rise of heritage tourism on both a local and international scale<sup>332</sup>, with historic monuments becoming an increasingly commodified resource<sup>333</sup> with a high economic value in their own right<sup>334</sup>. Tourism is currently the fourth biggest industry in Scotland<sup>335</sup>, with the visitation of heritage sites being the most popular activity for tourists nationwide<sup>336</sup>, but also in Orkney<sup>337</sup>.

Indeed, perhaps contrary to expectation, the effects of tourism are a very real issue in Orkney, though admittedly to a lesser degree outwith the principle island of Mainland. Throughout the summer months the isles are infiltrated with cruise ships which dock for a very limited time, e.g. on July 5<sup>th</sup> 2014, three large liners collectively carrying over seven thousand persons<sup>338</sup> were docked in Kirkwall for no more than nine hours<sup>339</sup>, with the passengers bussed out en masse for a whistle-stop tour of key heritage sites<sup>340</sup>. Consequently, here, as elsewhere, there is a very real danger that the physical integrity of heritage sites may be imperilled by the damaging effects of

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330 Silberman, 2013: 21

331 Pye, 2009: 130

332 Tomaszewski, 2008: 227

333 Silberman, 2013: 27; Tomaszewski, 2008: 227

334 de la Torre and Mac Lean, 1995: 10; Jameson Jr, 2008a: 59; Orbaşlı, 2008: 4; Russell, 2006a: 22; Walsh, 1992: 117; White, 2007: 247; 263

335 Yeoman, 2008: 14

336 Historic Scotland, 2002: 22

337 Historic Scotland, 2000: 43

338 Which equates to one third of the total resident population of Orkney (British Government, 2014)

339 These being the MSC Magnifica, the Nautica and the Ruby Princess – see OIC Marine Services, 2014

340 Such tours are generally limited to those sites accessible by road (i.e. the islands connected by causeways and not requiring ferries, i.e. Mainland down to South Ronaldsay)

concentrated over-visitation<sup>341</sup>. Tourists may inadvertently compromise the character of the resource<sup>342</sup>, as mass visitation threatens the destruction or irreversible erosion of that which they came to see<sup>343</sup>. Hence conservation is laden with conflicts<sup>344</sup> and there is often contention between providing physical access to remains, whilst preserving their scientific value<sup>345</sup>.

The long-term 'visitability' of sites is therefore dependent upon their active protection<sup>346</sup>, and the process of conservation may therefore necessitate some sacrifice in visitor usage<sup>347</sup>; hence it is perhaps entirely justified that following the works of HMMOW the full extent of the Neolithic structures are not always visible or accessible (see below). Notable international examples of damage by visitation include the abrasion of the stones of the Parthenon by mass footfall, or the growth of microorganisms on the painted walls of Lascaux following disturbance of the microbiological environment by thousands of visitors each year<sup>348</sup>, the interiors of both of which are no longer publicly accessible for reasons of conservation. But since visitation to accessible sites is only likely to increase<sup>349</sup>, it should be recognised that each site or monument has a maximum carrying capacity which should not be exceeded<sup>350</sup>. It may therefore be necessary to adopt a programme of 'traffic management'<sup>351</sup> e.g. limiting visitor numbers in order to control humidity levels<sup>352</sup>, or, as we see in certain of the Orcadian sites, establishing prescribed circulation routes to prevent the walking over or touching of remains<sup>353</sup>. But whilst the separation of the visitor from the ruin may be commendable in terms

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341 Breeze, 2005: 33; de la Torre and Mac Lean, 1995: 6, 10; English Heritage, 2008: 319; Keck, S., 1982: 337; Pye, 2009: 130; Skeates 2000: 61; White 2007: 247-248

342 English Heritage, 2008: 319

343 Blockley, 1999: 18; Kennedy, 2006: iv; Skeates, 2000: 61; White, 2007: 248

344 Orbaşlı, 2008: 37

345 Aslan, 2008: 46, 77

346 Smith G.S., 2006: 124; Stanley Price, 1994: 284

347 Keck, S., 1982: 337

348 Doehne and Price, 2010: 60; Feilden, 1979: 19; Keck, S., 1982: 336

349 Connally, 1982: 343

350 de la Torre and Mac Lean, 1995: 11; Feilden, 1979: 19; Feilden and Jokilehto, 1998, 4; Marston Fitch, 1982: 324

351 Marston Fitch, 1982: 324

352 Feilden and Jokilehto, 1998: 102) e.g. as later adopted at Maeshowe see Watt, 2009a

353 Çetin and İpekoğlu, 2013: 22, e.g. as at Skara Brae and Midhowe, but also subsequently the Ring of Brodgar (see Watt, 2009c), and Stonehenge ( – see Bridgwood and Lennie, 2009: 313)

of the preservation of the built fabric<sup>354</sup>, we must also consider the resulting ways in which buildings and monuments are experienced by the consumer<sup>355</sup>. In so doing it is beneficial to briefly examine the theories behind the phenomenological movement within the discipline of archaeology, which places a heavy emphasis upon individual bodily experience<sup>356</sup>.

## Phenomenology and the Experience of Space

In the 1990s a new phase was entered in the study of prehistoric monuments; referencing the works of Heidegger and Merleau-Ponty, phenomenological approaches sought to explore the understanding and description of experience, as encountered by prehistoric subjects<sup>357</sup>. Based on the premise that worldly experience extended outward from the materiality of the body<sup>358</sup>, this approach involved the detailed descriptive examination of lived experience and perception as encountered under certain material conditions by a living human subject<sup>359</sup>. Embodiment or “being-in-the-world”<sup>360</sup> offered a means by which to conceptualise the past as lived, sensual experience<sup>361</sup>, with the suggestion being that a greater understanding of pre-modern space might be gleaned through engaging with its somatic qualities<sup>362</sup> and being more in tune with its effects on bodily experience and movement<sup>363</sup>. The notion stood that the materiality of architecture could prompt, guide and limit bodily movement<sup>364</sup> whilst concurrently shaping visual and auditory experience<sup>365</sup>. In structuring somatic motility, built space could therefore actively orchestrate particular experiences<sup>366</sup>, and if one

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354 Aslan, 2008: 106

355 Orbaşlı, 2008: 62

356 Bradley, 1998: 87; Hamilakis, 2002b: 122; Hamilakis, Plucuennik and Tarlow, 2002: 9; Thomas, 2002: 36

357 Tilley, 1994: 12

358 Hodder and Hutson, 2004: 107; Joyce, 2007: 83; Preucel, 2006: 129; Tilley, 2004: 24, 221

359 Barrett, 2006: 158; Carman, 1999: 26; Shanks, 1992: 122; Shanks and Tilley, 1987: 251; Tilley, 2005: 151; Van Dyke and Alcock, 2003: 5-6

360 Heidegger, 1962; Joyce, 2007: 83; Tilley, 1994: 12

361 Hamilakis, Plucuennik and Tarlow, 2002: 1

362 Giles, 2007: 109

363 Cooney, 2000: 250; Thomas, 1996; 2006: 31

364 Barrett, 1994: 91; Cochrane, 2008: 175; Kirk, 1993: 183 ; Thomas, 1993a: 44; 1999: 48; 2000d: 79; Tilley, 2005: 153

365 Ashmore, W. 2007: 264; Watson and Keating, 2000: 260

366 Bradley, 1998: 53; Hodder, 1994: 74; Thomas, 1999: 48

were to physically engage with the materiality of ancient forms in the present<sup>367</sup>, one could potentially produce a reading of such places based on how they influenced the body<sup>368</sup>, or how visual ‘cues’ seemed to signal or elicit certain modes of behaviour<sup>369</sup>.

Such post-processual approaches are to some degree outmoded, and few would now actively attempt an empathetic reading of how ancient persons experienced architecture based on their own corporeal experience. But phenomenology is insightful in prompting us to consider how architecture choreographs and controls movement<sup>370</sup>, and the ways in which contrasting approaches to presentation (and conservation) can actively shape our contemporary experience of these forms.

## Experiential and Sensory Phenomena

At Skara Brae and Midhowe, by design of the HMMOW interventions, only visual access is provided to the remains, with entry to the original forms prohibited; the visitor instead occupies an elevated position and looks down into structures that would have been roofed in antiquity; a view alien to that of Neolithic man. We might here recall criticisms made on a larger scale of Minissi’s scheme at Piazza Armerina, where raised prescribed walkways<sup>371</sup> prevented the visitor from engaging in the patterns of movement and circulation as originally enacted through the ancient villa<sup>372</sup>. But whilst the sense of sight is indeed of primary significance in the visitation of historic structures, one does experience architecture with all of one’s senses<sup>373</sup>. An engaged physical interaction with an ancient form is considered to provide the most valuable experience for the individual<sup>374</sup>, allowing the tactile experience of the textures and contours of age<sup>375</sup>. This is clearly not possible when viewing a structure from above, but it does seem to be something that the public directly desire. As part of an earlier study, the author questioned eighty survey participants on their experience of visiting

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367 Moore, 1986: 85; Thomas, 1999: 45; Tilley, 2000: 78

368 Tilley, 2004: 31

369 Giles, 2007: 108; Means, 2007: 42

370 See Jones and Richards, 2005: 83

371 Enabling views of the mosaics without walking upon them (Stanley-Price, 1995: 70)

372 Stanley-Price, 1995: 80

373 Marston Fitch, 1982: 314

374 Baker, 1999a: 11

375 Chitty, 1999: 94

Skara Brae, and ascertained that of this group, 50% had found the current level of interaction with the remains to be inadequate, and had sought direct bodily access afterwards<sup>376</sup>. Similarly it would appear that visual access through a grille into one of the cells at Isbister was unsatisfactory for one visitor, who recently unscrewed the aforementioned metal barrier over the damaged cell (Chapter 5) in order to gain entry and better experience the ancient configuration for himself.

But the question should surely be asked whether interaction with an ancient structure should even attempt to recreate original conditions, or if presentation should instead be optimised “for the convenience of the modern-day visitor”<sup>377</sup>?

In light of this question we might consider the approaches adopted at the sites discussed in relation to the design of the original architecture. It is surely not by chance or lack of ambition that the entrances to Neolithic architecture are consistently low and narrow; the towering corbelling within the Knowe of Laird, Quoyness and Maeshowe are testimony to the fact that great heights could be achieved through drystone construction, and yet passages throughout were consciously restrictive<sup>378</sup>. However, it is now no longer possible to experience the cramped proportions of the original passages at many sites; at Midhowe and Skara Brae as aforementioned, this is because the remains themselves are out of bounds, but at Blackhammer, Wideford, Taversoe Tuick<sup>379</sup> and HoPW the interventions now choreograph our movements away from the original mode of entry; the passages having been closed off, with access instead provided from above by means of an entry hatch and ladder<sup>380</sup>.

This mode of access would clearly not have been utilised in antiquity, but perhaps its current use is entirely justified. There were evidently early concerns regarding ease of public access<sup>381</sup>, e.g. through the 18 foot long passage at HoPW which was only 1 foot 10 inches wide, and 2 feet 8 inches high<sup>382</sup>, and it was clearly deemed better for the safety of both monument and visitor that entry was provided from above; indeed

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376 Ritchie, 2013

377 Stanley-Price, 1995: 81

378 See Richards 1993a; 1993b

379 Lower chamber

380 See B3, AX1; P1, AX9; P12, AX10; P19, AX12 – generally due to the narrowness of the original entry

381 See P19, AX12; SB13, AX15

382 P1, AX9

the current interpretation board at Taversoe Tuick states that the lower entrance passage has been closed for reasons of safety. But the introduction of any modern forms atop, or in the direct vicinity of, a historic monument produces a context which will inevitably influence their perception and means of viewing<sup>383</sup>. When in use, these tombs would have likely been cold and damp as now, but their interiors would also have been completely dark<sup>384</sup> (and therefore devoid of algae); of the sites discussed, the approach adopted at Cuween perhaps comes closest to replicating the original configuration<sup>385</sup> without roof-lights, casements or an entry hatch. In their Inventory, RCAMS discuss the original configuration of corbelling at HoPW, which would have converged in a beehive fashion to support lintels in a way which was “very different in appearance from the concrete roof that has replaced it”<sup>386</sup>, the archaeology beneath now overshadowed by the modern form on top.

## Perceptions of the Spaces

It was not possible to conduct an in-depth survey of public perception of the forms for the purpose of this discussion, but a quick internet search produced plentiful hits of users describing their contemporary experiences of visiting these sites, and the dominance of the modern roofs and their resulting effects<sup>387</sup>. Similarly, in an article commissioned by Historic Scotland, author Kenny Taylor writes of his perceptions of visiting a number of these sites, including how the steel gangways over Midhowe give the experience of visitation a “sci-fi feel”, and that the concrete roof of Blackhammer “imparts and added strangeness” to the form<sup>388</sup>. Indeed, the algal growth coupled with the scale, mass and contrasting materials of the roofing interventions do tend to dominate the archaeology, and present a curious and perhaps disappointing

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383 Tomaszewski, 2008: 232

384 Hedges, 1984: 149

385 See Hedges, 1984: 15

386 RCAMS, 1946: 188

387 Of particular interest is the Modern Antiquarian website, through which users can upload their own ‘fieldnotes’ after visiting an archaeological site. Here we find plentiful descriptions of the HMMOW roofing interventions dominating the contemporary experience, whether due to the “vivid” or “luminous green” algae in Unstan, to the concrete dome over Blackhammer which gives the feeling that one “could be in a public lavatory” <http://www.themodernantiquarian.com/site/214/unstan.html#fieldnotes>

388 Taylor, 2011

juxtaposition of forms.

But equally, in considering the current experience of visitation, we must acknowledge all that has occurred in the years succeeding these interventions – both in terms of the level of information provided on site, and the development of subsequent affects and associations. It is perhaps worth noting here that whilst concrete is generally not regarded to be aesthetically pleasing now<sup>389</sup>, at the time of installation it was a material “without history” which could theoretically lend itself to stylistically neutral forms<sup>390</sup>. What was then a fresh material has since acquired negative associations, perhaps in no small part due to its extensive employment in the construction of military buildings during the Second World War<sup>391</sup>. This is surely particularly poignant within the context of Orkney, where a land-based garrison of over 60,000 were stationed and hence such structures are still readily visible in the isles today. These negative associations are likely to sculpt the way these forms are perceived.

But in considering the contemporary experience of visiting these sites we must not forget the apparent limits of the HMMOW remit (Chapter 2) i.e. they were tasked to protect the remains, and to provide safe access to their forms in doing so. It was not a part of their agenda to recreate the conditions of the architecture as it was experienced by Neolithic man, but rather, to ensure that the forms survived and could be safely viewed. Hence walls were stabilised, access was in some instances provided from above, and roof-lights (or in the case of House 7 at Skara Brae, an entire glass roof) were installed for practical convenience, allowing the inspection of the details within without the need for artificial illumination<sup>392</sup>.

Evidently there are limitations in considering the impact of these interventions upon contemporary experience, since perception of their forms is of course highly subjective. But it is surely fair to say that decisions made regarding the conservation of these sites have in many instances come to dominate the contemporary experience of their visitation, for good or for bad. This situation could, however, be conceivably bettered through altering the ways in which these sites are currently presented.

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389 Kienzle, 1998: 368

390 Calderini, 2008: 55

391 Griffin, 2013: 7

392 SB2, AX13 but see too B3, B4, AX1; B7, AX2; M11, AX5; P1, AX9; U6, AX26; Y3, AX28; Y6, Y10, AX29; Y12, AX30,

## The Subsequent Presentation of these Sites

Interpretation is generally seen as the process of presenting the cultural significance of a built form or place to its visitors<sup>393</sup> in a way that avoids falsification<sup>394</sup>. Such effective presentation can achieve an educational experience for the observer<sup>395</sup> and if carefully phrased may communicate the importance of archaeological research and conservation<sup>396</sup>. Yet the public presentation and interpretation of heritage sites is often woefully inadequate<sup>397</sup>, and perhaps particularly so regarding conservative interventions. Typically, information boards will focus upon the pre/historic past of a remain, and not on its subsequent history. But it is important to relate the interpreted past to the living present<sup>398</sup>, and to remember that “few visitors are versed in the nuances of restoration philosophy”<sup>399</sup>, and hence even seemingly obvious interventions may therefore require some explanation.

The majority of interpretive panels now displayed at the sites in question do at least acknowledge the existence of a modern roof where applicable, whilst others (e.g. Taversoe Tuick) make absolutely no reference to the presence of a large mass of concrete atop the Neolithic remains. All seven 20<sup>th</sup> century editions of the detailed guidebooks regularly revised for Skara Brae did little more than mention that a cover house was present over House 7<sup>400</sup> and while the current version provides a good explanation of the ongoing consequences of the 1930s interventions on this structure<sup>401</sup>, its precursor stated only generally that “the buildings were strengthened and consolidated”<sup>402</sup>, with the modern roof having miraculously vanished from any plans and illustrations<sup>403</sup>. Ruins of any type can often be bewildering for the

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393 Orbaşlı, 2008: 62

394 Aslan, 2008: 42

395 Aslan, 2008: 42

396 de la Torre and Mac Lean 1995: 9; Orbaşlı, 2008: 62; Silberman, 2013: 21-22; see too Lausanne Charter: ICOMOS, 1990: Article 7

397 de la Torre and Mac Lean 1995: 9

398 Aslan, 2008: 44

399 Demas, 1995: 139

400 Childe 1933: 17; 1950: 13; 1958: 13; 1972: 14; 1974: 14; 1977: 14; Childe and Clarke, 1983: 22

401 Historic Scotland, 2012: 2, 5, 16-17

402 Historic Scotland, 1999: 30

403 With the exception of one small aerial photograph of the site on page 3

layperson<sup>404</sup> and intelligibility is key<sup>405</sup>, but this is particularly so where large-scale interventions have occurred. Since these works have changed our perceptions of the sites so drastically, it seems even a short passage on their extent and motivations would significantly benefit users, since the current lack of information seems to do an injustice to the level of care and consideration that informed the current works, as illuminated through previous chapters.

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404 Thompson, 1981: 31

405 Thompson, 1981: 22

## **CHAPTER 7: SOME CONCLUSIONS: SUCCESS AND LASTING EFFECTS**

### **Current Expectations from a Protective Structure: Do the HMMOW Examples Perform?**

Ultimately, a protective structure should respond to the specificities of the site<sup>406</sup> in fulfilling its function against the deteriorative effects of the atmosphere<sup>407</sup> by providing improved and stable environmental conditions<sup>408</sup>, and preventing invasion by flora, fauna or man<sup>409</sup>. It should be sympathetic to<sup>410</sup>, yet distinguishable from, the original remains both physically and structurally<sup>411</sup>, taking a form which faithfully represents the era of its installation<sup>412</sup>. In so doing, it must be of a scale and type appropriate for the situation and landscape characteristics of the site<sup>413</sup>, and finally should ensure long-term physical conservation<sup>414</sup> with the capacity for removal without inflicting damage<sup>415</sup>.

The interventions discussed to many extents fulfil the above criteria. The roofs apparently withdraw the archaeology from the extremes of temperatures of the Orkney climate and despite appearances, seem (from the limited data available) to subject the remains to lesser environmental fluctuations than if they had been left exposed. In so doing, those with impermeable concrete roofs do however seem to retain moisture, and facilitate potentially harmful colonisation by algal growth through the roof-lights incorporated within their design. But in questioning the creation of potentially harmful microclimates, as with the possibility for structural damage as a result of the domes, further expertise and monitoring are clearly required before anything can be said conclusively.

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- 406 Aslan, 2008: 71  
407 Çetin and İpekoğlu, 2013: 22  
408 Aslan, 1997; 2008: 12  
409 Çetin and İpekoğlu, 2013: 22  
410 Aslan, 2008: 71  
411 Marston Fitch, 1982: 317  
412 Aslan, 2008: 56, 71  
413 Çetin and İpekoğlu, 2013: 22  
414 Çetin and İpekoğlu, 2013: 22  
415 Çetin and İpekoğlu, 2013: 22

In light of the ever-growing pressures of heritage tourism the interventions are in the most part successful in withdrawing the remains from harm's way in a fashion that is recognisably modern in approach, using the materials in vogue at the time of their installation. In the concrete- and masonry-topped sites this is at a scale appropriate for the setting, and whilst at Midhowe the vast cover house dominates its landscape setting, this is apparently to the benefit of the archaeology, which here beneath its spacious enclosing form is notably more dry than its counterparts. The roofing solutions, and the associated consolidation works, are clearly not successful in one key aspect of what we now consider to be good conservation practice and that is the capacity for removal without sacrifice to the original fabric. And yet we must here be mindful that the individuals involved clearly thought they had adopted appropriate solutions for the task, of HoPW we read: "It must clearly be protected from the weather – the proper way to do this is to put a concrete cover over it"<sup>416</sup>.

Whilst we admittedly cannot determine what condition these remains would be in had they been left unroofed, we may note the early concerns made in 1934 by Walter Grant to "provide the approved covers at the earliest possible date, otherwise there will be nothing left to cover"<sup>417</sup>. Yet conservation inescapably involves some level of modification of the original object<sup>418</sup> and as such, some loss of value will almost inevitably incur<sup>419</sup>. Hence, while a certain level of information has indeed been lost through under-recording, or obscured by the heavy-handed application of concrete as was lamented at HoPW by RCAM (Chapter 4), the same source goes on to state that "the remarkable internal structure is [however] effectually preserved". And by this logic, the cover houses successfully fulfil their role of preserving the structures whilst also allowing their inspection. Certain of these findings can potentially inform the successful conservation and presentation of contemporary sites currently being exposed through excavation.

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416 P4, AX9

417 Y13, AX30

418 Munoz Vinas, 2009: 55; Pye, 2009: 131

419 This may be a justifiable sacrifice if it ensures the preservation of forms for the future, Feilden, 1979: 31

## The Lasting Effects of the Interventions

It should be remembered that these roofing interventions and associated works were at the time considered to be permanent solutions<sup>420</sup> to ensuring the perpetual life of the respective monuments<sup>421</sup>, and regard for reversibility was therefore inappropriate. They were motivated instead by concerns for ongoing and safe access, and consolidation was therefore entirely justified if it ensured the stability of the structures. With the benefit of hindsight we would surely refrain from using irreversible materials such as concrete or cement, yet these do have the benefit of being identifiably modern, at least where they are visible. But they are equally a direct reflection of their time of installation within the history of conservation, and we must not overlook the fact that the Athens Charter of 1931 not only encouraged the use of reinforced concrete, but actually specified that where utilised in consolidation works it should “wherever possible be concealed in order that the aspect and character of the restored monument may be preserved”<sup>422</sup>. Perhaps in light of this we should look a little less critically upon the secret bedding of stones at Skara Brae.

The same Charter also supported the implementation of anastylosis and the reinstating of “any original fragments that may be recovered”<sup>423</sup>, but where this and reconstruction using new stone has occurred it is misleading since it is not always possible to determine the boundary between old and new. The key issue then, is the lack of documentation; Childe himself noted that even during the works he was “frequently...asked whether a given bit of walling were original or not”<sup>424</sup>, and it would be helpful to have a better means of determining this information now that he and his colleagues are no longer available to consult. There is hence a very real need for information regarding these interventions to be made publicly available.

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420 See M13, AX5; SB2, AX13; SB7, AX14; U14, AX26; Y5, AX28; Y6, AX29;

421 SB12, AX15; SB15, AX16;

422 ICOMOS, 1931: Conclusion IV

423 ICOMOS, 1931: Conclusion VI

424 Childe, 1931

Indeed, this project was initially approached with the intent of exposing what appeared to be a hugely heavy-handed and forceful series of interventions, presumably enacted in the late twentieth century, in which modern forms and materials were brutally inflicted upon fragile archaeological remains at the expense of the latter. Primary research into this previously little discussed area exposed, however, that these were in fact far earlier approaches of a pioneering nature; they were a highly considered and progressive response to a uniquely Orcadian problem where monuments survived to such a height that their interiors could be entered for inspection. They were designed within the limits of the skills, resources and technology available at the time, and hence, without existing precedents (or at least without any that we can now readily identify) there was no fore-warning of the harmful microclimates that apparently resulted; of the damaging effects of condensation or algal growth that subsequently incurred. Here we cannot overlook what is perhaps a crucial factor in considering the lasting effects of these interventions, and that is all that has subsequently occurred, from negative associations with materials, to changing approaches to conservation practice, and we must be equally wary of over-criticising the experience of contemporary visitation when such concerns were beyond the initial requirements of the HMMOW remit.

Many of the perceptions and misconceptions of these forms are simply a result of lack of information, and perhaps with better interpretation boards the public could learn that these are not the brutal, thoughtless interventions that they might at first appear to be. We note through the extended discussions and design revisions relating to each of the sites in the HMMOW files, that decisions about these structures were not taken lightly at all, but only “after prolonged consideration”<sup>425</sup>. They were highly considered approaches that were simply constrained by the availability of materials and knowledge at the time of their installation, but through this they are a material reflection of the epoch of their creation.

The crucial lasting result of these interventions is that they succeeded in making the monuments safely accessible, therefore permitting their direct study and comparison<sup>426</sup>, but also their reappraisal as knowledge and understanding has further advanced<sup>427</sup>. Hence with the ongoing excavation of contemporary sites, these forms are becoming

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425 In relation to decisions at Midhowe M8, AX4

426 See Davidson and Henshall, 1989: 8

427 See Hedges, 1984: 232-233

increasingly intelligible.

As was written in the HMMOW files in relation to the works at Skara Brae: “it is just possible that future students with additional knowledge might be glad to study the remains themselves”<sup>428</sup>, and thanks to their interventions, indeed we are.

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428 SB19, AX16

## CHAPTER 8: LIMITATIONS

The previous work was severely limited by the lack of available resources on both the subject matter and contemporary interventions, relying solely upon publicly accessible sources<sup>429</sup>, and the generosity of certain individuals and organisations who were willing to share further information. Very few of these structures have been subject to any extensive environmental or structural monitoring, and whilst the few that have provide a rare and useful insight, they are regrettably not relating to the precise case studies here discussed. Analysis has therefore been largely limited to visual and non-intrusive investigation, and naturally, the observations made are constrained by the knowledge and experience of the author.

The brevity of the piece has not allowed wider discussion of, for example, the very particular case study of House 7 at Skara Brae, the mechanisms of decay affecting both concrete and historic stone, or the notion that the various interventions have now acquired their own value as part of the history of the monuments all of which could have offered a valid contribution to the present debate.

However, the present study has succeeded in its attempts to illuminate a suite of interventions which had previously gone entirely undiscussed in the world of academia. Primary research has established a timeframe of enactment and development, but also exposed a far wider range of associated works, many of which were not detectable from observations of the built fabric alone. Discussing these within a framework of contemporary conservation thought and practice helped to illuminate the decisions made, and to consider the resulting impacts upon the condition of the archaeology, its value as a scientific resource, and the contemporary experience of visitation.

16, 256 words

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429 And in the case of the contemporary interventions, those that were published in English

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