PORTLAND STONE: A MATERIAL CONSIDERATION OF PLACE, COLLAPSE AND DISRUPTION

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ABSTRACT

The island of Portland, in Dorset is a site made by the material needs and uses of architecture; it is a landscape constructed by absence and disruption. This almost-island barely tied to the mainland by Chesil beach is an uncertain edge. This paper investigates Portland as place and material inscribed by time through multiple histories and disciplines. My particular focus is on the potential in architecture to retrieve links to absence, disruption and collapse.

This paper starts with the source of the stone; Portland as history, material and place is followed and its significance for pre- and post-Enlightenment architecture is established. The absences left by the process of quarrying create a series of double absences: quarries are constructed absences, the use of stone for building and memorials is a manifestation of absence materialized in the traces of its destruction; this is epitomised in the use of Portland stone for WWI and II memorials. The methodology reaches back to eighteenth century philosophy, theories of the earth, and architectural accounts of Portland alongside contemporary theories of place. The site is viewed as one of perpetual change and the spaces left as the outcome of quarrying are imbued with meaning. This unique site at the edge shows that the complexity of cultural meaning found in Portland offers deeper understandings of the history of architecture.

Key words: Portland stone, geology, architecture, landscape, disruption, collapse

Independent Quarry, Portland 2010

INTRODUCTION

The landscape of Portland has been created by the removal of its stone; it is a built environment made from the voids left by quarrying. On Portland the landscape of the quarries is architectural negative space. Portland's exhausted landscape, marked by more than three centuries of quarrying, is one of disruption, dislocation and absence. Recurrent landslips of the coastal cliffs exposed the strata of Portland's fine limestone showing its aesthetic qualities and potential as architectural material. As such coastal collapse started the quarrying industry in the seventeenth century. The long-term result of four centuries of quarrying to the topography of Portland means that much of the island cannot be built on. The space of the quarries implies both construction and collapse.

The eighteenth century development of scientific thinking in which Kant participated, concerned the instability of the matter and material foundation beneath our feet. These cracks in the certainty of the Enlightenment are manifested in the work of the late eighteenth century writer Heinrich von Kleist (1777-1811) whose transition between empirical and critical thinking was tormented. In my research, the moment of recognition of collapse as a concept was reading Kleist's observation that an arch is only held in place because the stones that construct it want to collapse. Kleist's formulation raises the unsaid of architecture: that something devised and constructed embeds collapse within its form. At the end of the eighteenth and in the early nineteenth centuries Portland and Dorset's Jurassic coast were important for early geological mapping. Scientists have studied Portland's oolitic limestone for more than two hundred years; yet there has been little consideration of Portland in architectural history and theory or in contemporary writing on site and place.

The island of Portland is an intriguing and compelling site: its multiple histories suggest a nexus of departures. I was led to Portland as a site that suggested a tangible image of collapse. Through my creative research, I have looked at the spaces where Portland stone has been taken from the landscape investigating the site as a multifaceted starting point for architectural history and have interrogated absence as architectural formation.

I. PORTLAND: GEOLOGICAL TIME

As a material with a long and complex history of use, little was written about stone as a material for architects in the 20th century. However, the development of stereotomy, the use of geometry to precision-cut stone for architecture, produced a number of treatises, especially in France, between the 16th and 18th centuries. Currently there is considerable interest in writing about concrete as a material, particularly its use by Brutalist architecture; concrete as the dislocated material of non-place is the antithesis of stone. The materiality of concrete is derivative - an amorphous mass that takes shape from the moulds that cast it, whereas stone is already solid form. The most common ingredient of concrete is Portland cement, named because it looked like Portland stone. Portland as a place and a material occupies a significant part in the long and complex history of both geology and architecture in Britain. Portland has been remade by disasters and collapse – both as accident and outcome. This history can be traced to the middle of the eighteenth century when quarrying expanded rapidly on Portland.

A series of disasters above and below the ground gave impetus to the question of how to theorise what is under our feet. The earthquake that devastated Lisbon in 1755 was widely felt throughout Europe and had a significant impact on the certainties of Enlightenment thinking. By early 1756 Kant published three essays that attempted to theorise the cause of earthquake, starting with the observation,

We dwell peacefully on ground the foundations of which are battered from time to time. We build unconcernedly on vaults whose pillars sometimes sway and threaten to collapse. (Reinhardt and Oldroyd 1983:253)

The second, and most substantial essay, acknowledges,

We know pretty completely the surface of the earth, when the ampliation* is concerned. But we have under our feet a world still, with which we at present are but little acquainted. (Kant 1799:96)[i]

In these statements Kant speaks in architectural terms of the precariousness of the foundation on which architecture stands, and the limits of knowledge about what is at a deeper structural and material level. James Hutton (1726-1797), who published his first observations about geology in 1785 as *Theory of the Earth,* identifying geological time, suggested that layers were incrementally formed over vast periods; his theory, 'Hutton's unconformity', was based on observations that volcanic activity had breached sedimentary layers. In Playfair's life of Hutton, he wrote,

> We felt ourselves carried back to the time when the schistus on which we stood was yet at the bottom of the sea, and when the sandstone before us was only beginning to be deposited…The mind seemed to grow giddy by looking so far into the abyss of time. (Cosgrove ed. 2002:134).

This well-known quote suggests the abyss as a telescopic fissure through which the earth's layers could be discovered and that geological time is both spatial and conceptual.

The development of geological thinking took a different turn with Georges Cuvier (1769-1832), who proposed the idea of extinction after comparing the anatomy of living and fossilized vertebrates. The cultural context in which Cuvier advanced his hypothesis of 'catastrophism' in *Essay on the Theory of the Earth* (1812), lay in the aftermath of the Lisbon earthquake, and the contemporary situation of the turmoil of the French Revolution and Napoleonic wars. For example, Cuvier states,

> Life, […] has been often disturbed on this earth by terrible events – calamities which, at their commencement, have perhaps moved and overturned to a great depth the entire outer crust of the globe […] Numberless living beings have been the victims of these catastrophes (Cuvier 1813/2003:16)

These comments have a social, political and historical resonance. With reference to Cuvier's theories of catastrophe and extinction, Foucault argues that

> With spatial discontinuity, the breaking up of the great table, and the fragmentation of the surface upon which all natural beings had taken their ordered places, it became possible to replace natural history with a 'history' of nature. (Foucault 2000:275)

Foucault suggests how nature began to be ordered, classified, and archived as an outcome of disaster. An adherent to Cuvier's theory of catastrophe, William Smith, a West Country surveyor excavating canals, noticed that the layers of fossils contained in them could identify strata, this lead to the first geological map of Britain. The fossil material in Jurrassic limestone from the Dorset coast was key to his project. Smith's 1815 geological map was the first of its kind; by mapping strata, he too looked into the 'abyss of time' and charted volume rather than surface; and consequently, he mapped space and time.

Portland stone is an oolitic limestone of the Jurassic period that took place 100 – 170 million years ago. The stone lies in three beds on top of Kimmerage clay - the Basebed and Whitbeds have the finest oolitic material, with the Whitbed, the most favoured for building because of its durability and capacity to retain detailed carving, the top layer; the Roach bed has fossil shell impressions of Portland Screw and bivalves. The Jurassic coast of Dorset is the most researched and written about coastline in Britain (see Coombe 1983). Portland is the subject of numerous studies from the eighteenth century onwards by geologists of every description, as well as biologists and archaeologists, but rarely by cultural or architectural historians. Stone holds time, this attribute of the material is brought to the building; architecture borrows time from the stone from which it is constructed, architecture quarries a geological history along with the material. Stone belongs to a place, it comes from a landscape; it can be mapped. All stone is located; it can be identified and traced to its source. This relationship is temporal: geological time, excavation time, and architectural time.

Most of the limited numbers of texts about the use of stone in British architecture are from the 1950s and 1960s. The likely imperative for writing about stone in this period was the need to repair damaged buildings after WWII. Repair offers a deeper sense of renewal; stone has enduring qualities - it has continuity with the land, it has survived for millions of years. These ideas had particular provenance during and immediately after the Second World War when a poetics of landscape appeared in writing, film, and art[ii]. New forms of cultural history about land and landscape appeared. For example, in 1955 W.G. Hoskins wrote *The Making of the English Landscape* an evolutionary and topographical history of human intervention on the landscape, developing the new discipline of local history, and partly laying the ground for the contemporary field of place and site writing, now a critical area in architectural thinking.

At the Festival of Britain in 1951 a pavilion entitled *The Land* was devoted to what made and lay beneath the landscape of Britain; Jacquetta Hawkes's 'memoir', *A Land*, also of 1951, a cultural geology and archaeology of Britain, was written as a poetics of place and location:

> Every layer of the sedimentary rocks that has formed since life began, each layer of rubbish accumulated since man became an artificer, can be distinguished through this extraordinary fact – that existence is never for two moments the same (Hawkes 1980:30)

With reference to architecture she says:

> Portland and other less fine but lovely oolitic building stones form a relationship between the Jurassic Age, the eighteenth century and ourselves, its latest inheritors. English eighteenth century architecture could not have achieved some of its highest felicities without this ideal material. (Hawkes 1980:76)

Hawkes articulates how architecture can reach back in time to the geology of the material from which it is constructed and can then be dressed in its history. The precariousness of immanent disaster links the development of all these theoretical perspectives. Displacement and upheaval of countryside and cities occurs through natural disaster, accident and war. The connections of geological time, and the material of place can be demonstrably traced to architecture made from stone.

II. PORTLAND: MATERIAL MEMORIAL

Portland Stone was chosen by architects for its durability and for the fine grain of the oolite composing this limestone. Inigo Jones (1573-1652) chose Portland stone to stand in for the whiteness of classicism rather than for its unique qualities, mythically recreating the marble of classical Greece, whereas Christopher Wren used Portland stone for its intrinsic qualities. A series of significant historical disasters accelerated the wholesale requisition for Portland stone as a material: firstly, and best known, the rebuilding of the city after the Great Fire of London, and also the repair and renewal of buildings after the second world war; less acknowledged is the use of Portland stone for memorials following the First and Second World Wars. Christopher Wren rebuilt more than fifty churches as well as St Paul's Cathedral, choosing Portland stone as the primary material. A large landslide had occurred previously in 1636 on the northeast coast of Portland, making the stone workable from the cliff, and six million tons of stone were taken for the rebuilding of London. In 1697 another

landslip damaged two piers beyond repair and delayed delivery of stone for St Pauls. Wren used mainly the Grove quarries on the cliffs on the north east of the island. At the northern edge of the Grove quarries there is a pillar of stone called Nicodemus Knob; at first glance it seems as though it is a unique geological formation, but it is the remainder of a whole section of cliff, a tangible demonstration of the vast volume of stone quarried away.

A compelling image of a landscape of disruption and a world in a state of collapse is the turmoil of the First World War. The battlefields held innumerable casualties, yet early in the war the dead had barely been considered. The formation of the Imperial War Graves Commission[iii] was initiated by Fabian Ware, who had been shocked by the disregard and disorder of the battlefields, and the lack of preparation and provision for the dead. Ware organized burials, and by 1915 his unit had registered 30,000 graves. Ware stopped exhumations and the repatriation of bodies of those whose families could afford to bring them to back to Britain, insisting that all ranks were buried together, equal in death. Equality was taken into consideration in the design of graves: Ware consulted Sir Frederick Kenyon, director of the British Museum, who suggested rows of headstones of uniform design[iv] erected above flattened turf. The simple gravestone looks similar to the ancient Egyptian burial stele, a reference Kenyon was undoubtedly aware of, suggesting an intention that these graves should be marked for time immemorial.

Portland stone was the principal material chosen for the headstones because it was reliable, cheap, and – importantly - British. The flat tablet of white limestone was secular, but could be carved with religious symbols, regimental insignia, rank, name, age, date of death, and next of kin could supply a short commemoration. Carving individual stones was expensive, and a machine, based on the pantograph, was invented in Lancashire. The difficult question of how to commemorate the missing with no known grave was onerous, and resolved through memorials naming the absent dead. The main architects for the memorials and cemeteries were Edwin Lutyens, Reginald Blomfield and Herbert Baker. The typographer Macdonald Gill designed a font used uniformly on all graves and memorials: 500,000 names of the missing are carved into Portland stone - text and stone forming a material nexus tracing over absence.

In designing and building the memorials and cemeteries, the provisional architecture of the battleground was replaced and order exerted over the chaos, disruption and collapse brought about by the first industrialised war[v]. Blomfield designed the ‘Cross of Sacrifice’ made from Portland Stone embedded with a bronze broad-sword; it was available in three sizes from 18’ to 32’ for cemeteries of forty or more, juxtaposing a more prosaic standardization reminiscent of nineteenth century industrialization and planning against the classical references in the memorials. The ‘Stone of Remembrance’, for cemeteries of over 1,000 graves, was designed by Lutyens based on proportions from the Parthenon: it was 12’ long and weighed 8 tons, and had an inscription chosen by Rudyard Kipling from Ecclesiastes: ‘*Their name liveth evermore’*. The altar-like ‘Stone of Remembrance’ made from Portland stone is a weighty piece of the English landmass, a material manifestation of place, of belonging, and redolent of Rupert Brooke’s 1914 poem, *The Soldier*:

> *'If I should die, think only this of me:/ That there's some corner of a foreign field / That is for ever England. There shall be /In that rich earth a richer dust concealed; / A dust whom England bore, shaped, made aware…'*

The 'dust' borne and shaped by England became the stone marking the graves of the dead, and like the body beneath the earth, also originated within the shores of England. The stone gives gravitas to grief and endeavours to fill the psychic and material void of absent bodies. An echo of this can be seen in the holes left behind on Portland from quarrying the stone for the headstones and memorials. A poignant paradox, a double absence, is generated: in order to commemorate the absent body, absence is created by the removal of the stone. This double absence further occurs in the property of limestone as the flesh eating stone, a concept based on the chemical effect on the body observed in early limestone sarcophagi.[vi] By the completion of the WWII cemeteries, the CWGC had bought approximately 120,000 tons of Portland stone, which works out as 100,000 tons of finished stone (Bezzant 1980:211). Distributed in foreign fields around the world, there are between 700,000 and 800,000 grave markers of Portland stone, the disaster of war redressed and ameliorated through the process of mourning and the construction of memorials.

III. PORTLAND: PLACE

> *…he sometimes cast his eye across the Thames to the wharves on the south side, and to that particular one whereat his father's tons of freestone were daily landed from the ketches of the south coast. He could occasionally discern the white blocks lying there, vast cubes so persistently nibbled by his parent from his island rock in the English Channel that it seemed as if in time it would be nibbled all away.* (Hardy 1997:41)

So Thomas Hardy describes Portland stone arriving from what he calls the 'Isle of Slingers' in *The Well-Beloved* 1897. Hardy captures the incremental disappearance and shrinkage of the island, as the stone is carted away piece by piece. There is a sense that the island may collapse in on itself, buried under the rubble left behind, becoming its own cenotaph. Portland is characterized as an uncertain place, always changing as another absence is made.

A distinctive feature of Portland's landscape is the collapsed landslip material from the cliffs, called 'weares'. Brunsden et al noted that '27% of Portland is affected by landslips (*c.* 317 ha out of a total area of *c.*1130 ha) this includes most of the coastal fringe' (Brunsden et al. 1996:214). They add that the earliest record of coastal landslip is 1615; occurring relatively frequently, there have been seventy-two landslips since then. The Portland coast has the most landslides in Britain, causing problems for quarrying, as well as necessitating the demolition and reinstating of many buildings. Distinct horizontal layers of sedimentary rock with vertical joints characterize limestone. This is both advantageous and dangerous for quarrying, as the joints can facilitate the removal of stone, but are also unstable. Brunsden et al outline how the geomorphology of Portland further adds to the propensity for the joints or 'gullies' in the limestone to enlarge and weaken causing cliffs to collapse (Brunsden et al. 1996). The geology of these coastal landslips links with Paul Carter's thoughts on the study of coasts,

> The coast was primarily conceived as an arena of intellectual inquiry; in this form it was the line that enabled the scientist to draw other lines. [...] Its very disarray, the

> mimic resemblance of its productions to the specimens arranged in a *cabinet de curiosités*, […], suggested a museum in the making. (Cosgove ed. 2002:132).

Carter creates an evocative picture of the relationship of science to the delineation of coasts as both real and abstract, that coasts, as edges under constant battering by the sea, elude fixity.

Portland as a site is contradictory: an island that is not an island, there is a paradox in the durability of the stone against the instability of the cliffs. A substantial amount of Portland cannot be built on because it is so disrupted by quarrying and landslips, and the arable strip fields, or 'lawns' remnants of mediaeval agriculture on the south of the island, are of archaeological significance. The five villages fit in the gaps. The landscape of Portland has de facto become the collateral damage of the stone industry. Portland is a terrain of scars; quarrying has irretrievably changed the topography of the island, it is impossible to return it to an undisturbed state. The term 'weares' also applies to layers of debris at the quarries, in the past often dumped over the cliffs, and used as partial infill across the island. The 'weares' look as though something has collapsed, or a disaster has happened, like a battlefield; but the 'weares' are also constructed, the abandoned rubble making unintended, random sculptures, abstract arrangements from the piles of stone.

Portland's strategic location on the English Channel was ideally suited to fortification and maritime use[vii]. Portland is an industrial landscape constructed by labour working to extract the blocks. Quarries are industrialised work places, and perhaps too quotidian for architectural historians who prefer the outcome of the material rather than its source. Stone is a commodity bearing the marks of the labour that worked it; the landscape also bears marks of those tools. For many men in the quarries, the time was measured as the hard labour of a prison sentence where working the stone was punishment and rehabilitation. Portland has two prisons, The Verne[viii], and The Grove; the latter built by inmates in 1848 was regarded by reformers as a model because it offered the chance for prisoners to earn a ticket of leave when they were transported to Australia, their past histories 'annulled' buried under the rubble of the quarries, lost in gaping holes they worked into the landscape (Carter 2004:2). Quarrying is sometimes called winning, each stone is won. There is no doubt quarrying is hard, dangerous work, but perhaps if the quarryman has won, then the landscape is the loser in a battle for a material.

The landscape of the quarries is a built environment constructed from the voids of absent stone, it is the negative space of architecture, but there are no architects or builders present in their construction. The walls of the quarries - scarred by drills, cutters and saws - show the history of quarrying, and the geological strata exposed evoke the levels of a building. At the abandoned and working quarries space is a remainder: a history, it is both the absent material and the material absence, and as such space becomes something; at the quarries space is *made.* This is contrary to the view Kant advances:

> One can never represent that there is no space, although one can very well think that that there are no objects to be encountered in it. It is therefore to be regarded as the condition of the possibility of appearances, not as a determination dependent on them (Kant 1998:158)

Kant suggests that space is the outward appearance of possibility, an idea of imminence, of something impending, that in the future something might come into being; this does not necessarily have to be an

actual form, though this is not absolutely ruled out.

The sheer scale of the space left behind compels the viewer of the quarry to re-imagine the stone that has been taken, to re-build the landscape out of the absent blocks of free stone. Carter suggests methods for 'viewing emptiness' concluding that 'in materialising the laughable offspring of dust, it was pleasurable to prove that things as we see them right here generate expectations of things elsewhere and out of sight…'(Carter 2004:55,58). With reference to the Portland quarries it might be possible to suggest an addition to this, that in looking at these big, dusty voids and debris it is possible to generate images of architecture over the emptiness and to trace in the absent blocks of stone.

CONCLUSION

This inquiry has advanced the idea that the construction of absence, through the spaces left by architecture's uses, can be regarded as architecture and it history. I am drawn to Portland because its fractured, disrupted landscape suggests an image of collapse. Four centuries of quarrying have left Portland's landscape scarred by dislocation and absence and the repeated gnawing away of the stone means the island is in a state of perpetual change, this instability is further demonstrated in the geomorphology of the island where the limestone cliffs can break away causing coastal collapse, an edge that is as uncertain as it is unstable.

The exploration of concepts of absence and collapse have traced a thread of disruption and catastrophe through early theories of natural philosophy, geology, history and architecture to contemporary ideas of place and site. By following Portland stone as a material and a place I have found a means of retrieving the history of architecture and re-inserting it into the specific location of Portland, making productive connections between architecture as form and current thoughts from emerging from place, site or situated writing as architectural thinking.

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