Presenting academic research in an exhibition: the case of the

Portsmouth Block Mills

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I hereby declare that except where specified in appropriate notes, this dissertation is the result of my own independent research.

Katariina Mauranen

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Abstract

Presenting academic research in an exhibition: the case of the Portsmouth Block Mills

This dissertation is based on a poster exhibition of the Portsmouth Block Mills, a steam-powered workshop at Portsmouth Naval Dockyard, designed to produce the wooden pulley blocks used to manage a sailing ship’s rigging. The exhibition is presented as a kind of experiment, intended to discover whether academic history can be communicated to a wide audience in a museum environment. In designing the exhibition I drew upon a range of academic literature. The key aim is to mediate between the often complex scholarly work of academic historians and the potential museums have for attracting, entertaining and educating audiences.

The exhibition portrayed the Block Mills in the wide historical context of war, industrialisation and workforce control. The central concept of the exhibition was based on the notion of the Block Mills as a manifestation of the Panopticon principle of surveillance. The exhibition was mounted in Portsmouth Historic Dockyard in July 2009. An audience survey was used to assess the effectiveness of the display in conveying the scholarly content. A diary was kept throughout to try to give as accurate an account as possible of the creative process of production. By analysing the creative process the dissertation provides a new perspective on exhibition design, thereby addressing a gap in the museological literature. It will thus be relevant to the wider museum community.
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Chapter 1
Introduction

I first encountered the Block Mills while studying for a Master’s degree in Museum Studies at the University of Portsmouth. The story of the Block Mills combined two of my greatest interests: sailing ships and steam engines. For this reason I found the story fascinating, yet I have often been disappointed by the way maritime history is portrayed in museums as separate from land-based history. As a literal and figurative interface between land and the sea, the dockyard defies this division. The Block Mills represent the industrial revolution at the dockyards, and are thus an important emblem of change within this world.

With a background in economic and social history, I was drawn towards the story of dockyard workers, their skills, and how these changed over time. I was interested in the story of the Block Mills as an embodiment of the navy’s industrial revolution: how the work was done, what the Block Mills’ economic impact was on the trade itself and the surrounding communities, and why the navy decided to build the Block Mills at such great cost. However, while the academic literature on the Block Mills addresses some of these issues, the museum exhibitions displaying the surviving machines do not. The block machines are interpreted purely as objects, and displayed with technical details of their operation. While the lack of a more analytical approach to the story of the Block Mills is disappointing, it is not uncommon: museums rarely display the kind of history academics write.
History museums and the academic discipline of history both deal with the past, but in very different ways. They use different media, cater for different audiences and aim for different purposes. Academic history is primarily communicated through lengthy texts for an educated expert audience that reads them for work or study. Museum exhibitions communicate the past through objects and images for a wide audience of diverse educational backgrounds that visit museums as a leisure activity. Whereas both academic historians and museums also communicate through other media, such as lecture series, conferences or museum publications, this study is concerned specifically with academic publications and museum exhibitions. Published text remains the most important means of communicating academic history. Exhibitions not only distinguish museums from other institutions, they are also common to all museums, regardless of resources: small regional or specialist museums may lack the resources necessary for publications for example, but most museums display their collections through exhibitions. Although resources for exhibitions also vary considerably by institution, the aims and audiences are broadly similar.

Academic history seeks to revise established “truths” and create new interpretations about the past, while museums generally use existing knowledge to uphold values and identities in their community. While museums have educational goals, entertainment also plays an important part, as museums compete for audiences with other leisure activities. This is bound to result in a lighter intellectual content in exhibitions. Conversely, scholarly history is often complex and, for a non-expert, difficult to approach. This is an attempt to bridge the gap between these two worlds. I will use academic history to inform an exhibition that will bring academic ideas to a museum audience in an accessible and exciting way. I believe displaying such exhibitions could
widen the access to academic ideas, make more interesting exhibitions, and attract a broad and varied audience.

For this purpose I will use the Block Mills as a case study. Exhibitions currently displaying the surviving machinery do not convey the substantial academic research accomplished on the history of the Block Mills. For my study I have examined a wide range of literature related to the Block Mills from a variety of historical perspectives. I will draw upon this literature to create my exhibition. I interpret the Block Mills as the start of the navy’s industrial revolution, using abstract ideas such as workforce control, and the kind of history that employs social theory and evaluates society as a whole. This is a new approach in museums, where social history is more often confined to a focus on people’s daily lives.

1.1 Aims of the thesis

My principal aim is to combine the research efforts of scholarly history with the potential museums have for attracting, entertaining and educating audiences. The exhibition, which draws upon scholarly research, plays a key role: in the context of the study, it will function as a kind of experiment. The aim is to find out whether academic material can be successfully presented in an exhibition format, and whether the result will interest the public. To achieve these goals I will describe and examine the process of creating the exhibition, and assess its success by displaying it to the public and conducting an audience survey. The feedback will form the results of my experiment.

It is a multi-disciplinary study, for which I will use methods and literature from both history and museology. The outcomes are intended to provide an innovative method of
making museum exhibitions and are intended to be of use to others interested in displaying scholarly research.

More specifically, the aims of my study are:

(I) To present academic history in a museum environment in an accessible way;
(II) To display a new view of the Portsmouth Block Mills;
(III) To describe and analyse the process of creating this exhibition;
(IV) To discover, via visitor feedback, whether the chosen approach appeals to a relevant audience.

Of these the first is the key general aim of the thesis, the second more directly related to the content of the exhibition, and the last two to do with the process and outcome of the whole project. I shall now consider each of these aims in more detail.

(I) Presenting academic history in a museum environment

The differences between academic history and the history depicted in museums make my first goal difficult to achieve. Expressing intangible and often complex academic ideas using the tangible medium of museum exhibits is a difficult mental leap. Academic research and museum exhibitions have very different objectives, and thus ideas shown in exhibitions are fundamentally different to those found in academic history. Target audiences for exhibitions are also much wider in scope than academic audiences. Museum visitors can only be expected to know the basics on any exhibition topic, and texts must be written accordingly. Visitors are unlikely to enjoy an exhibition that makes them feel stupid or uninformed. I believe it is not necessarily the content but the presentation that makes much of academic history inaccessible to a wider audience.
What I mean by academic history in this study is the kind of history written, published and discussed in the context of academic institutions such as universities, academic conferences and peer-reviewed books and journals. Many museums and museum professionals also actively engage in this kind of history for example through publications, research and by offering fellowships such as the Caird Fellowships at the National Maritime Museum. The Arts and Humanities Research Council (AHRC) recognises several large museums such as the National Maritime Museum, the Science Museum, and National Museums Liverpool as Independent Research Organisations.¹ However, such involvement in academic research is mainly confined to larger museums with sufficient staff and resources. One of the criteria to qualify as an AHRC Independent Research Organisation is to employ “a critical mass of around 10 or more staff who have significant experience of research at post-doctoral level in the arts and humanities and whose current position requires them actively to undertake research”.² Many smaller museums do not have the staff and resources to carry out research that aims to contribute to academic debate, and such research is not part of the core function of museums according to the International Council of Museums (ICOM) definition cited below, in section 1.2.

The history seen in museums is public history. It is primarily popular and intended for large audiences. Public history, as Ludmilla Jordanova argues, includes elements of the academic discipline as well as the dissemination of its findings to wide audiences.³ Thus its function is different from that of academic history. This function is also reflected in

¹ http://www.ahrc.ac.uk/FundingOpportunities/Pages/IndependentResearchOrganisations.aspx (Retrieved 29/2/2012).
² Arts and Humanities Research Council (2005): Recognition of Academic Analogues.
the kind of research carried out in museums: Laura Gascoigne points out that museum research is often planned on a piecemeal basis, according to the needs of exhibition projects. Whereas the outcome of an academic research project is a contribution to academic debate, the outcome of museum research is typically an exhibition. This is especially the case in smaller museums such as private or local authority museums, whereas large national museums such as the British Museum or the National Maritime Museum also carry out research unrelated to exhibition projects. At the Maritime Museum of Finland, historical research is usually only carried out when required for exhibitions or care of collections. For the forthcoming exhibition on two 18th century shipwrecks, Spoil of Riches, some archival research was seen as necessary. However, for the permanent exhibition North Star, Southern Cross only existing secondary academic work and staff expertise were used. Resources were not sufficient to carry out original research for such a large exhibition. The emphasis in museum history is on offering a refined version of history that helps visitors to understand the past rather than contributing to debate. A good museum research practice for a small museum should serve this purpose.

As an example of how museum research differs from academic research I present two displays in the Maritime Centre Vellamo in Kotka, Finland. Both depict a space in an “as found” state. The exhibit in the main exhibition of the Maritime Museum of Finland is a cabin from the passenger liner GTS Finnjet, displayed as a cabin cleaner might find it: with unmade beds and discarded beer cans on the floor. The purpose of the display is

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5 Personal communication: Erik Tirkkonen, Curator, the Maritime Museum of Finland, to K. Mäuranen, 16/2/2012; Sari Mäenpää, Keeper, the Maritime Museum of Finland to K. Mäuranen, 16/2/2012.
7 The Maritime Centre Vellamo houses two museums: the Maritime Museum of Finland and the Museum of Kymenlaakso, incorporating the Coast Guard Museum. The library and archive facilities, museum shop and restaurant are shared by the two museums.
to highlight the work of cabin cleaners and it is based on academic research that contributes to a wider debate about women’s work at sea.\textsuperscript{8} The curator who created the display carried out the research herself, prior to joining the museum. The display reflects her academic ideas and deals with much wider issues than many of the surrounding displays in the exhibition. The aim of the original research used for the display was a greater understanding of the historical contexts of women’s work at sea.\textsuperscript{9}

The other example is a reconstruction of a coast guard station displayed in the Finnish Coast Guard Museum. Similarly to the passenger cabin, the room is displayed as if the coast guards working there had just left: with dirty coffee cups on desks and simulated data on screens and notice boards. The aim is a realistic depiction of a coast guard’s work. The display was created as a result of very careful oral history research and documentation.\textsuperscript{10} This research was carried out in order to document the collections and to preserve the intangible heritage of the work of coast guards using the \textit{Samdok} methodology of documenting contemporary history.\textsuperscript{11} Some of the research was conducted specifically for the purpose of creating the display. Thus the aim of what could here be termed museum research was very different from the aim of the academic research used to create the GTS \textit{Finnjet} cabin display.

Museums are mostly visited as a leisure activity, often by people interested in history but not necessarily ready or able to read lengthy academic texts. It is this audience that

\textsuperscript{8} Mauranen, K. and Mäenpää, S. ‘Ships have no gender? The challenges of displaying gender issues in a maritime museum’, unpublished paper at the Annual Conference of the International Association for the History of Transport, Traffic and Mobility, Berlin, October 2011.

\textsuperscript{9} Mauranen and Mäenpää: ‘Ships have no gender?’

\textsuperscript{10} Personal communication: Aaro Sahari, Curator, Coast Guard Museum, to K. Mauranen, December 2011.

could be reached through mediation between museums and academic history. Museums could also benefit from interacting more closely with the academic world. Tapping into the reserves of knowledge available there could help museums make better use of their collections and stage more varied exhibitions. This, in turn, could bring new audiences to museums, or encourage repeat visits. Increasing visitor numbers is an important goal for both grant-aided and ticket-financed museums.

A greater degree of interaction between museums and the academic world could bring academic history to a wider public in a new way. This kind of approach is currently advocated by funding agencies such as the AHRC to encourage a better public understanding of history. This study is an experiment in this type of approach, and will assess whether such an exhibition can be achieved, and whether the target audience will enjoy it. My background in both museums and academic history enables me to take the role of mediating between the two disciplines.

(II) A new view on the Portsmouth Block Mills

The Portsmouth Block Mills were an early form of mass production introduced at Portsmouth dockyard at the beginning of the nineteenth century by Samuel Bentham and Marc Brunel. This was the beginning of a major change in the way work in the yards was organised. I will combine industrial and maritime history to portray the Block Mills as the start of the navy’s industrial revolution. For the content of my exhibition, I draw upon literature about the Block Mills directly, along with other material I consider relevant, such as academic work about industrialisation, Samuel Bentham, and dockyard labour relations. I treat the literature as a primary rather than a secondary source. It is
the raw material that I interpret to create the intellectual content of my exhibition, rather than a body of work I am seeking to criticise or develop.

I have two reasons for choosing to exhibit the Block Mills. Firstly, from the point of view of the experiment I am conducting, they present an interesting case: they are artefacts that have been much researched in academic history and are also currently on display in two very different exhibitions. Thus they offer an interesting view into the diverse approaches taken by museums and academic history, and grounds for comparing these perspectives. This provides a starting point for a new approach, one quite different from the existing exhibitions. Secondly, from the point of view of the exhibition content, the Block Mills represent an interesting moment in history that is often omitted from the grand narratives of both naval history and the history of the industrial revolution. For example the interpretation of the machinery in the *Making the Modern World* gallery at the Science Museum is purely technological rather than historical. My exhibition places the Block Mills in a wider context by using a variety of academic research.

The perspective I have chosen interprets the Block Mills as a manifestation of the Panopticon Principle. The concept of the Panopticon was devised by Samuel Bentham, Inspector General of Naval Works, to control an unskilled workforce through invisible supervision and the introduction of machinery and an early production line at the dockyard. This was also a labour saving measure. The principle is best known for its implementation in a circular prison model by Jeremy Bentham, the Utilitarian philosopher and Samuel’s brother. In displaying the history of the Block Mills and the

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12 I use the term *Science Museum* to refer to the museum site in South Kensington. This museum is part of the *National Museum of Science and Industry*, which functions as an administrative unit covering several sites.
navy’s industrial revolution in this way, I am submitting a perspective that is not usually seen in museums. The story I present is my interpretation of the literature I considered relevant to the Block Mills and to the goals of my project. I am not offering a new interpretation of the Block Mills, the industrial revolution or the dockyard to professional historians. Rather, I am retelling the familiar story of the industrial revolution in terms that will be new to much of the museum-going public. I shall illustrate the industrial revolution through unusual objects by placing the block making machines within the broader context of new regimes of workforce management and global war. I have not seen museums display the kind of history of the industrial revolution that would put control over the workforce in a central position. Nor have I seen the story of industrialisation told through maritime artefacts of any description.13

(III) The exhibition process

In addition to the exhibition itself, the outcome of the study includes suggestions about the process of creating exhibitions based on academic research. These will be based partly on audience feedback received from the exhibition, and partly on my reflections on the creative process. As I will demonstrate later, museological literature has had very little to say on the issue of the analytical processes involved in creating exhibitions. I will attempt to describe my process and methods in a sufficiently general way to be of use to someone else embarking on a similar project. The description will cover the process from the initial idea to the finished display. The aim is systematically to observe the process - in part by keeping a diary of my evolving thoughts - and determine the kind of elements that are particularly important or difficult in conveying academic material to a museum audience.

13 Unlike academic research, it is not possible to search all previous museum exhibitions to verify that this kind of material has never been displayed. I base this claim on my own experience of exhibitions I have visited or read about, and conversations with museum professionals.
(IV) Assessing the appeal of the exhibition

As the aim of the study is to convey the richness of academic work to a wide and varied audience, it is essential to assess whether this goal has been met. For this purpose I will conduct an audience survey among the visitors to my exhibition. The aim is to discover whether the ideas I have displayed have interested the visitors, and whether the display was successful in conveying these ideas to a non-expert audience. The results of the audience survey will indicate whether museum audiences enjoy intellectually challenging displays. This is a crucial concern for museums, as displaying exhibitions that do not appeal to the relevant audiences is counterproductive and wastes resources. A positive audience response would indicate that museums could be braver in displaying challenging content.

1.2 Background to the research question

Since I seek to mediate between the worlds of academic and museum history it will be useful at this point to comment on some of the key differences between the two. This will help the reader to see why their versions of the past are so dissimilar. By “academic” or “scholarly” history I mean the kind of peer reviewed research typically carried out in universities and other research institutions. It is communicated most often through text written for an academic, educated audience. The aim of academic history is to present interpretations of the past and contribute to academic debate. Academic historians expect their views to be challenged by others, even when they are widely considered authorities in their field. In museums, knowledge is disseminated to an audience that visits for entertainment as well as learning. Museums must understand what audiences want to see and cater for these needs, instead of pursuing solely their
own research or collecting interests. Museum visitors are seldom expected to challenge the views presented in exhibitions. It is also fairly unusual to explicitly publicise the names of curators in exhibitions or leaflets. This creates an impression of impartiality and objectivity. Academic research, by contrast, is published by name and taken to be the author’s interpretation rather than an objective truth.

It will also be useful at this point to clarify the terminology I shall employ concerning museums and those who work in them. ICOM defines a museum as “a non-profit making, permanent institution in the service of society and of its development, and open to the public, which acquires, conserves, researches, communicates and exhibits, for purposes of study, education and enjoyment, material evidence of people and their environment”. In this study I use the term “museum” in a more limited way to refer to a narrow range of history museums, and exclude for example natural history and art museums and galleries. I use the term for the whole institution, including the physical surroundings, the collections and the organisation. I refer to people working in museums with the general term “museum professionals”. For museum professionals whose work involves collections and interpretation I will use the term “curator”.

Research in museums often focuses on artefacts. Although archival material, oral history and secondary sources can also be used, the emphasis is typically on material in the museum’s collections. Conversely, while there is no particular obstacle to academic historians using artefacts as source material, they seldom do so, and more typically

concentrate on written sources. These different sources lead to a different perspective on history. Museum history tends to be descriptive and highly accessible, whereas academic history is more analytical, abstract and written in a language intended for the professional historian. Academic history also generally assumes a familiarity with a broad literature in the given field.

The domain of academic research and the quality of work expected are broadly defined by convention. The former is shaped by training and professional debate, the latter by peer review. Professional academic history is a specific discipline that practitioners must be trained in. As Ludmilla Jordanova points out, it is not the only type of history, but one of many. Museum exhibitions are shaped by other criteria. They must be accessible to a wide audience that includes children and adults of a wide range of social and educational backgrounds. The level of understanding and prior knowledge required of academic audiences cannot be expected of a more general readership, and certainly not a museum audience. Although education is an important element in museums, entertainment and accessibility of concept and language often takes precedence in order to increase visitor numbers.

Academic history seeks new knowledge and understanding of the past. This often means posing new questions and challenging prevailing notions. Museums and the heritage profession, by contrast, generally preserve and display what is known and accepted. They often reconstruct history for the purposes of reinforcing shared myths and beliefs and maintaining identities. Unlike academic research, museum history is viewer-centred: it is conveyed through objects from which visitors to some extent

construct their own personal meanings.\textsuperscript{18} Heritage and public history, which is primarily what museums display, are not merely distorted history. They are forms of study of the past in their own right, and serve specific purposes.\textsuperscript{19} Public history includes elements of academic history and its findings, and may interpret these to an audience in a refined format.\textsuperscript{20} The function of heritage is to pass on stories and views of the past that reinforce our identities, both individual and communal. The aim is to commemorate and celebrate the past rather than to challenge and to change it, and to offer a digestible version of history that the target audience is able to understand.\textsuperscript{21}

By celebrating the past I do not mean an absence of criticism in museums, but rather a lack of analysis, relative to academic research. As an example consider the International Slavery Museum in Liverpool. The lives of enslaved people are displayed in some detail, including their African origins, the horrors of the Atlantic crossing, and life on plantations. Abolition and the legacy of slavery are also featured, but why the transatlantic slave trade developed in the first place and how Europeans justified it at the time are not. These are issues that the modern viewer might find difficult to understand, as they are not part of their experience in modern society, but the questions are left unasked and unanswered. In short, the museum commemorates the lives of the slaves and the abolition of slavery, it does not analyse these things. That transatlantic slavery took place is taken for granted rather than explained. This example illustrates the differences of approach between museums and academic history. The aim of the museum is to reassure the visitor and to reaffirm shared beliefs on the subject.

Academic history would seek to understand the causes, taking a more balanced analytical approach and assume a detailed knowledge of early modern social, economic and political history.

One reason why history in museums takes the form it does is that the collections are central to their purpose and displays. The collection defines the museum’s mode of communication and the content of exhibitions. Unlike academic history, the use of text in exhibitions is very limited in terms of length and complexity as it has to be comprehensible to a non-expert audience. Using lengthy text in a museum exhibition risks displaying what is called books on walls, and is likely to bore and exclude the visitor.\textsuperscript{22}

The available resources, practical considerations such as the building and exhibition spaces and the museum’s collections are all important elements that affect exhibition contents. Museums must also adhere to national and local government policies. They must consider school curricula on the one hand, as well as for example the demands of the tourism industry on the other hand.\textsuperscript{23} Sponsors and museum trustees may also have a say in exhibition content. For example the planned food gallery for the Science Museum, described by Sharon Macdonald, faced many problems as soon as the creative planning phase was over and the team of curators tried to convince trustees, other curators and the museum director of the viability of their plans.\textsuperscript{24} Other curators within the museum felt that there were not enough objects in the exhibition, whereas trustees


\textsuperscript{24} Macdonald, S. (2002): Behind the Scenes at the Science Museum, Oxford: Berg, p.84; 133-137; 141-142.
and the director were sceptical about the exhibition concept and the messages it was intended to convey. The structure of the exhibition and the key messages in the brief were refined and modified many times during the process in order to satisfy the team and the external stakeholders. Creating an exhibition involves managing relations with several groups of people, often with conflicting interests.\textsuperscript{25} For example how certain objects should and could be displayed looks very different from the point of view of designers and conservators. Many museums employ the help of academic advisers. In some cases, as in the Science Museum, they may be deeply involved in the exhibition process. In the case of the food gallery, the academic advisers engaged in debates about issues on display that they disagreed on, for example the meaning of a healthy diet.\textsuperscript{26} Other museums, such as the Maritime Museum of Finland, consult external experts for comments on script drafts, relatively late in the process. For the Museum’s main exhibition, \textit{North Star, Southern Cross}, two maritime historians and a historian not specialising in maritime history, read the scripts and commented on historical accuracy and the suitability of the subject matter.\textsuperscript{27} In either case the academic advisers’ views may not form a large part of the final product simply because the process of creating an exhibition is so complex and includes so many different interest groups, but curators felt it important to engage with academics.\textsuperscript{28}

In light of the differences described above, combining academic history with a museum exhibition presents a major challenge. In crafting the intellectual content I will use my academic background in economic and social history, and draw upon the Panopticon theory of control through surveillance. To convey my ideas through the exhibition I will

\textsuperscript{26} Macdonald (2002): \textit{Behind the Scenes at the Science Museum}, p.133. 
\textsuperscript{27} Personal communication: Erik Tirkkonen, to K. Mauranen, 16/2/2012; Sari Mäenpää to K. Mauranen, 16/2/2012. 
\textsuperscript{28} Personal communication: Erik Tirkkonen to K. Mauranen, 16/2/2012.
rely on the expertise derived from a Heritage and Museum Studies MSc course and from the experience I gained working in museums. My project is also supervised by an academic historian and an expert in museum studies. Having interdisciplinary experience and expertise in both academic history and museums gives me a particular insight into how the two disciplines might productively interact. By creating this exhibition, I hope to demonstrate that the obstacles to displaying academic history to a wide public, although considerable, are not insurmountable.

The exhibition content and the process of creating it address specific issues in the public understanding of history. I shall use the next five sub-sections to introduce certain key issues central to my study. The first of these concerns museological literature and the lack of analytical material about exhibition processes. The other four are more directly concerned with the content of my exhibition: I introduce the Portsmouth Block Mills and three specific types of history I wish to display.

1.2.1 Exhibition literature
In this section I give a brief overview of different types of museological literature concerning exhibitions. The literature I found was not particularly useful for my project, and one aim of my study is to address the kind of issues that are currently missing. A vast literature exists on the role of museums in society and on individual exhibitions. I searched this material for guidance in creating the content and display of my exhibition. I found no comprehensive analysis of creating exhibitions that would cover the entire process from initial idea to completion, including the interpretation of history and the
way of expressing these ideas to the public. Particularly, the intellectual process of creating exhibition content is almost completely absent from museological literature, as is creating exhibitions drawing upon academic material. The exhibition process, described in Chapter 4, will address this issue.

The existing literature can usefully be classified into the following four categories:

1) Theoretical literature about museums, their role in society, and the idea of exhibitions as communication between museums and the public, including “new museology” literature

2) Practical literature about conservation, visitor studies and general museum management

3) Design literature, specifically for designers rather than curators

4) Case studies of individual museums and exhibitions

As these categories demonstrate, literature is either very general or very specific in ways that are not especially helpful to my project. The general literature (categories 1-3) looks at museums from a wide theoretic or practical perspective, observing either their role in society or practical issues in museum management. It does not offer solutions to specific exhibition questions. The specific literature (category 4) does not generalise, but mostly examines individual cases. What is missing is an analytical look at the creative processes involved in exhibition making. My study will address this issue by examining the process I went through to create my experimental exhibition. Although I am looking only at one case and it is thus necessarily a case study, my aim is to analyse the process in a good deal more detail than the existing literature has done. Since I

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conducted each part of the process myself (rather than dividing tasks among a team) I have an overall view of the whole project as well as detailed knowledge of each separate part. The scope of this study is not wide enough to develop a general theory of exhibitions, and this is not my aim. What I hope to achieve is a structured view of one example of the creative process.

1.2.2 The Portsmouth Block Mills – an introduction

Since the Block Mills are central to my study, it will be helpful to the reader if I here give a brief introduction to their purpose, origin and current state. The Block Mills were a workshop for producing pulley blocks for naval vessels in Portsmouth Dockyard. The navy needed approximately 100,000 blocks every year, and they were mass-produced in a flow sequence in the Block Mills using machines powered by the navy’s first steam engine. Until the Block Mills were built, blocks were made by contractors who relied on semi-mechanised processes and handcrafts. In the Block Mills, the task of making a block was divided into phases with a single-purpose machine for each phase. The machines were housed in the same building with workshops for making other small wooden objects, but the building quickly became known as the Block Mills, after its most famous occupants. In this study I will use the term *Block Mills* to cover both the building and the workshops, including the machinery and lines of production. *Block machines or block making machines* will refer to the machinery alone, and *Block Mills building* to the building alone. The nature and purpose of the machines is discussed further in Chapter 2.

The Block Mills building is still standing in Portsmouth Dockyard, managed by Defence Estates. Although it has been restored and is now structurally sound, there is
only very limited public access. It is currently not included in the heritage area of Portsmouth Historic Dockyard, although it is visible beyond the boundary and open for tours on a limited basis. Some of the original block making machines have been preserved in museums and are on display in two exhibitions in London and Portsmouth.

1.2.3 Maritime history and land-based history

A secondary objective of my exhibition is to portray a new view of maritime history to the public. In museums, maritime history is typically displayed as the history of naval warfare, trade, or exploration of distant places. The stories start with the ships already at sea. Dockyards, when displayed at all, seem to have little to do with the events that happen at sea or land and are typically portrayed almost as a separate world. The focus is usually on the age of sail and wooden shipbuilding, and the dockyard is seen as a static world of ancient handcrafts. Change is displayed in the form of the transition from wood to metal and sail to steam. Portrayed like this, the dockyard appears a stagnant backwater rather than a vibrant community busy constructing and maintaining the foundation of seafaring and at the forefront of technological and management innovation.

As David Edgerton has argued, maintenance work is seen as neither glamorous nor innovative.\(^{30}\) It is thus not surprising that dockyards should suffer in comparison with the glorious battles or exploration voyages when it comes to museum displays. However, this separation of dockyards from seafaring enforces a more general trend in museums, the disconnection of land and sea. Perhaps an extreme example of this is the Science Museum’s Shipping Gallery where the interpretation focuses narrowly on

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individual ships, and is completely detached from the broader themes of the Museum. This is not particularly helpful in interpreting maritime history, as the maritime world is often unfamiliar to the visitor. This may make maritime issues difficult to understand and thus unlikely to generate much interest.

In academic history, the separation between land and sea is far less strict: Yrjö Kaukiainen has focused on the connections of land and sea-based life for example in his study of wreckers in the Finnish archipelago, or by focusing on the maritime economy as a national and international phenomenon. Marcus Rediker and Peter Linebaugh have also drawn interesting parallels between land-based and seaborne society, observing their similarities rather than differences. The image I wish to present of maritime history is much closer to this broad vision of ships, docks, war and the maritime economy. Dockyards stand quite literally at the meeting point of land and the sea. In my study they represent a natural connection between these two worlds.

1.2.4 Industrialisation

In a similar way, the history of industrialisation in museums tends to focus on the industries traditionally associated with the industrial revolution: iron, coal and cotton. Dockyards were the largest industrial enterprises in the world at the end of the eighteenth century, but they are usually not included in the classic stories of the industrial revolution. Shipbuilding is a form of centralised production requiring large groups to work together, and thus is interesting from the perspective of the history of industry. The role of the navy in the industrial revolution is more commonly seen as the

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protector of trade, or at most a consumer of industrial produce, than as an active participant. The industrial revolution is also typically portrayed from the perspective of private industry rather than state industry such as dockyards. The story of the Block Mills shows the navy’s own industrial revolution in the form of the reorganisation of the workforce, industrial time and work discipline, and the introduction of steam power and mass production into the dockyard.

The way museums present industrialisation is to me reminiscent of a schoolchild’s view quoted by T. S. Ashton: “About 1760, a wave of gadgets swept over England”. These “gadgets” are what museums have in their collections, and therefore put on display. My view of the industrial revolution is different, and my exhibition will reflect this. It will advocate an economic and social history approach, focusing on workers and work practices rather than machinery. I believe this will provide an easier entry point for a non-expert visitor than would displaying technical details.

1.2.5 Social history

In museums social history typically means putting a human face on a story, and often includes themes like family life, leisure, and living standards. The focus is on daily activities and interaction between people, and these are shown through items like household goods or clothing. For example, the Amuri Museum of Workers’ Housing in Tampere, displaying interiors of working class homes from various eras, is considered a social history museum. This kind of social history is particularly popular in local history museums, where the emphasis is on reliving a local past. Maritime museums, might also

display the lives of sailors, as is done in the *Sailing Navy* gallery in the Royal Naval Museum.\(^{35}\)

My aim is to display an academic approach to social history. In this kind of history the emphasis is on society and social structures, rather than individual stories. This is not to say that individuals and communities are not examined. For example, in *Montaillou*, his study of life in a Medieval French village, Emmanuel Le Roy Ladurie describes in detail the beliefs, practices and social interaction of the villagers, as seen through Inquisition records.\(^{36}\) However, in academic social history of this kind the emphasis is less on facts and detail, and more on the causes and consequences of events or phenomena. Academic social history may use social theories and models in a historical context, or indeed formulate them. This analytical side of history is what I will attempt to portray in my exhibition on the Portsmouth Block Mills.

### 1.3 Methods

Despite my broad concerns with the portrayal of maritime, industrial and social history, the central focus of the study is the exhibition itself, the process by which it was constructed and the audience response. I will here briefly outline the methods I used.

To create the content of the exhibition I drew upon the kind of academic literature discussed above, broadly relevant to the Block Mills and themes I found important to convey. The key idea of the exhibition was the notion put forward in the works of William Ashworth and Peter Linebaugh that connected Bentham’s dockyard reforms

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\(^{35}\) I will use the name *Royal Naval Museum* to refer to the museum in Portsmouth Historic Dockyard. It is now part of the *National Museum of the Royal Navy*, which also includes other sites in Portsmouth and elsewhere.

with the Panopticon idea of surveillance and control.\textsuperscript{37} I therefore named the exhibition *Portsmouth Panopticon*. I expressed this key concept and other ideas in the exhibition using a variety of techniques, some of which were derived from my museum experience, others devised specifically for the purpose of this exhibition. Chapter 4 contains an account of this process, based on my self-reflection and the journal I kept during the project. The final exhibition was displayed at Portsmouth Historic Dockyard in July 2009. I recorded visitors’ views through a questionnaire survey and Focus Group interviews with relevant groups of experts and representatives of potential audience groups, namely students and schoolchildren.

1.4 A serious setback

At a crucial moment in the process, in 2008, as I had completed a message document to act as a basis for the script and was ready to start choosing objects for display, my supervisor from the Science Museum, Dr Dan Albert, left his post. As a consequence the collaboration with the Museum unravelled, and I was left without a collection around which to base my exhibition. I was also deprived of an important mentor, with expertise in both maritime history and the museum world. The consequences to my project were serious: I had to find a new supervisor to replace Dr Albert, and reconsider the entire exhibition plan, as the circumstances for display had changed dramatically. The original plan was to use the Science Museum’s collections and stage the exhibition in the Museum’s premises. This was no longer possible. My access to collections for research was also restricted to objects that had been photographed, unless I was willing to pay for photography and wait several months for the museum photographer to be available. It was clear I had to change my approach.

My options at this stage were few. I could find a supervisor and a collection from another museum. This could mean starting from scratch with the exhibition, or at least revising the content significantly to fit the available collections. I could also continue with the same exhibition plan using images instead of objects. This would mean a very different approach to expressing the content, but it would solve the practical problem of collections and space: a poster exhibition is easier to accommodate as a secure location is not necessary. In this case I would not need access to object collections, and my new supervisor could come from outside the museum world. I found a new supervisor in Dr Ann Coats at the University of Portsmouth. Her expertise in the history of Portsmouth Dockyard and experience in teaching Heritage and Museum Studies made her the ideal choice. As her affiliation is to a university rather than a museum, it was apparent I would have to use images instead of objects. It was thus decided to create a poster exhibition instead of one with three-dimensional objects.

In order to realise the exhibition with images instead of objects, the exhibition plan had to be revised. For this purpose the content and messages were further refined. The aim was to maintain the original ideas and convey them as effectively as possible in the changed circumstances. My new supervisor also brought different views into the project. The process of finding a supervisor and familiarising Dr Coats with the project took almost a year. During this time there was very little I could do to advance the exhibition, which was a considerable setback to the project.
1.5 Structure of the study

My study begins with an analysis of two exhibitions displaying the block making machinery, one at the Science Museum, the other at Portsmouth Historic Dockyard. This analysis is intended to act as the equivalent of a literature review. My study is multidisciplinary and it is not intended as a critique of the secondary sources I am employing. I am intending to design and build a new kind of exhibition and it therefore seemed appropriate to use a critique of extant exhibitions of the Block Mills as a starting point. By looking at what I regard as some of the shortcomings of these exhibitions, the need for and originality of my study, will be made clearer.

In Chapter 3, I discuss the academic history material I drew upon for the content of my exhibition, drawing attention to the aspects I found most promising. The material is drawn from maritime, economic, social and industrial history, and is the starting point for building the content of my exhibition. Chapter 4 describes the experiment of constructing the exhibition: the process I followed from the initial vision to the final exhibition seen by the public. I examine, for example, how the messages were formulated and how I finally expressed these in a series of posters. I will also address issues such as collaboration with different organisations, and the building of the exhibition itself. The description of the creative process is an important part of the original contribution of my thesis. Images of the posters are included in the chapter and the script of the exhibition is reproduced in Appendix A.

Chapter 5 presents the results of the audience survey. The views of the audience are the most important gauge of an exhibition’s success, as it is for the visiting public that all exhibitions are made. This chapter will therefore measure the success of my experiment.
The type of audience I expected to visit the exhibition reflected its location within a large heritage attraction, Portsmouth Historic Dockyard. The results and the visitor numbers may have been different, had the exhibition been staged in a local authority museum or a large national museum. Finally, in Chapter 6, I draw my general conclusions. I will focus particularly on my experience of making the exhibition, as laid out in Chapter 4, and the audience feedback discussed in Chapter 5. The conclusions are intended to provide new insight into the process of exhibition making, as well as the suitability of museum exhibitions for displaying academic research.
In this chapter I assess two exhibitions currently displaying the Portsmouth block making machines. The aim is to present the context of my research question, and the chapter thus functions as a kind of literature review. There is virtually no literature on displaying academic research in museums, and my work represents a new way of looking at museum exhibitions and public access to scholarly history. The two exhibitions displaying the focal objects of my exhibition thus represent the most relevant medium to the outcome of my study. I have chosen to present my research in this way because my work is very different from traditional history theses, and thus traditional methods and formats do not always apply.

I consider the two exhibitions as published media and as texts in their own right. My aim is to examine the kind of history employed in these exhibitions, and how the Portsmouth Block Mills are portrayed. The history of the Block Mills is rich and complex and, as will be seen in Chapter 3, subject to a substantial body of research. The purpose of this chapter is to evaluate the interpretation of the surviving machinery in the existing exhibitions, and to show where my work will fit in this context.

The two exhibitions I examine display almost all of the surviving block making machines, and are natural choices for comparison. I could also have included

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exhibitions displaying other material relevant to dockyard or labour history, such as the Museum of London Docklands or the *Wooden Walls of England* exhibition at Chatham Historic Dockyard. The exhibitions I have chosen, *Making the Modern World* and *Dockyard Apprentice*, share a direct connection to my proposed exhibition through the block making machinery. They also represent very different perspectives to history and to the block machines, thus offering an interesting contrast and an insight to representations of history in museums. Limiting my examples to two allows me to look at each of them in more detail than would be possible with more exhibitions.

The different approaches to history and to the Block Mills employed in these exhibitions demonstrate how the same artefacts can be interpreted and displayed in a variety of ways, even where the objects are as thoroughly researched and unique as the Portsmouth block making machines. The chosen perspective and the story included in the interpretation are important choices made by the museum and the curators involved. Like other published media, museum exhibitions represent the views of individuals and organisations, but unlike in academic text for example, this is usually not made obvious to the audience. Comparing these two very different exhibitions can shed some light on the way this kind of history is seen in museums.

The Block Mills combine elements from two of the most important historical developments of their era, the Napoleonic Wars and the industrial revolution. They also represent an intersection between different branches of history. They were the first instance of factory style production in naval shipbuilding and so mark the beginning of the navy’s industrialisation, and an important phase in naval and dockyard history. The

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39 Examples of exhibitions that do not state their aims and agendas explicitly are the *Shipping* gallery at the Science Museum, the galleries of the Maritime Museum of Finland, and the *Dockyard Apprentice* exhibition, to name just a few.
implementation of factory style time and work discipline advocated by Samuel Bentham is particularly significant in this context. The Block Mills can be seen as an early form of mass production, and they represent an important development in industrial history and the history of technology.

These themes are similar to the ones I intend to display in my exhibition, and in the assessment that follows I will evaluate whether they are addressed in the existing exhibitions. Before creating an exhibition about the Block Mills, I wish to find out how they have been portrayed within these two very different contexts, and what kind of history is employed in their interpretation.

I begin by explaining what the Portsmouth Block Mills are and what they were used for, before examining the exhibitions displaying the surviving machinery. I evaluate each exhibition in turn, starting with the Science Museum’s *Making the Modern World*, and followed by the *Dockyard Apprentice* in Portsmouth Historic Dockyard. I first evaluate each the exhibition as a whole, looking at the values and messages conveyed, the surroundings and their intellectual content, and then focus on the depiction of the Block Mills.

2.1 The nature and purpose of the Portsmouth Block Mills

“The Block Mills” was the name given to a group of workshops at Portsmouth Dockyard. The building became known by this name because of its most famous occupants, the block making machines. The block making machines were a set of steam powered machine tools designed by Marc Brunel and built by Henry Maudsley for making pulley blocks for the navy’s ships. A large ship of the line such as HMS *Victory*
needed almost 1400 blocks for rigging and guns alone.\textsuperscript{40} The navy needed some 100,000 pulley blocks every year.

A block, or pulley block, is a wheel, or pulley, set inside a piece of wood (these days usually metal or plastic). With ropes running through them, blocks are used to gain a mechanical advantage when lifting or pulling heavy loads. Blocks are a crucial part of a sailing vessel’s rigging. They augment the manual manoeuvring of sails and consequently the steering of the vessel. They are also used to restrict the recoil of guns and to haul them back into place after loading and firing, and for heavy lifting, for example when handling anchors or boats. Blocks wear out and break, so ships also carried spares.

Figure 2.1: Blocks, or pulley blocks, are essential parts of a sailing ship’s rigging. They are also used for a variety of other purposes on board. (Image credit: Science and Society Picture Library.)

The block making machines were fitted with stops and guides, so they could be operated by unskilled workers rather than skilled craftsmen. Each of the 45 machines performed one specific task, so there was no need to adjust settings between pieces. The process of making a block was divided into 22 phases, and each phase was carried out using a purpose-built machine. Within the Block Mills, the machines were set in sequence to form a line of production to achieve maximum efficiency. Historians disagree over whether the correct term for this is mass production or flow production,
although neither was used at the time. For simplicity, I will call it mass production, defined as producing large quantities of articles quickly, cheaply and with minimum skill.

Until the Block Mills started production in 1805, blocks had been supplied by private contractors who used simple machinery in workshops outside the yards. The largest suppliers, the Taylors (father and son) of Southampton and Dunsterville of Plymouth, had a virtual monopoly over production. They also controlled the supply of *lignum vitae*, a tropical hardwood used for the pulleys. The establishment of the Block Mills and the ending of the Taylors’ contract brought block production under direct Admiralty control.

The machines are remarkable in many ways. They were built with iron frames instead of wooden ones, which was the usual method at the time, making the block machines an important step in the development of machine tools. They were also powered by the navy’s first steam engine, and were thus a first step towards mechanised ship construction in naval dockyards. As a product of collaboration between famous individuals like Marc Brunel, Henry Maudsley and Samuel Bentham, the machines also hold something of a celebrity status among early nineteenth-century technology.

The Block Mills were more than the machines alone, however. The mode of production in the Block Mills was based on a new vision of work, advocated by Samuel Bentham, the first and only Inspector General of Naval Works. His task was to improve efficiency.

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at the yards during the war against France. His vision was to transform the dockyard from a shared workspace for a range of parallel trades into an integrated mechanism for producing ships. The reorganisation of the workforce and the introduction of factory style work discipline into the artisan world of the dockyard are important elements in the story of the Block Mills.

2.2 The Block Mills on display

Blockmaking was gradually discontinued from the 1930s onwards, ceasing in the Block Mills building in the 1960s but continuing in Boathouse 6 until the 1980s. Some of the machines were collected by two museums. These surviving machines are displayed in two very different exhibitions, Making the Modern World in the Science Museum in London and the Dockyard Apprentice in Portsmouth Historic Dockyard. I will assess these two exhibitions according to three factors: their objectives, display, and scholarship.

By objectives I mean the key messages conveyed through the exhibitions. I examine the story and the point of view presented in each exhibition, and who the exhibition is aimed at. In the case of the block machines I will examine the purpose of displaying them. I will base my assessment on the material available to the public instead of going behind the scenes and interviewing curators, for example. I wish to treat the exhibition as a published medium that should not require further explanation. Just as books or articles, museum exhibitions are created for a reason, aimed at an audience and are the

work of one or more persons.\textsuperscript{46} Sometimes, as in the case of \textit{Making the Modern World}, there is a clear statement of purpose in the exhibition. However, this is not always the case and the identities and possible agendas of the curators are usually not made explicit to visitors. In the \textit{Dockyard Apprentice} I will base my assessment purely on the content of the displays, as there is no statement of purpose.

Assessing \textit{display}, I look at how the objectives are met and the messages conveyed in the physical exhibition space. I examine the choice of objects, how they are arranged, and what messages these choices convey. I also examine the interpretational material available in the exhibition and how this is presented. How an exhibition is arranged and what interpretation is provided is by no means self-evident, and it conveys important messages about the values upheld by the museum and the curators. This point will be illustrated by the contrast between the two exhibitions.

Finally, by \textit{scholarship} I mean the intellectual content of the exhibition. This includes the perspective to history presented in the exhibition and the context in which the storyline is placed. In this part I examine the content of the interpretation rather than its form. I will also assess learning outcomes and what is expected of the public entering the gallery. In the case of the block machines I will evaluate what a visitor entering the exhibition without any prior knowledge about the Block Mills might learn during their visit. What I find more interesting than the mere informative content of displays, is the often implicit view of history presented through the exhibitions. Most museum visitors are likely to take the exhibition at face value, and thus unlike in academic text for example, the curator’s views will go unchallenged. It is therefore important to assess

\textsuperscript{46} Wilk and Humphrey (eds.) (2004): \textit{Creating the British Galleries at the V&A}.\vspace{1cm}
what these views are. I will first examine each exhibition as a whole, and then look at the block making machines within them.

2.3 Making the Modern World

2.3.1 Objectives

The block making machines in the Science Museum’s collections are displayed in *Making the Modern World*, the museum’s flagship gallery. It contains a vast array of the most notable objects from the museum’s collections, including icons like Stephenson’s *Rocket*, and the *Apollo 10* space capsule. These are arranged in a style I call “technology hall of fame”, depicting the evolution of technology from 1750 to 2000. Located in a large exhibition hall on the ground floor, the exhibition is clearly aimed at a wide audience. The objectives stated at the entrance to the gallery read as follows:

> Our history is embedded in the things we have invented, made and used. Curators spent three years searching the Science Museum collections to assemble over 2000 objects on display in this gallery. You’ll find objects from every area of life, the home, street, office and railway, the hospital and lab. Many illustrate new departures in science and technology – events, objects and ideas that have helped to shape our world.

The gallery offers an overview of the development of technology, covering a wide range of material culture over a 250-year period. The main gallery is divided in three sections: *Historical themes*, *Icons* and *Technology in everyday life*. The exhibition takes a classic grand narrative approach, telling the story of the evolution of technology from
the industrial revolution until the present. This wide scope would work very well in a book or a television programme, but in an exhibition where the visitor is on the level of the individual object it is often difficult to see the bigger picture. Walking through the gallery, visitors will inevitably concentrate on some objects and ignore others, simply because there is so much to see. The overall picture visitors get from the gallery depends on which objects they choose to examine more closely. It is difficult to grasp the entire wide-ranging narrative because of the scale and number of objects in the gallery. The stated aim of the exhibition is ambitious: to show how the material culture around us has changed over the last 250 years. Unfortunately the medium of museum objects does not lend itself easily to such wide themes. What the gallery conveys is that material culture has changed, but next to nothing is said about how or why these changes occurred.

The objects are arranged chronologically with an emphasis on icons, and the narrative implies a progressivist view of the history of technology: the message appears to be that technology has made things better and will continue to do so. The visitor who enters the gallery from the beginning of the chronology, will first see the sturdy cast iron objects, then the old fashioned cars and the shiny aeroplanes suspended from the ceiling, before moving on to the Apollo 10 space capsule and other space age exhibits. The visitor is given an impression of increasing technological sophistication and ever greater speed and larger scale, moving from trains to aeroplanes and finally spacecraft. The implication is that better technology is irrevocably coupled with increasing prosperity. This perception is emphasised by the minimal interpretation of the objects, as the visitor may not be familiar with the older artefacts. This not only mystifies the older

technology, but makes it appear less significant in comparison with the more familiar inventions, like cars and aeroplanes, which are commonly known to be of importance and to have an impact on our lives. It also leads to a view of the inevitability of technological progress, rather than it being driven by the largely invisible interests of industry, capital or state, for example.

The emphasis in *Making the Modern World* is very firmly on the objects, with an intention to showcase the highlights of the collections. The gallery is full of objects that are the first of their kind. In fact there are so many of these that exhibit fatigue is difficult to avoid. The display of the objects is designed to impress visitors with their beauty, scale or complexity, rather than to engage them to interact with specific objects. There is relatively little interpretation, and the gallery works by evoking feelings and memories rather than producing a more analytical approach. For educational purposes there is a website, designed for A-level and vocational students, with more information on the objects. This is separate from the museum website, and not accessible from the gallery.

As an idea, a gallery that showcases the museum’s most valued treasures while giving an overview of the development of technology in the last 250 years is ambitious. However, it is difficult to do justice to individual artefacts in a gallery containing over 2000 objects. It is also difficult to tell a story with such a wide scope, and keep the visitor from losing the overall vision in the details of the gallery. The unfortunate result seems to be a gallery that lifts technology on a pedestal, where it is to be admired but not understood, fostering a deterministic view of technological progress.

2.3.2 Display

The main floor of the gallery is divided into three sections: *Icons* runs down the middle of the gallery, *Historical Themes* to the left of the main entrance, and *Technology in Everyday Life* to the right. There is also a display of models on the mezzanine floor. The artefacts are arranged in chronological order, starting with older objects at the east end of the gallery (see figure 2.3). There are dates carved to the floor, but they are so discreet that it is easy to pass them by.

The gallery is arranged so that the visitor who enters from the east end, where the chronology begins, sees 250 years of technological progress laid out before them, looking past the sturdy eighteenth-century cast iron engines towards increasingly modern things. Figure 2.2 shows the view from the east entrance, past the *Rocket* (1829), the Ford Model T (1916), to the Lockheed Electra (1935) aeroplane suspended from the ceiling (Figure 2.3 shows the floor plan of the gallery for clarity). This illustrates my earlier point about museums being collections led, as the main purpose of the gallery is to display as many of the museum’s treasures as possible.

The emphasis of the display is on aesthetics, and the artefacts are arranged more like sculptures than technology. They are there to impress and amaze, rather than to inform or to engage. This kind of display style is not new. Scratching the surface, the ideas prominent in the arrangement of cabinets of curiosities are still visible. These sixteenth- and seventeenth-century private collections of rare and valuable objects were a
precursor of the modern museum. Their idea was to show various wonderful objects to impress those privileged enough to see them. A similar impression is easy to get in *Making the Modern World*. The visitor can get right up close to the Rocket for example, and experience its size and beauty, but can leave the exhibition without having learned anything else about the engine. Displaying the museum’s most iconic objects in a gallery that provides so little historical context obscures their individual importance, the circumstances in which they were made and used, and the stories that make these objects significant in the first place.

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Figure 2.2: View from the east entrance to *Making the Modern World*. Stephenson’s *Rocket* (1829) on the right, the Lockheed Electra (1935) and the Ford Model T (1916) in the centre background.
Figure 2.3: Floor plan of *Making the Modern World*. The block making machines are not shown in the plan: they are in the bottom right corner, by the *Puffing Billy*. (Image credit: Science Museum.)

The wide scope of the gallery accounts partly for the relatively superficial interpretation of individual objects. It would be impossible to include detailed socio-economic context for each of the two thousand plus artefacts. The chosen style of display favours impressions over contextual information. It seems some of the interpretation was added only after the gallery opened.\(^{51}\) These include the light boxes highlighting key artefacts, seen in Figure 2.4. These are on a suitable level for wheelchair users and rather uncomfortable to read for anyone else, but the contents of these boxes make it easier for the visitor to place the objects in historical context. There are more traditional labels relating to the objects in the gallery as well. As Figure 2.5 demonstrates, these are quite small and, considering they contain a fair amount of text, relatively uninformative. They provide facts about the object itself, rather than contextual information that would help

\(^{51}\) Personal communication: Dr Dan Albert to K. Mauanen.
tie the object in with the overarching theme of the gallery. In this respect the yellow boxes are more helpful for navigating the story of evolving technology.

Figure 2.4: Interpretative boxes like this are provided for key artefacts. They put the objects in historical context, but are quite uncomfortable to read, being so low.
Figure 2.5: A label for the block making machines. The text is quite long and the print small. These are common flaws in museums.

The display of the gallery relies on the Gestalt principle, taking in the whole, rather than its parts. The idea is that seeing the objects will evoke thoughts, feelings and memories rather than producing a more intellectual response. This works well with familiar objects, like a wall full of small cars, or domestic technology the visitor may recognise from their childhood. Even icons like the Rocket or the Ford Model T may be familiar from school textbooks or television. However, when it comes to older and less recognisable technology, the theory falls apart as there is no connection with the visitor’s own experience. With unfamiliar objects this kind of display technique may actually have an alienating effect, rather than encouraging a personal connection to the

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artefact. As the interpretation is not always well linked to an overall storyline, artefacts may seem isolated and almost arbitrary. In other words, it is not always made clear why these objects are on display. This is a problem, because most visitors do not view the gallery as a coherent whole, but concentrate on a few objects, and so might miss the overall picture the curators intended them to see. This undermines the storyline of the exhibition and reduces it to a cavalcade of treasures.

2.3.3 Scholarship

Although the gallery is intended to be accessible to all, the chosen display technique makes some parts of it, particularly those displaying nineteenth-century technology such as the block machines somewhat difficult to grasp without considerable prior knowledge. I will come back to this issue in more detail in connection with the block machines. This idea, that technology is something incomprehensible, almost magical, is heightened by the segregation of “technology” and “life”. A third of the gallery is dedicated to a section called Technology in Everyday Life, which implies that all the other technology in the gallery has nothing to do with everyday life, but can only be understood by scientists or engineers.

The aesthetic display of machinery, together with the relative lack of contextual information about unfamiliar objects mystifies technology instead of explaining it. This easily leads to the assumption that the progress displayed in the gallery is somehow natural and outside human control, as the processes and interests behind the development of technology are not explained. Such a deterministic view of the history

of technology may not be intentional, but it is easy to read it in *Making the Modern World*. This is what Merritt Roe Smith terms a “hard view” of technological determinism: one where technology is seen as an autonomous force of its own, with no reference to society.\(^{56}\) The linear chronology suggests an Whig view of progress: that things have been getting better since the industrial revolution, and will continue to do so.\(^{57}\) As no alternative is suggested, the onward march of technology seems inevitable. The downsides of technology are only displayed in the rather special case of the atomic bomb, where a consensus exists on its horrific effects. Omitting the people who make decisions to use or build technologies, or whose lives are changed by it, reinforces the idea that technology is self-guiding.

The outlook of the exhibition is towards the future, and the past is seen as a series of steppingstones leading to the present. The old artefacts are revered, but at the same time seen as outmoded, as newer and better ones take their place. These are, as the title of the exhibition suggests, the things that made the modern world. They signify human ingenuity and triumph over nature, in the sense the great exhibitions of the nineteenth century did.\(^{58}\) This techno-optimism sits well in a major exhibition in a national museum displaying the achievements of science and technology. The implication is that things will continue to improve beyond the timescale of the exhibition, thanks to technology.

The majority of the people featured in the displays are Western, white, middle class and male. Only the most famous names are included, and workers are left out entirely. This


underlines the segregation of life and technology, as it is implied that these machines had no impact on the working lives of ordinary people. This seems to me a wasted opportunity to represent how technology actually has made the modern world. For example, Ray Batchelor has argued that a simple electric kettle touches the lives of thousands, starting from the miners who extracted the material from which it was made.\(^5\) I would argue that one of the greatest changes technology has made in the world since the industrial revolution is the transformation of work and the working lives of people.\(^6\) This aspect does not feature in the exhibition.

It could be said that *Making the Modern World* takes a top-down approach to history, portraying great men and their inventions that made the world what it is. This approach is quite common particularly in museums dealing with issues connected to national interests, such as military or maritime history, or science and technology. These museums were often founded to foster national pride, sometimes as part of a wider effort of nation-building. A certain degree of hero-worship of national icons and institutions remains.\(^6\)

My final point about the interpretation of history seen in *Making the Modern World*, is that it is an internalist view of the history of technology. The story of the evolution of technology is seen from the point of view of technology itself, rather than from that of society in general. This is underlined by the object-centred approach taken in the narrative. The starting point for the exhibition, as stated in the panel quoted above, has been the collections and the treasures held in the Science Museum. The objects are

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central to how the narrative is presented. However, paradoxically the stories of the objects are not prominent in the interpretation. Instead, the objects are used as props in telling the story of technological achievement.

2.4 The block making machines on display in *Making the Modern World*

2.4.1 Objectives

The block machines are displayed in *Making the Modern World* as part of the section on production. Their role is interpreted as the first machines of mass production (see figure 2.10, below) and they are surrounded by other artefacts related to making things. This part of the exhibition is at the very beginning of the chronology as these are some of the oldest artefacts in the gallery. They are shown as the beginning of the technological quest that has made our world what it is today. Most other artefacts in the gallery are made by machine, so it is fitting from the point of view of the narrative that the interpretation of the block machines concentrates almost entirely on the aspect of their being machines for making things.

The significance of the block machines is implied by their inclusion in this gallery, and they are indicated as a key artefact. The machines are connected with the famous names of Brunel and Bentham, and this is not forgotten in the interpretation. They also represent mass production at a time before the concept was developed in America, in a spirit of “we did it first”, which is in line with my earlier point about national pride. However, for the most part the motivation of having these machines in the exhibition seems to be their place in the greater scheme of things, as represented by the storyline of the exhibition as a whole. They are here because they were machines for mass
producing things. What these things actually were is not explained at all. This leaves out a major part of the block machines’ history. Although their function and significance as mass production machinery remains, without the product they made the machines appear abstract and disconnected which is likely to alienate visitors. If the machines were for making buckets for example, an explanation of the product could be left out, but as it is, most visitors are probably not familiar with blocks as they are not part of their everyday experience. The object itself and its use are fairly easy to understand, and would require only a short explanation, but leaving it out is an important omission. Because of the way the gallery is constructed, important contextual information is sacrificed for the overall story, and the museum’s treasures are reduced to a collection of curiosities.

Another missed opportunity in the gallery is expanding the context from the immediate function of the artefacts on display to their wider connections in society, although this is what the name of the gallery would imply is the aim. For example, the production of blocks could easily be linked to national heroes of the same period, most notably Admiral Lord Nelson, who visited the Block Mills on the day he sailed for the battle of Trafalgar. Displaying block production with Britain’s success as a naval power could expand the story beyond technology as well as boost national pride.\textsuperscript{62} It would also serve to connect the technology with the world it has supposedly made, in a more concrete way.

\textsuperscript{62} For example Coad makes this link in Coad (2005): The Portsmouth Block Mills.
2.4.2 Display

As machinery of the early nineteenth century, the block machines are displayed at the beginning of the gallery timeline, to the left of the east entrance. They are a little out of the way, almost hidden behind the *Puffing Billy*, as Figure 2.6 illustrates. The light is a little dim in that corner of the exhibition, which adds to the impression of the machines being tucked away. Visitors tend to head towards the better lit parts in the centre of the gallery.63

![Image of machinery in a museum exhibit]

**Figure 2.6**: Some of the machinery is just visible between the pillar and the *Puffing Billy* engine. In the foreground you can see the date 1800 carved to the floor.

The block machines are displayed in a sort of pen, arranged in an aesthetic group (Figure 2.7). They are loosely sorted by function, the machines for making the shell of the block on one side of the display, and those for making sheaves on the other. Apart from this rough grouping, they are in no particular order regarding the block making process. The distinction between the two types of machines is not very clear, and they are positioned very close together, as Figure 2.7 shows. This arrangement makes the larger machines at the back quite difficult to see. There are labels describing the function of each individual machine on the pillars on each side of the display, shown in Figure 2.8. The description is purely textual, with no use of pictures or other visual material, and thus rather difficult to follow. In the given context the functions of individual machines seem almost irrelevant to the display. It does not tie in with the gallery as a whole, nor does it clarify the purpose of the machinery.
Figure 2.7: The machines are grouped very closely together, and those at the back are quite distant.
Some of the machines, for example the shaping engine in Figure 2.9, have pieces of unfinished blocks in place, marking the function and use of the machines as woodworking tools. However, there are no finished blocks or even images of blocks on display. The text on the light box (seen in Figure 2.10) states that blocks were used in large quantities on the navy’s ships. They are referred to as “pulley blocks”, which is helpful as “block” alone is a common word with a multitude of meanings. Even with this concession, the average visitor probably does not know what blocks were used for on ships, or why the navy needed so many of them. The text describes blocks as “a
natural subject for the early application of mass production” but does not make clear why this was. This is confusing, and makes it more difficult to understand what the machines were for, why they were built and what makes them special.

The exhibition showcases important and iconic objects from the collections, but does not explain what each artefact was for. As discussed above, this approach works well with more familiar artefacts: it is hardly necessary to explain what a car is. However, with machinery for making objects that are no longer a part of everyday experience, it would help if the visitor was shown what it is that they were used for. In this style of display, a lot is expected of the visitor in order to engage with an unfamiliar object. It is particularly frustrating in the case of the block making machines as a very short explanation with a block or an image would be enough to clarify the purpose of the machines. That this has not been provided implies a lack of attention to visitor experience.
Figure 2.9: Shaping engine with unfinished blocks in place.
As mentioned above, key artefacts in the exhibition are marked by yellow interpretation boxes. Figure 2.10 shows the box for the block machines, which provides a description of what the machines are and what makes them significant (see Figures 2.11 and 2.12), and a portrait of Marc Brunel with a short biography. There is also a page from Brunel’s notebook, seen in the bottom left hand corner of Figure 2.10, and a video, in the top left corner. This video, as Figure 2.13 demonstrates, is very small indeed. It is possible to distinguish that the scenes shown are from sailing ships, but the text between the images is far too small to read comfortably in the dim light. Although the interpretation concentrates heavily on Brunel, both Samuel and Jeremy Bentham are mentioned in connection with Enlightenment ideas and rational manufacture. This is useful for placing the block machines in a wider context, at least for visitors already familiar with the names and ideas presented.
The aesthetic display of the machines does not invite enquiry, only admiration. A panel nearby, titled “Manufacture by Machine 1800-1860” refers to the machine tools section in the Great Exhibition of 1851: “The machinery was seen as a direct source of Britain’s prosperity, but it was also, as The Times newspaper and Queen Victoria independently remarked, “beautiful” in its own right.” Looking around the exhibition, these sentiments do not seem all that unfamiliar: both national pride and the beauty of machinery are emphasised.

These machines, designed by Marc Isambard Brunel to make pulley blocks for the Royal Navy, are the first purpose-designed and integrated system for quantity production in the world.

British power in the eighteenth century relied on the sailing ships of the Royal Navy. A single fighting ship such as Nelson’s Victory needed over a thousand pulley blocks and, during the Napoleonic Wars, the Navy purchased about 100,000 a year. The pulley block was a natural subject for the early application of mass production.

Machines for cutting and shaping wood were not new, but the core idea behind Brunel’s system was to design a suite of machines in which each did a particular job in sequence and the workpieces were passed from one machine to the next.

Figure 2.11

64 Text panel in Making the Modern World.
This idea of rational manufacture fitted in well with eighteenth century Enlightenment ideals. Brunel’s system was adopted for the Navy by Sir Samuel Bentham, the brother of Jeremy Bentham, the Utilitarian philosopher.

The machines continued to be used for well over a hundred years. Perhaps the greatest puzzle behind the feat is why the system remained a notable and highly regarded ‘one off’, but did not lead to similar techniques in other industries. In spite of its success British manufacturers and government largely ignored the principles it established until they awoke to the power of ‘the American system of manufacture’ over fifty years later.


Figure 2.13: It is difficult to see how a video smaller than my hand could enhance a visitor’s experience.


2.4.3 Scholarship

Placing the block machines in the *Making the Modern World* gallery portrays them as important machinery. The artefacts in the exhibition are interpreted as having changed the way we live. The block machines are also highlighted as a key artefact, and given a yellow interpretation box. They are shown as something out of the ordinary and worthy of attention. The block machines have received such attention ever since they were built, as Samuel Bentham encouraged visitors to the Block Mills in order to market his idea, and the machines were mentioned in contemporary accounts of the dockyard, as well as in tourist information on Portsmouth.65 This aspect of the Block Mills’ history does not feature in the interpretation that concentrates on their role in the development of machinery.

As I have tried to demonstrate above, the gallery concentrates a little too much on the technology, and not quite enough on the world it changed. The block machines are a good example of this approach. The introduction of the block making machinery permanently changed the working lives of countless people. They were emblems of a new vision of work.66 Yet their impact in *Making the Modern World* is shown purely as ground-breaking inventions in the machine-tool trade. They are seen as the first machines for mass production, or “quantity production” as it is put in the text on the light box. The view presented defines production solely through the machinery, excluding the people who used them and even the product that was made.

The dockyard does not feature in the interpretation of the machines, and although the navy is mentioned, maritime concerns remain firmly in the sidelines. Not even the use

66 For this view, see Ashworth (1998): ‘System of terror’.
of blocks on board ships is explained. With a heavy emphasis on technology, the display of the Block Mills leaves out the maritime connection as well as the people who worked the machines. The inventors are presented as heroes, but the ordinary people whose lives were most affected are left out. The language of the interpretation underlines this: the labels describing the function of each machine refer to the machines as “doing” things, rather than being used by people. Displaying social history of technology in a museum setting could make it easier for visitors to connect with the artefacts through seeing them in a social context. At the moment the displays in *Making the Modern World* encourage the visitor to gaze upon, but not to engage with the exhibits. The machines are not shown to have formed a part of the lives of the people who built them and used them. The *How the gallery works* panel suggests this could be a major part of the exhibition, but the display does not fulfil this promise. Technological change is experienced by everyone, and personal experience may bring the artefacts to life in a way that technical information or biographical details of the inventor never could. The trend to display social history of technology in museums is not new, and it is surprising to see so little of it in the Science Museum.67

### 2.5 The Dockyard Apprentice

I will now turn to another exhibition, the *Dockyard Apprentice* in Portsmouth Historic Dockyard, where five block machines on loan from Portsmouth City Museum are displayed in a very different way from *Making the Modern World*.

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2.5.1 Objectives

The *Dockyard Apprentice* is an independent exhibition, maintained by the Portsmouth Naval Base Property Trust, and mainly run by volunteers. The exhibition is housed in a nineteenth-century boathouse in Portsmouth Historic Dockyard, together with a restaurant, gift shop, and school groups’ lunch area. It is one of the very few attractions within the dockyard that is free to enter. It is interesting to note that a similar exhibition displaying the history of the yard at Chatham Historic Dockyard is also maintained entirely by volunteers.68 There is clearly an interest in this kind of exhibition, but this has not been taken seriously by museum professionals.

Figure 2.14: Visitor map of Portsmouth Historic Dockyard. HMS Victory is number 12, the Dockyard Apprentice, number 8. The area in grey is accessible to the public.

(Image credit: Portsmouth Historic Dockyard.)

Portsmouth Historic Dockyard is a popular visitor attraction, and home to several museums and historic ships, including HMS Victory, the recovered hull of the Mary
The dockyard is also a functioning naval base. The part of the dockyard nearest to the Victory Gate entrance, by the Hard and the Portsmouth Harbour railway station is the heritage area known as Portsmouth Historic Dockyard. It opens to the public in the morning and closes in the evening. Outside these hours it becomes part of the naval base, and access is restricted. The rest of the dockyard, including the area where the original Block Mills building stands, is not accessible to the general public without special permission. The heritage area is very popular with tourists and school groups, and hosts various events throughout the year, some with a naval theme, like the Festival of the Sea, others, like the Victorian Christmas Fair, less so. The museums are housed in old dockyard buildings: boathouses or storehouses. The museums and historic ships cover a vast range of naval history from Tudor times in the form of the Mary Rose Museum and ship hall, to the present day in Action Stations. As is typical to naval history, these museums and attractions focus on the ships at sea and the battles they fought. The Dockyard Apprentice, however, looks at the dockyard itself: its purpose is to display the function of the yard.

The Dockyard Apprentice shows a view of the yard in 1911. This was a time when wooden boats and iron ships, were built and repaired in Portsmouth. The Block Mills had been in operation for over a hundred years by this time. The focus of the exhibition is on the work carried out in the dockyards. The idea is that the visitor enters as an apprentice and learns about the necessary shipbuilding skills and the various trades of the yard. There is even a little clocking in card for children, with questions and answers to find in the exhibition. Different skills and trades are exhibited by life-size mannequins, such as those in Figure 2.15. There is no stated mission at the outset of the

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exhibition, but from the tone of the exhibits it is clear that this is a tribute to the men and women who worked in the diverse trades of the dockyard. The overarching theme in the exhibition is a nostalgic look at the good old days when the yard was buzzing with artisans instead of tourists.

This approach is frequently used in places where heritage attractions are replacing the declining original industry, such as Liverpool’s Albert Dock. The port of Liverpool has long since moved out of the city, and the nineteenth-century warehouses are now home to museums, galleries and bars. Unlike the merchant port of Liverpool, Portsmouth is still a functioning naval base, but as warships are no longer built there, the site has lost its original function. Similarly to the Albert Dock, Portsmouth Historic Dockyard has been converted to a tourist attraction, and now celebrates the glorious past of the navy.
As the Dockyard Apprentice is situated in the middle of a major heritage attraction, where the past is big business, its approach and focus are rather different from Making the Modern World, the flagship exhibition of a major national museum. The Dockyard Apprentice and Making the Modern World operate under very different circumstances. Scale, budget and the staff involved are all factors that make these exhibitions different on an operational level. The Dockyard Apprentice is a small-scale exhibition with a relatively small budget, designed by the Portsmouth Naval Base Property Trust, not a museum, and run almost entirely by volunteers. It is clearly motivated by a passion for the dockyard and its history rather than museological ambition.
2.5.2 Display

The various trades of the dockyard are displayed using life-size mannequins in workshop dioramas and panels with brief explanations of each trade. Some of the trades are displayed as empty workshops, others with photographs in the background. The age of steamships is displayed simply with machinery rather than people, and thus differs from the general style of the exhibition. The layout is a kind of trail through the various trades. The trades are randomly placed and do not follow any particular logic. This works well in the context as there is no final product, like a ship, at the end.

However, what is a little disorienting is that there is no introduction to the exhibition, and no statement of its purpose. A very brief panel would be sufficient to tell the visitor what to expect inside. Instead, there is a clock card machine at the entrance. The idea is that the visitor gets a card and clocks in, answers questions in the exhibition, ticking off the answers on the card, and at the end can purchase “indentures” from the gift shop. (See Figures 2.16, 2.17 and 2.18) However, the exhibition is frequently out of cards.
Figure 2.16: Clock-in at the Dockyard Apprentice entrance, where there are no cards left.
Figure 2.17: Now that you have completed the apprenticeship, perhaps you would like to purchase your indentures. Note the flag: there are many patriotic and religious symbols in the exhibition, as these were important values in the community.\textsuperscript{70}

Figure 2.18: An interpretation panel on caulking a metal ship. There are questions for the clock card trail half way down in bold.

The display style offers a varied view of the dockyard trades, and shows how diverse parts of ships were made. It is made clear that shipbuilding was a complex process
involving many different trades, and that building the hulls of large ships, the most visible process, was not the only thing the dockyard was for. The yard is shown as a busy place with plenty of things going on. An important message in the exhibition is that ships were built by people, and that the dockyard was a workplace for large numbers of artisans. The mannequins used in the displays are quite realistic in their depiction of work, as Figure 2.19 illustrates.

![Figure 2.19: The expression on the smith’s face shows the visitor that work in the dockyards was hard.](image)

_Dockyard Apprentice_ guides the visitor through the different crafts of the yard on a human level. The displays allow the visitor almost into the workshops, very close to the
work that formed the essence of the dockyard. The workers and their work are at the centre of the exhibition, made real through the realistic mannequins and blown up photographs of people at work. The atmosphere is warm, celebrating the skill that went into building ships. However, the displays of hard-working artificers in clean white shirts do not tell the story of the yard as a community, or of the lives of the workers, often riddled with poverty and strife. The exhibition concentrates solely on the work, giving an impression of what the yard was like in the past.

The wider context of naval shipbuilding, the reason for the dockyard’s existence, rests on a display at the beginning of the exhibition. This consists of facts about the expansion of Portsmouth Dockyard, and computer screens with detailed information about naval warfare from the 12th century onwards. These screens, seen in Figure 2.20, seem a little isolated, as their scope and medium are so different from the rest of the exhibition. They are text based and contain numerous facts about naval warfare, rather too much to absorb in an exhibition setting.
Figure 2.20: Workers portrayed on a break. Accusations of inefficiency in the yard, or for example the practice of long lunch hours are not addressed in the exhibition. An interactive screen with general information on naval and dockyard history can be seen in the foreground.

2.5.3 Scholarship

Whereas *Making the Modern World* covers 250 years of technological progress, in the *Dockyard Apprentice*, time stands still. What is displayed is a view of the yard in one moment in time in 1911. This approach allows concentration on the crafts, and makes the narrative simpler to follow, as the element of change over time is removed. It also gives the exhibition a static, yesteryear feel. The problems of such an approach are not only that the role of the dockyard in history is left out, but that variation over short periods of time is not considered either. No difference is made between war and peace, for example, although this had a significant impact on employment and the pace of
work. Fluctuation was a considerable part of the nature of dockyard work, but it is not displayed in the exhibition. The visitor gets no sense of what drives change in the yards. It is not made clear in the exhibition itself that it depicts a specific moment in history, and the visitor is left with a static image of the past. The information concerning the year is only available on the website.

**Figure 2.21**: Women were employed as flag makers from the Victorian times. No further comment is made on the inclusion or exclusion of women in the dockyard workforce.

Despite its name, the *Dockyard Apprentice* is not an exhibition about apprentices. Apprenticeships are covered briefly towards the end, in a few panels describing mostly

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examinations and leisure activities. The thrust of the exhibition is in educating the visitor about the work and skills of the dockyard. A good example of the scope of this exhibition is how women are portrayed. Figure 2.21 shows a display of flag making, a trade that employed women from the nineteenth century onwards. The role of women in the dockyard community is not commented on, however. The lives of dockyard workers outside work are simply excluded from the exhibition. This is not a social history exhibition, as it does not depict the economic and social context in which the workers lived. It would be better described as a local history exhibition, as it concentrates on the history of a specific location, the dockyard.

The *Dockyard Apprentice* presents an internal view of the dockyard. This may reflect the attitudes of dockyard workers, as they were a relatively isolated community, but it does not enlighten the visitor about the special features of life and work at the yard, as there is no point of comparison. This could be provided by contrasting a dockyard trade with a similar one outside the yard, say, a carpenter or an engineer. Highlighting the particular characteristics of Portsmouth relative to other naval or private yards could also give the exhibition some perspective. As it stands, it is often difficult to appreciate the unique nature of dockyard work.

I call this kind of approach to history *nostalgic*, because it looks back to how things used to be, but does not draw parallels or connections to today’s world. The exhibition offers a positive and somewhat sentimental view of a bygone era, honouring the skills and hard work of the people who worked at the dockyard. The outlook is backwards, focusing on the past and ignoring the present. This produces a yearning for the good old days when life was simple, and happy artificers in clean clothes built ships by hand.
This kind of approach is not unexpected in a major heritage attraction, where people come looking for a good day out. It is perhaps easier to relate to than for example the exhibition called *Action Stations* across the mast pond in Boathouse Number 6, which consists of simulations of the navy in action. Its purpose is to convince young people to join the Navy. For a family day out or a school trip, nostalgic views of handcrafts may be preferable to sophisticated technology for killing people. By the same token, aspects of dockyard life such as poverty or labour relations, may be convenient to leave out in this environment.

On the whole the *Dockyard Apprentice* is a pleasant exhibition paying tribute to the work done in the yards. It provides an overview of the function and day to day operation of the dockyard, and gives the visitor a sense of the site they are visiting.

### 2.6 The Block Making Machines on display in the *Dockyard Apprentice*

#### 2.6.1 Objectives

The role of the block making machines in the *Dockyard Apprentice* is depicted clearly as a functioning part of the shipbuilding complex that was Portsmouth Dockyard. They represent one of the dockyard trades, blockmaking, and the emphasis is on their function as machinery for making blocks. This sounds straightforward, but as we have seen in the case of *Making the Modern World*, it is not the only way to display them. Moreover, the block making machines, along with some small machinery in the steam power section, are the only machines in the exhibition dominated by handcrafts. Removing the block machines from the *Dockyard Apprentice* would not significantly alter its nature. On the contrary, it might even make it more consistent.
Displaying the machines adds another trade to the exhibition, but they are not essential to the story. The block machines are probably the most important and valuable artefacts in the exhibition (I suspect they may even have been a focal point around which the idea of the exhibition grew, but this is speculation). Their importance, however, fades into the background in this style of display.

2.6.2 Display
The block machines are displayed in a room that takes the visitor from caulking, the process of making a ship watertight, to rigging and rope making. There are human figures and a sound track playing in the metal ship caulking room, but no figures or sound effects in the block making or rigging rooms, so to the visitor who has been conditioned to look for these things, the display of the block machines may seem a little boring. Instead of mannequins, the people in the block machine display are shown in wall-sized photographs from the Block Mills when they were in operation. This is an excellent idea in principle, but by competing with three-dimensional human figures, the black and white photographs lose some of their impressiveness. As the only machine tools in the exhibition the block machines stand out from the handcrafts on display. The display gives the impression that only blocks were made by machine and everything else in the dockyard was handcrafted by skilled artisans.

The block machines are laid out on two sides of the room, with a passage between them, as shown in Figure 2.22. The arrangement allows visitors within touching distance of the machines where they can examine each of them in detail. Some parts of the machines have in fact been chained down for this reason. However, the disadvantage of
the display is that it is easy to walk past without paying much attention, as the room is laid out like a corridor. Only five machines, those for making the shell of the block, are displayed, compared to the seven in the Science Museum. They are organised by function, and although the sequence is not immediately clear, the interpretation panels guide the visitor to understand how the shell of a block was produced (Figure 2.23). Helpful images of unfinished blocks at each stage are provided, as well as a clear explanation of what a block is and how it is used on board a ship. This is done with reference to HMS *Victory*, which is only a few hundred metres away and the main attraction of the Historic Dockyard.

A hands-on demonstration of the purpose of blocks is provided later in the exhibition in the form of a block and tackle game (Figure 2.24). There are unfinished blocks in place in many of the machines, and although the display does not contain a finished block, plenty of these can be seen just outside the room, in the rigging display. Photographs of people using some of the machines, as well as photographs showing block making by hand are also shown. The belts seen in Figure 2.25 mark the power transfer system, and displayed in this way it is not difficult to imagine how the machines worked. An original table of standard sizes for each type of block is displayed in the corner of the room. The focus of the display is firmly in the process of block making.
Figure 2.22: The space where the block machines are displayed. The room to the rear of the picture contains displays on rigging and rope making.
Figure 2.23: Interpretation panel for the shaping engine. A drawing of the block at this phase is on the top right. In the middle, a plan of the engine and bottom, a photograph of a *lignum vitae* saw being used. Note the translation to four foreign languages, where many larger museums (such as the Science Museum or the Royal Naval Museum) fail to provide even one.
Figure 2.24: The block and tackle game demonstrates how blocks work.
Figure 2.25: The scoring engine. The belt going through the ceiling represents the power transfer system. A chart with the specifications of each type of block can be seen on the right. A wall-sized photograph from the Block Mills, *circa* 1911 is in the background.

2.6.3 Scholarship

The display of the machinery shows them as a functional part of the dockyard and concentrates on their use in making blocks. The exhibition takes a user-centred view to this particular technology, which is different to the inventor-centred view seen in *Making the Modern World*. The work of the yards takes precedence over innovations. The interpretation concentrates on how blocks were made and what they were used for.
This approach is in line with the rest of the exhibition, but it does somewhat obscure the unique and revolutionary nature of the block making machines.

The Block Mills have an important role in the history of Portsmouth dockyard. They were unique, and when the Block Mills were built, all naval block making concentrated in Portsmouth. Because the exhibition presents the yard from an internal perspective, this does not come across to the visitor. The machines are displayed as the normal run of a dockyard, not as something unique and exclusive to Portsmouth. The significance of the block machines is acknowledged in the panel introducing the machines, but their revolutionary nature and their local importance should be stressed more (Figure 2.26). The introduction concentrates on Brunel and Bentham, although Maudslay and the Taylors are also mentioned. The machines are also mentioned in a long list of the achievements of Samuel Bentham at the entrance to the exhibition. This list has virtually nothing to do with the content of the exhibition, particularly as the timeframe is set 80 years after Bentham’s death.
Figure 2.26: The panel introducing block making mentions the significance of the machines, and attributes them to Brunel.

The most problematic aspect in the display of the block machines in this exhibition is the time perspective. By 1911 the Block Mills had become an everyday feature of the yard, having been in operation there for over a century. Yet, it is Bentham and Brunel and the machines’ importance as an innovation that are brought up in the interpretation.
However, the time aspect of the exhibition does not allow for change over time, so although the machines are said to have been “of great historic importance”, their impact is watered down by the static time and the choice of year. Bentham’s new vision of work was put in operation, and the lives of workers and the community were changed as a consequence, but this is not seen in the exhibition, as it happened in the early 1800s. For the year 1911, a more appropriate comment on the machinery would be on their longevity, or perhaps that this was the year when electric motors replaced steam power in the Block Mills.\footnote{Coad (2005): The Portsmouth Block Mills, p.109.}

For the most part the display of the machines concentrates on block making, and as a display of how blocks were made and what they are, as well as a brief introduction to the block machines, the display in the Dockyard Apprentice serves its function well.

### 2.7 Remarks on the two exhibitions

The two exhibitions I have assessed here could in many ways be seen as opposites. Making the Modern World displays a grand narrative with a timeline of 250 years and an emphasis on technological progress and change. The Dockyard Apprentice shows an internal view of the dockyard at a specific point in time and concentrates on handcrafts. The ideas behind these exhibitions are very different. The nostalgia displayed in the Dockyard Apprentice is based on values associated with artisans, such as hard work, honesty and appreciation of craft skills (see Figure 2.27). The dockyard is seen on a human scale, and the values are those of the dockyard community. They are taken for granted in the exhibition, rather than explained or contrasted with the outside world.
Figure 2.27: Dockyard values. The carved panel on the wall reads “Craftsmanship”.
The flags are not part of the display, but fit the image nevertheless.

Making the Modern World shows the world from the perspective of technology. The values expressed in the exhibition are those of progress, growth and material prosperity. As in the Dockyard Apprentice, these values are implicit rather than explicit. Technology is seen as the achievements of great men, leading humanity from the industrial revolution to our modern lifestyle in a series of inevitable steps of ever greater sophistication, efficiency and prosperity. This inevitability is not explicitly paraded, but nor is it denied, and as no alternative is presented, the storyline of the exhibition becomes received wisdom. This uncritical approach is shared by both exhibitions. As the values on which they are based are not stated, they cannot be called into question either. Both exhibitions present an apparent picture of how things were, of historical truth.
The values and approaches to history displayed in the two exhibitions are typical of their genres. The *Dockyard Apprentice* represents local history, as it displays the history of a specific location. Because the history of the area and community takes centre stage in local history museums, the worldview exhibited can be rather myopic, particularly if a wider historical context is not provided. The *Dockyard Apprentice* looks at the past entirely from the perspective of the dockyard, effectively ignoring anything outside its walls. Seeing history from this limited point of view induces nostalgia, which is common in the heritage industry.\(^73\) Heritage attractions, such as Portsmouth Historic Dockyard, or for example the Ironbridge Gorge museums, are aimed at tourists who come for a day out, and whose interest in history may be limited to television costume dramas. Although not always as blatantly commercial as the Charles Dickens World theme park in Chatham, heritage attractions cater for an audience looking for entertainment, and a nostalgic approach sells.\(^74\)

*Making the Modern World*, on the other hand represents a tradition going back to the Great Exhibition of 1851. To some degree, the Victorian ideals of progress through technological advancement exhibited in the Crystal Palace are still visible in museums of science and technology today.\(^75\) The public is presented with a very positive view of science, and it is seldom criticised. These museums celebrate the achievements of science and technology through objects, typically machinery and other technological devices, as well as seeking approval for future development.\(^76\) The implication is that science has brought us prosperity therefore it is worth supporting in the future. National pride also plays a role in these museums, although it is perhaps not always explicit.

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74 [http://www.dickensworld.co.uk/](http://www.dickensworld.co.uk/).


There is a strong bias towards the achievements of British and Western technology, and the people whose lives are displayed are predominantly white middle-class men. Just as the Dockyard Apprentice displays typical characteristics of local history museums, Making the Modern World fits the description of the science and technology museums genre seamlessly.

Both these exhibitions display the block making machines from a technological point of view. In Making the Modern World they fit the grand narrative of technological progress as mass production machinery, and in the Dockyard Apprentice they are shown as steam powered block making devices in the midst of hand tools. In both exhibitions they are displayed as important machines, as interesting artefacts in their own right. Neither exhibition looks at the factory environment of the Block Mills, thus leaving out a crucial part of the history of the machines. Although the Dockyard Apprentice displays the process of making blocks and how it involved all of the machines in sequence, the focus is fairly narrowly on the function of the machinery, rather than the Block Mills as a whole. Making the Modern World shows the machines purely as a phase in the development of mechanised production and pays no attention to their surroundings. Although particularly in Making the Modern World the machines are portrayed as part of a wider story, this gallery effectively ignores the significance of the Block Mills. It presents a story of material development, rather than change on the level of society. The human context of the machinery is an important part of their story, but this style of display omits it. This is characteristic to the way museums see history, as their starting point is object collections.77

2.8 Conclusions: The role of my exhibition

The two exhibitions I have examined in this chapter represent two very different ways of displaying the block making machinery. In many respects they are almost opposite, but they share one common trait: neither way of displaying the machines is very innovative. As I argued above, both exhibitions have stayed faithful to the genres they represent rather than introducing new elements or points of view. This could be due to resources: curators may not have the expertise or space to incorporate different perspectives into exhibitions, or the time to read academic research around the subject, to gain different points of view. The museums may prioritise visitor numbers and prefer to stick to familiar formats and content rather than risk alienating existing visitor groups by experimenting. Curators may also see displaying material from other fields of history as irrelevant to the museum’s function. As discussed in Chapter 1, museums and academic history serve very different purposes, and it is understandable that they should work in different ways. However, it does not follow that museums could not use academic history as material for exhibitions. I believe the Block Mills could have been interpreted in a way that would give the audience a more thorough understanding of them if the depth of academic research available on the subject had been employed in creating the exhibitions.

Both these exhibitions are presented as displaying history, but what is on display has little to do with the academic discipline. Rather, what they are displaying is the past. Academic history examines, interprets and analyses the past, but museums and other public history media typically present it as a collection of facts and objects, thus perpetuating the myth that history recounts the past impartially and as it really happened. The two exhibitions display correct factual information about the block
machines, along with the genuine objects. Visitors will find out when the machines were built, who Marc Brunel was, and even how blocks were made, but they will not learn why they were built or what makes them significant. In other words, they will learn about the past of these machines, but not see them in historical context. Neither exhibition, for example, connects the machinery with the key historic events of the period in which they were built, such as the Napoleonic Wars or the industrial revolution.

The machines were built to produce blocks for the navy in the midst of a global war. It is unlikely that the navy would have invested in such expensive specialist equipment had it not been for the war, yet neither exhibition mentions the Napoleonic Wars in connection with the machines or shows the machines in the context of naval warfare. In the Dockyard Apprentice the setting is that of naval shipbuilding, but this is implicit and the presence of war is not put forward in the displays.

Both exhibitions display the block machines simply as machinery, rather than as a part of a wider complex. In the Dockyard Apprentice it is made clear that the machines operated in sequence, and this is also mentioned in Making the Modern World, but neither of the exhibitions includes the factory environment where the machinery was used. The Block Mills as a complex of workshops was an important development in the history of the dockyard. It was here that the navy’s industrial revolution started. The Block Mills were where the navy first used both steam power and industrial time and work discipline.
The Block Mills were initiated by Samuel Bentham who as Inspector General of Naval Works played a crucial role in the navy’s industrial revolution. His dockyard reforms were based on new perceptions of work, and these ideas were epitomised in the Block Mills. His importance is recognised in the Dockyard Apprentice with a list of his achievements by the entrance, but because this is in no way tied into what is inside, it is an empty gesture. Bentham is mentioned in both exhibitions in connection with the machines, but his role is left unclear.

The Block Mills can be seen as the start of the navy’s industrial revolution, but they are not portrayed this way in either exhibition, not even in Making the Modern World where the industrial revolution is the starting point and a key element. The way the Block Mills revolutionised production is not included in the interpretation of the machinery. In an exhibition claiming to display how the world has changed, it is surprising to see how little the element of change features in the display of individual objects.

It is made clear in both exhibitions that the machines were important, but what is much less obvious is what made them important. The historical context of the Napoleonic Wars, the industrial revolution and Enlightenment ideas of work are an integral part of why these machines were built. Along with their innovative technology, this context is also why they have been considered an important development for over two hundred years and why they were collected in museums. These two exhibitions display the machines outside of this context and therefore leave out their historical significance.

Both these exhibitions start from the object collections rather than the story. Even in Making the Modern World, which presents itself as a grand narrative of technological
history, the collections are the actual focus. It is a story about the evolution of material objects, not a story about how this technology changed the world we live in, or how the way we live changed technology. Similarly, even though the Dockyard Apprentice displays human figures, they are portrayed only as the operators of tools and machinery, rather than people who get their living from this work. This leaves the stories rather one-dimensional, and provides the museum visitor with very little to identify with. The machinery on display is not relevant to the visitor’s own experience, which may be alienating. This is particularly true in Making the Modern World, as no human context is displayed for the block machines.

Academic history, particularly economic and social history, could provide a wider contextual framework that would enable the visitor to see the objects in the context of their own experience, regardless of what that experience is. Unlike the social history usually employed in museums, academic social history does not start from the lowest common denominator of food, drink and family life. Instead, it looks at social phenomena and society as a wider context for human interaction. A social history framework could enable visitors to see themselves as part of history in a way that is relevant and meaningful for them. This kind of social history would bring history alive on a different level from giving stories a human face, which is often what social history is taken to mean.

The exhibition I intend to create as part of this study is very different from either of those examined in this chapter. This exhibition will put the Block Mills in the historical context of work, war and industrialisation, and interpret them through the thinking and actions of the people who developed them. These are concepts that visitors will be able
to relate to, and this way the exhibition will underline the importance of the Block Mills in a way the current exhibitions fail to do.
Chapter 3  
Analysis of the source material: academic literature on the Portsmouth Block Mills, the dockyards, and the industrial revolution

The purpose of this chapter is to evaluate the sources I drew upon to create my exhibition. I used my experience in economic and social history and the history of science and technology to explore the existing literature relating to the Block Mills. The literature I selected for this evaluation ranges from work directly about the Block Mills to the much broader themes of war, industrialisation and workforce control. This wide selection is deliberate: by drawing upon the work of a range of historians from different branches of the discipline, I constructed a view of the Block Mills that is different from that currently existing in the literature or in museum exhibitions.

I included technologically oriented literature that is directly about the Block Mills, focusing on the machinery and how it worked, and material from a broader field to interpret the Block Mills in a wider context. For a closer look at the environment into which the Block Mills were brought, and the people whose lives were affected, I examined studies about the dockyard and its workforce at this period. For a view of the ideology that instigated the Block Mills and other dockyard reforms at this time, I included literature on Samuel Bentham. In his book on the Block Mills, Jonathan Coad cast these reforms in the role of starting the navy’s industrial revolution.\(^7^8\) Although the Block Mills themselves are absent from most studies of industrialisation, I included some relevant literature. This literature was selected to portray the Block Mills as a part of much wider developments, instead of simply a collection of interesting machines.

\(^7^8\) Coad (2005): The Portsmouth Block Mills.
I have arranged the material in this chapter by topic. I will start from the machines themselves, and then look at the dockyards in the early nineteenth century, the dockyard workers, Samuel Bentham and his ideology, and finally industrialisation and mass production. The purpose is to start from the Block Mills as tangible objects, and expand towards more contextual literature. The topics I have chosen to include in this chapter emphasise the depth of academic research surrounding the Block Mills. As the literature in this chapter serves as material for my exhibition, I have chosen themes that are possible to display to a museum audience. The perspectives on history adopted by various branches of the discipline add to the depth of interpretation. I examine these differences, for example work focusing on the navy or on material things, to emphasise the variety of historical work that can be used to interpret the Block Mills.

3.1 The block making machinery

A significant part of the literature directly about the Block Mills concentrates on the machines as objects, looking at their technical qualities and their function. This is understandable as the machines were the tangible part of what made the Block Mills unique. They were also much publicised from the earliest days of operation. This emphasis is reflected in the current displays of the machinery in the two existing exhibitions, and is a common approach to displaying machinery in museums. In this part of the chapter I examine the literature directly concerning the machines and blockmaking to see whether historians have taken a wider view to the topic than is seen in museums. Earlier work on the machines focuses very tightly on the technical side of the individual objects. This work includes such fairly simple, functional descriptions as K.R. Gilbert’s Science Museum monograph, or Ray Riley’s paper on the innovations
visible in the various machines. Later work has produced more complex analyses of the Block Mills as a factory, such as for example work by Ann Coats or Carolyn Cooper.\textsuperscript{79} The work in this section focuses on the block machines, blockmaking and the Block Mills directly. This literature is immediately related to the objects at the hub of my proposed exhibition, and is thus an obvious starting point.

The earliest modern work on the Block Mills, published since they ceased operating, is by K.R. Gilbert. In a short booklet he introduces the machines acquired by the Science Museum in the 1940s and 1950s. Until the publication of Coad’s work on the Block Mills, this was the definitive work on the machinery. Gilbert describes each machine and its function in the process of blockmaking. Much of the later works rely on Gilbert’s description of the process. He views the machines in terms of pure technology. This is also the approach taken by Ray Riley in his paper on the innovations in the design of the machinery.\textsuperscript{80} Much like Gilbert, Riley also looks at the operation of each of the machines held in the Science Museum and in the collections of Portsmouth City Museum, but in addition he assesses the innovation and the technical knowledge that made the building and design of these machines possible. He argues that Marc Brunel’s innovative approach in designing the machinery was largely to combine existing technological elements in a new way. The machines were the first large scale woodworking machines with metal frames instead of wooden ones. Riley argues that most of them were semi-automatic, requiring at least some input from the operator.\textsuperscript{81}


Both Riley and Gilbert view the machines purely as technology. Although Riley expands his view beyond the objects themselves, the context is still technological.

Alec Barlow has looked at a number of machines in the Block Mills that were not invented by Brunel. Instead of producing blocks, many of these machines were for making other small items needed in ship construction or on board ships. For example, a machine for making treenails, the wooden pegs used to fasten ships’ planks together, remains in place in the Block Mills. Barlow’s focus in examining these machines is on technology, similar to Gilbert and Riley’s studies. These works give a very thorough picture of the machinery used in the Block Mills and how it was operated. It is a detail-oriented technological view, starting from the objects in question, which is very similar to how most museums look at history.

Another technical perspective to blockmaking comes from work examining the craft of making blocks by hand. This has been studied by a number of historians, including Gregory Clark, John Horsley and Carolyn Cooper. I have included this work because it gives an idea of how the trade of blockmaking changed, thus looking at the navy’s industrialisation process from the micro level of one trade. Cooper and Horsley both describe the slow and laborious process of making blocks by hand, using hand tools such as block maker’s stools, lathes, axes and saws. The process was prone to errors that could cause the block to fail in use, for example by catching fire due to friction.

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from irregularities in the shell.\textsuperscript{83} Cooper argues this made it an ideal trade for mechanising.

Clark has shown that until the Block Mills started operating, the navy’s blocks were typically supplied by contractors. Only a handful of block makers were employed in the yards for emergencies or for making special kinds of blocks. The main contractors at the end of the eighteenth century were the Taylors, father and son, in Southampton, and Dunsterville in Plymouth. They both used horse or water powered machinery in the process of making blocks. Walter Taylor, senior, has in fact been credited with inventing the circular saw.\textsuperscript{84} The change from hand blockmaking to the industrialised process in the Block Mills was not abrupt, and various mechanised methods existed simultaneously. A similar point has also been made about the industrialisation process of other trades in literature on the industrial revolution, which will be examined later in this chapter.\textsuperscript{85}

Carolyn Cooper stresses the importance of the Block Mills as a system of manufacture, and the role of the machines in forming a factory style mode of production. She has examined photographic evidence, Brunel’s notebooks, the buildings at Portsmouth dockyard, and the shaft drawings of the power transfer system to work out what amounts to something akin to a time-motion study of the Block Mills.\textsuperscript{86} The machines were arranged by type to create a flow of materials through the Block Mills. Additional machines were added to production phases where the pace was slower. A duplicate of

\textsuperscript{84} Clark, G. (1979): ‘Naval blockmaking in the 18\textsuperscript{th} and 19\textsuperscript{th} centuries’, Mariner’s Mirror, 62, 1979, p.137-144: p.137-138.
\textsuperscript{85} See for example Berg (1985): The Age of Manufactures.
\textsuperscript{86} Cooper (1981): ‘The production line at Portsmouth Block Mill’.
the large boring machine, for example, was installed in 1805. Cooper’s work highlights the importance of the Block Mills as a production method rather than simply as unique machine tools, and she presents the Block Mills as a forerunner of mass production. However, the Block Mills had no direct successor in this respect, and the mode of production did not catch on until much later, when it was imported as “the American System”. Looking at the machines in this light, as part of a system and within the wider context of production, gives them meaning that technological detail alone cannot convey. Cooper’s work is very useful in interpreting the Block Mills as a functioning factory system, but an even wider context is necessary to understand the significance of such systems.

Jonathan Coad has looked at the Block Mills as a factory complex. His 2005 book is the most thorough examination of the Block Mills to date. He approaches the Block Mills primarily from a built heritage angle, looking at the building, the machines, and their role in producing blocks. He also examines Bentham’s role in bringing about the Block Mills, and the subsequent fame of the machinery. Coad’s background is in researching ancient monuments, and the book is published by English Heritage, so it is not surprising that the built environment of the Block Mills is examined rather more thoroughly than for example working conditions. Coad analyses the Block Mills as a factory, as a system, and as a phenomenon not limited to blockmaking alone, but concerning the whole of the dockyard. He puts the Block Mills into the wider contexts of Portsmouth Dockyard and naval shipbuilding, showing the importance of the Block Mills and the machinery in a way that a narrow focus on technology would not allow: the Block Mills are portrayed as a part the process of wider dockyard developments as

88 Coad (2005): The Portsmouth Block Mills.
well as the embodiment of the navy’s industrial revolution. Coad’s work is an important step in interpreting the Block Mills in a wider context, and as such, crucial material for my exhibition.

3.2 Early nineteenth-century naval dockyards

The late eighteenth and early nineteenth centuries hold a certain fascination among dockyard historians. Over half of the papers published in Transactions of the Naval Dockyards Society concern the period from 1750 to 1850.\(^{89}\) I have selected some of these papers together with other literature concerning the dockyards and their operation at this period for examination in this section. The picture that emerges is one of a world governed by tradition, rather than innovation. Ships were built using ancient technology in yards that had been established for centuries. Dockyard workers took great pride in their traditional skills on which the industry depended. As MacDougall shows, the adoption of new technology like steam was slow at this time. Writing about the eighteenth century, he argues that part of the problem was in the administrative system that favoured a conservative approach. The Navy Board included men with no scientific knowledge or training, and placed in key positions such as the surveyor, their lack of experience could effectively halt progress.\(^{90}\)

A more recent view of the yards has been put forward by Sue Wilkin, who argues that describing them as inefficient and corrupt does not do justice to their contribution to the Napoleonic Wars. The yards, she argues, managed to maintain a fleet of 500 vessels at sea, and therefore could not have been as inefficient as is commonly believed. Through


statistical evidence she demonstrates that productivity at Portsmouth Dockyard rose by 27% between 1793 and 1815 without the impact of the new trades in the Block Mills and metal mills, which supplied not only Portsmouth but the entire navy’s needs. Much of the improvement, Wilkin argues, was due to administrative and technological changes at the yard.\textsuperscript{91} This is relevant to wider arguments about the industrial revolution, put forward by for example Maxine Berg, that industrialisation began with organisational reform rather than technological advancement such as steam power.\textsuperscript{92}

### 3.2.1 Administration

A large and complex organisation, naval administration has interested a number of historians, most importantly Roger Morriss, James Haas and Roger Knight. In his introduction to an edited volume of Portsmouth Dockyard papers of the American War of Independence, Knight gives an overview of the Navy’s administrative structure.\textsuperscript{93} The dockyards came under the administration of the Admiralty Board, which usually consisted of two sea officers and five politicians. They dealt mainly with the executive level administration, and decided for example which ship to send where and under which commander. Their subordinate boards, The Navy Board, the Victualling Board, the Sick and Hurt Board, and the Ordnance Board, took care of making the ships ready for sea. The Navy Board was made up of ten Commissioners, each responsible for a different part of the service. The office employed over a hundred clerks, making it one of the largest state departments. The Commissioners most involved with the dockyards were the Controller and the Surveyor. The Navy Board had the most control over the dockyards, but could not for example appoint officers, a powerful Admiralty

\textsuperscript{92} Berg (1985): The Age of Manufactures.
prerogative. The Navy Board was heavily criticised by contemporaries. It has also been painted as a hindrance to progress by many historians, including Haas, who portrays the board members as elderly, uneducated and set in their ways.\textsuperscript{94} Morriss argues that the Navy Board worked as well as they could under the circumstances, and a more accurate picture would be one of gradual improvement.\textsuperscript{95}

Morriss, Haas and Coats have all written about dockyard administration at this period and take very different views to the claims that the yards were inefficient and corrupt, and to the significance of the changes that took place during the revolutionary and Napoleonic wars.\textsuperscript{96} Haas argues that the dockyards’ reputation as inefficient, slack and corrupt was fully deserved. “Large numbers of workmen were elderly, disabled or simply lazy”, he writes, arguing that the human resources at the yards were inefficiently managed.\textsuperscript{97} Yard officers were not necessarily well educated, and often ill qualified for their duties. The master shipwrights were no businessmen, and were concerned only with their craft, not with issues like the efficient running of the yard or management of materials. The management system also shielded mistakes and malpractice from inspection. The process of modernising dockyard management started in the late eighteenth century, but Haas argues progress was slow, and likens the unprecedented number of changes that took place during the revolutionary and Napoleonic wars to fixing an old car: the changes enabled the yards to function better than they had before,
so they could keep going for a while longer, but they were still a long way from functioning well.98

Morriss and Coats both take a more positive view. Morriss describes the period of the revolutionary and Napoleonic wars as a silent revolution because of the number and variety of changes that took place. The picture that emerges from Morriss’s account is very different to that described by Haas. Morriss shows the yards as a buzzing industrial centre where proud craftsmen applied their trade in a way they had done for centuries. He sees improvement where Haas sees stagnation, and attention to detail and quality where Haas sees slack attitudes to work. Coats takes a similar view to Morriss, emphasising the ownership of the system felt by the dockyard workers, and defends the conservatism of the Navy Board in introducing reform.99 Bentham’s reforms clearly brought a change of culture in the yards, though Haas and Morriss disagree over how long it took to see the effects of these changes. This could be because of their different time perspectives: Haas looks at management over a period of 200 years, whereas Morriss focuses on the 23 years of revolutionary and Napoleonic wars.100 Haas’s view is convincing from a wide management angle, but as Morriss and Coats take the dockyard’s perspective, his interpretation seems more plausible in the context of the developments that lead to the building of the Block Mills. The reception of Haas’s views has been varied, with especially dockyard historians adverse to his ideas.101

3.2.2 Materials

Another important question that arises in the literature is the supply of materials to the yards. The navy was suffering from a shortage of wood that had affected shipbuilding since the sixteenth century. R.G. Albion has described the effects of the need for timber in great detail in his book *Forests and Sea Power*, originally published in 1926 and revised by Tim Bean, which remains the definitive work on the subject. The need for shipbuilding materials, Albion argues, was a key factor for example in colonising Canada and New England as a part of a worldwide search for timber.\(^{102}\)

Roger Morriss argues that the timber situation was not as desperate as Albion portrays it, and that dockyards were not running out of wood altogether.\(^{103}\) Shipwrights could not always have the desired quality, Morris argues, but had to rely on replacement materials for English oak, the preferred construction timber for ships. Substitutes included foreign oak, fir, and in some cases unseasoned timber which would not last and could cause rot. The long wars caused problems with imports of materials, most of which came from the Baltic area and the colonies. Suppliers could often get a better price for their goods from private shipbuilders or the mining industry. These two factors pushed prices up and exacerbated the problem.\(^{104}\)

Morriss argues that supply alone was not the only factor contributing to the shortage of wood, but that wastage was an even greater issue. Much of the timber reaching the yard was lost either due to poor storage causing it to rot, or in the process of conversion.


Morriss argues that three fifths of every log was reduced to offal and taken out of the yards as “chips”.

3.2.3 Chips

The issue of chips, or the right to collect waste wood, was a thorny one within the yards. It has interested historians from across the field, including dockyard historians such as Morriss, and social historians like Peter Linebaugh. Artificers in the wood trades were allowed to collect chips that were less than three feet long and thus too small for the navy’s use. Theoretically this was a by-product of the artificers’ work. In practice, however, many dockyard workers spent part of their working hours cutting up perfectly good wood for chips, and some smuggled out more valuable items hidden inside the bundles, thus contributing to shortages. From the Admiralty’s perspective the practice was seen as wasteful, and several attempts were made to abolish it. The right to collect chips was finally commuted to a cash payment in 1801. That the previous attempts to abolish the custom were unsuccessful has been attributed to the workers’ greed by Haas, and to necessity by others: dockyard wages were paid in arrears, sometimes with long delays, and chips were a ready source of cash. Peter Linebaugh looks at chips from an analytical economic perspective, and sees the abolition of the practice as a sign of a more formal economy at the dockyard. The traditional economy was based on low wages and perquisites that had little to do with the amount of work performed. These

included privileges such as beer allowances or apprentices’ wages that were paid to the master.

The issue of chips combines many elements of dockyard history including administrative practices such as pay and benefits, labour relations in the form of yard regulations and worker independence, and controlling what was taken out of the yard in connection with material costs. Chips carried economic value: to the navy they represented a loss of material and to the workers, a source of income. For the workers in particular, they also had practical value as domestic building material or as firewood. In addition, chips had significant symbolic value. Linebaugh argues that the right to collect chips was infused with “deeply held working-class ideas of freedom and slavery”.

They had been a bone of contention in dockyard labour relations for decades at the beginning of the nineteenth century, and appear in a caricature as late as 1831 (see figure 3.1). The multiple meanings associated with chips make them a useful tool in combining different aspects of dockyard history.

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3.3 The dockyard as an employer

The dockyard workforce is an important area historians have examined from a variety of perspectives. The royal dockyards were the largest single employers in the country at this time, with thousands on their payrolls. The workforce formed a tightly knit community unlike any other. They were frequently referred to as “the people of the yard”, as if they were citizens of their own separate country.¹¹² The literature I have included in this part of the chapter examines labour relations issues, such as disputes and strikes, and dockyard traditions concerning work practices. The element of community is examined in much of the work, and I have included a limited amount of literature on the local history of Portsmouth where it is relevant to the dockyard

community. Understanding the world of craftsmanship and fiercely independent artisans into which the Block Mills were introduced is, I believe, crucial in order to examine their role in the navy’s industrial revolution. The Block Mills represented the introduction of a new mode of production into the crafts based industry of shipbuilding, and had an impact on the workforce at large, not only those who worked in the Block Mills. Studies about the workers in the Block Mills are rare; only Coad and Coats have written about them. Studies about the dockyard workforce in general are more common, and will be examined below.

Workforce is not a key theme in Coad’s work, but he briefly examines employment policies. He quotes correspondence between Bentham and Brunel about the difficulty of finding suitable workers willing to work for the wages on offer. One of the key concerns in building the Block Mills was saving on costs: Brunel’s reward for his inventions was tied to the annual savings to the navy once the machinery was in full operation. Much of these savings came in the form of labour costs, and Coad quotes a figure put forward in K.R. Gilbert’s work mentioned above, stating that the block machines enabled ten unskilled workers to do the work of 110 skilled craftsmen.

Coats’s paper concentrates solely on the workers and the Block Mills as a new kind of work environment. She uses the diaries and papers of Simon Goodrich, the manager of the Block Mills, who, among other things, was in charge of recruitment. Coats argues that the Block Mills required very different work practices and discipline, and the work was organised in a very different way from the rest of the yard. She also writes about dockyard customs, and argues that although the factory setting was unfamiliar in the

artisan world of the dockyard, the newcomers in the Block Mills were nevertheless part of the yard and thus some of the old work practices were adopted in the Block Mills. This was despite many of the workers being engineers imported from other trades outside the yards who brought their own traditions with them. As an example Coats gives the employment patterns in the Block Mills, which followed the tradition of sons entering the same line of work as their fathers. Another example of a tradition preserved in the Block Mills, even against Bentham and Goodrich’s principles, was the beer allowance to those working in hot conditions. Some traditions, such as taking on apprentices, were however abolished within the Block Mills.

From the work of Coats and Coad, it is possible to form a picture of working conditions in the Block Mills, although more research is needed on this topic. Understanding the working conditions is useful in interpreting the machinery on a micro historical level, looking at their operation and how they affected the lives of the workers around them. This kind of context is often far easier for a non-expert to relate to than technical details. Coats’s work also ties the Block Mills in with wider issues in labour history. She looks at time and work discipline and the way the workers’ time was organised within the Block Mills, where control shifted from workers to the management. This is an important element in the development of factories. As will be seen later in this chapter, the Block Mills do not feature in histories of factory production. Coats’s work highlights these elements from the perspective of the Block Mills.

A key work when looking at working conditions at the dockyards more widely is *History of Work and Labour Relations at the Royal Dockyards*, edited by Kenneth Lunn

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and Ann Day.\footnote{Lunn, and Day (eds.) (1999): \textit{History of Work and Labour Relations in the Royal Dockyards}.} The volume includes essays by a number of dockyard historians who have tackled the question of labour relations from various angles. For the period on which the Block Mills were built, the most relevant chapters are by Roger Morriss and Philip MacDougall, as well as Roger Knight’s essay, which concerns a slightly earlier period, but offers valuable insight into the wage system.\footnote{Morriss (1999): ‘Government and Community’; MacDougall, P. (1999): ‘The changing nature of the dockyard dispute, 1790-1840’, in Lunn and Day (eds.) \textit{History of Work and Labour Relations in the Royal Dockyards}, p.41-65; Knight (1999): ‘From impressment to task work.’} Morriss’s paper describes the changing of dockyard employment from the 1770s to 1830. His book on the dockyards during the French Wars also explores similar themes in more depth.\footnote{Morriss (1983): \textit{The Royal Dockyards}, Chapter 4.} In both these works Morriss presents an image of the dockyard as a workplace where employment was relatively secure and although pay was generally lower than in private yards, it was supplemented by perquisites such as chips, and benefits such as medical care, that private yards were not able to offer. In return, workers were subject to sub-naval discipline, and a certain degree of patriotism and religious conformity was expected of them. Both Morriss and Knight describe dockyard workers as a strong community with a sense of independence and the value of their work. Morriss recounts the process that changed this somewhat informal, traditional arrangement into a more formal, bureaucratic system where “the people of the yard” became employees. Among other things, the new system ended the workers’ dependence on moneylenders by gradually establishing weekly pay instead of quarterly, which was often actually paid six months or more in arrears.\footnote{Morriss (1983): \textit{The Royal Dockyards}; MacDougall (1982): \textit{Royal Dockyards}, p.104.} Many of the changes Morriss describes were initiated by Samuel Bentham whose role will be examined in more detail later in this chapter.
MacDougall looks at dockyard disputes in the form of petitions and strikes. His time frame is only slightly tighter than Morriss’s, from 1790 to 1840. He describes the relations between different trades in the yard. Shipwrights and rope makers constituted 40% of the workforce, and had the strongest bargaining positions, whereas smaller trades were often left to fend for themselves. MacDougall uses the new trade of millwrights, brought into the Block Mills, to illustrate the insular nature of dockyard communities. At a time in the early nineteenth century when workers outside the yards typically used the strike as a weapon, dockyard workers more often turned to petitioning yard officials for change. This was not true of millwrights, who were more inclined to strike. As a new trade within the yards they had stronger connections to the outside world than the insular dockyard community.

In his book, *The Royal Dockyards*, MacDougall describes how the dockyard communities developed. The town of Portsea next to Portsmouth dockyard grew on what had been Portsmouth Common, and, according to Alistair Geddes, in a matter of 80 years exceeded Portsmouth itself in population. James Thomas gives an account of the relationship between the town and the yard in his paper *Portsmouth Yard and Town in the Age of Nelson*. As the largest local employer the dockyard had a considerable amount of power in Portsmouth. Much of the local economy relied on the yard either directly through contracts for goods and materials, or more indirectly through providing services for yard employees for example. Thomas paints a picture of dockyard culture intertwining with local practices for example in the form of trade in stolen goods. The relationship was somewhat ambivalent, however, as along with

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prosperity, the yard also brought trouble, and issues of overcrowding or drunkenness for example were common.

John Field’s pamphlet *Portsmouth Dockyard and its Workers 1815-1875* in the Portsmouth Papers local history series concerns a later period, but offers a workforce perspective to the world of the dockyard. Field looks at for example the internal hierarchy between different trades in the yard. He argues that as the largest employer in the world at the time, the dockyards could almost be considered a world of their own. Unlike Haas who portrays dockyard workers as lazy, Field describes a world of proud artisans, conscious of their skill and the quality of their work. He points out the physical and mental awareness required to master the shipwright’s trade: “Shipwrights needed a high level of skill with unusual strength and stamina. Their tools – the axe, the adze and borers – required force, accuracy and judgement.” Field’s description of the workers’ lives outside the yard is an important part of his research. This includes for example involvement in the local community, religious practices and participation in various self-help organisations. He shows the interaction between yard and town from a human perspective, which is complemented by Thomas’ work, mentioned above, on a more general level.

Field has also edited and published a dockyard worker’s diary from 1813. Through careful research he has attributed it to William Webber, a cabin-keeper at Portsmouth Dockyard. Diaries describing life at the dockyards are extremely rare. Through Field’s interpretation of this document we obtain a picture of the rhythm of daily life in the yards. We also get an idea of the relationships between dockyard workers, when

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Webber records being offended by some impolite language.\textsuperscript{126} The internal hierarchy of the yards was very strict. The emphasis of Webber’s diary is entirely on the working environment, and references to his life outside the yard are scarce. Through Field’s work we learn that Webber lived in a house large enough to accommodate lodgers, and was thus reasonably well off, with a source of income independent of the yard. The diary consists of only eight sheets of paper, so it is hardly a thorough exploration of working class life, but it offers a glimpse into dockyard workers’ way of life and daily work routines.\textsuperscript{127}

Whereas the historians mentioned above have studied the dockyard workforce as a whole, Coats looks at the Block Mills specifically, examining the new and traditional work practices that existed there.\textsuperscript{128} The Block Mills represented a completely new form of production in the otherwise crafts based dockyards, and Samuel Bentham presented them as a model of his ideas. Many of Bentham’s managerial concepts were implemented in the Block Mills, but as Coats demonstrates, some of the yard traditions penetrated even the newly established workshop. The result was a mixture of old and new work practices that sometimes defied logic, for example in the case of piece work. The Block Mills, where work was already highly divided and easily quantifiable operated on a day rate rather than a piece rate, which was becoming the norm in the rest of the yard. Another anomaly was chip money, which was paid to woodmillers on the grounds that they were wood workers. Such perquisites were linked to trades, and it should have been simple not to award this privilege to a new trade. The woodmillers did not enter the yard until after the right to collect chips was commuted to a cash payment.

\textsuperscript{127} Field (1978): ‘The diary of a Portsmouth dockyard worker’.
\textsuperscript{128} Coats (2006): ‘The block mills: new labour practices for new machines?’
This example demonstrates how deeply rooted the question of chips was in the
dockyard economy. Coats’s work also shows that at least some parts of the distinct
culture of the yards were applied to the new trades at the Block Mills as well.

3.4 Samuel Bentham’s social engineering

Samuel Bentham has attracted the interest of a number of historians writing about the
dockyards. Jonathan Coad and Roger Morriss have examined Bentham’s role in the
context of the Block Mills, whereas William Ashworth has looked at his dockyard reforms more widely.\textsuperscript{129} The key issues that emerge are Bentham’s dockyard reforms and the ideas that these represented. Coad has looked at the important physical developments in the yards, including the Block Mills. Morriss focuses more on the organisational changes, and Ashworth on the ideology behind these reforms. What all the historians writing about Bentham agree on, is that he represented a new way of thinking. Whether the changes he implemented were effective is less clear, as the disagreement between Morriss, Coats and Haas discussed above illustrates. In this section I will examine the work on Bentham, his life, and his role in the building of the Block Mills.

Immediately clear from literature on the Block Mills is that they were the product of several minds.\textsuperscript{130} The concept of a block making factory rested on the ideas Bentham implemented at the dockyards as Inspector General of Naval Works. The machines were designed by Brunel and built by Maudslay, whose ability to interpret Brunel’s drawings


\textsuperscript{130} For example Coad (2005): The Portsmouth Block Mills.
was, according to Riley, what made the project viable. The management and day to
day running of the Block Mills was largely in the hands of the mechanist Simon
Goodrich. A mechanist is a craftsman who constructs machinery, but Goodrich’s
responsibilities were much wider and included for example recruitment. He was
trusted and highly valued by Bentham. Each of these individuals played a significant
role, and it is often difficult, if not impossible, to discern their individual input. In this
study I focus on Samuel Bentham. Looking at the work of for example Coad or Morriss,
Bentham emerges as the mastermind behind the Block Mills. He had a vision of the
overall operation of not only the Block Mills but the entire dockyard. He even shared
many of his philosopher brother’s visions for society as a whole. As Inspector General
he was also in a position to negotiate with the Admiralty to bring the Block Mills about.

The two key biographical works about Bentham are by his widow, Maria Sophia
Bentham, and by Ian Christie. Mrs Bentham traces her husband’s life from birth to
death, putting great emphasis on his career in the service of the navy and the
innovations he had a hand in. Bentham’s introduction of steam in the dockyard despite
opposing views is portrayed as a triumph in the face of adversity, and the abolition of
chips as almost a moral duty. This account is of course highly partial, showing Bentham
in a good light, but it also includes some very detailed descriptions, for example of
Bentham hiding in the shadows, spying on workers who sold their bundles of chips
outside the dockyard gates, and an account of the uses of chips in local architecture.

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Portsmouth Block Mills, p.60, 70.
133 Bentham, M. S. (1862): The Life of Brigadier-General Sir Samuel Bentham, K.S.G. London:
Longman, Green Longman and Roberts; Christie, I. (1993): The Benthams in Russia 1780-1791, Oxford:
Berg.
134 Bentham (1862): The Life of Samuel Bentham, p.127-128, 142-144.
Christie’s work focuses on the period Bentham spent in Russia at the end of the eighteenth century. It is based on the correspondence between Bentham and his brother, Jeremy. Christie portrays the brothers as very close, and it is clear they collaborated on many of the ideas seen in their later work. A key example is the Panopticon principle, a system of surveillance and control where the surveyed are visible all the time but the surveyor remains hidden. The principle is best known for Jeremy’s prison design. Christie gives a detailed picture of the developments that led to its invention. He describes Bentham’s work at the shipbuilding establishment in Krichev, and looks at the innovations he made in workforce organisation and mechanisation of shipbuilding. In Krichev Bentham could arrange matters as he pleased. This was in stark contrast with the restrictions he faced as Inspector General.\textsuperscript{135} Whereas most authors focus on Jeremy as the better known of the brothers, Christie looks at both, with an emphasis on Samuel. The letters on which his research is based provide a wealth of detail about Samuel’s life in Russia. Unfortunately this account ends with his return to Britain. Nothing is said about the Block Mills, making the work less directly useful to my project.

Coad also devotes an entire chapter of his book on the Block Mills to Bentham and his dockyard reforms. He includes illustrations of new docks Bentham introduced, as well as a drawing of a reciprocating saw he designed.\textsuperscript{136} Although the block making machines themselves were designed by Brunel, Bentham designed many of the other machines in the Block Mills. During his stay in Russia and after his return to England in the 1790s, Bentham designed several machine tools for woodworking, and even had ideas for block making machines himself.\textsuperscript{137} He brought about many concrete reforms in yard infrastructure, such as new docks and basins, steam engines to pump water and

\textsuperscript{135} Christie (1993): \textit{The Benthams in Russia}, p.131-135; 166-170; 177-178.
fireproofing buildings among other things. His most important contribution, however, was organisational reform.

Even Haas, who dismisses the changes that took place at the beginning of the nineteenth century as “tinkering”, acknowledges Bentham’s crucial role as a management theorist. Bentham’s ideas, he argues, were the foundation of dockyard reforms implemented over the course of the nineteenth century, even after he himself was forgotten. Like many others, Haas sees the Block Mills as Bentham’s greatest achievement, and credits him with bringing the industrial revolution to the dockyard. Haas’s view of management is very practical, and he looks for concrete changes in dockyard practices. He rejects Morriss’s claim of a “silent revolution” in dockyard management. What Morriss examines are more subtle changes. He argues there was a shift in thinking that endorsed greater efficiency and economy. Morriss describes a detailed plan covering individual responsibility, financial control, classification of work and new forms of education, which were intended to deliver greater efficiency. On the surface, new timber management practices or a wage reform may seem trivial. Yet they manifested fundamental changes in thinking that were felt across the yards, Morriss argues. Through them, dockyard administration became more reliable and systematic.

In a paper originally presented in the 2005 Naval Dockyards Society conference and later published, Morriss argues that Bentham was very aware of dealing in ideas as well as in practical solutions. He implemented many physical changes in the yards, but he also set out to change attitudes in both the Admiralty and the yards. In effect, he tried to

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create a new, unified culture, built on the principles of individual responsibility, centralised financial control and a type of meritocracy that involved educating dockyard workers to a much higher degree.\textsuperscript{142} Bentham had toured the dockyards and found them inefficient in a number of ways. One of the key failings he found was a lack of individual responsibility. In the event of misconduct or errors, all those involved were implicated, which encouraged covering up even large mistakes. Conversely, personal achievement and efficiency also went unacknowledged. Bentham’s idea was to introduce a formal and visible system of administration. This included new wage systems that were supposed to act as a deterrent against fraud.\textsuperscript{143} In his book on the dockyards during the Napoleonic Wars, Morriss examines this change of culture. He argues that by 1815 technology had been fully accepted as a means for improving efficiency.\textsuperscript{144} Bentham saw the independence of the workforce as a threat. As a countermeasure, he advocated the use of machinery. He also re-organised work in the wood and metal mills according to tasks rather than what had been the customary practice of trades. For example, no distinction was made between the traditionally separate trades of carpenters and joiners. They were all considered woodmillers, and paid accordingly. By this reorganisation he avoided threatening any particular group of workers within the dockyard, thus making the workers less likely to resist the new labour practices.\textsuperscript{145} According to Ashworth, Bentham saw himself as a social engineer. His aim, like his brother’s, was to change society.

\textsuperscript{144} Morriss (1983): The Royal Dockyards, p.60.
It is in this capacity of social engineer that both Ashworth and Linebaugh look at Bentham. Linebaugh compares Bentham’s ideas to those of Frederick Winslow Taylor over a century later. Looking at the issue of wages from the workers’ perspective, he argues that Bentham’s reforms were aimed at controlling the worker through division of labour and a standardised wage system. He uses the right to collect chips as an example of class struggle in the early nineteenth-century dockyard. Chips were deeply resented by both the Admiralty and Bentham. For the workers, however, they represented a source of cash to tide them over to the next payday. More importantly, they were also invested with strong symbolic value as a sign of independence. Bentham is seen responsible for bringing about the changes that lead to a formal administrative system in which independent artisans became wage labourers.

According to Ashworth, Bentham’s aim was no less than a complete change in work and administration practices that would enable the dockyards to work as “part of one great machine”. Bentham trusted machines more than workers. He advocated a system where each part of a process, be it manufacturing or administration, was visible and standardised. This system was intended to replace the existing paternalistic culture that in Bentham’s view encouraged fraud and shielded malpractice. Ashworth argues that the reforms were the outcome of a “new philosophy”, of ideas that reached beyond the dockyard and into society. At the centre of this way of thinking was the Panopticon, a system of surveillance where the observed do not know when they are being observed. The principle of seeing without being seen was employed in the yards

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in the form of transparency in accounting and allowing the public into the Block Mills, for example.\textsuperscript{151} By allowing accounts and practices to be freely inspected by almost anyone, this system placed the general public in the role of the ultimate inspector. Less subtle ways of observation were also employed in the form of a bridge over the shop floor in the Block Mills, where workers could be observed from a window while the manager remained hidden.\textsuperscript{152}

Whereas much of the literature about the dockyards and about Bentham is fairly descriptive and practical, Ashworth and Linebaugh have each taken a conceptual view to the changes in dockyard practices around 1800. They each examine the yard and the reforms in the light of abstract ideas. The Panopticon concept of surveillance and individual responsibility is prominent among these ideas, and it can be seen to have affected many of the new practices at the dockyards. This gives a new perspective to the yards and enables the reader to see them as a part of a much wider context.

\textbf{3.5 Industrialisation}

As many of the historians mentioned above have noted, the Block Mills were a crucial element in the industrial revolution of the navy. While this fact is acknowledged by historians of the navy, the dockyards are hardly mentioned in works about the industrial revolution. The omission does not make this literature irrelevant to the Block Mills, though, as it provides an interesting background to the developments in the yards. The industrial revolution is a concept many people have encountered in school history, popular history or television, and it can therefore act as an entry point to an otherwise perhaps unfamiliar world of dockyards and technology.

\textsuperscript{152} Coad (2005): The Portsmouth Block Mills, p.58.
The classic depiction of the industrial revolution focuses on the textile industries. The popular imagination pictures it as the coming of steam power. Collectively the textile industry employed more people than any other, although each naval dockyard employed more than any individual cotton mill. Eric Hobsbawm argues that the significance of the industrial revolution was not in creating new technology or new industry alone, it was also in creating new markets.\textsuperscript{153} The Block Mills did not do this; instead they served an existing closed market. This is an example of how dockyards differed from other industries, and why they do not easily fit into the grand narrative of the industrial revolution: they are not part of the commercial economy and operate under different economic circumstances. Unlike most of the classic industries associated with the industrial revolution, the Block Mills were state operated rather than a private enterprise. The mode of production in the Block Mills also sets them apart from other industries of the era. It was not taken up outside the dockyards until much later, and thus makes the Block Mills an uneasy fit within the story of the industrial revolution.

Although the Block Mills were the first instance in the use of steam-powered factory production in naval shipbuilding, the mode of production was more commonplace in other industries at the time. Sir Eric Roll describes the layout of the Boulton and Watt Soho Foundry from 1801 as having a clear “route”.\textsuperscript{154} Separate workshops for different production phases were situated relative to each other so that work could flow through. Roll describes this as the most advanced factory plan of its time.\textsuperscript{155} It is very similar in principle to the production line in the Block Mills, which indicates that Bentham’s ideas


\textsuperscript{155} Roll (1968): \textit{An Early Experiment in Industrial Organisation}, p.180; 187.
were not unique, and that similar principles were put to practice elsewhere. Indeed, Bentham himself used the same principles of an assembly line within the dockyards for example in the biscuit manufactory he established in Deptford.\(^{156}\) Richard Arkwright’s cotton mills are another example of the use of machinery at this time. His system of production was designed to be so simple it could be – and frequently was – supervised by children.\(^{157}\) These examples show that the ideas behind the Block Mills were not conceived in isolation, but were part of a continuum of innovation. Water-powered textile mills where work was highly organised already existed in the 1760s when Arkwright was starting in cotton, and in turn, his ideas influenced others. For example Robert Owen is said to have been interested in Arkwright’s machinery and its resemblance to automata at the time he was setting up his cotton mill at New Lanark.\(^{158}\) Chris Aspin argues that Arkwright’s mills were subject to much industrial espionage and were widely copied both within Britain and internationally.\(^{159}\) This was not the case with the Block Mills, however. Bentham encouraged visitors to the Block Mills in the hope of spreading his ideas, but there is little evidence of such highly specialised machinery or production methods spreading until much later.

Another difference between Arkwright mills and workshops like the Soho Foundry or the Block Mills is the nature of the product. Cotton mills produced a bulk item that could be refined to a variety of goods, and thus only represented the mechanisation of a part of the process. Both the Soho Foundry and the Block Mills produced finished articles. The steam engines produced at the Soho Foundry were a highly specialised

article. Although they were produced in a sequence of work phases, they were not mass-produced as such, as the quantities were far lower than for cotton or blocks. The Block Mills thus stand out as producing large quantities of practically identical finished products by using specialised machinery working in a sequence, and a disciplined, organised workforce. The elements of this type of production existed, but Bentham’s combination of them was innovative.

Maxine Berg has pointed out that industrialisation was by no means limited to the classic industries of cotton, steel and coal, but that it was a process that affected all kinds of manufacturing. She focuses on the small industries like foundries, but some of her points – for example, that foundries were industrial enterprises well before the industrial revolution – are also applicable to dockyards. One of the other key points in her book *The Age of Manufactures (1700-1820)* is that an important legacy of the industrial revolution was the reorganisation of labour.\(^\text{160}\) Hobsbawm makes a similar point, and it is this element in particular that I find important in the context of the Block Mills, as a new workforce was created within the dockyard.\(^\text{161}\)

Another aspect of the industrialisation process relevant in the context of the Block Mills is time and work discipline. E.P. Thompson’s classic essay on the subject presents ideas that apply in the Block Mills and the yards as well: the somewhat irregular working patterns of the artisans, for example, and the way workers’ time was controlled in the Block Mills. The pace of work was no longer dependent on the worker, his skill, or the urgency of the task, but was dictated by the speed of the machines and factory time. Thompson recounts an event of a worker’s watch being confiscated to keep the control


over time in the managers’ hands. With little control over their time, workers were compelled to follow the pace of the machine.

The Block Mills represent an early form of mass production. The term and the exact type of production it generally refers to were not invented until the twentieth century. However, mass production is a useful term in this context because it is widely recognised. Literature on mass production, though not directly dealing with the Block Mills, is relevant on a more conceptual level. The Rational Factory by Lindy Biggs, for example, presents the kind of ideas that can also be seen as applicable in the Block Mills. Biggs argues that the workers in a factory were to function like the parts of a machine. She mentions Adam Smith in connection with the idea, rather than Bentham, but the principle is very similar to what was seen in the Block Mills. On a larger scale, Biggs terms Ford’s River Rouge plant his “most ambitious machine”.

Bentham’s idea was similar: to have the dockyards function as one great machine for producing ships. David Hounshell refers to practices at Ford’s factory that aimed at standardising work processes and routines. This is very similar to what Bentham was trying to achieve at the dockyard. Ford’s mechanics also designed machines they called “farmer tools” as the idea was that anyone, even a farm boy, could use them with minimal training. Again, the workforce that inspired Bentham’s idea for machines

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that produced items independently of the worker’s skill consisted largely of Russian peasants.\textsuperscript{168}

Merritt Roe Smith has studied a military application of the principle at Harpers Ferry Armoury at the beginning of the nineteenth century.\textsuperscript{169} Like the dockyard, this was a military establishment controlled by the government. Mechanisation was introduced in the early nineteenth century, when an increase in production was necessary. A new division of labour was adopted, and the process for making a musket was divided into 55 separate operations, carried out by different workers.\textsuperscript{170} Smith argues that economy, although important, was not the main reason for mechanisation at Harpers Ferry. The army needed more precisely made weapons, and mass production and machinery could provide this where individual armourers could not.\textsuperscript{171} This is similar to Riley’s argument that the Block Mills were built for technological rather than political reasons.\textsuperscript{172} Smith looks at the community at Harpers Ferry, the environment into which the town and the armoury were built. He maps the progress of the enterprise from its establishment in the 1790s to its destruction by fire in 1861. Many of his findings, particularly those on the community, could be used as a parallel with dockyard developments. He argues for example that the community at Harpers Ferry was resistant to change because of its isolation as well as factors like lack of education.\textsuperscript{173} Dockyards, although not physically isolated from the outside world like the remote town of Harpers Ferry, were nevertheless culturally separate from the surroundings, as they had their own customs and way of life.

\textsuperscript{172} Riley (1985): \textit{The evolution of the docks and industrial buildings in Portsmouth Royal Dockyard}, p.3.
The examples I have presented in this section show that the Block Mills and the dockyards in general have numerous points in common with other industries during this period. That they have not been included in the accounts of the industrial revolution could be because they do not easily fit the models constructed of the industrialisation process. Dockyards were after all already large industrial establishments at this time. The Block Mills represent a significant phase in the industrial revolution, and the start of the industrialisation of state-controlled shipbuilding. In my view they should be examined and presented as part of the industrial revolution.

3.6 Perspectives to history

The work I have presented here represents the views of historians from different branches of the discipline. The perspectives taken by academic historians vary greatly, and I have tried to select fairly different approaches for this study. I have explored a range of perspectives and selected those I find most useful for the purpose of the story I wish to tell. These views range from technological accounts of the machinery itself to more conceptual approaches to the industrial revolution and to Samuel Bentham’s dockyard reforms. The material I have examined here can be divided into four main approaches: work focusing on the navy, on society, on material things, and on people.

The literature with a naval focus understandably puts great emphasis on war. This is partly to do with the subject matter, as navies exist to fight battles. I believe the development of naval history is also an important concern here. According to Andrew Lambert, the discipline began as a component in naval training, for example with regard
to strategy.\textsuperscript{174} It was long the preserve of retired naval officers interested in studying their profession in the context of the past. It has retained elements of antiquarian interest in battle details or ship designs. There is also a very practical element to naval and maritime history and its supporting organisations. For example the Society for Nautical Research supports academic research and publishes one of the leading journals in the field, the \textit{Mariner's Mirror}, but also takes an active role in preserving and researching historic vessels. This is hardly surprising, as one of the Society's early rallying points was the preservation of HMS \textit{Victory}.\textsuperscript{175} With the focus of naval and maritime history on ships and war, the dockyards that built the ships were largely ignored until work by historians such as Morriss and MacDougall was published in the 1980s. The Naval Dockyards Society was founded in the late 1990s, and has published a refereed journal since 2006. Much of the work published on naval dockyards concerns the late eighteenth and early nineteenth centuries, when the Block Mills were built.

Some of the research I have looked at in this chapter, including some of the research on naval matters, focuses on material things: technology, ships, dockyard buildings, and shipbuilding materials. This kind of approach is typical in industrial archaeology, heritage studies, and certain kinds of history of technology. It is often narrowly focused: the aim is to learn more about the object, rather than to draw parallels or to examine wider phenomena. For example, in his booklet on the block making machines, K.R. Gilbert does not aim to analyse the context of building the machines, but presents factual information with the aim of better understanding of the technology itself.\textsuperscript{176} Similarly to naval history, this approach is typical of former professionals. As we have


\textsuperscript{176} Gilbert (1965): \textit{The Portsmouth Blockmaking Machinery}. 
seen in Chapter 2, it is also the prevailing attitude in museums displaying technology. Museum curators’ work centres on the objects in their collections. This can lead to a narrow focus on the qualities of the object itself rather than wider contextual concerns. This kind of approach is very specialised, and appeals to a limited audience. It can be difficult for a reader or museum visitor without prior knowledge about the subject to relate to it. Connecting the material things at hand to wider issues can provide useful insight. This is what historians like Cooper and Coad have done in their work on the Block Mills.\textsuperscript{177}

Focusing on people is one way of relating subject matter to readers or museum visitors, as human concerns are something everyone has experience of. This approach can be taken too far, expecting visitors to relate only to everyday concepts they have direct experience of. This is often what social history is taken to mean in a museum context. Academic social history is very different, and does not always focus directly on people. In the more conceptual form of academic social history the emphas"A is on society and social structures rather than individual stories. This is not to say that individuals and events are not examined at all. What I mean is that the focus is less on facts and detail, and more on the causes and consequences of events or phenomena. In this sense it is often almost indistinguishable from the kind of economic history that looks at wider trends and their impact on society.

In the material I have examined in this chapter, two kinds of people-centred approaches can be detected: work focusing on individuals, in this case mostly Bentham, and work focusing on groups of people, like dockyard workers. Literature focusing on individuals

\textsuperscript{177} Cooper (1984): ‘The Portsmouth system of manufacture’; Coad (2005): \textit{The Portsmouth Block Mills}.
includes biographies but is not limited to them. Morriss’s paper on the post of Inspector General of Naval Works is not biographical, but looks at Bentham, the only holder of the post. The people studied are usually powerful or influential individuals. Often in cases of people like Nelson, there is also some degree of hero worship. At their best, studies focusing on individuals can relate the subject’s actions to a wider context and offer interesting perspectives on contemporary issues. Many of the studies examined here shed light on Bentham’s crucial role in bringing the Block Mills about. As mentioned above, I could have expanded my scope to other individuals, such as Brunel or Maudsley, who were also instrumental to the building of the Block Mills. By choosing to focus on Bentham rather than the more technologically oriented Brunel and Maudsley, I am highlighting the role of social rather than technological reform.

Purely technological reform tends to affect the few rather than the many, as its immediate effects are felt by those who come into contact with its physical manifestations, such as machinery. By contrast, social reform reaches large numbers of people. Social and technological reforms are not mutually exclusive, of course, and in the case of the industrial revolution they are very closely intertwined. Literature on the subject often focuses on one or the other. To understand the significance of technology in society, however, it is useful to look at it in a wider context. This is a central element in my study. For this purpose I have looked at work focusing on groups of people connected with the Block Mills: dockyard workers and inhabitants of Portsmouth. Labour history and local history provide different perspectives to the subject. This kind of history can provide good analysis of how communities operate, and how people live their lives under the conditions created by economic and political events. Studies of

moral economy, including survival strategies like embezzling and chips collection, or collective bargaining and its internal mechanisms are good examples. At its worst, history focusing on groups of people can veer towards the everyday and the mundane, consisting of little more than details about local customs or family traditions.

The more abstract kind of economic and social history takes a wider perspective by examining social phenomena and society as a whole, rather than individuals or groups of people. Although this type of history can sometimes take a closer look at events or people, the focus is on wider implications and generalisations rather than explaining a single phenomenon. As an example, Linebaugh looks at the practice of collecting chips in some detail, while seeking to explain a much wider issue, the development of modern wage labour. Research focusing on society takes a wider perspective than the other types of history I have examined in this chapter. This kind of history can be very theoretical because the emphasis is on wider trends and the bigger picture rather than single events. Because work focusing on societies tends to use theoretical models and ideas, many factual details get omitted as irrelevant. The very nature of theoretical models is to generalise rather than accommodate slight variation, and this can make it appear inflexible. This kind of history is uncommon in museums precisely because it does not fit easily with a focus on objects. It can also be perceived as too complex and conceptual for the majority of museum visitors because of its theoretic nature.

3.7 Conclusions: Representations of the Block Mills

The picture of the Block Mills that emerges in this chapter differs significantly from the one seen in the two exhibitions reviewed in Chapter 2. Much of this material has, in

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principle, been available to curators. Some of it could have been used for the purposes of creating the existing exhibitions. For example, material about Portsmouth dockyard, or the context of the Napoleonic war would have been relatively easy to adopt in either exhibition. Why this material has not been used is likely to stem from curators’ work practices as well as constraints of time and expertise. Using this kind of history in a museum exhibition could help visitors with understanding and engagement with the objects. Particularly the more conceptual material can, of course, be very difficult to interpret using tangible objects. A wide theoretical framework that includes familiar concepts, such as war or the industrial revolution, could help visitors connect with the themes and objects on display and draw parallels with their own lives. This could result in a different perspective on history.

In this chapter I have presented material from a variety of historical traditions, including economic and social history, industrial archaeology, labour history, naval history and the history of technology. Each branch of history looks at slightly different issues relevant to the Block Mills, and for example the literature on industrialisation and mass production does not mention the Block Mills at all. I have brought this material together to form a deeper and more exciting picture of the Block Mills than that seen in the existing exhibitions or in any branch of history alone.

The literature I have presented in this chapter will serve as raw material for my experimental exhibition. It is the base from which I shall create the intellectual content of the exhibition, and the messages I wish to convey, which will be developed in the next chapter. The angle I have chosen for the story is leaning towards economic and social history, rather than focusing on machinery as seen in the existing exhibitions.
Presenting this kind of view is very different from presenting a technological one. Economic and social history can be much more abstract, as it does not focus on the tangible machinery itself. The kind of history I will display is fairly abstract and conceptual social history that is seldom seen outside the circle of academic history. For example concepts such as Linebaugh’s *thanatocracy*, ruling by fear of death, or Thompson’s *time and work discipline*, may appear too abstract to be useful in a popular history setting. Using such complex concepts in an exhibition can be difficult, but I believe they may be useful in analysing the events and objects and showing them in a wider context.

Museums usually understand social history to mean the kind of stories that give historical events a human face. At its best this kind of microhistory can present touching narratives that reach the public and give them a new perspective on their own lives or those of others. A successful example of this approach is an entire working class apartment where two generations of the same family lived for nearly 70 years, preserved with all of its furniture intact at the Arbejdermuseet (Workers’ Museum) in Copenhagen. The simple household objects and family photographs need no explanation. The visitor in effect steps into the living room of a real person. By contrast, fictional characters and scenarios do not always resonate with visitors. In such cases they will serve as window dressing rather than interpretation. Storylines with fictional characters always present a limited view, even where there are several voices telling the story, like at the International Slavery Museum in Liverpool. At worst the curator is pointing out differences or similarities with the lives of the subjects and the visitors, which does not allow for diversity, and can alienate visitors.
The kind of economic and social history I wish to display involves applying social theory to the past and looking at events in an economic and social context rather than focusing on individuals and their lives. The material that I shall draw upon for this perspective is the more theoretical and abstract work presented above. Linebaugh and Ashworth’s conceptual take on Bentham’s dockyard reforms and the application of the Panopticon concept will be central to the view I present. I will interpret the Block Mills and the dockyard reforms in the light of the ideas underlying the Panopticon principle: workforce control, transparency, individual responsibility and surveillance. I will draw upon material on Bentham’s thinking and his ideas rather than biographical details, which is perhaps more typical in a museum setting. Similarly, literature on industrialisation and mass production will serve as material for constructing the theoretic framework of the exhibition, rather than as a source of factual information. This literature does not touch on the Block Mills, but provides excellent parallels for developments within the factory and the dockyard: Berg, Thompson and Biggs are particularly useful in this respect. Cooper has presented similar ideas with regard to the Block Mills. Especially her article The Portsmouth System of Manufacture deals with the issues of mass production from the perspective of the Block Mills.\(^\text{180}\)

Of the literature on the Block Mills themselves I find Coad’s book a good starting point, as he offers a rounded picture of the Block Mills and portrays them in a wide historical context rather than simply as machines. The wealth of technological detail in work such as Gilbert and Riley is less relevant to a museum visitor with little or no knowledge on the subject. I will use this work mainly to explain the functions of the machines, as I believe learning what a particular machine does creates a connection with the object, the

\(^{180}\) Cooper (1984): ‘The Portsmouth system of manufacture’.
process, and through them, the worker who used it. For material on the living and working conditions of the workers, I will draw upon Coats’s work on the Block Mills, as well as Morriss and MacDougall’s work on the dockyard communities more widely. This literature gives a picture of the dockyards as a functioning work environment with its own customs and practices that set it apart from any other workplace. Thomas and Field both provide local history material that connects the dockyard to the surrounding communities, where the workforce lived, giving the dockyard issues local significance. This kind of connection can be important in anchoring fairly complex issues to real communities and people whose lives they affected.

Another useful way of looking at some of the more complex and potentially dull aspects of dockyards comes from the material on chips. Linebaugh uses them successfully in discussing the emergence of modern wage labour, but chips also touch many other issues discussed in the literature. Because of the values ascribed to chips by workers, the management, and the Admiralty alike, they can be used as a tangible manifestation of some important but abstract issues. For example material shortages were exacerbated by the amount of wastage through chips. Perfectly good wood was cut into chips, and more valuable materials smuggled out under their cover. At the same time, chips were necessary for the workers’ survival because of the wage system. The concrete example of chips can help explain the abstract issues of waste and administrative practices like wages. The example of chips also illustrates how these issues relate to one another. This helps to create a coherent story rather than a collection of issues that may otherwise appear isolated.
The picture of the Block Mills that emerges from the literature in this chapter is much more complex and varied than the somewhat dull, machine oriented approaches of the exhibitions seen in Chapter 2. The Block Mills were introduced into an old industrial establishment with its proud traditions and relatively isolated skilled workforce. They were built in the middle of a war as a way to save money and to better control production. Crucially, the Block Mills include a strong element of control through surveillance and the use of machinery. This resonates with notions of mass production and the industrial revolution as fundamental changes in workforce organisation. These ideas are central to my vision of how technological history should be explored in museums.
Chapter 4

Portsmouth Panopticon: the making of an exhibition

In this chapter I present the process of creating the exhibition that serves as my experiment. In the previous chapters I have evaluated, on the one hand existing exhibitions, and on the other academic literature on the Block Mills. As we saw, there are very significant differences between the historical approaches taken in each case. My key aim in this chapter is to demonstrate how the very different media of academic literature and museum exhibitions can be brought together to create an exhibition that displays the Block Mills in a wider historical context.

The following sections describe the creation of the exhibition in some detail, providing a systematic evaluation of the process of turning academic history into a publically accessible form. I have not found a model for this process in the exiting literature. I am not aware of any study that discusses in a systematic way the process of communicating complex academic material in the context of exhibition design. In this study I have examined academic history and museum exhibitions in a way that reveals their differences more clearly than do studies focusing on one or the other. In this chapter I explore these differences further in an attempt to bridge the existing gap. The skills and expertise required in these two disciplines are very different: for example writing for an academic audience is very different from writing exhibition text. Such differences may in part explain why exhibitions displaying academic material are rare in the museum world.
I start by an assessment of the differences between academic history and material culture to provide contextual background for the exhibition project. After initially evaluating different types of exhibitions, I analyse the process itself. This is described in some detail, following the thought process that allowed me to convey the academic material and my interpretations through an exhibition. I describe how the lengthy text was condensed into messages, which were then expressed through images. For practical reasons my exhibition was realised in poster format. I describe the creation process of the posters from the selection of images through to the final set up. I include examples and images from the final display throughout the chapter, and the exhibition posters can be found at the end of the chapter. The complete exhibition script is included in the Appendix. Finally I shall evaluate the success of the project and my approach to exhibition making.

4.1 History exhibitions and material culture

In this section I examine the differences between an academic and a material culture approach to the past. Understanding these differences is important in order to appreciate the difficulty of expressing the findings of one approach through the medium of the other. I shall discuss the literature on material culture in order to reveal the light it throws on this problem. Although my exhibition was realised ultimately with images rather than objects, I believe that many of the claims made about the latter apply equally to the former. The most significant of these is that information conveyed by written and non-written sources is very different.

Presenting academic history in a museum exhibition is a major challenge because it involves a radical change of medium. The material examined in Chapter 3 is not easily
approachable or accessible to a wide public. It consists mainly of lengthy scholarly text, written for an educated expert audience. The language and many of the concepts used are often familiar only to a readership with a high level of education, preferably in history or a related academic discipline. Concepts such as time and work discipline or moral economy are not widely known outside academic debate, and for example the concept of Panopticon is not commonplace even among historians.

Such material does not readily convert into a museum format. Museum exhibitions are usually created with a focus on the objects, on the display or the experience of visiting and learning. This approach is very different from academic history, which requires reflection rather than physical presence or interaction with objects. Academic history focuses on fairly abstract ideas of the past, whereas museums deal with material culture. Material culture can be defined as the physical objects created in the past that still exist today. It can include anything that has been modified by humans, from landscapes and buildings to machines and household goods. A material culture approach to the past examines objects as representations of events and cultures as well as functional objects. Objects can be linked to their makers and users, and observed through their function, as instruments, or through their meaning, as signs, to construct an image of the past. The information gained from material objects is non-verbal. In this context I also interpret images to be part of material culture, because, like objects, the medium of images is visual rather than verbal.

Steven Lubar and David Kingery argue that even the dichotomy between object and document is artificial, as documents are essentially artefacts and should be treated as material culture.\textsuperscript{185} I disagree, as the process of interpretation is very different: the principal information in documents comes in written form, whereas objects are nonverbal and thus independent of language. This is a key point of difference between academic history and material culture. Documents, like academic history, may refer to \textit{mentifacts} such as events, ideas, beliefs or personal reflection instead of concrete events. Because they are in a written format, their subjects remain intangible. Material culture concerns the tangible elements of the past. Eilean Hooper-Greenhill argues that objects help make intangible ideas possible to grasp and to experience in a concrete form.\textsuperscript{186} For example one of the striking features of the \textit{Apollo 10} capsule in the Science Museum is how small it is. Seeing it in the museum makes space travel appear more real. This is the key strength of a material culture approach to history.

The main weakness arises from a narrow focus on the object itself. This is especially true where a formalist approach, as Michael Ettema terms it, is adopted.\textsuperscript{187} Ettema divides museums’ perspectives to the past into \textit{formalist}, with the focus on deriving facts from objects, and \textit{analytical}, which looks more at the context. Robert Gordon presents a similar distinction in approaches to object analysis, where the observer analyses either the characteristics of the object or its context.\textsuperscript{188} According to Ettema, critics of the analytical approach argue that the object should be the main focus as they

\textsuperscript{188} Gordon (1993): ‘The interpretation of artifacts’, p.76.
are what separates museums from other institutions.\textsuperscript{189} Jules Prown, for example, favours an internalist approach, starting from the characteristics of the object itself, and argues that although other perspectives can be introduced in interpretation, they should be secondary.\textsuperscript{190} Other scholars, such as David Kingery and Susan Pearce, have argued that the context is what gives the object its meaning, and is thus an integral part.\textsuperscript{191} Observing an object from the past can tell us what the object is like, but not what it was used for or what it meant to those who made or used it.\textsuperscript{192} Although museums as institutions are distinguished by their collections, I believe museums make individual objects special. As they are preserved largely by choice, the selected objects are distinguished by their inclusion in the collection.

As academic history deals with intangible ideas and communicates through words, it is not constrained by the immediacy of material objects. David Lowenthal has argued that history and memory are processes of insight, whereas relics are products of processes.\textsuperscript{193} These ways of understanding the past are very different, and thus it is difficult to express the findings of one discipline through the language of the other. Gordon argues that much of technical thinking is nonverbal and thus not easy to express in writing.\textsuperscript{194} Conversely, ideas originally conceived in verbal form, such as those found in academic literature, are difficult to express through the nonverbal means of objects. This is a key difficulty in presenting academic history in a museum exhibition, and one central to my thesis. The process I describe in this chapter is one way to overcome this...

\textsuperscript{189} Ettema (1987): ‘History museums and the culture of materialism’, p.64.
\textsuperscript{192} Maquet (1993): ‘Objects as instruments, objects as signs’, p.39.
barrier between the two disciplines, albeit through the medium of images rather than objects.

4.2 Exhibition literature

Before I go further into the process of creating Portsmouth Panopticon, I shall review the museological literature concerning exhibitions. It is useful for the reader to understand what kind of material exists on the topic in order to put my work into a museological context. As I shall explain, most of this literature was not particularly helpful for my project. In this section I shall demonstrate that a gap exists in current museological literature that my work seeks to address.

This literature can usefully be classified into four categories:

(I) Theoretical literature about museums as an institution, their role in society, and the idea of exhibitions as communication between museums and the public

(II) Practical literature about conservation, visitor studies and general museum management

(III) Design literature, specifically for designers rather than curators

(IV) Case studies of individual museums and exhibitions

Although this literature concerns exhibitions, it does not offer specific guidance on creating them, but tends to comment on what already exists. When the analysis goes further than commenting on case studies, it covers much wider topics such as the role of museum exhibitions in society. Exhibitions are seen as communication from museums
to visitors, but how this communication is created is not discussed. I now examine each of these categories in more detail.

By theoretical literature I mean the kind of work that focuses on the role of museums in society and the purpose of the exhibitions they hold. Books such as Peter Vergo’s classic *New Museology*, and *Thinking About Exhibitions*, edited by Greenberg, Ferguson and Nairne, examine the role of museums in society. They look at communication in exhibitions on a fairly abstract level. The outlook is general, although examples from various exhibitions are used to illustrate the points the authors are making. When it comes to specific exhibitions, the aim of this kind of work is to examine the concept of exhibitions as communication between the museum and the public. It is not concerned with the processes involved in bringing about this communication.

Practical literature deals with the tangible side of exhibition management. It gives no advice on designing the intellectual content. This kind of literature includes works like David Dean’s *Museum Exhibition: Theory and Practice*, *Forward Planning* by Timothy Ambrose and Sue Runyard, curatorial handbooks such as *A Manual of Maritime Curatorship*, produced by the Maritime Curators Group, and for example *Museum Practice Magazine*. There are guides to almost any practical issue concerning museums, from conservation of various materials to visitor studies and exhibitions. Regarding exhibitions, this kind of work focuses on the practical aspects such as visitor flow or lighting. There is very little in such guides about interpretation. *Forward Planning*

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Planning has a chapter about temporary exhibitions, in which they are treated almost as if they were superfluous to the museum’s core function. Such guides can be very useful in solving practical, display-related issues such as font size or how to place exhibits.

Much of the literature I found when looking for material about exhibition design was aimed at designers, rather than museum professionals. This means it is not restricted to museums but concerns all kinds of exhibitions, from trade shows to shop fronts. Designers work mainly on the visual side of exhibitions, so this kind of literature does not cover exhibition content, or even collections. It is thus more limited in scope than practical museum literature. It is also less useful from the perspective of my project. I mention this type of literature because I encountered it frequently when looking for works about exhibitions, but did not find it very helpful. Works such as Exhibition Design by Philip Hughes and even Michael Belcher’s Exhibitions in Museums are written exclusively for a designer audience, and omit any mention of museum collections or the content of exhibitions.

Between practical guides to exhibition management and abstract studies on the role of museums in society, there is little written on designing an exhibition for a particular purpose. The numerous case studies that exist can be slightly more useful than the general literature. Such studies examine individual museums or exhibitions and sometimes go into much more depth and detail than general studies. For example, I found Making Histories in Transport Museums by Colin Divall and Andrew Scott useful in focusing my thoughts on certain issues of content development, even if it did

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not provide specific guidance; they discuss the issue of using social history in transport museums. More detailed studies of individual exhibitions can describe the process, but they seldom generalise from their findings. This kind of work includes accounts of, for example, the British Galleries in the Victoria and Albert Museum (V&A), the Food Gallery in the Science Museum, as well as an early piece on the Human Biology Gallery in the British Museum. More recent case studies, especially, are quite detailed and analytical, but they do not generalise from their findings. The emphasis is on the decisions that were taken in a particular situation and the solutions that worked for that particular museum or gallery.

As the examples above indicate, museological literature is of limited use when designing the content of a scholarly exhibition. However, I have identified two kinds of literature that could prove to be more useful. These are photojournalism literature and literature about propaganda. I did not use either of these in the design of my exhibition, in each case for different reasons. I considered photojournalism literature, but decided against it as I felt my time was too limited to incorporate extensive methodology from a discipline with which I was unfamiliar. The literature on propaganda, by contrast, was only suggested to me after I had held the exhibition. I believe both these types of literature could offer support and ideas for designing exhibitions that convey abstract ideas. Literature on photojournalism offers ideas on how to use images to tell stories. Particularly when dealing with feature stories, photojournalists typically start from an idea or a narrative rather than a specific image, and often present abstract issues through

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images.\textsuperscript{201} Literature on propaganda also offers insight on how powerful images can be used to persuade people. Toby Clark explores the imagery of propaganda art, but propaganda can also be disseminated through history exhibitions.\textsuperscript{202} For example Anssi Saari describes how exhibitions were used to boost morale and influence Finns’ attitudes to Russians during the Second World War.\textsuperscript{203}

The main difference between my exhibition and propaganda art or photojournalism is that the exhibition displays existing images created by others rather than specifically designed images on a defined topic. The approach is different because the historical material is beyond the curator’s control. Although I took some of the photographs in the exhibition myself, their content could not be designed to create a particular impression in the way a painter could, for example.\textsuperscript{204} Most of the photographs were also taken before the Expression phase, and I had no specific use or message in mind as I took them.

**4.3 Creating an exhibition as a process**

From the literature described above it is clear that there is a gap that omits content development. A detailed description of the creative exhibition process that is general enough to be of use to someone embarking on a specific exhibition project is also missing. In this and the following sections I will attempt to describe the steps I followed


to create my exhibition, paying special attention to content. This is intended to be beneficial to future exhibition designers.

Creating an exhibition drawing upon academic literature was complex, time-consuming, and required a specific combination of skills from two distinct disciplines: history and museology. As observed above, these disciplines operate in very different ways and bring very different issues and perspectives to the process. A practitioner in either history or museology needs the specific skills of their own discipline, and despite some overlap, these are different. For example, a historian has very limited use for the kind of practical problem solving involved in designing an exhibition. In a museum context an understanding of specific historical theories may be useful in interpreting the collections, but is unlikely to be a high priority. Much museum work involves more practical concerns such as documentation, classification and maintenance of collections.

The main challenge in this process was expressing ideas through tangible exhibits, or in this case, images, in an accessible way and with minimum text. Academic history is invariably text-rich and often abstract. Historical concepts are difficult to explain without using more text than a museum exhibition can convey following museological best practice. Conversely, the historian’s main concern is not tangible heritage or objects, but ideas. Apart from the actual block machines, literature on the Block Mills contains little reference to objects suitable for display. I found some images in this literature that could be used for the exhibition but not many. Thus the academic material requires considerable interpretation and a creative approach.

The starting point for an exhibition is the vision, or concept, which defines the exhibition. The end point or goal is the finished exhibition and the effect it aims to produce. In this case, the aims were to convey abstract ideas to museum visitors, display an alternative interpretation of the Block Mills, and in doing so make these rather dull and very complex machines interesting to the relevant audience. Thus, the basic premises of an exhibition project are a starting point, a goal and a target audience. These elements, along with practical issues such as location, schedule and budget, are discussed in practical literature about exhibitions.

The creative process takes the exhibition from the initial vision to the physical display. To describe this process, I have divided it into four phases, related to the key activity in each phase. Each phase also has a corresponding element or key outcome.

The phases with the corresponding elements are:

1) Material Gathering – academic content
2) Interpretation – messages
3) Expression – media
4) Production – the final display

The word concept in this context has a similar meaning to brief, as it outlines the key ideas of the exhibition as a guide to the rest of the process. In this study I also use the word concept in the meaning of an academic concept, signifying an abstract idea used in academic debate. The word concept is also used in museums to refer to the theme of an exhibition, for example in the phrase single-concept exhibition. This is not to be confused with the academic meaning of the word, as its usage is more similar to concept albums in the music industry, such as The Wall by Pink Floyd. The term here refers to a single overarching theme.

In the first two phases the work was primarily intellectual, and required mainly the skills of a historian. Material Gathering was very similar to the preliminary work done for historical research, and Interpretation required a thorough understanding of the academic material at hand. In these two phases the work was primarily concerned with using and interpreting existing material. Expression and production were much more practically oriented phases, where museum and design skills were more useful than historical analysis. Expression was the most creative phase of the four, as it transformed the ideas of the Interpretation phase into an exhibition script with concrete suggestions for exhibits. This involved creating entirely new content by combining images with text. In the Production phase, again the focus was on existing material instead of creating new: it was the final execution of the plan created as the results of the previous three phases. Until the Production phase was complete, there was no exhibition, only plans. Thus each of the phases was important in its own right. I consider Interpretation and Expression the core of the process, because it was during these phases that the bulk of the creative work of transforming the material was done. These two intertwined processes were at the heart of moulding the academic material into an executable exhibition plan. I will examine each of these phases in detail in sections 4.5 to 4.7.

4.3.1 Aims and intended outcomes of the exhibition

The key aims of the exhibition were to reinterpret the Block Mills as the navy’s industrial revolution, using academic history and the Panopticon concept. As seen in Chapter 2, current museum interpretations of the Block Mills concentrate exclusively on the machinery at the expense of the whole manufacturing complex and the wider implications of their story. This approach ignores a significant part of the Block Mills’ history and portrays them out of context, as obscure machines for making blocks. While
this approach may be of considerable interest to the technology enthusiast, it does not have a wide appeal. I found the interpretation unsatisfactory because the wider context is what makes these machines such important historical artefacts. My aim therefore was to portray the Block Mills in the wider context of the Napoleonic wars and the industrial revolution.

For this purpose I used the academic literature examined in Chapter 3. A key aim regarding the content of this material was to convey a vision of the industrial revolution as a fundamental change in work and workforce organisation. The Panopticon principle, the idea of workforce control through surveillance, was at the centre of this interpretation. The idea of displaying social theory in the context of the past as the central theme of an exhibition was new. A key aim of this experiment was to find out whether this kind of approach is workable in a museum context and appeals to a museum audience.

In the exhibition I used concepts and elements visitors may know from school history, such as the industrial revolution or the Napoleonic wars. However, the learning outcomes were not linked to the national curriculum, as the exhibition was not specifically designed with school audiences in mind. The idea was to use familiar concepts to put the Block Mills into a wider context. These concepts also formed the basis for introducing ideas that are not commonly associated with industrialisation such as the key concepts of the exhibition: workforce control and surveillance. My aim was to present these themes in a way that would enable visitors to connect historical events to their own lives and stimulate them to see themselves as part of history. To achieve this I tried to present a theoretic framework built around the concept of the Panopticon,
instead of a fact or object-oriented narrative such as the exhibitions examined in Chapter 2.

The exhibition showed how Samuel Bentham’s ideas of control were put into practice in the Block Mills. The ideas were explained using wider ranging examples such as the Panopticon prison, early twentieth-century mass production and modern CCTV. This demonstrated that Bentham’s early nineteenth-century thinking still has resonance within our modern society and has recurred regularly, for example in the thinking of Frederick Winslow Taylor (who makes no reference to Bentham). It also presented social history as the history of society and of ideas about society. This is close to the academic discipline of social history, but is a new approach in a museum context. Social history in museums is more typically portrayed as human interest stories, or giving the story a human face, as some of the curators who participated in a Focus Group interview expressed it.

The exhibition presented a view of history as an interpretive discipline, whereas the more common type of history seen in museums is more descriptive. This exhibition focused on themes and ideas rather than facts and dates. The past was not presented as objective and quantifiable facts, but as something open to interpretation. I wished to show history as a social rather than exact science, a discipline that analyses and interprets the past, rather than categorising and recording it. It was with this goal in mind that I displayed four different perspectives to the story, as will be discussed below, under Structure of the Exhibition.

209 Portsmouth Panopticon, Museum Professionals Focus Group 1/7/2009.
A more specific intended outcome was to portray the machinery as part of a wide human context. I hoped to achieve this by examining the machines through Bentham’s thinking. I also wished to advocate a view of maritime history and land-based history as interconnected, and as part of that same wider context. Without the dockyard there would have been no fleet and vice versa.\textsuperscript{210} The fleet and the navy ensured the survival of the empire, which fostered the growth of the industrial revolution.\textsuperscript{211} This in turn provided the innovations that led to the building of the Block Mills. I wish to portray the dockyard as an integral part of the development of the navy and the industrial revolution.

The exhibition also aimed to promote the Block Mills to a wider public. Although the surviving machines are displayed in two exhibitions, they do not play a prominent role in either of them. The Block Mills building has recently been restored by Defence Estates under the guidance of English Heritage, but, located in a military area, remains inaccessible to the public. Greater public awareness of the building would be advantageous in securing a sustainable solution for its future, which will include some form of public access.\textsuperscript{212}

\textbf{4.3.2 Target audiences}

Exhibitions should be targeted at specific audiences as are books, articles or television programmes.\textsuperscript{213} No exhibition can reach everyone. For example, language limits the audience to those who can understand it. While it is possible to translate exhibition text

\textsuperscript{211} Hobsbawm (1999): \textit{Industry and Empire}, p.34-36.
\textsuperscript{213} Ambrose (1993): \textit{Managing new museums}, p.70.
into several languages, it is not always practical or useful to do so. Therefore decisions must be made as to who the target audience is. This includes defining the age groups, education levels and interests of the intended audiences.

I decided to target an audience of adults and children over 14, visiting with family or friends or alone, rather than for example school groups. I had two reasons for this. Firstly, writing complex material for children is a very specialised skill. As my experience of writing for children is very limited, targeting adults and older children was a practical decision as well as one of principle. Secondly, much of what is seen in museums is currently aimed at school age children, at the expense of displaying content that could interest adults. In Britain, publicly funded museums have very wide educational objectives set by the government. For example the Museums, Libraries and Archives Council (MLA) runs a Strategic Commissioning programme to increase school participation in museums. School groups and families are thus vital visitor groups, and much exhibition content is aimed at children.

I find this bias towards children particularly prominent in museums displaying science and technology topics, and thus important to address with my exhibition. The Science Museum, for example, has in recent years put up distinctively child-oriented blockbuster exhibitions such as The Science of Aliens (February-October 2006) and the Game on games console exhibition (October 2006-February 2007). By contrast, the

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215 This is supported by recent research which suggests people over 70 visit museums less frequently than the 16-24 age group often targeted by museums. Nightingale, J. (2010): ‘Age concern’, in Museums Journal, Issue 110, p.28-31.
National Maritime Museum in Greenwich is an example of a museum catering for different visitor groups. For example the interactive galleries *All Hands* and *The Bridge* are aimed at children while adult visitors are the focus in the historical galleries such as *Atlantic Worlds* or *Maritime London*. This is evident even in the marketing of the galleries: images on the Museum website portray children engaging with interactive displays in *All Hands* and *The Bridge*, while pages for the adult-oriented galleries focus entirely on the content.\(^{219}\)

My exhibition was intended for an audience primarily interested in general history rather than technology or warfare. These were not ignored, of course, but the emphasis was on historical interpretation.

### 4.4 Material Gathering

I will now examine each of the four phases of the exhibition process in turn, starting with Material Gathering. The process of gathering material starts with the initial exhibition idea. This is developed into a defined concept and a body of material to draw upon for the intellectual content. This material forms the base from which ideas, themes and messages are extracted to form the storyline.

I started my search by reading material directly about the Block Mills, such as Gilbert’s booklet on the machinery and Cooper’s work on the system of production.\(^{220}\) This was both because it was the literature most obviously focusing on the Block Mills, and because I wished to understand what was innovative and exciting about the objects at


the centre of the story. I did not wish to display many technical details about the machines, but I used this material to explain the basic functions of the machines. Its main use for me was in understanding the system of production and how the ideas of production and control were put into practice. In this respect I found Coad’s book on the Block Mills very important. He looks at the dockyard more widely than the machinery alone, and depicts the Block Mills as the start of the navy’s industrial revolution.\[^{221}\] I decided that portraying the Block Mills in this way in an exhibition would be a good way to approach the subject, as it would tie the Block Mills with an event most people are familiar with.

I followed this work with more literature on the dockyards around 1800, particularly by Morriss.\[^{222}\] It quickly became apparent that the Block Mills were not the only reform in the yards at this time. I was especially interested in the changes the workforce experienced, as I see this as a crucial element of the industrial revolution. I decided this would be an interesting angle to display, both because everyone has experienced some kind of technological change, and so can relate to the issue, and because it is different from the more traditional, heavy technology centred approach. Coad writes about the industrial revolution, but as an archaeologist and architectural historian, his focus is on the buildings and he barely mentions the workforce. I expanded my search towards work on dockyard workers. This included a volume edited by Kenneth Lunn and Ann Day on dockyard labour relations, and a paper by Coats on workers in the Block Mills.\[^{223}\] These social historians focus much more on the workforce as a whole and how labour relations affected the operation of the dockyards, for example. Through these

\[^{221}\text{Coad (2005): The Portsmouth Block Mills.}\]
\[^{222}\text{Morriss (1983): The Royal Dockyards.}\]
themes and the issue of chips, the workers’ right to collect waste wood, I came across Linebaugh’s work. He argues that Samuel Bentham’s thinking on the Panopticon was similar to what was manifested in the dockyard.\textsuperscript{224} He portrays control over the workforce as the key in both cases. Researching Bentham, I also encountered Ashworth’s article that expressed similar ideas.\textsuperscript{225} I was fascinated by the concept of Panopticon in the dockyard, and found supporting evidence for it for example in Coad and Cooper’s work describing the bird’s eye view from the walkway across the Block Mills. I later saw the view myself and was convinced of its purpose and link with the Panopticon: the workers below could not see the manager, but the window afforded an excellent view over the shop floor. I was very interested in this human subtext to the building of the machinery, and believed museum audiences would find it equally fascinating.

When choosing the material, I looked for concrete manifestations of the ideas I wanted to display. Surveillance was a strong element in the exhibition, both because it is central to the principle and because it is possible to explain with relatively little text. Choosing the material, I had to bear in mind the practicality of display as well as the academic issues I wanted the exhibition to address. However, at this point in the process finding a good idea for a story and enough material to support it took precedence over practical concerns.

As seen in Chapter 3, I found an abundance of literature to draw upon for the exhibition. Starting from a very narrow specialist topic, the Block Mills, I expanded to wider issues. This showed the Block Mills in the context of war and industrialisation, as well

\textsuperscript{224} Linebaugh (2003): \textit{The London Hanged}. Chapter 11.
\textsuperscript{225} Ashworth (1998): ‘System of terror’.
as including the less-known ideas about Panopticon. Using familiar and unfamiliar material allowed me to construct a background that made the Block Mills easier to approach and to understand, as well as to introduce more complex ideas such as the Panopticon. The advantage of using familiar material is that the audience feels familiar with some of the issues on display. This reduces the need for complex and lengthy background explanation. Displaying well-known and relatively new concepts together also stimulates thinking, as familiar ideas are seen in a new light.

The end products of this phase are the body of material from which to draw the ideas (discussed in detail in Chapter 3), and the concept, or brief, for the exhibition. As I developed the concept, it also guided my further search for material.

4.4.1 The concept

The key idea of the exhibition was one put forward in the work of Linebaugh and Ashworth: Samuel Bentham’s dockyard reforms and particularly the Block Mills were based on the thinking behind the Panopticon principle. Made famous by Jeremy Bentham’s design for a circular prison where inmates were observed from a central tower, the principle was first devised by Samuel to control an undisciplined, unskilled workforce in Russia. The key elements were control, visibility or transparency, and employing unskilled labour and machinery. These were central to the exhibition. To reflect the central role played by the concept, I called the exhibition *Portsmouth Panopticon*.

The central aim was to display the Block Mills in a wide context of economy, society, and war. They were seen as the start of the navy’s industrial revolution. The Block Mills
constitute the first use of steam powered machinery in naval shipbuilding, a traditional way of perceiving the industrial revolution. More importantly, they also represent a new mode of production, in which control over the work process was transferred more overtly from the private contractor managing artisan block makers to the naval management of the Block Mills. They also demonstrate Admiralty behaviour in seeking to break the contractors’ monopolies over materials and supply of blocks.

The exhibition was built around the concept of control over the workforce, and the notion of the industrial revolution as a social phenomenon. Industrialisation resulted in profound changes in perceptions of work and in labour relations. It is this perspective to the industrialisation process that the exhibition focuses on. In a museum context, this was a new approach to a familiar story. It was also a new approach to the block machines: the machines were featured in the exhibition, but they were secondary to the historical developments that brought them into existence. The focus of the exhibition was thus on issues rather than facts.

4.5 Interpretation

In the Interpretation phase I determined the messages I wanted to convey through the exhibition. The main aim was to produce a content hierarchy outlining the story the exhibition would tell. This was perhaps the most personal part of the process: choosing the themes and messages from the material was essentially communicating my own views about the past and about history to the public. I will attempt to describe my route in condensing these fairly complex ideas into short messages. Describing the mental process behind my choices is much more difficult, which could in part explain the lack

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226 Bentham had used steam previously for pumping out docks.
of literature on this particular element of the process. As discussed above, exhibition processes are described in literature such as the book on the British Galleries at the V&A. Such works focus on the practical implementation of ideas, not the creative mental process that produced those ideas. I will here attempt to explore both.

In choosing themes from the literature, I considered both their importance in the overall story, and their practicability for display. Control over the workforce became a central theme through which I tried to explain the Panopticon and the Block Mills. It was a uniting theme in this context. I considered the themes I included or omitted very carefully. For example, I included the question of replacing the right to collect waste wood by an allowance known as chip money. However, I left out the complicated arrangement that allowed chip money to Block Mills workers who were taken on after the perquisite was commuted to a cash payment. I decided this would complicate the overall picture too much. In some cases even though the idea was suitable for display in theory, there were too many practical obstacles. For example, I thought about displaying a food basket, similar to what a dockyard worker’s wife may have prepared and brought into the yard for his dinner. This could have illustrated the dockyard workers’ way of life and standard of living, and introduced aspects of division of labour by gender. However, while the practice is mentioned in the literature, there are few details about diet, and reconstructing a realistic basket would have required quite extensive research of primary sources. The aim of the exhibition was to display issues from academic literature rather than factual information, and such research would not have served this purpose.

One of my key aims in the exhibition was to show a human side to technological development. Thus I looked for material that would support this aim, such as accounts of people adapting to change. There was relatively little such material directly related to the dockyards, so I looked further afield, to industrialisation. I examined themes such as surveillance from a wide human perspective, and avoided stories of individuals. What I wished to convey of the industrialisation process of the dockyard were the sometimes conflicted interests of different groups of people, and the way such an enormous workplace functioned and adapted to change. Ideas of controlling what were referred to as the lower orders of society were much less veiled in the early nineteenth century than they are today, but traces of similar thinking can be seen in modern surveillance technology: CCTV cameras are claimed to improve safety and protect the public.\(^{230}\) The crime they detect is almost exclusively low level street crime typically committed by individuals from lower socio-economic classes, suggesting that these are what the public is protected against.\(^{231}\)

In creating a coherent storyline my idea was to start from wider topics and progress towards more specific issues concerning the Block Mills and the dockyard. This way the Block Mills would stand out against a solid background of historical events such as the Napoleonic wars and the industrial revolution. The visitor would encounter these more familiar events and issues together with less familiar things, such as the Panopticon or block making. I assumed that most museum visitors over the age of 14 would have encountered the industrial revolution in either school history, television or other media, and be familiar with the names of Napoleon and Nelson, as these are


widely known. The familiar names and concepts provide a background to the less well-known dockyard history and a way of anchoring the issues to a time period.

Figure 4.1: A timeline from the section War and Industrialisation. Familiar images of Nelson, Napoleon, Ford Model T and the Spinning Jenny, were intended as visual clues to help the visitor place the Block Mills within a wider historical context.

From the start I envisioned the exhibition functioning as separate sections, based around the block making machines and the Panopticon concept. The original version was divided into six sections, two of which were eventually dropped in order to have more time to devote to the core sections. Of the original sections Fame was left out because although important, I decided it was not essential to the story and would have complicated the overall picture. The idea of Fame was to show how Bentham used the Block Mills to market his vision of work. The dockyard was a popular tourist attraction by the early nineteenth century, and Bentham encouraged especially influential visitors to tour the Block Mills in the hope of spreading his ideas. For example the Emperor of Russia and the King of Prussia were included in a royal party visiting the Block
Using contemporary tourist guides and accounts by visitors my plan was to draw parallels to the Block Mills as a tourist attraction today. *People of the Yard* was dropped because the amount of material in the literature was insufficient.\(^{233}\) The central idea for this section was to illustrate the life of the closely knit dockyard community. The workforce of the yard was enormous with its own traditions and way of life. This section was intended to provide a people-centred approach. Part of the material was incorporated in *Dockyard Economy* which was thematically very close. The four sections I finally chose to display were *War and Industrialisation*, *Panopticon*, *Blockmaking*, and *Dockyard Economy*. The storyline was not a continuous narrative but the sections were united by the common themes of the Block Mills and the Panopticon principle.

Under these broad headings I produced a separate storyline for each section. I organised the material from the literature under a few key themes. For example some of the themes under *Panopticon* were the reorganisation of the workforce, supervision in the dockyard, and Bentham’s vision of work. I grouped the material loosely around the themes, and through this process gradually worked the themes into messages to convey to the public. This was a very intensive and time-consuming process, because it involved condensing large amounts of text into a few short statements. I re-read parts of the material several times and selected key ideas I wished to convey, distilling these into short sentences. The aim was to have a set of clear, concise messages to convey to the public through images and objects in the exhibition itself. These messages would then be used as a kind of guideline or skeleton for the exhibition script.


\(^{233}\) There is a vast amount of material in archives but this is not easily accessible, and it was not the aim of my study to conduct archival research.
I used a message document, or content hierarchy, from a Thinktank exhibition called *Recycle It* as a model for developing my own messages. The purpose of a content hierarchy is to organise the intended exhibition messages with the more general headline messages at the top of the hierarchy and the more detailed, specific points lower down. The document I used as an example had one headline message for each part of the exhibition, and two or three lower levels of more specific messages. An example of a general message for the whole exhibition is: “UK society generates a vast and increasing amount of domestic waste”. For a specific part of the exhibition called Process, a top-level message was: “Recycling is only one option for dealing with domestic waste – it can also be incinerated to release energy or sent to land-fill sites for long-term storage”. A lower-level, more detailed message for the same section is “Ferrous metals are extracted using powerful electro-magnets”. The messages were delivered in a short format, intended to convey the purpose of each part to the team working on the exhibition. The team would use the content hierarchy as a guideline for creating an exhibition that would communicate these messages to the public. I followed a similar basic pattern for my document, but opted for more headline messages in each section, as my subject matter was more complex.

At every stage of this process, the key aim was to simplify, condense and prune, so as to have a clear purpose for each section. I started by composing a short essay based on the material examined in Chapter 3, then further condensed this into two or three paragraphs briefly explaining what I wished to achieve with each section, and finally into the brief messages seen below, under The Main Sections of the Exhibition. During this process much of the material that was included in earlier plans was left out. For

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234 The document has been used as an example in the Science Museum. The exhibition is part of Thinktank’s permanent education programme and was in the development stage in 2006.
example, the first version of the content hierarchy contained three or even four levels of messages, whereas this was reduced to two for most sections in the final version. In the earliest version of the message document, Dockyard Economy had four levels of messages. The omitted Level 4 messages were:

- Piecework was resented, as it left the artificers less control over the pace of the work.
- Working hours in the Block Mills remained as long as in the rest of the yard.

In the final version, the interpretation focuses much more tightly on the issue of chips as a concrete example to explain the dockyard labour relations.

The key processes in the Interpretation phase were thus selecting the themes and focusing the messages. The end result was a 500-word skeleton around which the exhibition was built. The messages for each section are included below under the appropriate headings. The message document can be found in Appendix B.

4.5.1 Structure

As stated above, the exhibition was divided into four sections, each dealing with a different issue. I chose this model because I believed it would be a good way to divide a large and complex subject into smaller portions. It also allowed me to look at the subject from a variety of angles, focusing on one perspective at a time. By displaying these different perspectives to the story, I wished to underline the role of history as an interpretive rather than a descriptive discipline. Selecting different angles to display the story provided a more nuanced picture than for example portraying a purely industrial

235 Blockmaking remains the only section with three levels of messages.
or economic history perspective alone. I wished to highlight the complex nature of historical interpretation.

Each section was intended to work both in conjunction with the others, and on its own. They could be viewed in any order, as there was no continuous narrative. In addition to the four main sections there was a separate fifth section explaining the function of each of the block making machines. This was intended to connect the tangible machines with the more abstract history exhibited in the other sections. As the machines were what made the Block Mills unique, I believed that knowing how they functioned would help the visitor to gain a deeper understanding and connection with the subject.

To portray a variety of perspectives to the Block Mills and their history, I used a top-down view alongside a bottom-up approach. What I call top down here, is the kind of history usually associated with formal social structures, the government and powerful individuals and institutions. A bottom up perspective, also known as history from below, takes the point of view of the common people rather than the establishment. The dockyard as a government institution employing thousands of independent artisans, and at this time in the middle of a war, offers interesting material for both perspectives. It is an ideal focus for an interpretation that juxtaposes these two opposite angles. In some sections I portrayed a top down approach, focusing on the management perspective and control, while in others the workforce and the small craft of blockmaking took centre stage.

The different approaches varied according to how concrete or abstract they were. By abstract I mean the kind of history that looks at the past through social structures and
theories. The focus is on society and human behaviour, for example, and the perspective is wide. By a concrete approach I mean history focusing more closely on individual phenomena such as the workings of a particular trade like blockmaking, or a specific war. This kind of history has a more grass-roots approach, looking at concrete things and events rather than theorising more widely about society.

The four sections of the exhibition each represented a different approach to the history of the Block Mills. These approaches are summarised in Table 4.1. They are either concrete or abstract, and look at history either from below or from above. For example *Panopticon* displayed a top down abstract perspective, whereas *War and Industrialisation* represented a top down concrete one. *War and Industrialisation* looked at the practical elements of war and of the industrial revolution focusing on the structures, rather than the people involved. *Panopticon* looked at the ideas that led to the building of the Block Mills, again from a perspective focusing on the structure and organisation of the workforce, rather than the point of view of that workforce. *Blockmaking* and *Dockyard Economy* on the other hand, represented views from below in the sense that they both focused on the people who worked at the dockyard. *Blockmaking* took a concrete viewpoint to the trade of blockmaking and how it changed. *Dockyard Economy* looked at the much more abstract issue of economy in the very localised context of the yard.

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<td><em>War and Industrialisation</em></td>
<td><em>Panopticon</em></td>
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<tr>
<td><strong>Bottom-Up</strong></td>
<td><em>Blockmaking</em></td>
<td><em>Dockyard Economy</em></td>
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*Table 4.1:* Different approaches to history in *Portsmouth Panopticon.*
The fifth section, focusing on the machinery, was somewhat different from the four main sections. It does not fit into the model seen in Table 4.1, because it does not have a historical perspective. The aim of section 5 was to introduce the visitors to machinery that was likely to be unfamiliar to them. Its focus was technical rather than historical, as it simply described the functions of each machine. This section was similar to more conventional interpretation of machinery in museums. It represented the machines as objects. Ideally I would have liked to display the machines themselves, but this was not possible. Fortunately, and completely unplanned, some of the machines were on display in the exhibition adjacent to where I held mine, and could thus be juxtaposed with it.

The layout of the exhibition was based on the Panopticon model. Each section had its own separate cell with the machinery section at the centre as a unifying element. This layout was intended to reinforce the idea of control and supervision. It replicated the form of the Panopticon prison, where prisoners were kept in cells along the perimeter of a circular prison building. The guard observing the prisoners remained hidden from view, so inmates did not know when they were being observed. The circular form of the Panopticon building inspired the design, although for practical reasons I opted for a semi-circle. The cell design gave the visitor a sense of confinement and emphasised the messages of shifting control and worker freedom. It also divided the different approaches to the Block Mills into manageable and clearly defined parts. I believed this could make it easier for visitors to adjust to each perspective on display as they moved from one cell to another. The design showed up the different perspectives on a concrete, visual level.
Figure 4.2: Each section had its own cell in the layout, seen here with colour codes. Each cell had a large poster or two on the back wall, and smaller posters on the separating walls.

4.5.2 The main sections of the exhibition

Each section supported the headline messages for the whole exhibition. These were:

- Machines are part of a wide human context, and I will interpret them through people and their thinking
- The Industrial Revolution created fundamental workforce changes and shifted control of the work process
- Samuel Bentham saw dockyards as machines for maintaining warships
- His dockyard reforms were based on the panopticon principle and his new vision of work
- Dockyard changes affected the Navy, war and the empire, as well as dockyard workers

4.5.2.1 War and Industrialisation

This section set the scene for the building of the Block Mills, and thus the rest of the exhibition. It portrayed the economic, social and political situation in the country at the time. The period from 1793 to 1815 was dominated by war and the industrial revolution. There was an ever-present fear of Jacobin rebellion and French invasion, and vast amounts of resources were directed to the war effort. The size of the fleet grew from just under 400 vessels at the start of the war in 1793 to over 700 by 1800, peaking at over 900 in 1809. These ships required maintenance, crews and supplies. To finance this expensive war, the government introduced a new income tax, in use from 1799 to 1816, to ease the cost of borrowing. Simultaneously, industrialisation fostered the growth of a large population of urban poor in larger cities. As one consequence the ruling classes grew anxious about social unrest. This anxiety is reflected in legislation against trade unions and the Combination Acts of 1799 and 1800, immediately after the French revolution of 1789.

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238 Hobsbawm (1962): The Age of Revolution, p.120-122.
The story of the Block Mills is closely intertwined with the war as well as with industrialisation. The enormous initial investment of £54,000 for building the machinery was justified by the war. The new social order created by industrialisation called for new ways for the ruling classes to maintain control. In the context of the dockyard this was done for example by forbidding private yards from employing men leaving the King’s yards, prosecuting shipwrights who tried to emigrate, and through Bentham’s reforms.242 A key element in these attempts to control the working classes was fear. This section aimed to present the Block Mills and Bentham’s factory system as an answer to that fear.

I divided the section into two sub-sections, War and Industrialisation. They were displayed together to emphasise their interrelation, but treated separately for clarity. The connection between war and naval shipbuilding is an obvious one. Industrialisation is far less visible in dockyard history, although elements of it underpin Coad’s account of the Block Mills, for example. In this section I bring together these elements in a way that combines views from industrial and naval history perspectives.

The sub-section War showed the enormous production pressure imposed on the dockyards, using the work of Morriss and Wilkin.243 I displayed for example the size of the fleet, demonstrating how it grew during this period. Coad’s views were also an important inspiration for juxtaposing the wartime pressure and its impact on the industrialisation process of the yard.244 Linebaugh writes about the crisis of what he calls thanatocracy, ruling by fear of death, and the notion that public hangings were

244 Coad (2005): The Portsmouth Block Mills.
losing their power as an implement of fear at the end of the eighteenth century.\textsuperscript{245} He argues that the large urban population that had experienced war, slavery and revolution, could no longer be controlled by the sight of individuals punished by hanging.\textsuperscript{246} This was relevant because it affected thinking on controlling the workforce: the working class was getting larger and posed a threat of unrest, and their fear of the death penalty alone was no longer sufficient to maintain order.

The sub-section \textit{Industrialisation} portrayed the notion put forward by Berg and Hobsbawm, that the industrial revolution was primarily about workforce control and reorganisation, rather than simply technological innovation.\textsuperscript{247} Ashworth and Linebaugh’s works are important sources for this section, as they have looked at the ideas behind Bentham’s reforms at the dockyards, such as the notion of individual responsibility and de-skilling.\textsuperscript{248} For the more immediate effects of the war on the yards I drew upon Morriss’s and MacDougall’s work on the dockyards.\textsuperscript{249}

The Napoleonic Wars and especially the industrial revolution are familiar to most people from school history or popular history. They are very concrete, practical issues that had a wide impact on all levels of society. Placing the Block Mills into this context tied them into historical issues much wider than technological change at the dockyards. This section provided a framework against which the other parts of the exhibition could be placed. It also worked on its own as an introduction to the role of the dockyard in both war and industrialisation. I hoped to convey that the development of these


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machines was neither arbitrary nor isolated, but connected to what was happening in the world beyond the dockyard.

The key messages I wished to put forward in this section are divided into two levels, with the headline messages for the whole section constituting Level 1, and the more specific messages Level 2.

Level 1
- The key to the industrial revolution was workforce control.
- Wars against France between 1793 and 1815 put enormous pressure on the dockyard to fit out and repair warships.
- These factors motivated the navy’s industrial revolution in the Block Mills.

Level 2
- War
  - The dockyards were under huge pressure to return warships to sea
  - Fears of French invasion and Jacobin revolution were widespread
- Industrialisation
  - Shipbuilding and repairs required centralisation and skills
  - The industrial revolution changed perceptions of work

4.5.2.2 The Panopticon

This was the most abstract section of the exhibition, dealing with Bentham’s thinking, the Panopticon principle, and its application in the dockyards. In this section a social theory, the Panopticon, was applied in a very specific historical context. The aim was to explain Bentham’s concept for a factory, and the idea of control through surveillance.
The key works I drew upon for this section were again those by Linebaugh and Ashworth who have both put forward the idea that the Panopticon idea drove the dockyard reforms. Their perspective focused on ideas. For a more practical, dockyard centred view I drew upon the works of Morriss and Coad. I also included some biographical details about Bentham, taken from the work of Maria Bentham and Ian Christie.

I explained the concept through the prison model designed by Jeremy Bentham, because it is the best known application of the principle. The prison itself was never built in the form Bentham had planned, and it had little to do with the dockyard. It nevertheless serves as a useful way of explaining the principle, as it connects the abstract idea with a concrete plan for a building. The design was also made manifest in the Block Mills where an opportunity for invisible supervision was built into the walkway above the shop floor. The image of a prison also emphasised the role of surveillance in the Panopticon principle. The key elements of the principle were control, visibility, and using unskilled workers and machinery to do the work of skilled men. The emphasis was on controlling the worker or inmate. Jeremy Bentham called it “a mill for grinding rogues honest and idle men industrious”. 250

There were two key aims for this section. The more immediate and concrete one was to explain the Panopticon principle and its role in the dockyard. A more abstract goal was to encourage visitors to think about the role of control and surveillance in the workplace.

250 Quoted for example in Ashworth (1998): ‘System of terror’, p.69; The use of the Panopticon principle in factories was also discussed in one of the Focus Groups for the exhibition, discussed in Chapter 5.
in the context of the industrial revolution and beyond. The messages I hoped to convey are, as above, divided into two levels:

Level 1
- Bentham’s new principles drove workforce reorganisation
- Key panopticon components: control, visibility, machinery, unskilled labour
- Bentham’s dockyard was transformed from a shared workspace for autonomous trades to an integrated machine

Level 2
- Under the new work methods the worker no longer controlled how, where and when each task was performed
- This control was essential to developing the Block Mills
- Bentham advocated more businesslike and transparent dockyard administration and accounting

4.5.2.3 Blockmaking

This section represented history from below in the sense that it described the industrialisation process of naval shipbuilding from the perspective of the trade of blockmaking. It was a practical look at dockyard skills and perceptions of work and how these changed as a consequence of Bentham’s reforms.

The idea was to show the effect of the Block Mills on the craft of blockmaking. There were two kinds of changes: to the trade itself and to the dockyard. Craft skills were mechanised and moved into the yard under the navy’s supervision. The navy’s blocks were no longer made by the same people, in the same places or by the same processes
as before. At the same time, the dockyard had to accommodate not only new buildings and technology, but new trades with new skills, work practices and connections outside the yard. Naval block making was also now in the hands of the navy, rather than private block makers. Before the Block Mills were built, blocks were made outside the yards by private contractors, some of whom had simple machinery and employed block makers in their workshops. The Taylors, father and son, who produced blocks in Southampton and monopolised production, had water- and horse-powered machinery.

This section included an explanation of what a block is and what it is used for. The approach was practical, but more abstract issues, such as the changing nature of work were also displayed. The key works I drew upon for this section were Cooper’s two papers about the Block Mills, John Field’s local history work, and the more practical aspects of for example Coad’s work. I also used more abstract literature, for example Linebaugh and Berg, for changing ideas of skill and work.

The key messages I derived from this literature are presented in three levels, rather than two as above, since there were complex changes on two levels of dockyard operations.

Level 1

- The Block Mills introduced two changes:
  - Changes to the blockmaking industry
  - Changes to Portsmouth Dockyard
- The defining change was the shift of control from the blockmaker to the Block Mills management.

Level 2
- Changes to the blockmaking industry:
  - Who? – Blocks were made by unskilled workers instead of skilled artisans.
  - Where? – They were produced in the dockyard, under direct naval control, instead of independent workshops.
  - How? – They were produced by machine, instead of by hand.

- Changes to the dockyard:
  - A new trade and set of workers were brought into the yard
  - New steam skills
  - A new building

Level 3

- Taylor and Dunsterville, the largest contractors, used water- and horse powered machinery

- The steam-powered machines in the Block Mills represented a technological revolution

4.5.2.4 Dockyard Economy

The last of the main sections focused on Portsmouth Dockyard. The aim was to show that Bentham’s reforms concerned the yard as a whole, not only the Block Mills. His aim was to challenge the traditional balance of power, which was shown through the internal economy of the yard. This notion was at the heart of this section.

Linebaugh has used chips as a way of explaining the rather complex traditional internal economy of the yards, and how Bentham’s reforms challenged that order. I used the idea in a similar way, showing both the workers’ and the management’s views on the
chips issue as a way of demonstrating the balance of power. “Chips” was a traditional perquisite allowing workers in the wood trades to collect waste wood for their own use, which caused friction as the right was often abused. I used them as an accessible way to display standards of living, as perquisites and pilfering formed an important part of the dockyard workers’ income. From the management’s perspective this was a serious problem. Because the scale of the operation was so large, pilfered materials added up to considerable amounts.²⁵¹ Along with Linebaugh, the works of Field, Morriss and Knight were important sources for this part.

In this section I also examined the local economy and yard operations as a whole. The balance of power within the yard was matched by another important balance, that between the yard and the town of Portsmouth. The local economy was closely intertwined with the yard. For this part I drew mainly upon the works of Thomas, Field and Coad.

Although the focus was on the grass-roots level of operations, mainly the workers and their survival, this was a more abstract section than Blockmaking. The emphasis was on the balance of power and the rather abstract significance of chips. A key aim was to evoke thoughts about the complex nature of workplace relations, and how these are influenced by ideology and tradition.

The key messages are, again, presented on two levels:

Level 1
- Bentham’s reforms changed dockyard culture beyond the Block Mills

- Bentham aimed to improve efficiency, eradicate waste and run the dockyards as a business, with transparent accounts
- The traditional balance of power between dockyard management and workers was changed
- British naval dockyards were the largest industrial enterprises in the world, employing thousands even in peace time

Level 2
- Chips were an economic necessity and a traditional right to the workers
- Management saw them as waste, because the right was often abused
- Money substituted for chips was a more formal mode of remuneration. It was more reliable, but also meant a loss of independence.
- The navy improved efficiency and workforce control with chip money

4.5.2.5 The machinery section

In addition to the four main sections, there was a display focusing solely on the block making machines. This section explained the functions of each machine and showed how they worked in conjunction to produce the shell and the sheave of a block. There were no historical messages as such for this section because the focus was on objects rather than history. The aim of the section was simply to familiarise the visitor with the block making machines and the process of making blocks in a factory environment. The machines were the central, unifying objects in the exhibition. I decided it would be useful for visitors to understand their functions, as it ties the more abstract historical issues to something tangible. It also provided a contrast to the section about block making, explaining the mechanised process. Although I did not display a detailed description of making blocks by hand, the implication was that each of the actions
performed by a separate machine had previously been done manually. This gave an impression of the complexity of the task.

I also gave a brief overview of the people involved in designing, building and installing the machines, Marc Brunel, Henry Maudslay, and the mechanist and project manager of the Block Mills, Simon Goodrich. The aim was to show the machinery as a product of human hands and minds. They were built by a group of talented, innovative individuals who each had an input on the final product. In the rest of the exhibition I concentrated on Bentham, because the emphasis was on the system rather than the physical machinery. The other key individuals, dealt with in this section, had more to do with the physical machines than Bentham.

4.6 Expression

In this section I describe expressing the messages formulated in the previous phase through the actual exhibition. Interpretation and Expression together form what I see as the core of the process of creating an exhibition. In the Interpretation phase the raw material acquired during research is distilled into a set of messages. In the Expression phase these messages are then expanded into a script that contains all of the exhibition text and descriptions of the exhibits. This part of the process involves selecting the material for display and writing the exhibition text. I found this to be the most challenging phase of the process, as it involves a mental leap from abstract ideas to expressing them with concrete exhibits.

As explained in Chapter 1, at this stage in the process my supervisor from the Science Museum, Dr Dan Albert, left his post, and the exhibition plan had to be dramatically
altered. The Science Museum’s collections and exhibition space were no longer available to me. It was decided that I would create a poster exhibition and use images instead of physical objects. This decision changed the nature of the task, as expressing ideas through objects is different from expressing them through images. Museum objects can be special, even unique, whereas images are not. Images lack the authenticity and immediacy of three-dimensional objects. They do not grab the attention of the viewer in the same way objects do. As I set out to design the posters, I assumed I would have to work hard to attract and maintain the attention of my audience with a poster exhibition.

Sourcing the exhibition materials was also very different when working solely with images. I had looked into the Science Museum’s object collections for inspiration, and a key problem I identified from the start was finding suitable objects within the limitations of an existing collection. Much of the material I had imagined would be available was not in the Museum’s collections or in some cases did not exist at all. In this way the change of medium was actually quite helpful, as working with images was closer to the original academic medium. Switching to images also put me in a very different position regarding sourcing the materials. Unlike museum objects, images can easily be borrowed from almost anywhere with permission, and I had access to millions of images on the internet. The seemingly endless possibilities made decision-making rather taxing, so I decided to focus on museum collections available online. As my main source I used the Science Museum’s Science and Society Picture Library, which contains approximately 60,000 digital images related to science and technology, and thus largely relevant for my topic.\(^\text{252}\) The Science Museum agreed to waive the fees

\(^{252}\) [http://www.scienceandsociety.co.uk/](http://www.scienceandsociety.co.uk/)
normally charged for using their material. I supplemented this material with images from other online image collections, but focusing on one collection helped me to define the boundaries of the project.

4.6.1 Selecting the material

Expressing fairly abstract messages through images and very limited text is a difficult task, as the media are so different. As discussed above, I could not find a useful model for doing this in existing museological literature. Therefore, as I set out to choose the material for my exhibition I did not know how others may have accomplished this task. What follows is a description of the techniques I used.

I started by stripping the messages down to basic elements in an attempt to crystallise the ideas I wanted to convey. Instead of taking me closer to a concrete display, this technique first took me to a more abstract level. For example, I ended up with elements such as “change”, “skill” and “the nature of work”, which are very abstract and difficult to convey. This seemed counterproductive, but it actually helped to clarify the exact elements that I wanted the audience to see. The wider, more general topics alongside the more specific points turned out to give depth to the overall story.

In the process of searching for the most suitable images to convey my messages, I identified five layers of meaning that required careful thought. These were, with examples:

- General topic – “the nature of work”
- Message – “Bentham’s new principles drove workforce reorganisation”
- Specific elements – modern ideas of work versus historical ideas
- General object ideas – modern and nineteenth-century images of people working
- Specific object ideas – specific images, see Figures 4.3 and 4.4, below

I worked from wider topics towards more specific exhibit ideas. Going from general to more specific ideas proved very difficult. It was easy to move too far from the intended message. For example, an idea I had for conveying the fear of revolution and French invasion was to display images of the terrorist attacks in London on 7 July 2005. I abandoned this idea because firstly I considered it to be too far from the intended message, secondly it could have seemed insensitive to the survivors and relatives of the bombings, and thirdly the powerfully emotional images would have distracted attention from the intended message. Instead, I used contemporary illustrations and cartoons that conveyed the idea of fear in the context of the day. It was a more conservative approach, but as fear was not a central concept, I chose not to highlight it with very powerful imagery.

One technique I used was oscillating between the different levels of meaning or communication to gain a wider perspective on the problem at hand. When considering specific points, I tried to think back to the original messages, to keep on target. Linking the tangible images back to the intangible ideas was also a useful way of finding out which images to discard. While browsing image banks I occasionally found interesting images and tried to fit them with messages. This was less helpful, as the aim was to express ideas through exhibits rather than attach them to convenient finds. For example, images relating to Brunel’s Thames Tunnel project would have been relatively easily available, though not directly relevant to the exhibition. I considered including them,
but finally decided against this, as it would have digressed too far from what I wanted the exhibition to convey. Thinking back to the messages it became clear that these images would not fit the overall themes of the exhibition.

For very abstract and wide elements like work, I used internet search engines, images in the press, popular history publications, websites and museums to get an impression of how the public understands the concept in the present and in the past. An internet image search for “work” produced several pages of images of people working in offices using computers and paper, or sitting in meetings. Adding a qualifier like “nineteenth century” gets very different results: the images were almost exclusively from factories or fields. The method does not give unique or definitive results, of course. It gives an indication of the kind of images most frequently associated with the concept. I then used similar imagery to illustrate the changing nature of work.

Figure 4.3: White-collar workers at Clarks' shoe factory, 1963. I used this image in a poster about work. It evoked memories in older visitors who had worked under similar conditions. (Image credit: Science and Society Picture Library.)
Figure 4.4: This image of a nineteenth century joiner’s shop represented a perception of independent artisans’ work. It was juxtaposed with images such as that in Figure 4.3 above to indicate change. (Image credit: Science and Society Picture Library.)

4.6.2 Different types of images

In the exhibition I aimed to convey concepts, issues, and facts. Each required a slightly different approach, and was expressed through the use of different material. Facts were perhaps the easiest of these to express, as a simple statement, image, or table will suffice. I also considered them the least important, as the nature of the exhibition was not factual, but conceptual. My main concern with facts was leaving out as much as possible, as too many facts can draw attention away from the main issues, and risk boring the visitor. Where possible, facts were confined to the smaller posters I called Fact Files. Examples of these are the Timeline seen in Figure 4.1 above, and The Fleet, seen in Figure 4.5.
Figure 4.5: Fact File displaying information about the fleet.

Concepts were the most difficult to display, as they are abstract, and do not easily lend themselves to an explanation through images and limited use of words. The technique I used most with concepts was juxtaposing different images to evoke thoughts. I also used familiar images associated with certain concepts. For example, I displayed a clocking in clock to signify controlled time in the workplace and images from Charlie Chaplin’s *Modern Times* to suggest ideas about the machine-like nature of factory work. In this context I decided to use material that was not strictly historical and related directly to the Block Mills. Such images were intended to provoke thought rather than
convey factual information, and acted as a conceptual and emotional bridge to the past. According to David Lowenthal, the most credible and lasting images of the past are created through a combination of memory or personal experience, historical knowledge, and relics of the past such as artefacts.\textsuperscript{253} I tried to achieve this effect by combining widely known concepts and familiar images with less well-known and rather complex concepts. This meant employing a communication model in which the visitors create their own meaning out of the material on display.\textsuperscript{254}

Wider than concepts or facts, issues were typically the subject of a poster or a whole section. They ranged from war to surveillance to labour relations, and were supported by the facts and concepts displayed. The most difficult task with both concepts and issues was to stay on topic. It was easy to drift away from the message when I found interesting images or facts that did not entirely support the issue, but were relatively close to the topic. For example, I had an idea of using a badly made object and contrast it with a similar but well made one to illustrate skill. This brought up other ideas about modern consumer culture, which digressed too far from the original topic. In the end I abandoned the idea both because it did not fit with the messages I wished to convey, and because it would have been too impractical to realise with images.

The context in which an image is displayed has an impact on the message it conveys.\textsuperscript{255} I tried to use various types of images to convey different messages and responses. The types of images I used can be divided into three categories that I have called Factual, Authentic and Symbolic:

\textsuperscript{253} Lowenthal (1985): \textit{The Past is a Foreign Country}, p.249.
- Factual images to carry knowledge
- Authentic images to carry a direct connection to the past
- Symbolic images to evoke:
  - An emotional response
  - An intellectual response

I developed these categories by reflecting on some of my early choices of images. They overlap in many cases, but these are the key functions I sought images for. The Factual images were the most straightforward of these categories. They included images such as portraits of the key people involved, or illustrations of the uses of blocks. Their function was to illustrate and enhance the factual text that accompanied them.
What I mean by Authentic images includes historic images from the period and other images with a direct connection to the era or events in question. This definition includes photographs of objects where these acted as substitutes for the object itself, such as images of the block making machines. Historic locations were also represented by images that I classify as Authentic, as they are relics from the past but cannot be present in the exhibition. The function of these images was to convey a connection to the past. This is an important issue in story-led exhibitions. Whereas exhibit-led exhibitions focus directly on the objects or images, it is possible to tell a story without using a single object from the relevant era. From the perspective of explaining the function of a
block, there is no need to use a nineteenth-century block. The same goal can be achieved with a replica or even a modern plastic or steel block. In a story-led exhibition the emphasis is on what is being conveyed rather than the object itself.\textsuperscript{256} However, using real objects gives a sense of authenticity that cannot be achieved with replicas and modern artefacts alone.\textsuperscript{257} According to Lowenthal, handling a real object from the past creates a connection and makes the past appear more real.\textsuperscript{258} By displaying images of, for example, floor boards from the Block Mills worn out by the workers’ feet, I was trying to reach a similar type of experience. The connection to the past can come from what is depicted, not only the era when the image was produced. Hence I classify photographs from the Block Mills as Authentic, although they are necessarily from a later period than the one my exhibition focuses on.

The issue of authenticity surfaced at an early stage of the process in a discussion with my supervisor from the Science Museum, Dr Albert. I expressed the idea of using a CCTV camera to explain the concept of surveillance. He suggested I choose a camera that is in some way significant, such as the oldest camera in the collection. I disagreed, as the main function of the camera was not as an object in its own right but as a symbol of something else. This brings me to Symbolic images. Whereas Authentic and Factual images represent what they depict, for example a specific machine or building, Symbolic images represent an idea beyond what is immediately shown, such as a CCTV camera representing surveillance. Symbolic images were intended to evoke an emotional or intellectual response. The image of a CCTV camera works on both levels, as it evokes feelings associated with the modern day device, and thoughts about the

\textsuperscript{257} Lowenthal (1985): \textit{The Past is a Foreign Country}, p.293-295.
\textsuperscript{258} Lowenthal (1985): \textit{The Past is a Foreign Country}, p.245-247.
nature of surveillance. I sought to reinforce the latter response by displaying the image of the camera with images related to workforce control such as a clocking-in-clock.

**Figure 4.7:** Section from the introductory poster juxtaposing Symbolic images.

Iconic images of the industrial revolution and still images from Charlie Chaplin’s *Modern Times* were intended to work on an emotional level, evoking feelings of familiarity. Fitting new ideas in with what is already known aids learning and makes a complex subject easier to understand.²⁵⁹ Images that appear familiar work well in this context. Images associated with familiar ideas such as the industrial revolution also carry some intellectual meaning, but this is secondary to the more emotional effect of immediately recognisable icons such as steam engines or cotton factories.

Figure 4.8: The Little Tramp caught loitering. This strong image of an instantly recognisable situation was intended to evoke an emotional rather than intellectual response. (Image credit: Roy Export S.A.S.)
Figure 4.9: This image of a worker using a boring machine in the Block Mills is from the 1890s. It can function as a Symbolic image depicting factory work, but I have also categorised it as an Authentic image. Although the image is from a later period, it depicts a real Block Mill worker using the same machine in the Block Mills. The process, the location and the machine are authentic. (Reproduced from Coad (2005): *The Portsmouth Block Mills.*)

Caricatures of the Napoleonic wars are an example of Symbolic images to produce an intellectual response. They evoke feelings, as they are drawn in caricature style associated with humour. However, their primary function in the exhibition was an intellectual one. The aim was for the visitor to think about concepts related to the image, for example fear of invasion through depicting the French dismantling the House of Lords, as seen in Figure 4.10. Images of different types of work were intended to encourage the visitor to think about work as a broad concept. They thus primarily served an intellectual function, but in some cases they evoked reminiscence, and therefore also worked on an emotional level. Although I selected each image for one primary function, many of them also served a secondary purpose.
In expressing the complex subject matter of the exhibition, I tried to use a mixture of these different types of images. Most posters contained a mix of different types of images, but there was a small number of Fact Files or Concept Files where I used only one kind of expression. The Fact File Blocks only contained Factual images, whereas in the Concept File Work all images were Symbolic. I tried to include at least some Authentic images in each poster to give the exhibition a genuine connection to the past. Some of the Factual images could also serve as Authentic, which was helpful. For conveying abstract concepts, I found Symbolic images more effective, whereas Factual illustrations worked best for displaying simple facts. This is because what Factual images represent is exact and concrete, whereas Symbolic images work on perceptions.
and ideas. An abstract concept could not be conveyed through Factual images, because they do not take the interpretation further than what is depicted. Of course, it would be possible to interpret the same images in a way that would expand from the immediately visible, for example by juxtaposing images of blocks with images of engine cogs to represent their vital role on the ship. However, displayed in this way they would cease to be Factual images and become Symbolic.

When choosing images, I often decided early on which type of expression I wished to use. Even when I could not select an exact image directly, or needed to keep several options open, I usually knew whether I needed a Factual, Authentic or Symbolic image. In some cases I had different types of images as options, and could thus balance the expression on the posters.

Counterintuitively, the section with the most Symbolic images in the main posters was *War and Industrialisation*, which is a *concrete* section according to the categories laid out in Table 4.1. The *War* poster contained only one Factual image, although a concrete section could be expected to focus more on facts. By contrast the *abstract Dockyard Economy* contains Factual and Authentic images in an equal mix, with only one Symbolic image on the main poster. The picture is slightly more balanced when looking at whole sections instead of the main posters alone. *War and Industrialisation* contained only Fact Files beside the main posters, and no Concept Files. However, this was also true of *Dockyard Economy*. For this particular section I struggled to find suitable material to express the ideas I wanted to convey. I ended up using very solid, concrete examples, such as chips. These are best expressed through Factual and Authentic images rather than Symbolic ones. With *War and Industrialisation* the process seems to
have been almost the reverse. Although the issues in question are primarily practical, I eventually had posters expressing the ideas of war, national fears and workforce control, rather than using more concrete examples. These were expressed in the Fact Files: *Timeline* and *The Fleet*. Thus in the final version Symbolic images dominate the main posters.

The end product for the Expression phase was the exhibition script, which is included in the Appendix. The mental leap from the medium of text and ideas into the expressive medium of images makes this the most intellectually challenging part of the process. It is also the most creative of the four phases for the same reason. The first two phases, Material Gathering and Interpretation, are concerned with the existing material on the topic, gathering and interpreting it, and moulding it into a coherent storyline. The fourth phase, Production, focuses on executing the plans made in the previous phases. In the Expression phase I started with material that was essentially my own interpretation of the story of the Block Mills, and translated this into a medium suitable for display in an exhibition. In other words, at this phase I determined how to convey my ideas to the public. This is very challenging creative work.

4.7 Production

The next phase of the process was producing the physical display. This crucial process was very different from the more intellectual processes described above as it involved working with exhibits and a physical space. The Production phase was where the ideas were transformed into reality. The end product of this phase was the final display, so it was vitally important for the whole project: had the display not conveyed the messages to the visitors, all the work in the previous phases would have been wasted. Producing
the display involved the kind of skills that historians may not have, such as design skills. The decisions and problem solving I encountered at this phase were much more practical than in the previous three phases. For example placing text and images on a poster was very different from creating the content of the text and choosing the images. Much of the editing of content was done at this stage.

The Production phase was less defined by the chronology of the project than the other phases. In addition to producing the display, which could only be accomplished after the content development phases had been completed, it also included matters such as location, schedule and budget. These had to be determined early on to give a clear framework and timescale to the project. For example, budget and space were crucial in determining the scale and format of the exhibition. My schedule was loosely shaped by the length of the PhD project, but when I started I had no real budget to work with, and after collaboration with the Science Museum faded, no space.

The location, as well as a budget, were obtained through the contacts of Dr Ann Coats. After communicating the exhibition design and parameters to the Portsmouth Naval Base Property Trust (PNBPT), the trustees welcomed it as fitting within their aims to interpret the material culture of the Historic Dockyard and complement the Dockyard Apprentice exhibition. PNBPT generously provided a space at Portsmouth Historic Dockyard free of charge, provided administrative support, and offered me a grant of £700 to cover its expenses. Dr Coats’s contacts brought my exhibition to the attention of the PNBPT and without her assistance the project may have collapsed for want of the crucial parameters of location and budget. The space and time of the exhibition were
finally confirmed in May 2009, and the exhibition ran from 29 June to 5 July. This left me with a month to complete the posters I had first started designing in February.

Apart from the logistics of the exhibition, the production phase consisted of three main elements: design, obtaining the material, and construction. They were carried out approximately in this order, although there was some overlap, for example where the design had to be changed due to images being unavailable. I shall now discuss each of these elements individually.

4.7.1 Designing the posters

Designing the exhibition involved making the final choices regarding text and images, and fitting everything onto the very limited surface of the posters. It was important that the posters contained a manageable amount of text and images in an attractive, easy to follow layout.

I have described the semi-circular layout of the whole exhibition above. At this stage my task was to make sure the content of each section was laid out clearly, and that each cell of the Panopticon design contained a similar number of posters relevant to the theme. The format I used was one or two large posters, A0 or A1 size, and two smaller, A3 size posters per section. The smaller posters, Fact Files, were intended to convey information that was useful for understanding the issues on display but that I considered too detailed for the main posters. They functioned rather like fact boxes in newspaper articles. Some of the small posters I called Concept Files. These complemented the main posters by focusing on the more abstract concepts the exhibition dealt with, such
as work or surveillance. Instead of factual information, these posters were intended to evoke thoughts about the concepts on display.

Along with the main sections, there was an introductory poster, a large poster about the machinery at the centre of the semi-circle, an extra Fact File on the final wall about the current state of the Block Mills building and machinery, and a CCTV warning sign. In all, there were 16 posters.

**Figure 4.11**: Part of the final display, showing how the posters were arranged in the cell design. Large posters were on the back walls and the Fact Files and Concept Files on the dividing walls. To the left of the photograph are two blocks borrowed from HMS *Victory*, the only tangible objects in the exhibition. They were replicas, rather than authentic to the era, but they served their purpose well, immediately showing the audience what a block is.
I used a common layout for all the posters, but different colour schemes, both to emphasise the variety of themes and viewpoints, and for a more varied look. The basic poster design consisted of a background image to set the scene, and a main heading. I then used small portions of text to carry the storyline, and images with captions or quotations grouped thematically around the text. Early on, I experimented with designs where the posters were divided into sub-sections more rigorously, but this made them confusing and difficult to read. For example, one of my designs, seen in Figure 4.12, involved reading sections in an order that was not left to right and top to bottom, which is very confusing. The images were all of a similar size, something that was criticised by one commentator, as it did not differentiate between more and less important images. My reasoning behind this was that similar size images could be viewed from the same distance, and there was little room for moving about in the exhibition cells. For the same reason, I used the same font sizes throughout. Although the aim of designing the poster layout is partly to create aesthetically pleasing posters, it is even more important that they are clear and easy to navigate and read.

In the text I aimed for clarity and brevity. I wished to convey my messages in a style that the visitor would find easy to read and interesting to follow. I was aware of the Ekarp method of writing, but did not adhere to it strictly. This method emphasises simple language, spoken word order and short sentences. \(^{260}\) It is used for example in the Royal Naval Museum’s galleries, where I worked as a warder in the past, and thus became accustomed to reading this style of text. \(^{261}\) The guideline amount of text


suggested to me by my advisor at the Science Museum was no more than 30 words for a caption and 70 words for a text panel, and I aimed to stay within these limits. Editing the text to a standard that was both brief and conveyed the message was a rigorous process that involved several re-writes and input from my supervisors.

When making the final selections of images, I tried to balance the types of expression on the posters, as I believed having a variety of expression would help convey the messages more efficiently. I tried to use a balanced mixture of images and text. Particularly in the case of *Dockyard Economy* I had to use rather more quotations and photographs of documents than I would have liked, as I could not find suitable images. For example an image of a pawnshop proved surprisingly difficult to acquire, and in the final version I used a quotation instead. I had to work with the material I had, rather than the material I would like to have had.

To design the posters, I used Microsoft PowerPoint. I chose this software because it was easily available and I was already familiar with it. A student colleague had used it for a similar purpose and recommended it.²⁶² The software is for designing slideshows, not posters, but because it allows easy positioning of text and images, it is possible to use it for this purpose as well. I used one slide for each complete poster, collating different versions into the same file to have them easily accessible for comparison. The downside of using PowerPoint rather than desktop publishing or design software, was the file type. The files were so large I could not share them with my supervisors via email but had to use a file-sharing site. There were also compatibility issues with the software used in the print shop, described below under Construction.

The layout was a crucial part of the process, where the final choices of content and material were made. The final selection of material was much more difficult than I had anticipated, as it was only at this stage that it became clear how little material it is possible to fit on a poster. This was considerably less than I had anticipated, even with the large A0 posters. Therefore I had to leave out a lot of material. For example approximately a third of the content of an early version of the main poster for the Panopticon section was left out or used elsewhere in the exhibition. (See Figure 4.12) The early version of this poster contains 17 images and nearly 700 words. Both text and images were cut down by nearly a half: the final version, seen in Figure 4.13, contains under 400 words and 9 images including the background. These numbers were typical throughout the main posters, with the exception of Dockyard Economy which contained rather more text due to quotations.
Figure 4.12: The first draft of the Panopticon poster looked very crowded and is difficult to follow.
Figure 4.13: The final version of the *Panopticon* poster is clearer and reads from left to right and top to bottom.
Much of the process of reducing the content of the posters was done through rearranging ideas rather than eliminating them directly. When looking at content from a new perspective, some images and text looked less relevant to the posters in question. For example, moving some content to the Concept File on surveillance allowed me to examine the idea in more depth, which in turn gave more prominence to the images of a CCTV camera and the view from the Block Mills walkway (Figure 4.12, bottom middle and left). By contrast, re-focusing my thoughts in this way meant that the ideas behind the *Big Brother* television show logo and Charlie Chaplin’s feeding machine (Figure 4.12, second row from the bottom, middle and right) now seemed less relevant to the overall messages of the section. Cutting content was not always easy: the feeding machine image was a personal favourite. I found readjusting my ideas and how I expressed them was a useful learning experience, as it required thinking about the posters from the perspective of visitors. In this process the editorial help of my supervisors was vital, as they looked at the posters from a distance, with fresh eyes, and could spot problems I could not always see.

Not all of the decisions to omit material were related to whether a particular exhibit was best suited for the purpose. Some material was judged too expensive, other images were not available at all, or the institution that held them did not respond to my enquiries. I found an image of a chair made of chair legs bunched together, and thought I could use it to illustrate the uses of waste wood. However, after several attempts to contact the rights holder without receiving a response, I finally dropped the image. As I could not find an equivalent, I replaced it with different content altogether.
In museological literature, if final cuts are mentioned, they are often treated dismissively, as something that is not planned for and occurs because of circumstances external to the design project. I believe it is a mistake to treat the practical problems in an exhibition project lightly. Adverse circumstances are likely to arise in every project, and can have a profound effect on what goes on display and what does not. This can affect the messages conveyed in unintended ways, and can have a significant overall effect on the exhibition as a whole. Practical concerns at the production phase are crucial in determining the end product and the visitor’s experience.

4.7.2 Obtaining the images

The posters could only be finalised once I had obtained permission and high resolution copies of the images I wished to use. The response times from different institutions varied, and there were some last minute changes. For example a sketch by architect Willey Reveley of the Panopticon concept, showing the all-seeing eye and three main elements as “Mercy, Justice, Vigilance” was still present at printing stage, but finally had to be abandoned as it could not be reproduced to high enough quality in anything but a very small size. (The image is seen in Figure 4.12 as the centrepiece of the poster.)

As I did not strictly speaking have a collection to work with, I had relatively free hands regarding the material I wished to use, within the limits of what was possible to borrow. My original project was linked to the Science Museum, so I used the Museum’s collections as a starting point. I was given access to the museum’s collections database, and searched for photographs of museum objects, finding almost none suitable for my purposes. I moved my search to the Museum’s online image bank, the Science and

263 For example British Museum (1977): Human Biology.
Society Picture Library. I used this and other online image banks as my main source of material. These included the databases of the National Maritime Museum, University College London Library Service and the British Library. I looked for material in Portsmouth City Museum and Archives, where I had help from curators and archivists. I also consulted curator Matthew Sheldon at the Royal Naval Museum for use of the museum’s collections.

The material I used consisted of:

- Historic photographs
- Photographs of objects
- Photographs of documents
- Images of works of art
- Still images from *Modern Times* by Charlie Chaplin
- Technical drawings
- My own photographs
- Blocks borrowed from HMS *Victory*

Different institutions took very different approaches to my project. For example, most institutions waived the fees for using their material because my project was an educational one. However, the British Library and University College London charged me for scanning the images, although their use in the exhibition was free. In the case of the British Library the fee was so high I had to limit my use of their material to a minimum. Similarly, I decided against using a portrait of Samuel Bentham from the National Portrait Gallery because the reproduction fee was fairly high, and, as mentioned above, I used another image of Bentham four times instead.
The attitude of the staff varied greatly from institution to institution. For example in Portsmouth City Museum staff was already overstretched and busy with an upcoming exhibition. However, they still found time to assist me invaluably, and I was made to feel welcome. This was not the case in the Science Museum. The much larger institution made it clear there were no staff members available to deal with my requests, and the bureaucracy was occasionally overwhelmingly slow and complicated. With Charlie Chaplin’s estate I had anticipated a long wait and high fees to use the stills from *Modern Times*. However, the response I got was friendly, fast and there was no charge. By contrast, the image of a chair made of recycled chair legs bunched together had to be dropped because I did not get a response to my several enquiries about permission to use the image.

I collected the CD containing the last image for the exhibition from Portsmouth City Museum an hour before the posters were due to be printed. I had an alternative in reserve, but I wanted this particular image that had been difficult to locate. Fortunately the image fitted the poster and there was no need for redesign, but this example illustrates the unpredictability of exhibition projects.

### 4.8 Location

Finding a suitable space proved a complicated issue. Initially, the plan was to stage the exhibition at the Science Museum. One early plan would have set the exhibition within the *Making the Modern World* gallery in the Science Museum, near the block making machinery. This plan was soon abandoned as the Museum would not allow it. After Dr Albert’s departure from the Science Museum, my plans had to be modified drastically,
as the location that had been discussed at that point, in the Museum’s stores, was only available to me through a supervisor at the Museum. I considered other exhibition spaces at the Museum and alternatives at Imperial College and at Portsmouth Historic Dockyard. The process of securing a space took a long time as the plans had to be altered several times.

As I had no specific space for my exhibition, I designed it to fit any room with display boards. The semi-circular cell design of the Panopticon was built with display boards as the outer walls and as dividers between the four cells. A similar effect could have been achieved with fewer boards arranged in a corner, for example. It was necessary to keep the design as flexible as possible until I had a space.

Among the many options considered was the Block Mills building itself at Portsmouth Historic Dockyard. This was the preferred option, as displaying the machines in their original setting would give the visitor a real connection with the past. Unfortunately staging an exhibition in the Block Mills building was not possible at this time. However, as the future use of the building was not decided, it seemed possible that an exhibition could perhaps be arranged at a future date. In the hope that it could one day be realised, I devised a rough plan for how my exhibition would fit the space. Should such an exhibition be realised, the feedback from the poster exhibition could be used in the development. Planning the imaginary exhibition gave me a different perspective on the poster exhibition, for example with regard to the authenticity of exhibition surroundings and how these might affect the visitor. I will briefly describe the plan for the imaginary exhibition before discussing the search for a real space.

4.8.1 An imaginary exhibition plan for the Block Mills building

The idea for this future or imaginary exhibition was to use the script of the poster exhibition, but realise it with objects borrowed from museum collections. For this I had to consider placing a three-dimensional exhibition in the Block Mills building. Devising the hypothetical exhibition plan was an important part of developing my poster exhibition. It helped me clarify for example ideas of layout, and how these would affect the exhibition.

At present the Block Mills building belongs to Defence Estates and has no designated re-use. It is outside the heritage area of the Historic Dockyard and is not accessible to the public except on pre-arranged tours of a maximum of 12 visitors. Access to the upper floors is poor, which creates a health and safety problem, for example regarding fire escapes.
Figure 4.14: The Block Mills are inaccessible to the public: the grey area indicated by the grey arrow is the heritage area. The yellow arrow indicates the location of the Block Mills. (Original image credit: Portsmouth Historic Dockyard. Arrows: author).
**Figure 4.15:** So near and yet so far. The Block Mills can be seen from next to HMS Victory, but as they are outside the heritage area, public access is very limited.

I considered the first floor of the north range the most suitable space for my exhibition within the Block Mills (See Figure 4.16). Ideally, I would have liked the block making machines themselves to be displayed in a different space from my exhibition. My preference would have been in their original setting on the ground floor of the middle range. Displaying the exhibition on the first floor would give a bird’s eye view on the machines from the walkway over the middle range, underlining the element of invisible supervision.
Figure 4.16: Plan of the Block Mills. The space I preferred is on the first floor of the North Range. The walkway crosses over the Block Mills space towards the East end of the room. (Image credit: English Heritage).
Figure 4.17: The first floor of the North Range in the Block Mills would be an ideal location for the exhibition. (The posters in the photograph are part of a small exhibition describing the Block Mills.)

In my plan, the four main sections of the exhibition were arranged along the walls of the exhibition space in a design inspired by the Panopticon. I intended the display to be more loosely arranged than in the strict cell design of the poster exhibition. Each section should be clearly visible from the middle of the room, where the section about the machinery was to be displayed. I planned to utilise the features of the building: the floors worn out by workers’ feet could be pointed out in the section on block making, and the walkway in the section on the Panopticon. The history of the building and the exhibition space were also going to form a part of the exhibition itself. Overall, the authenticity of this space would have added a great deal to the visitor experience. Holding an exhibition in the Block Mills building would also have raised awareness of
the building itself, perhaps resulting in a more historically informed discussion of its future.

Figure 4.18: View over the shop floor from the walkway across the Block Mills. This could have been incorporated as an element of the exhibition.
Figure 4.19: Features like this original flooring, worn out by workers’ feet cannot be replicated. I used this image in the exhibition, but it does not add as much personal engagement as seeing the real thing.

4.8.2 The search for a location for the poster exhibition

I visited the Block Mills in 2008, and although the space seemed promising in terms of putting up an exhibition, it soon became clear that in practice this was unattainable due to the access problems discussed above. Since my preferred location was not available, I had to find an alternative.
At this point it was clear that the collaboration with the Science Museum had come to an end, and I would not be able to use any of the spaces that had been discussed initially. Of these spaces, the stores at Blythe House in London had been the most realistic option in terms of availability. This would have posed an access problem, as there is very limited public admission to the stores. Exhibition spaces in the Museum itself would have been better from an access point of view, but they were either not available or could not be sufficiently supervised. I discussed the possibility of staging an exhibition on the Museum’s premises shortly after Dr Albert’s departure. It was made clear to me that even if a space was available, I would not be able to use it: a staff member would have to be present to supervise the exhibition during opening hours, and no one from the Science Museum’s staff of 600 would be available to do this.

As the Science Museum was unavailable, rooms at Imperial College were considered for the exhibition. A space at the College would have been relatively easy to arrange for a short time, but as with Blythe House, would have posed an access problem. In effect, using a room at the College would have limited my audience to members of the College and invited guests.

When I changed my institutional connection from the Science Museum to the University of Portsmouth, I hoped to find a space to display my exhibition in Portsmouth. Proximity to the original setting of the story would lend the posters some authenticity, and the exhibition might attract visitors interested in local history. As the Block Mills building was not available, the next most highly desirable space was another location in Portsmouth Historic Dockyard, as it has a direct connection to the
story I was telling. The strongest alternative for a space at the Historic Dockyard was Boathouse 4, a large hall currently used for restoring historic small boats. The location near the entrance to the yard and on the way to and from other attractions could provide visitors as passing trade. A drawback was the vast, unstructured space: unless directly by the door, the exhibition would be easy to miss. Unfortunately the building was undergoing repair works and was thus out of the question.

Another option was the Visitor Centre, by the entrance to the yard. This location could attract many visitors, but it was very busy and noisy for the purpose, and there were concerns over the amount of available space. Yet another idea was a small temporary exhibition space in Boathouse 6. The building is not on the main route, but slightly tucked away, so there might be fewer visitors. The main attraction in Boathouse 6, Action Stations, is an interactive exhibition aimed at children, so the context was not the most appropriate. The space considered was intended for exhibition purposes, and was suitable from that perspective. However, it was already in use at this time.

The fourth option that was offered was a school group lunch area in Boathouse 7. This was the space where I finally staged the exhibition. It was a very good choice in many respects. The space was easily accessible and a comfortable size for housing the full Panopticon design. Situated opposite Boathouse 4 it is also along the route to the main attractions. The space itself was at the back of the building and thus not immediately visible from the main route. However, Boathouse 7 houses the Dockyard Apprentice exhibition and amenities such as a shop and a café, and is frequented by visitors. Thus the exhibition could be advertised to the other users of the building. The space in which Portsmouth Panopticon was held was adjacent to Dockyard Apprentice, where some of
the original machines are displayed, so visitors could easily see the actual machines. The adjoining door was kept open during the week. This cooled the space down in the sweltering July weather and allowed visitors to pass from one exhibition to the other. This proved very popular and was an additional benefit. The staff in the gift shop and restaurant provided practical support, for example by helping to move the lunch tables away from the exhibition space. The café also catered for the exhibition launch.

The few disadvantages of the space were that it was slightly out of the way and difficult to find, as it was at the back of the building. There was also a noisy soundtrack from the metal caulking display in Dockyard Apprentice. A school prom dance was held in the space, so I had to take the exhibition down one evening and reassemble it the following morning. Overall, although the space was a lunchroom rather than an actual exhibition space, it served its purpose superbly.

Staging the exhibition in Portsmouth Historic Dockyard, the original scene of the story I was telling, gave the exhibition the kind of authenticity and connection to the past that is very difficult to achieve with a poster exhibition. Several visitors expressed their surprise at the important role Portsmouth played in the navy’s industrialisation process and were pleased to learn more about the site they were visiting. The exhibition space itself, housed in a nineteenth-century boathouse, had an air of a workshop about it. Telling a story of dockyard workers in a building they worked in is very different from staging a poster exhibition in a modern museum space. According to Ivo Maroevic, the surroundings of the exhibition affect how the messages are received.\textsuperscript{265} I believe the location added authenticity and a genuine feel to the exhibition.

4.9 Construction

As the space in Boathouse 7 was not an exhibition space, there were no display boards or other exhibition materials at hand. I was able to borrow display boards from the Royal Naval Museum, and had much support from Portsmouth Naval Base Property Trustees and staff in putting the physical display together. The set-up was scheduled for the Friday preceding the exhibition week. It was only on that day that I saw the display boards and the final, printed posters. I did not know whether there would be enough display boards, whether they would be large enough to fit the posters, or suitable for realising the Panopticon layout. Fortunately this was possible, and there was no need for large-scale improvisation or contingency plans. Staff from Portsmouth Naval Base Property Trust built the exhibition structure according to my design. The end product had the eerie feel of an enclosed space, as the boards were fairly high and close together. This worked very well with the theme of the exhibition, emphasising the prison cell context of the Panopticon design.

As I had little experience in such matters, deciding the best way to hang the posters required careful thought. I needed a method that would not damage the posters, and that would allow me to take them down and put them up again easily, as they had to be removed for one evening. I opted for Velcro tape, which worked well, but left strips of tape in the back of all the posters.
Figure 4.20: Rigger John Hayes from HMS *Victory* putting up blocks, the only artefacts in the exhibition. The physical Panopticon structure was built on the spot from borrowed material, and some improvisation was necessary: the single blocks were rigged as double to display them on eye level.

The posters were printed in Portsmouth, both for ease of transport to the location and to keep costs down, as prices tend to be higher in London. Because of the size of the posters, I had no opportunity to see draft versions of them. The software I used to design them, Microsoft PowerPoint, was different from the print shop’s software, resulting in some visual changes. These were minor in the posters themselves, only slightly changing the colour schemes. Only two small posters had to be reprinted. With the exhibition leaflet, however, the problems were very obvious. I had created a brochure for the exhibition, with basic information about the subject and the layout, as
well as details of my project. The first prints looked untidy and some text portions were lost. The print shop staff kindly worked several hours at no extra charge to convert the file to a suitable format.

Practical arrangements for the exhibition focus groups required provision of coffee and tea for the participants and volunteers to supervise the exhibition while I was engaged with the group. MSc Heritage and Museum Studies students from the University of Portsmouth generously volunteered their time. The company running a café in Boathouse Number 7 catered for drinks and the launch reception. The exhibition was opened on 29 June 2009 by Councillor Terry Hall, Lord Mayor of Portsmouth, and the event was photographed by University of Portsmouth photographer Kevin Purdey.
4.9.1 Budget

Portsmouth Naval Base Property Trust very generously offered to cover the running costs of the exhibition up to £700. This was more than enough, as I had designed and planned the exhibition assuming I would have no grant to realise it.

The main costs involved in producing the exhibition were printing, use of images and catering for the launch and the Focus Groups. These main costs can be broken down as follows:

- Printing posters and exhibition leaflets: £350
- Catering: £150 approximately
Other costs relating to the exhibition included printing advertisement and visitor feedback questionnaires, and various miscellaneous items such as adhesive for hanging the posters and tubes for transporting them, a digital recorder for Focus Groups, and various other costs that ran up to approximately £150. I received a grant from the Emil Aaltonen Foundation in Finland to cover my living costs and travel to Portsmouth, as well as part of the material costs including hardware purchases and the cost of using images.

4.10 Conclusions about the process of creating a scholarly exhibition

The process I have described in this chapter combined theoretical academic history with the practicalities of museum work. I have not seen a systematic description that covers the entire process from developing the content from academic literature to designing and building the exhibition itself in the way I have done here. For example, Creating the British Galleries at the V&A examines the process from many angles, but the material and the starting point for the galleries are very different from my project.\textsuperscript{266}

In the V&A, as in most museums, realising the project was also divided between different team members who, in the book, each describe their own particular contribution. By contrast, I realised each phase myself. I thus have an overview of the whole process, as well as a thorough understanding of how each individual part was conceived and constructed. This has allowed me to examine the process more systematically than has been done in the past. My conclusions accordingly relate to the

\textsuperscript{266} Wilk and Humphrey (eds.) (2004): Creating the British Galleries at the V&A.
material I used, and the practicalities of the process, as well as offering some general points about the process as a whole.

The literature relating to the Panopticon concept, is very abstract even for academic history. Using this kind of material serves a dual purpose. On the one hand I am displaying the kind of history that is usually confined to academic texts and an academic readership, thereby presenting a perspective that is new to the wider museum-going public. On the other the example I have chosen underlines the differences between academic history and museum practice. The argumentation and ideas presented in the literature require a more subtle approach than would a straightforward narrative of the building of the Block Mills. I was not presenting a collection of facts, but a set of ideas. These ideas were not those found in mainstream historical interpretation, but are the preserve of academic history. As such they are both very complex and unfamiliar to most people. I could not include lengthy explanations of these historical theories or of the details of my thought processes in assimilating, selecting and refashioning this material. My aim was to guide the visitors to make the connections for themselves, instead of providing ready answers. This way of presenting history in museums is uncommon. Indeed, during this project I have discovered that what passes for history in most museum exhibitions is typically a narrative of facts about the past. The amount of interpretation built on the kind of history academic historians would recognise is extremely small. The differences between academic and museum history, and the specialist skills required in each, form a major hurdle to much meaningful interaction. As my study begins to make clear, such interaction requires a new set of mediating skills and is very time consuming.
Without a sound understanding of academic history it would not have been possible to shape the material I used into an exhibition. The language, the concepts and the style of argumentation are specific to the discipline, and difficult to grasp without training. The skills required for setting up an exhibition are very different. As with academic history, this is not an easy medium to master without effort, study and experience. Design skills, communication theories, material culture, and the kind of practical problem solving historians have no use for, all came into play at different stages of the process. It is clear that this kind of project requires a combination of skills that is not part of the training of either historians or curators, but merges elements from both.

The project relied heavily on collaboration with several institutions. I have covered the process of obtaining images from several sources, and my varying success, earlier in this chapter. Even more crucial for this study was the supervision and guidance I received from both Imperial College and the museum partner of the collaboration. Initially this was the Science Museum, where I was supervised by Dr Albert who had expertise in both museums and maritime history, and a great enthusiasm about the project. At the Museum I also had the benefit of consulting other curators, for example regarding technical details of the block machines. With Dr Albert’s departure I lost not only access to the collections, exhibition spaces and the expertise at the Science Museum, but also a mentor whose input and encouragement had been very important to me in the early stages.

After Dr Albert’s departure, my project was in crisis. I turned to Dr Ann Coats whom I knew well from my previous studies at the University of Portsmouth. Dr Coats’s background ensured I would get the support I needed. Dr Coats joining the project
opened up completely new possibilities, and shaped the final outcome considerably. Instead of an exhibition in the Science Museum stores, where the access was very limited, I was now looking at displaying my posters at one of the busiest heritage tourism destinations in the country, and near the original site of the Block Mills. Dr Coats’s connections played a crucial part in obtaining the space at Portsmouth Historic Dockyard.

The change of collaborating partner was a major setback to the project. Without the continued support of my Imperial College supervisor, Professor Andrew Warwick, it is likely the project would have collapsed with Dr Albert’s departure. Having a committed supervisor with an interest in the topic was vital for keeping the project on track through difficulties. In a project realised as part of academic study the role of the academic supervisors is very important. Professor Warwick provided the continuity my project needed, as he was involved from the beginning to the end. Without his enthusiasm for displaying the findings of academic research the project would have been very difficult to realise at all.

Most museum exhibitions are created by teams of people each with different expertise. I, by contrast, did almost all of the creative work for the exhibition myself. I had help and support from my supervisors throughout, especially at the editing stage, but I did not delegate any part of the process to others. Although this allowed me to have an understanding of the whole of the project as well as each part, it also meant that I had to stretch my abilities to cover every aspect of the process. In some cases, for example providing for younger children, I was forced to admit my limitations and abandon best practice for an option I could realise. Such problems may of course arise with teams of
curators in museums, but they are less easy to confront and solve when there is no team to share the load. Although I developed much of the project alone, especially from an intellectual perspective, I nevertheless had help and support from others at every stage, from proofreading to finding material to building the set and manning the exhibition. Collaboration with institutions was essential for obtaining the exhibits and the space, and for advertising the exhibition. Collaboration with individuals within these institutions was essential to get anything done effectively and on time. It is therefore an essential part of an exhibition project to communicate well with key individuals.

I found no model or methodology in the literature directly for this kind of work, and had to improvise and borrow methods from other disciplines. For example, I used internet search engines to gauge public perceptions of certain concepts. The idea for this came from corpus linguistics, where a large body of text is used as a basis of observing and analysing patterns of language usage. This is an example of the kind of creative thinking necessary for designing an exhibition drawing upon academic research. Much of museum work requires a systematic and detail-oriented approach, as the aims are largely in maintaining collections. Academic history research by contrast requires investigative and theoretic thinking. A project such as this requires a combination of these skills and ways of thinking, as well as creative and mediating skills. The model I have presented in this chapter divides the process into four phases, each of which requires slightly different skills and ways of thinking. The first phase, Material Gathering, is mainly investigative, for example, whereas the other three are increasingly creative. The first two phases are purely intellectual, but the last, Production requires practical and communication skills.
Robert Gordon, cited earlier in this chapter in connection with material culture, has argued that technical thinking is not easy to express in writing, as it is largely nonverbal.\textsuperscript{268} I believe the same to be true for creating museum exhibitions, which probably explains the scarcity of literature on the subject. The model I presented in this chapter emerged from retrospectively examining the process I undertook by trial and error. At the time I did not perceive the work as I have described it here. Rather, I divided it into numerous tasks and seemingly endless To Do lists. Examining my own thought processes through a diary I kept throughout, and the lists I wrote at various times, I was able to see emerging patterns that I then collated into a more systematic account of the whole process.

\textit{Portsmouth Panopticon} was an experiment. A key aim of this study is to test the viability of displaying scholarly ideas through the museum medium, and this chapter has described the practical and intellectual process of choosing these ideas and putting them on display. The project was successful in the sense that the exhibition was completed and mounted. I also regard my description of the project’s development as an important contribution to knowledge. Much of the work involved in creating the exhibition was conceptual or visual, rather than verbal, and as discussed above, writing about such work is not always easy. Describing the whole process in such a systematic way involves the kind of reflection most museum professionals may not have the time, inclination or tools for. Most scholars simply never do such work, and would thus not know how to describe it. I trust that the description provided in this chapter will ensure

\footnote{Gordon (1993): ‘The interpretation of artifacts’, p.75.}
that my experiment will be far easier to replicate than it was for me to carry out from scratch.
4.11 *Portsmouth Panopticon exhibition posters*

The exhibition posters are presented below as they were arranged in the exhibition, by section. A floor plan is provided for convenience (Figure 4.22).

The posters are presented in the following order:

Introduction: Figure 4.23

1) War and Industrialisation

Timeline: Figure 4.24

War: Figure 4.25

Industrialisation: Figure 4.26

Fleet: Figure 4.27

2) Panopticon

Samuel Bentham: Figure 4.28

Panopticon: Figure 4.29

Seeing without being seen: Figure 4.30 (Note: the final version of this poster had a different background image. Unfortunately the file was destroyed during printing.)

3) Blockmaking

Blocks: Figure 4.31

Blockmaking: Figure 4.32

Work: Figure 4.33

4) Dockyard Economy

Portsmouth: Figure 4.34

Dockyard Economy: Figure 4.35

The Block Mills building: Figure 4.36

5) Other posters

Where are they now: Figure 4.37
Figure 4.22: The posters arranged in the Panopticon layout.
The Portsmouth Panopticon

What do a microchip, a Ford Model T and a pulley-block have in common?

They were all mass-produced

Mass production, a method for producing large quantities quickly and cheaply, has brought cars, microchip technology and these countless other things modern consumer society is based on within the reach of all.

A key element of the Industrial revolution, mass-production changed more than the availability of consumer goods. It created a new outlook towards work. Control over the process shifted from workers to factory management, as machines were designed to replace skills.

Mass-production was first used here in Portsmouth Dockyard, a hundred years before Ford made the Model T, the first mass-produced car. This exhibition shows how changes in the making of pulley-blocks started the Navy’s Industrial revolution.

The Panopticon Principle

The mass production of pulley-blocks started in the Portsmouth Dockyards in 1803. Blocks were needed in large quantities, so mass-producing them was sensible. But the key aim was to control the Independent dockyard workforce. Created by Samuel Bentham, the Mills were based on the Panopticon Principle, a system of surveillance made famous by his brother, Jeremy Bentham’s prison model.

The Industrial revolution of the Navy

The Block Mills were based on new ideas and visions, many still around today. Block Mills work practices influenced later factory production lines. The Industrial revolution changed the way people work. For the Navy, the Industrial revolution started here.

How the Exhibition works

The Portsmouth Panopticon tells the story of how the Navy’s Industrial revolution began. It is divided into four sections, each telling a different part of the story:

- War and Industrialisation
- The Panopticon
- Block Making
- Dockyard Economy

The sections are displayed in a design inspired by the panopticon. View them in any order.

Fact Files and Concept Files are smaller posters with key information on the people, events and mechanisms referred to in the main posters.

This exhibition is a pilot for a larger display in the Block Mills building.

Figure 4.23: Introduction (original size A1).
Figure 4.24: Timeline.
War

"Under pressure"

Frequent warfare throughout the 18th century stretched resources and put dockyards under enormous pressure. Ships needed repairs, stores and men. Maintaining a fighting fleet was expensive and labour-intensive. See the Fact File for more information on the fleet.

"The artificers of this dockyard worked the whole of Christmas-day, a circumstance which has not happened before since the peace of 1763... So great is the emergency for getting the ships ordered ready, that the shipwrights and caulkers afloat, and in the yard, were obliged to work during the dinner hour, and they are to be put immediately on double time."
Salisbury Journal 31st December 1792

Figure 4.25: War (original size A1).
Figure 4.26: Industrialisation (original size A1).
The Fleet

The Navy needed more ships during the war than ever before. Portsmouth Dockyard specialised in refits and repairs. In a typical year over 50 ships would pass through the yard.

<table>
<thead>
<tr>
<th>Year</th>
<th>Total of the Navy’s ships</th>
<th>Ships commissioned at sea</th>
<th>% of total</th>
<th>Ships in ordinary or in port</th>
<th>% of total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1793</td>
<td>390</td>
<td>135</td>
<td>35</td>
<td>255</td>
<td>65</td>
</tr>
<tr>
<td>1800</td>
<td>729</td>
<td>468</td>
<td>64</td>
<td>261</td>
<td>36</td>
</tr>
<tr>
<td>1805</td>
<td>726</td>
<td>508</td>
<td>70</td>
<td>218</td>
<td>30</td>
</tr>
<tr>
<td>1809</td>
<td>979</td>
<td>709</td>
<td>72</td>
<td>270</td>
<td>28</td>
</tr>
</tbody>
</table>


The British fleet at the Battle of Trafalgar, October 1805:

- 3 first rates
- 5 second rates
- 18 third rates
- 4 fifth rates
- 1 armed schooner
- 1 armed cutter
- 2,370 guns
- 17,000 men


This 1806 chart lists the types of vessels used by the Navy.

The Navy’s consumption of wood was enormous. The 33 ships at Trafalgar were built of 115,725 trees. There had been a growing shortage of timber since the 17th century.

Background image: The Fleet off Spithead © Science Museum Library/SSPL

Oak felling for the Navy in the New Forest, 1798 © The British Library Board, Maps K.Top.14.84.a

Figure 4.27: The fleet (original size A3).
Sir Samuel Bentham  
Inventor of the Panopticon

Samuel Bentham served as the first and only Inspector General of Naval Works from 1796 to 1812. He played a crucial role in the Navy’s industrial revolution by creating the Block Mills.

Bentham trained as a shipwright at Woolwich Dockyard in the 1770s, but was more interested in reforming shipbuilding than wielding an adze. He travelled to Russia, where he managed an industrial estate and invented the Panopticon Principle to control the large unskilled workforce.

On his return in 1791, he built experimental woodworking machines where mechanical guides replaced skill. These machines had no commercial success, but he implemented the ideas at the dockyard.

When introduced to Marc Brunel and his block machines, Bentham recognised their superior design and persuaded the Navy to buy them.

Marc Brunel (1769–1849) Inventor of the block making machines. Father of the famous engineer, Isambard Kingdom Brunel.

Jeremy Bentham (1748–1832) author of Panopticon or the Inspection House (1791). Based on Samuel’s idea, the brothers developed the Panopticon Principle together.

**Figure 4.28:** Bentham (original size A3).
Figure 4.29: Panopticon (original size A0).
Figure 4.30: Seeing without being seen (original size A3).
Blocks

Pulley blocks, rigged with rope are used to lift heavy loads. On ships their main use is in the rigging to manoeuvre sails.

A 3-sheaved block

Uses of blocks

The weight of sails and wind force is so great that large sails cannot be handled without blocks. Blocks come under considerable strain, and spares are needed when they break.

Blocks are a crucial part of rigging, as this model shows

HMS Victory needed 768 blocks for her 37 sails, and another 628 to control the recoil of her 100 guns. In addition she carried spares, and blocks for boats, anchors and other lifting. The Navy needed 100,000 blocks a year.

Figure 4.31: Blocks (original size A3).
**Figure 4.32:** Blockmaking (original size A0).
A joiner with his apprentices at work, 1849. The small workshop was typical of the time. Dockyard scale was exceptional.

*Modern Times.* Charlie Chaplin’s iconic film shows the monotony of production line work.

Clocking in, 1949. Management control of the worker’s time increased with industrialisation.


**Figure 4.33:** Work (original size A3).
Portsmouth was the largest and most important of the six Naval Dockyards during the French wars.

A view of Portsmouth Harbour 1772. The yard closest to the theatre of war, Portsmouth was best placed for repairs and refits.

**Portsmouth population**

<table>
<thead>
<tr>
<th>Year</th>
<th>Portsmouth Town</th>
<th>Portsea Town</th>
</tr>
</thead>
<tbody>
<tr>
<td>1801</td>
<td>7,839</td>
<td>8,348</td>
</tr>
<tr>
<td>1811</td>
<td>7,103</td>
<td>11,004</td>
</tr>
</tbody>
</table>

**Men employed at the yard**

<table>
<thead>
<tr>
<th>Year</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>1782</td>
<td>2,445</td>
</tr>
<tr>
<td>1790</td>
<td>2,219</td>
</tr>
<tr>
<td>1805</td>
<td>3,000</td>
</tr>
</tbody>
</table>

Source: J. Thomas, Portsmouth town and yard in the age of Nelson, in Transactions of the Naval Dockyards Society, 2006

**Tourism**

The Dockyard attracted a lot of visitors. A 1823 tourist guidebook describes the yard:

"The first and most earnest wish of visitors to this celebrated Port, is a view of the Dock yard and, we believe, whatever their imaginations of it may be, they cannot, before they have seen it, form any just idea of its grandeur and importance. Here, every thing is conducted on a scale to the full extent that the genius of man ever devised..."

Naval sails looming over Spice Island at the entrance to Portsmouth Harbour signified the dominance of the Dockyard over the town.

**Figure 4.34**: Portsmouth (original size A3).
Dockyard Economy

Dockyards in the 18th and 19th centuries provided employment for many workers, often with the dockyard economy being a significant part of local economies. The dockyard economy was characterized by the production of ships and the associated supporting industries, such as shipbuilding, ship repair, and the production of shipbuilding materials.

Components of the dockyard economy included:
- Shipbuilding: The construction of ships using various materials and techniques.
- Repair and maintenance: Keeping ships in a usable condition through regular maintenance and repairs.
- Supply and distribution: Providing goods and services to the dockyard and to ships at sea.
- Local industries: Supporting local businesses that supplied materials or services to the dockyard.
- Employment: Providing jobs for many workers, including skilled craftsmen and unskilled laborers.
- Economy: The dockyard economy was a significant contributor to local economies, providing employment and economic benefits.

Dockyards were typically located near ports with easy access to water, making it convenient for the transportation of goods and materials.

Earnings from the dockyard economy were important for workers, who often relied on this income for their livelihoods. The dockyard economy was a significant part of many local economies, providing employment and economic benefits.

Figure 4.35: Dockyard Economy (original size A0).
The Block Mills housed a number of wood workshops. The block machines were installed in 1805.

Bentham built the Mills over Edmund Dummer’s 1691 reservoir to save space. The yard between the original two buildings was covered to accommodate the machines.

This plan shows the reservoir under the Mills. The Navy’s first steam engine, housed in the South Range, pumped water from the docks into the reservoir and powered the Mills.

Blocks were made in the Mills until the 1960s. The building remained in workshop use until the 1980s.

For more about the current state of the Block Mills see Where are they now?

The middle range of the Block Mills, which housed the block machines. The power transfer system overhead remains intact.

**Figure 4.36:** The Block Mills building (original size A3).
Where are they now?

The Block Mills
In 1965 block making was moved to Boathouse No.6. The building remained in other use until the 1980s. It deteriorated, and was placed on the English Heritage Buildings at Risk Register in 1998. Under English Heritage guidance, Defence Estates carried out a major restoration works, completed in 2008.

There is currently no public access to the building, but you can see it beyond HMS Victory.

Some of the machinery used in the Mills still remains in place like this Log Cutter.

The Science Museum collected eight machines of different sizes. This Boring Machine is one of those on display.

This Scoring Engine is one of the machines acquired by Portsmouth City Museum, currently on display in the Dockyard Apprentice exhibition in the Historic Dockyard.

Figure 4.37: Where are they now? (original size A3).
Figure 4.38: The block making machines (original size A0).
Chapter 5

Reactions to the exhibition: audience feedback

This chapter will analyse the audience feedback collected during the week *Portsmouth Panopticon* was on display, and use it to assess its success. The chapter is based on data collected through a visitor survey using questionnaires and through focus group interviews with experts and potential audience groups. I will look at what visitors thought about the contents of the exhibition, whether they found it interesting and easy to follow, and which parts they struggled with. I will also assess visitors’ perceptions of what they learned in the exhibition and briefly consider the feedback on the presentation of the exhibition. The aim is to see whether the approach I presented in Chapter 4 was successful in conveying the concepts and ideas from the academic history presented in Chapter 3.

I begin with a brief statistical overview of visitors to the exhibition to present a picture of the people who attended, and of the data on which this chapter is based. I then examine the response of the largest audience group, a group I have called *independent visitors*. These are the visitors not participating in organised groups, but visiting the exhibition at their leisure. The views of these visitors are also discussed. I also briefly analyse display issues. Although these are not a primary concern in this study, display does have implications for the accessibility and inclusiveness of the exhibition. It also affects visitors’ perception of the content. The data from visitor questionnaires is analysed statistically and is presented here with charts and tables.
I then analyse the views of the experts and members of potential audience groups who participated in focus group interviews, and the differences between the views of the experts and of the public. After assessing the response of the various groups, I consider in more depth some of the specific issues that arise. These include accessibility and inclusiveness, which were widely discussed in the focus groups, and the Panopticon principle, which emerged as a firm audience favourite. Finally, I draw conclusions about the feedback and the success of the exhibition. I believe this experiment demonstrates that it is possible to interest the public with academic history, and that audiences are willing to learn new concepts, even quite complex ones like the Panopticon, in a museum context.

5.1 The setting of the exhibition

*Portsmouth Panopticon* was on display at Portsmouth Historic Dockyard from June 29 to July 5 2009. As described in the previous chapter, the location was Boathouse 7, a nineteenth century boathouse also housing a café and the *Dockyard Apprentice* exhibition. *Portsmouth Panopticon* was at the back of the building, in an area normally reserved as a lunch room for school groups. The space fitted the purpose well. The exhibition was publicised in the local press and Portsmouth University information channels. It was also advertised on site, and signposted from the dockyard entrance. The exhibition was opened by the Lord Mayor of Portsmouth, Councillor Terry Hall, who referred to its relevance in her speech. This was followed by a reception.

I was present in the exhibition for its duration, handing out brochures, guiding people in, and answering questions. Many visitors were attracted from the adjacent *Dockyard*
Apprentice exhibition because of its similar theme and the convenient open door between the exhibitions. I gained an understanding of what visitors found most interesting and what they struggled with, simply through observation and talking to them.

During the week, Portsmouth Panopticon was seen by 506 visitors, 32 of whom participated in focus groups, approximately 40 were invited guests to the launch, and the remaining 434 were independent visitors. During this time the Historic Dockyard saw 9,925 visitors, so roughly one in 20 Dockyard visitors came to see Portsmouth Panopticon.

5.1.1 Assessment methods

I assessed the visitors’ views using a questionnaire and a visitor book. The questionnaire was a mixture of multiple choice and open ended questions. I asked about the visitors’ views about the display, about the subject matter and about their experience in general. The first part of the questionnaire assessed the visitors’ views about the clarity of display and what they had found most interesting in the whole exhibition. In the second part I asked more specifically about the subject matter, and which parts of the exhibition visitors had enjoyed the most and the least, as well as evaluating their willingness to learn more about the topics presented. The third part assessed the visitors’ learning experience in the exhibition, and whether they felt they had gained a new perspective on some of the issues displayed. The final part asked statistical information about the visitors themselves. 157 visitors filled in a questionnaire about their experience, and some also left feedback in the visitor book. The questionnaire is included in the Appendix.
The invited groups of experts were assessed through focus group interviews. These were designed to give each group the chance to talk about their own expertise, and were thus slightly different for each group. The historians and students were interviewed more about the content of the displays, whereas the curators and the school group were more focused on the display. A group of historic buildings professionals was also invited to give their views about the future use of the Block Mills building, and whether the kind of exhibition I displayed would be sustainable in the building. I piloted the focus group approach with MSc Heritage and Museum Studies students in February 2009. As the exhibition was not completed at that point, the discussion centred on the issues and possible exhibit ideas.

While I was engaged in focus group discussions, student volunteers from the University of Portsmouth’s Heritage and Museum Studies course oversaw the exhibition. Thus visitors could always ask questions, and were made welcome.

5.2 The visitors

The exhibition was advertised in local press and the University of Portsmouth events calendar, as well as on site at the Historic Dockyard.\(^{270}\) Because the exhibition space was only agreed in May, when there was only one month left until the exhibition, advertising was also left until relatively late. From six to nine months to advertise would have been ideal, to reach the full range of special interest groups and groups visiting Portsmouth through tourism networks. Many of the visitors came in

\(^{270}\) [http://www.port.ac.uk/lookup/events/eventtitle,98659,en.html](http://www.port.ac.uk/lookup/events/eventtitle,98659,en.html).
spontaneously and had not heard of the exhibition prior to their visit to the Historic Dockyard.

The respondents who disclosed their age were between 10 and 87, giving an average age of 49.5. Chart 5.1 shows the respondents by age. According to Portsmouth Historic Dockyard, their average visitor is between 35 and 54, which would suggest that my visitors were slightly older than those of the Historic Dockyard in general. This is reflected by the small number of children in my exhibition, possibly because families with small children were less likely to be attracted to an exhibition where the main communication is through text and images rather than objects. School groups are also a significant visitor group at the Historic Dockyard, and my exhibition was not aimed at them. 37.5% of the visitors were female and 62.5% male. This could be because the subject appeals to men more than women, and could also reflect the medium not appealing to families. The visitors were on the whole very well educated. Over a third had a postgraduate degree, and nearly a quarter more an undergraduate degree. 5.8% were educated to GCSE level, and a few claimed to have “no education” (see Chart 5.2). Most were frequent visitors to museums, 35% visited 2-4 times a year, and just over a quarter visited over 10 times a year. I did not collect data on ethnicity, country of origin, whom the visitors accompanied or which other museums or attractions they saw on their visit. With hindsight it would have been interesting to know which of the attractions in the Historic Dockyard the visitors had enjoyed the most, to build a more complete picture of the interests of my audience. I did, however, ask their interests more directly on the questionnaire. Economic and social history and maritime or naval history were the most popular subjects. Most respondents were interested in more than one
subject, and some ticked all of the options. Only a very few were not interested in any of the subjects covered in the exhibition before coming.

Chart 5.1: Visitors by age. The largest groups were those over the age of 55, which is slightly older than the Historic Dockyard’s typical figures.
A bias toward the well educated is typical in museums. According to the Portsmouth Historic Dockyard, most of their visitors are of the ABC1 social grade, the top three grades on the National Readership Survey scale, indicating occupations with high levels of education.

Most visitors seemed to come in spontaneously, on being told about the exhibition, rather than having planned to come. There were, however, some who had heard about Portsmouth Panopticon or read about it in the media and come to the Historic Dockyard specifically to see it. Some of these visitors commented on the difficulty of finding the exhibition. One man’s answer to whether there was something he did not enjoy or

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271 This chart includes the visitors who had more than one qualification as doubles.
273 ABC1 indicate different levels of managerial, administrative or professional occupations. C1 also includes supervisory or clerical work.
274 Based on my observations in the exhibition, I did not collect data on decisions to visit.
understand illustrates this problem: “Finding it – poorly signed”. Another commented separately on the form “Well done – very interesting – a shame to be tucked away in a corner!!” The signage was indeed rather low key, and despite efforts to improve it over the week, tended to blend in too much with the general Historic Dockyard advertising. A temporary exhibition by a student, realised at short notice is unlikely to be a priority in advertising.

Many visitors came in from the adjacent Dockyard Apprentice exhibition, where the blockmaking machines are on display. The back door to the Dockyard Apprentice, normally a fire escape, was kept open both to attract visitors to Portsmouth Panopticon, and to create a breeze to cool both exhibitions down in hot weather. Many visitors who came in through Dockyard Apprentice were interested to learn more about the machines they had just seen. Conversely, visitors to Portsmouth Panopticon, were encouraged to visit Dockyard Apprentice in order to see the machines.

There were five focus groups. Of these, three were groups of experts: museum professionals, historians, and a group I called historic buildings professionals, such as surveyors and people working with historic building conservation. The other two groups were invited as potential audience groups: a group of five schoolchildren with their teacher, and a group of Heritage and Museum Studies students.

The principal idea of the focus groups was to invite participants with a professional interest in the Block Mills and dockyard history. This was to hear their expert opinions about the effectiveness of the content and presentation of the exhibition. In the case of

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275 Man, 59.
276 Man, 53.
the historic buildings professionals the purpose was also to discuss the use of the Block Mills building itself, and most of the participants had a professional connection to the Block Mills. Curators were invited from museums with local history, technology or naval history subjects. The historians all had naval dockyard connections and were invited on the basis that they could comment on the content of the exhibition and whether they felt it conveys something essential about its subject.

The university students were MSc students and graduates from the Heritage and Museum Studies course at the University of Portsmouth. One student from the Museum Studies MSc course at Leicester University also attended. The students were invited as a potential audience group, as they represented the kind of interested adult audience I was aiming at. They also doubled as an expert group in their capacity as future professionals with views about issues such as accessibility or display. The school children were year 9 pupils from Portsmouth Grammar School. They were 13 to 14 years old, the low end of my target age group, and already familiar with the Block Mills through participating in a school project.

The majority of focus group participants were based in the Portsmouth area with a few travelling from further afield. As a niche subject the Block Mills and the navy’s industrialisation may have seemed too specialist to the curators and students invited from London institutions, and thus many did not attend. Because the topic and even the name of the exhibition were specific to Portsmouth, the exhibition could be seen as local history and thus more likely to attract a local audience. Notably there were one or two participants in most groups who had travelled from a distance: a representative of English Heritage attended the historic buildings professionals group, and some of the
historians and one student travelled from further afield. Only the curators and the school group were all local, the latter because only a local school was invited. This could be because the exhibition was more appealing to academics, and those with an interest in dockyard history or the Block Mills. That curators did not make the journey could also reflect on the practicalities of curatorial work: curators may not have the time or resources to travel to see an exhibition or participate in a focus group.

As my exhibition was staged in a popular tourist destination, I assumed that most visitors would make the trip to see some of the major attractions on site, such as HMS Victory or the Mary Rose, and unlike the focus group participants, had not come specifically for Portsmouth Panopticon. Therefore I did not consider it relevant to collect data on from where visitors had travelled, or the primary reason for their visit, and thus cannot compare data on focus group participants and independent visitors as to the length of their journeys. However, at least ten visitors I talked to had come to the Historic Dockyard specifically to see the exhibition. Almost all of these visitors were locally based, and many had heard of the exhibition through local media or University of Portsmouth information channels. This would support the idea that the exhibition attracted academic and local audiences. Catering solely for an academic audience would defeat the object of the exercise as this would not be a new audience for academic research. My data about the education level of independent visitors (Chart 5.1) suggests that although the level of education was high, visitors were not solely academics. Local or dockyard history interests may therefore have also motivated independent visitors who came to the Historic Dockyard specifically to see Portsmouth Panopticon.

277 As I did not collect data on what visitors had come to see at the Historic Dockyard I do not have exact numbers. The real figure is likely to be higher, as I did not talk to all the visitors.
5.3 Views of the visiting public

I now turn to a more detailed examination of the reactions of independent visitors. The vast majority of the visitors who filled in a questionnaire enjoyed the exhibition and found it interesting: out of a total of 157 respondents only two visitors claimed not to find the exhibition interesting. Only six visitors found the text difficult to follow, and five struggled with the layout. 91.7% of the questionnaire respondents considered the way the ideas had been presented in the exhibition clear enough to understand. Similar views were expressed in the focus groups, which I will examine later. Most respondents expressed great interest in the topics presented in the exhibition: 89% of the visitors answered an open question about what they found most interesting, and 64% specified some of the key themes or components such as industrialisation or Panopticon in their answers. Visitors enjoyed the mixture of abstract concepts and more tangible material as well as the wide perspective I displayed. Many of the respondents said they would be interested to see another exhibition on a related topic. What the visitors found most interesting was the Panopticon concept: in an open question about what visitors had most enjoyed, the Panopticon was mentioned more than any other specific component. Display and presentation, such as the layout, the clarity of text and the quality of images were seen as important issues: nearly 30% of those who answered the question about what they had most enjoyed commented on the quality of the display. When asked what was most interesting, 41 visitors named the Panopticon, dwarfing all other responses, as seen in Chart 5.3.
Chart 5.3: Panopticon was what most respondents found most interesting. The concept of the exhibition refers to the way it was presented and the themes brought together. The Non-committal category includes answers like “it was all interesting”. (Categories derived from the answers.)

As the concept of Panopticon was seen as the most interesting part of the exhibition, it is not surprising that the section titled *Panopticon* emerged as the audience favourite with a little over a half of respondents naming it as the section they found most interesting.\textsuperscript{278} *Blockmaking* was the second favourite with approximately a third, or 52 respondents choosing it, followed by *Machinery* with 42 votes (26.7%), *Dockyard*

\textsuperscript{278} Based on question B1 of the questionnaire: “Which section of the exhibition did you find most interesting?” 152 visitors answered this question, of whom 79 (51.9%) answered *Panopticon*. 271
Economy with 36 (23.6%), and War and Industrialisation with 32 (21%). Many respondents chose more than one section as their favourite, so the figures are incongruent. Only 12 respondents had chosen Panopticon as their least favourite section. Even the two visitors who claimed not to find the subject of the exhibition interesting had chosen Panopticon as the most interesting section. The overwhelming success of Panopticon suggests that it is not necessarily the simplest or most easily comprehensible issues, such as everyday life, that attract museum visitors. As some of the comments examined below indicate, encountering a new concept in an exhibition can be an enjoyable experience. This evidence clearly shows that in Portsmouth Panopticon I have succeeded in presenting the complex issues of surveillance and workforce control in a way that has captivated the audience.

Panopticon was particularly favoured by the middling age groups, from 25 to 60. The young found blocks and blockmaking more interesting, and no one under 16 preferred the Panopticon. This could be an indication that children found the concept too complex, or not relevant to their experience. I had not for example related the Panopticon concept to the school world, like Foucault does in Discipline and punish. However, only one person under 16, and one between 16 and 25 chose Panopticon as the section that least interested them. The over 60s chose Panopticon as the least interesting section most often, and tended to focus more on images and details. This could reflect on the number of former dockyard employees who visited, as people are likely to be interested in images relating to their own past. This is reflected in some visitor comments, for example, a 72-year-old woman explained her preference for War

280 This is based on multiple choice question, B2.
and Industrialisation and Panopticon “Because I worked in an open plan office in the 1950s”. An image of such an office was included in the Work Concept File in the Blockmaking section, but the concept was also relevant to Panopticon. Another comment from the visitor book reveals that the exhibition induced reminiscence: “Sheila & Jo from Somerset remembered that rope was made in Bridport in Dorset”. The visitors’ personal experience and agenda are an important part of the museum experience and the role of museums: they create social cohesion and reinforce identities.\textsuperscript{282}

The most popular reason given for preferring Panopticon was that the concept was new to the respondent, which supports the idea that visitors are open to learning new concepts in an exhibition environment. A 37-year-old woman sums up the views of many other respondents who gave similar reasons for their preference for Panopticon: “The aspect I knew least about therefore discovered the most.”

However, other respondents stated familiarity with the concept as a reason for preferring the Panopticon section, suggesting that while some visitors enjoy learning new concepts, others may feel more comfortable with familiar ones. Because visitors have different preferences, a combination of familiar and unfamiliar concepts and their uses works particularly well. Indeed, some visitors found the combination itself most interesting: “While idea in connection with prisons is familiar, had not known of this use”\textsuperscript{283} commented a visitor who preferred Panopticon.

\textsuperscript{282} For example Falk and Dierking (1992): The Museum Experience, p.25-27.
\textsuperscript{283} Woman, 73.
One of my aims for the exhibition was to display the story of the Block Mills within a wider framework of historical significance and connecting the dockyard with social as well as naval and technological aspects of history. Many visitors expressed similar views to the woman in her 60s who preferred Panopticon, Blockmaking, and Dockyard Economy: “Not relevant just to wars or mechanisation”. This example demonstrates on the one hand, that such views of history appeal to visitors, and on the other hand that I have succeeded in expressing this idea through the exhibition.

Personal interest and the wider relevance of the topic were the most cited reasons for preferring Blockmaking. A 31-year-old man preferred this section because it was relevant to his interests: “Interests me as I’m a sailor”. Another man liked the social history perspective of the section: “Could relate more because of the more human aspects. […]”.

When asked for the least interesting section, Dockyard Economy and Machinery were each named by 24 respondents (18.7%). War and Industrialisation received 19 votes (14.8%), despite being the least popular answer to the question asking for the most interesting section. I included the machinery poster as a separate section on the questionnaire, although I have not treated it as such in the script or in the previous chapter. I considered it different from the sections based on scholarly material, as its only purpose was to explain the functions of the machines. It represented a more traditional display of machinery in museums. I included it on the form as a fifth section in order to gauge visitor reactions to more and less conventional display styles. With 42 (26.7%) respondents naming it as their favourite section, Machinery was quite popular. Most of the respondents expressed their interest for machinery as a reason for their
preference. A girl from the school group summarised many respondents comments with “It is interesting to see how they work & how they have changed”. This indicates a preference for the content rather than the display style, and this is true of most of the answers. However, a 29-year-old woman expressed the thoughts of many by naming Machinery as her least favourite section: “It was still interesting to see how they work but I liked the other subjects more”. No other topic was chosen for this reason, but Machinery received a number of similar comments. This could indicate that Machinery seemed different to visitors, and certainly more boring.

Machinery was also disliked because of lack of personal interest: many stated they were not technically minded and were thus not that interested in the machines themselves. That said, the exhibition did reach even those visitors who were not interested in the machines: “I find people more interesting than machinery although I realise that the introduction of machinery directly affects the workforce”. One of my key aims for the exhibition was to convey the idea that technology is a human pursuit, and this comment by a woman of 61 demonstrates my success.

Lack of personal interest was a common reason for disliking Dockyard Economy. Some also considered the topic too general. “Wants more depth” was what one 77-year-old man thought. War and Industrialisation received very similar comments. However, on three separate occasions visitors commented on the nature of war itself. As the environment in which I staged the exhibition was a naval dockyard, where the presence of the navy and of war is inevitable, I found it interesting that my exhibition attracted such comments as “War is never a solution to anything”.

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284 Woman, 68.
reflection in this context, as the connections I was trying to highlight were those between war, economy and technological innovation. These comments draw attention to the reflective purpose of museums. Because the medium is more passive than for example a lecture or a television programme, where the pace is set by the lecturer or producer, museums offer time for reflection and emphasise the role of personal experiences and interests of museum visitors. The outcomes of such personal reflection are unpredictable, as the example of the commentary on war demonstrates.

Although *Panopticon* emerged as the overwhelming audience favourite, there were of course those who disagreed. Only one person, a schoolgirl of 14, stated that she found *Panopticon* difficult to understand. Most comments revolved around the relevance and application of the principle in the context of the dockyard. Some questioned the application of the principle itself, while others struggled to see the connection between *Panopticon* and the dockyard: “It did not fit with the rest”. A successful exhibition can allow visitors to widen their intellectual scope. The comments discussed earlier demonstrate that many visitors enjoyed exploring concepts they were unfamiliar with. This would suggest my exhibition was successful in conveying a desire to learn.

Fewer respondents answered the question about the section they found least interesting than the question about the one they found most interesting: only five respondents did not name their favourite section, while 29 did not name their least favourite. This could be because these respondents did not especially dislike any part of the exhibition. Some

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285 Man, 79.

expressed this on the questionnaire: “I didn’t [find any section least interesting] they each complimented each other & helped the flow of the story.”

Of the more general topics covered in the exhibition, the audience favourite was, again, the topic most closely related to the Panopticon: surveillance and control. Approximately a third of the respondents named this as the topic they were most interested in. Perceptions of work were also popular, with a quarter of visitors expressing an interest. Overall, the topics relating to social history were seen as more interesting than those with a technological tone: dockyard workforce and industrialisation received a high proportion of the public’s interest, whereas naval shipbuilding and the way the machinery works scored low, the latter only being chosen by 10% of the respondents.

5.3.1 What visitors found difficult

The majority of visitors who answered the question about whether they found something difficult or not enjoyable in the exhibition answered “no”. Of those who had struggled with some parts, most named specific contents or had issues with the display, as Chart 5.4 indicates.

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287 Man, 67.
Chart 5.4: Most visitors who found something difficult or not enjoyable named specific contents or display issues. Panopticon is displayed separately in the chart, as it was, again the most often named specific content issue. Other specific content issues are grouped together.

Despite its popularity, the Panopticon was also seen as the most difficult topic to grasp. In an open question about whether there was something visitors did not enjoy or understand, the Panopticon principle was mentioned more often than any other content issues. To put this into perspective, although some had difficulty in understanding the concept, more visitors found it enjoyable or interesting. Answering the open question about what they found most interesting in the exhibition, 41 respondents mentioned the Panopticon, and 18 named it in their answers to what they enjoyed the most. By contrast, only 10 visitors specifically mention the Panopticon as something they
struggled with. This suggests that although the topic was undoubtedly challenging, most visitors were not put off by this. Indeed, one interesting and very encouraging outcome of the survey is that most visitors found the most challenging aspect of the exhibition the most interesting.

What visitors found difficult with the Panopticon was making the connection between Panopticon and the Block Mills. “I didn’t make the connection between the panopticon and the block mills without help!” commented one woman, who had asked a friend to explain the connection. Others found that the concept itself was not explained clearly enough. One suggestion from a visitor was to explain the concept very clearly at the beginning of the exhibition. This couple in their late fifties seem to have captured many visitors’ feelings: “Without detailed reading it wasn’t obvious what a panopticon was”. These comments relate mostly to how the Panopticon idea was presented in the exhibition. The concept itself and its application were criticised much less. One 62-year-old man claimed to be “Not sure of the relevance of the Panopticon”, which could indicate he did not agree with the interpretation. Although such comments do not frequently appear on the forms, my interpretation of the use of the Panopticon principle in the yards was occasionally criticised by visitors I talked to. This could indicate that these visitors were reluctant to enter into debate on the questionnaires, or that they were convinced of the idea after seeing the exhibition and talking to me.

Visitors also put forward ideas and suggestions about how parts of the exhibition could be improved. A 71-year-old woman commented on the display: “I would have liked to see more of the deposition for stealing chips with more space and perhaps a

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288 Woman, 51, Focus group participant.
‘translation’”, by which she meant that a transcript would have made the handwritten deposition document more accessible. Another visitor, a man of 62, called for more material on the machines: “I would like to see film of working stages to make it clearer”. Even some of the critical comments reveal an interest in the subject and a willingness to learn more.

Some visitors who raised issues about the concepts and ideas in the exhibition seemed quite familiar with the subject already. For example, one visitor called for a comparison with Taylor’s machinery, which indicates quite detailed knowledge about the history of the Block Mills. Walter Taylor, who had a blockmaking workshop with simple water-powered machinery in Southampton, was mentioned in the exhibition only briefly and is not considered in the adjacent Dockyard Apprentice at all. Other visitors would have liked more clarity regarding some of the ideas in the exhibition, like the 66-year-old man answering the question of whether there was a part he did not enjoy or understand: “The principle of a series of separate uni-purpose machines.”

I asked visitors what they would have liked more of in the exhibition. Some would have liked more details about specific contents. A 10-year-old girl wanted to find out more about the machines themselves, while a couple in their fifties called for more details about the Panopticon system. This 53-year-old woman was not alone asking for more contextual information: “Impact of naval industrialisation. Costs + savings of block mills”. Some visitors had comments about the way ideas were presented and would have liked more clarity, for example clearer definitions of some of the concepts, or simply clearer display. A 63-year-old woman suggested: “Parts of pulley just needed
labelling to clarify process”. Most answers to this question related to the content which I believe indicates a high level of interest in the subject matter.

5.3.2 Display issues

Display issues were brought up by 11 visitors, making it the single most frequent problem visitors found with the exhibition. There was only one written comment about the amount of text being too much, from a British couple whose foreign friends had struggled with the language. A few mentioned the text being too small as a problem, but the main display issues visitors struggled with were the layout and the location at the back of the Boathouse. This 29-year-old man found the navigation difficult: “Due to size and location it was not clear what direction (if any) you should go around”. As noted in Chapter 4, this was intentional: my aim was to evoke thoughts rather than narrate a story with a beginning and an end, and I thus chose to design the exhibition so it could be viewed in any order. A couple in their 60s commented: “Display boards too close together – confining space”. The layout was intended to create the feel of a prison, and the display boards – which I had not seen prior to setting up – emphasised this feel. Some visitors saw the layout as a problem, while others embraced it. A comment from the visitor book illustrates this: “The layout is clever – people can dip into what section they want & it doesn’t matter what they read first.[...]”

Most visitors found the text and layout easy to follow. Five visitors found the layout difficult and six struggled with the text. A slightly higher number, 13, found the concepts not explained well enough. These respondents were adults between 25 and 66, and most of them were highly educated, with only two having no university education. A significant number of them took part in focus groups. This suggests that a more
rigorous approach to definitions could have been useful. However, the majority of respondents found the concepts easy enough to understand as they were.

5.3.3 Impact of the exhibition

As an experiment Portsmouth Panopticon was a success. Just over 80% of the respondents said they would be prepared to visit another exhibition on a similar subject. Of the suggested topics, social history of work was the most popular, with 52% of respondents saying they would be interested to visit. It was followed by the industrial revolution of the navy, Panopticon, and finally the Block Mills, which as the least popular subject still attracted a third of the respondents. It is interesting to see that even though it was by far the most popular topic in this exhibition, only 36% of respondents were prepared to visit another exhibition about the Panopticon. This could mean that visitors felt the exhibition had satisfied their curiosity about the Panopticon. However, judging by the popularity of social history of work in these answers, I believe it is more likely to reflect on the way I portrayed the Panopticon principle: the context was social history of work, which was what visitors were most interested in seeing another exhibition about. It is therefore likely that the social history aspect of the Panopticon principle was what visitors found most appealing. When asked whether they were prepared to find out more about the same subjects through other media, the most popular subjects were again social history of work, followed by Panopticon, which supports this idea.289

One measure of an exhibition’s success, I believe, is the impact on visitors’ thinking or behaviour after they have left the exhibition. In order to gauge this impact, I asked

289 The above paragraph is based on answers to questions B4 and B5 on the questionnaire. Response rate for B4 was 80.8% and B5, 65.6%.
front-of-house staff at the Royal Naval Museum and HMS Victory to note down if they were asked questions about topics relating to my exhibition during the week it was running. The purpose was to find out whether visitors were stimulated enough by what they had seen to ask questions in other relevant attractions. HMS Victory did not record any questions, possibly because the way the ship operates does not encourage such questions, or indeed noting them down. I was warned by the duty manager at HMS Victory that this might be the case. At the Royal Naval Museum there were five questions from the public about pulley-blocks, and four each about blockmaking and the dockyard workforce. Unfortunately I did not have the opportunity to record the same questions for an equivalent week for control, but the wardens at the Royal Naval Museum could not remember being asked these questions before. Although the method was not particularly reliable, it nevertheless acts as an indication of the impact of my exhibition. Visitors wanted to relate what they had learned in Portsmouth Panopticon to other things they saw in the dockyard, and were prepared to ask questions about the topics covered in the exhibition.

5.3.4 Learning outcomes

Most of the respondents said they had learned something in the exhibition. Over 65% felt they had gained a new perspective on one or more of the topics covered in the exhibition. A high proportion, 83% of the respondents, also answered an open question about whether they felt they had learned something. Only one 25-year-old man answered “no” on the grounds that he “already knew it all”. As the interpretation was new, this comment is likely to refer to the factual information rather than the ideas I presented. A few also answered “maybe” and seven visitors knowingly skipped the

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290 Based on question C3 on the questionnaire, where visitors were given six topics and asked to tick those they felt they had gained a different perspective on.
This could mean they felt they had not learned anything, or that they had learned something but could not identify exactly what it was and chose not to answer.

Over half of the respondents simply answered “yes” without elaborating further, but of more interest are the answers of respondents who were happy to share what they had learned. A woman aged 53 summarised the two most popular answers: “Yes – detail of machinery. Unaware of Samuel Bentham”. While the machinery was mentioned often in these answers, the most popular topic was once again the Panopticon and Samuel Bentham’s role in the story. The use and influence of the Panopticon principle were among the most cited learning outcomes, as well as the meaning of the concept itself. As the concept is relatively unknown it is reasonable to expect that most visitors were not familiar with it prior to their visit. Thus my exhibition gave these visitors an understanding of a concept they had encountered for the first time, which is a significant learning outcome, and one central to my purpose.

Learning in an exhibition is an important motivation for visiting: according to Heinonen and Lahti, three quarters of museum visits are motivated by a desire to learn or be entertained. Therefore visitors can be expected to learn something, as they may regard this as the purpose of their visit, and enter with a receptive mindset. My aim for this exhibition was nevertheless more complex than merely presenting facts about the Block Mills, or even the concept of the Panopticon. I wished to convey ideas and perceptions about history and the abstract issues involved in the navy’s industrialisation process, such as surveillance and control, and perceptions of work. To measure the

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291 I have not considered those respondents who did not fill in the reverse of the questionnaire and thus did not answer this question, as the omission may not have been deliberate.

success of the exhibition in communicating these ideas I asked visitors whether they felt they had gained a different perspective on certain key issues.

Approximately a third of respondents felt what they learned had changed their perception of surveillance and control, while only 10% said the same about the machines. Technical details about blocks, the Block Mills and warship construction were mentioned relatively frequently in the answers to the open question about visitors’ learning experience. This data suggests that the learning that occurred may be related to facts rather than ideas. The machinery itself and, to a lesser extent, the craft of blockmaking were portrayed in a factual rather than conceptual way. Surveillance and control, by contrast, are fairly abstract concepts and were displayed in an unexpected context. The interpretation was intended to convey ideas, and this style of display had an impact on what visitors retained.

Social and industrial history were also important areas where visitors reported having learned something. When asked about the exhibition changing their perspective, approximately a quarter of the respondents ticked perceptions of work or the dockyard workforce as areas they had gained something new, and approximately 20% ticked industrialisation. Some answers to the open question also support this data. For example a woman described what she had learned with: “Yes, about the social history of work and circumstances of work in former times”. Another visitor reported learning “An appreciation of dockyard manufacturing”. One 65-year-old man reported he had learned “How to relate modern industrialisation to past eras”. His answer is unusual, but

293 Woman, 36.  
294 Man, 48.
important, as it shows that one of the key messages I wished to convey did indeed find resonance with some visitors.

These answers are compatible with data indicating that over 30% of respondents felt their perception of the history of technology or of social history had changed, when asked about their learning experience in the context of academic disciplines. A quarter of visitors also felt their views were affected in relation to naval history, but academic history in general was seen differently by only 7%. The result is not wholly surprising, as the aim of the exhibition was to display ideas rather than act as a marketing forum for academic history. The link between the content of the exhibition and scholarly history may not have been obvious to visitors not familiar with the academic field of enquiry. That so many visitors reported changing their perceptions is a very positive result.

5.4 The focus groups

The focus groups were chosen to represent potential audiences and experts in fields relevant to the content and display of Portsmouth Panopticon. There were three expert groups. A group of museum professionals was invited to give their opinion on the interpretation, the display and the viability of a full-scale exhibition. Historians were invited to provide an academic perspective to the interpretation and primarily to discuss the content and how I had put this across. The invited historians included authors of some of the academic literature I used as raw material, and they were thus familiar with the subject. A group of people working with historic building conservation and surveying were invited to discuss issues to do with the re-use of the Block Mills

295 Based on question C4 on the questionnaire. Visitors were asked if they had gained a different perspective on four fields of history, including academic history in general.
building, and whether an exhibition like *Portsmouth Panopticon* would attract sufficient audiences into the Block Mills to maintain it. The building had been recently restored under English Heritage guidance, but at the time there was no plan in place for its future use. My exhibition was therefore well-timed, as it both raised awareness and stirred discussion about the future of the Block Mills.

The two other focus groups, school children and university students were invited as potential audience groups. The school group represented the lower end of my target age group, and the purpose of the visit was to find out how well the children understood and could relate to the material on display. Although I was not specifically targeting school groups, I wished to assess whether the display style and interpretation were interesting to a young audience. The university students doubled as an audience of adults interested in history, and a group of future professionals providing perhaps different views from some of the issues discussed with the other experts.

As expected, organising the discussions in practice was more complicated than deciding which groups to invite. With the school group the initial idea was to persuade one or two teachers to bring their group to see the exhibition as part of their trip to the Historic Dockyard, as it is a very popular destination for school trips. However, the visiting groups during the week of the exhibition were all primary school children, and it was decided that as the poster exhibition was intended for adults and older children, having a primary school group evaluate it would not have served its purpose at this stage. In the end, a small group of secondary school pupils from Portsmouth Grammar School were invited to see the exhibition.
Inviting people to a focus group is unpredictable as they may have other commitments and be unavailable at the time of the discussion. Inevitably, some had to decline the invitation. As I noted above, many invitees from outside the Portsmouth area could not make the journey. There were some changes in the line-up of the groups, with a historian, a graduate and some university staff attending the students’ group. In the end, all the planned discussions were held. Group sizes ranged from 3 to 8 participants. Focus group participants also filled in the visitor questionnaires.

Below I will examine the results of each focus group session in turn. The student group had participants from a variety of professions and perspectives, which may be why the discussion was liveliest in this group and covered the widest range of topics. The other groups focused more closely on issues relating to their field of expertise, as was intended. The key issues of accessibility and inclusiveness arose in all of the groups. Each group had slightly different views on the subjects, which will be discussed separately below.

5.4.1 Portsmouth Grammar School

The group of schoolchildren consisted of five 13-14-year-old pupils from year nine at Portsmouth Grammar School, and their teacher. The children had participated in a Portsmouth Society project about the Block Mills as part of their school work, and had given a presentation about it the same morning. They were thus familiar with the subject and had visited the Block Mills with their teacher and seen the interpretation panels there. Their teacher had also studied the Block Mills. They all agreed that the Panopticon exhibition compared favourably with the panels in the Block Mills, mostly because the text was in small instalments rather than long blocks, and overall there was
less to read. The verdict was that *Portsmouth Panopticon* was “Nice and simple”. The children appreciated the number of images I had used and found the exhibition layout easy to follow. They enjoyed the wider context presented: that it was “related to other stuff… rather than just the Block Mills”.

The children were not familiar with the Panopticon concept before coming, but were interested in it. They said they could follow the exhibition storyline and had understood the concept. Only one of the children had found the *Panopticon* section difficult to understand, and the teacher was not convinced by the interpretation of the Block Mills as a Panopticon on the basis of the exhibition. He argued that there was no central observation point in the Block Mills, and that similar ideas of control had been used in Robert Owen’s New Lanark Mills. However, neither of these points stands in contradiction to the application of the Panopticon principle in the dockyards. What the children had found most interesting and what they retained from the exhibition were the blocks and the machinery itself. How the machinery works was seen as the most interesting topic in the exhibition, followed by naval shipbuilding. One of the girls explained her choice of the machinery as the most interesting section on the questionnaire with: “It is interesting seeing how they work & how they have changed”.

All of the children said they had learned something. Those who elaborated mentioned blocks and the Block Mills themselves. In the group discussion they said seeing the exhibition had helped them understand more about the Block Mills. They also thought learning about blocks could be useful in school subjects such as physics. They were most interested in finding out more about the social history of work, with some also interested in Block Mills and the navy’s industrial revolution.
While *Dockyard Economy* interested the children the least, there was a significant amount of curiosity towards social history. Early nineteenth-century thinking was seen as one of the most interesting topics by two of the children, and one reported having gained a different perspective on social history. One of the most popular topics to see another exhibition on or to find out more about was also the social history of work. The children had seen the depressions worn in the floor by the workers’ boots in the Block Mills, and noticed the photograph of such a depression in the *Blockmaking* poster. This type of connection with the past was something the children could relate to and it appears to have left a strong impression. Empathising with the human connection is an important part of museum learning and experience.\(^{296}\)

On the whole the children found the exhibition interesting, but would have liked to have seen more objects. They said they would be interested in seeing *Portsmouth Panopticon* in the Block Mills, preferably as a full-scale exhibition with working artefacts and interactive exhibits. As one of the boys put it, when asked about what was different about this exhibition compared to other museum exhibitions they had seen: “It’s less like a proper museum, there’s less, like, hands on stuff”. What I believe he meant by “a proper museum” is an establishment with a permanent space and objects on display, such as the Royal Naval Museum nearby. Although the key aim of the exhibition was conveying ideas about the content, it is not irrelevant how these messages are delivered, and the medium of posters is a difficult one when considering younger audiences. The children were not put off by reading the posters, but they would have preferred an

\(^{296}\) This aspect of museums is explored for example by Eilean Hooper-Greenhill in connection with portraits in Hooper-Greenhill (2000): *Museums and the Interpretation of Visual Culture*, Chapter 2.
exhibition with objects and things to do. It is significant that they found the exhibition messages interesting enough to read the posters fairly carefully.

5.4.2 University students

The university student group was intended to serve a double purpose as a well-informed potential audience group and as future professionals. The group finally consisted of three current students from MSc Museum and Heritage Studies at the University of Portsmouth, one graduate and one lecturer from that course, a student from an equivalent course at Leicester University, a naval historian and a lecturer from the Civil Engineering department at the University of Portsmouth. Thus only half of the group were actually students, and the remainder were professionals with various links to the subject of the exhibition. This combination worked very well, and served the original purpose, even though the composition of group did not adhere to the original plan. Unfortunately the recording device and its backup both failed during this focus group, so the record I have of the discussion is not complete.

One of the participants, a Portsmouth MSc Heritage and Museum Studies graduate, had prepared a very detailed critique of the exhibition, covering the approach and objectives as well as the content. This critique stimulated much discussion, as other participants offered their views on some of the points raised. One of the areas of criticism was that the exhibition was not academic enough. Participants expressed very different views about the nature of academic research, ranging from all research being academic to a very strictly defined format. It was suggested that in order to qualify as academic, my exhibition should have had a clear statement of purpose at the start, followed by a discussion supported by more evidence than I presented, and finally wrapped up with a
conclusion. This approach would imply an ordered route around the exhibition, which Portsmouth Panopticon deliberately did not have, an approach which other groups, notably the curators, thought worked well. These views illustrate the kind of difference in thinking that makes presenting academic work in a museum complicated: it may not be clear to different professionals exactly what academic research entails, or what is possible to realise in a museum format.

Display and design issues were discussed rather briefly. Most people in the group had enjoyed the display and thought there was a good balance of images and text. The Panopticon structure was seen as interesting and a working idea, as people could either consider it or ignore it. Some criticism was directed at the amount of text and sizes of images. One participant saw the image sizes as too similar.

On the whole, however, the group discussed mostly the content, and was perhaps more critical of it than the other groups. The use of the Panopticon principle and the way I had pulled the different elements together were questioned, and more evidence called for. Some would have liked more comparisons with other trades and other uses of the Panopticon for comparison as well as evidence. The author of the detailed feedback disagreed with my interpretation on the grounds that management changes and machinery changes are two separate issues and should not be mixed. Most of the other participants, however, agreed that this was a useful way of looking at the history of the Block Mills. The interpretation I presented in the exhibition was unconventional, and so likely to attract criticism from visitors familiar with the issues. Much of the critique I received on this account was a matter of opinion. The aim of the exhibition was to
provoke thoughts, and the discussion among this group is proof that I achieved this goal.

5.4.3 Dockyard historians

Predictably, the historians discussed the content more than the actual display. The group consisted of two dockyard historians and a naval history PhD student. It was a rather small group due to many of the invitees not being able to attend. The historians mainly agreed with the way I had presented the Block Mills in a wider context, but, like the student group, called for more evidence on the use of the Panopticon in the Block Mills. They expressed scepticism rather than outright rejection of the idea, and simply wished to see more proof for a theory they had not encountered before. Although the notion of Bentham using the Panopticon ideas in his dockyard reforms has been written about since the 1990s, it is not a mainstream approach and thus not familiar even to all historians. The idea was more prominent in the exhibition than in the literature, as it was central to my interpretation of the story of the Block Mills. The group also called for a more chronological approach at least within the cells and clearer definitions of terminology earlier on.

There were many ideas of how the exhibition could be expanded into a full-scale version. Some of these were to do with including more contextual information. For example, there was a suggestion for following the flow of materials to the Block Mills from around the country and the world. This would put the Block Mills into a global context of production and serve to make a point about the navy seeking control over resources such as *lignum vitae* and block production. Displaying the Block Mills in the context of factory building and machine tool making was also suggested, as were...
parallels with other industries and other uses of the Panopticon. These could provide useful reference points and help the visitor understand the principle and the developments at the yard better. The historians also suggested including more social history. Their ideas were very similar to those discussed in the curators’ group, with suggestions of displaying elements such as family life and living conditions. The curators’ views will be discussed later, but I had expected this to be one point on which curators and historians would differ, as academic social history is very different from simply giving a story a human face.297

A more detailed topic that was suggested for inclusion in a full-scale exhibition included the rates of pay. This was seen as possibly a better way of making the point of changes in the economy than were the chips. Another idea that was discussed was the floor plan of the Block Mills, and how the machines were arranged in flow line production. Both Coad and Cooper have written on this topic, and disagree to some extent. This disagreement, it was suggested, could be used to illustrate how academic research works. A suggestion related to this point was a puzzle for children to fit all the machines in the Block Mills. This could visualise the historian’s process of working out how the machines were laid out.

Generally speaking the historians did not perceive pitching high as a problem, and were more worried about dumbing down in most museums. However, their views echoed those of the curators in that in its current form the exhibition was not inclusive of every educational background, for example, and they would have welcomed a more layered interpretation. This would mean different levels of communication for different

297 The differences between academic social history and what is seen in museums was discussed in Chapter 3.
The issue of education was also discussed briefly. The Block Mills were seen as having a lot of potential for school groups, as they are relevant to a wide range of subjects. While my exhibition only covered history, a visit to the Block Mills could include material relevant to other subjects such as physics, in the form of studying blocks or steam power for example, or other subjects such as economics or the built environment. The debate about how history should be taught in schools also came up. It was suggested that the present interpretation is moving towards a wider, narrative approach, instead of more focused case studies. My exhibition would suit this type of history teaching very well, as it emphasises the wider context.

5.4.4 Museum professionals

The museum professionals included representatives from the Portsmouth City Museum and Records Office, the Royal Naval Museum, the Royal Navy Submarine Museum, the Institute of Naval Medicine, and two people from the Mary Rose Trust. The husband of one of the participants also contributed to the discussion. Much of the discussion centred on display, as would be expected from museum professionals. The issue was complicated by the fact that the exhibition was a prototype, and many of the problems arose from the limitations of time and resources. For example, it would not have been possible to include hands-on exhibits and three-dimensional objects in this exhibition. Although some of the suggestions would have been possible in a full-scale exhibition, they were not always relevant to the medium at my disposal. But the ideas which were suggested, such as including a CCTV camera and monitor, or displaying aspects of family life, with time and resources, could clearly be extended from this prototype.

Some of the points made were purely practical. For example the design was seen as a good idea, but from a practical point of view, it was seen as difficult to get around in a wheelchair. As one of the participants was a wheelchair user, this point was made very concretely. Providing for disabled visitors is an important concern for museums, as it relates directly to government agendas about accessibility and inclusiveness. There were problems with the poster sizes, as the viewer was standing very close to them, and the large posters could not be seen as a whole. The smaller posters were considered too high for children or wheelchair users to read. The text font was regarded too small, and at least some of the participants saw the exhibition as too wordy. However, it was agreed that in a poster format this is difficult to avoid.

On the whole the group was very positive about the exhibition, and offered their views with enthusiasm. The main concern was for visitors with less education who may not be able to follow the storyline. This could be partly addressed with three-dimensional and interactive exhibits. The title *Portsmouth Panopticon* was considered too academic, as many of the participants did not know the meaning of the word before coming. A different title, with “the all-seeing eye” replacing “Panopticon” was suggested. Inclusiveness was also discussed in relation to assumptions of prior knowledge, for example regarding eighteenth century naval wars, as well as more abstract concepts like the Panopticon. Some of the participants were adamant that children should be included in every exhibition, and my pitching for adults and older children was criticised.

A few participants said they struggled to make the connection between the Panopticon and the Block Mills, and it was suggested this should be made more obvious and
explicit. Making intangible concepts easier to understand by making them tangible through objects was discussed. An idea that was met with enthusiasm was using CCTV cameras in the exhibition and letting visitors see themselves on screen. I have seen something similar in the Brighton Museum, so it is possible to realise in an exhibition. Monitoring visitor behaviour in the exhibition through a variety of technologies could also double up as visitor feedback. My use of the CCTV concept, and asking whether seeing the sign had modified visitors’ behaviour was picked up by both the museum professionals and the visiting public, and the comments were very positive. The curators saw it as a good way of bringing the issue up to date, as well as making a wider point about how surveillance affects people.

Like the historians, the museum professionals were calling for more people-centred stories to bring the history alive. One suggestion was to display the life of a typical dockyard family, which could be a real family, traced from the records. This would bring issues like wages and the apprentice system to a more personal level, making it more approachable for the visitor. A worker’s house front with narrow stairs was suggested as a way of displaying the many uses of chips. Bits of waste wood were used in construction, resulting in stairs, doorways and other such features being built just under three feet wide, the maximum length of wood considered chips. The dip in the Block Mill floor, previously mentioned, illustrates the effect of the workers on the built environment. The curators thought this topic could be expanded into examining work related illnesses and repetitive strain injuries, for example. This kind of content would have worked well in the discarded People of the Yard section, which was intended to deal with dockyard workers’ daily lives and how they were affected by these changes.
The levels of surveillance in the Block Mills and that the principle was first applied in Portsmouth were the topics in the exhibition that stood out for most of the participants. The angle I had taken was seen as refreshing, as it was so different from what is usually seen as museums about the Block Mills and the dockyards in general. The wider context and the way I had put the story together were well received by the museum professionals. As one participant put it “It brought together different strands. I also liked the fact that it seemed to show how mechanisation and war and people all come together”. Overall, the exhibition was seen to function well as a unit.

5.4.5 Historic buildings professionals

The purpose of this group was slightly different from the other focus groups, as the main theme of discussion was the Block Mills building and its possible future uses. Participants were professionals working with surveying and historic buildings. At the time of discussion the future plans for the building were still completely open, and my aim was to find out whether experts in the preservation and use of historic buildings would consider displaying *Portsmouth Panopticon* a sustainable use for part of the space. The historical significance of the Block Mills is based on the machinery and the production line rather than the building itself. Thus displaying an exhibition about the machinery in the building would greatly enhance its interpretation as a historic building. This would be in line with the aims of its recent major restoration project. As discussed in Chapter 4, I planned an imaginary exhibition for the Block Mills building with the hope that it could be displayed there in the future. This group of experts was assembled to discuss whether this would be sustainable. Key questions were financial feasibility and access to the site, as well as the interpretation of the Block Mills. The discussion covered the future of the Block Mills more widely, however.
The group included representatives from Portsmouth City Council conservation team, Portsmouth Naval Base Property Trust, and English Heritage, all with a connection to the Block Mills. There were also three representatives from the University of Portsmouth: a lecturer and a PhD student from the School of Civil Engineering and Surveying and the Dean of the Faculty of Technology, all with a background in surveying.

It was established early on that a museum use alone would not generate sufficient funds for maintaining the building, and would not therefore be viable. There are also six attractions on site already, and adding another would damage business and funding opportunities for all the existing ones. The verdict was that a mixed use, partly as an exhibition space, partly as something that would generate enough income to maintain the building, would be the preferred option. However, there was no consensus on what the income-generating use could or should be because the group recognised the constraints on access and parking that would be imposed by the naval base. Suggestions included a high class restaurant with food provided by outside caterers on the top floor, a workshop for restoring boats or smaller objects with high value, a marine art dealer, a children’s science centre, and an office use, for example for architects or other professions that would not need a high level of materials transported in and out.

The main problem restricting the use of the building was seen to be access. There is no parking available at the dockyard, and vehicle access is limited, making it difficult for a business to operate from that part of the dockyard. It would seriously limit the access for both staff and customers, as well as making transporting goods very difficult. The
University of Portsmouth has, in the past, occupied part of Boathouse 6, a very short walk from the dockyard gate, but even that proved problematic because of restricted access outside the Heritage Area opening hours. This would also pose problems for any museum or exhibition use, as access is limited and the walking distance from the gate is rather long. The process of making the building physically more accessible (a stage necessary before any future use) was discussed as a useful student project.

One of the suggested uses as the non-profitable partner was a resource centre for dockyard history. This would include access to computer terminals rather than directly to archives material, and an exhibition space. This type of use could easily accommodate an exhibition like Portsmouth Panopticon, or other temporary exhibitions. An important issue would be to attract repeat visits which a resource centre with temporary exhibitions could achieve. The group considered Portsmouth Panopticon and the interpretation of history I presented a suitable exhibition for this kind of venue. The participants particularly commended the way it put the Block Mills into a wider context. It was also suggested the exhibition could expand towards science education, which would appeal to a wider range of school groups for example. Inclusiveness for all age groups was seen as essential, and staged in the Block Mills the exhibition would need to accommodate this aspect as well. A full-scale exhibition with material objects included, such as the imaginary one outlined in Chapter 4, could be well suited for the Block Mills building in the future.

5.5 Accessibility and inclusiveness

I will now address some of the specific issues raised both in the questionnaires and in focus group discussions, starting with accessibility and inclusiveness. These issues
came up several times during the exhibition, particularly in the focus groups, but also in feedback from members of the public. In the expert groups especially, participants expressed concern over the intellectual accessibility of the exhibition, and its exclusion of children and the less educated. In fact, only one person in any of the groups would have liked the display and presentation of the issues to have been more scholarly. Most agreed that the issues I was presenting were complex, and therefore difficult to present. The visitor feedback suggests that the exhibition was successful in conveying most of these ideas to a wider adult audience. However, there were inevitably problems relating to the text-based medium of posters and to the difficulty of expressing complex academic concepts to an audience with a varied educational background.

One of the main criticisms that arose in the museum professionals’ group was that the exhibition was aimed at adults and older children, rather than including all ages. Children are an essential visitor group for museums, as they visit both with schools and with families, and generate vital revenue through tickets and grant in aid to national museums. In both cases it is important to keep the children interested, so they will enjoy the experience, perhaps come back to the museum another time, and most importantly, learn something from their visit. The curators were of the opinion that I should have adapted my exhibition to include younger children as well, and one participant in particular argued that “any text can be adapted to any audience”. I accept the validity of this point regarding a full-scale exhibition or a museum setting where the resources and expertise to design exhibitions for children are readily available. However, as discussed in Chapter 4, the constraints of my own expertise and time and resources within the project necessarily limited the scope of my exhibition. Thus I decided early on to focus on older age groups.
One issue discussed in all the groups was the amount of text. Some of the curators and university students thought there was too much. This is a very common concern in museums, as too much text will bore and alienate visitors who are unable or unwilling to read it, and cause fatigue in those who do, as it is uncomfortable to read standing up. Despite the worries of the experts, however, the feedback from the public and especially the schoolchildren indicates that the amount of text was appropriate for the subject and the medium. A 29-year-old woman commented on whether the text was easy to follow: “Very. Nice chunks of info- not too much to read”, whereas a woman of 75 mentioned “The balance of illustration to text” as what was most interesting in the exhibition. For the schoolchildren the amount of text in the exhibition was seen as one of its strengths: they appreciated the use of pictures and the fact that the text was in small instalments rather than large blocks. Their comments during the discussion and on the questionnaires showed that the children had clearly read most of the text, which I believe is strong commendation in itself.

Accessibility was a key issue in designing the exhibition. I focused particularly on the intellectual accessibility of the posters, as the subject matter was so complex. The medium of posters relies entirely on text and images, and it was thus important to make these as clear and understandable as possible. Using text as the main medium of communication risks excluding younger children and visitors whose level of reading skills does not allow them to enjoy the activity. The carefully planned use of images makes the exhibition more accessible to these visitors, but as in most exhibitions, some reading was inevitable. Interpreting the content of the exhibition for an audience with
varying reading skills is one of the key tasks of museums, and one that I considered very carefully when preparing the exhibition.

Another accessibility issue to consider in the exhibition design is physical accessibility such as eye level. This issue was not considered as thoroughly as the intellectual accessibility, and as a consequence some of the posters were too high for small children or wheelchair users to see. One focus group participant who was disabled and sometimes uses a wheelchair, said it would not have been possible to enter into the cells with a wheelchair and see the posters from a sitting position. As discussed in Chapter 4, I did not see the exhibition space and what it looked like until the day of setting up, and therefore there was little I could have done about this particular design problem. Both these issues need to be taken into account when designing a full-scale exhibition. Eye level and the positioning of exhibits is a very different matter from the intellectual accessibility issues involved with the content. It is an important concern, as the design is what visitors see, and it will affect their perception of the content.

Some visitors, both independent and focus group participants, found the Panopticon concept and its connection with the Block Mills difficult to understand. I believe I could have made the connection clearer and somewhat more explicit. In its present form the principle and its application in the dockyard may be too subtle, and I may have relied too much on the visitors to make the connection themselves. One idea, suggested by a few visitors, was that I could have given clear explanations and definitions of the concepts at the start of the exhibition. This would be possible to realise, but whether it would have served the intended purpose is less certain. Including definitions would inevitably add to the amount of text, and could both distract from the theme by
providing too much detail, and alienate visitors. My aim in the exhibition was to inspire thought rather than to thoroughly explain a theory. While I accept that some visitors felt they needed more help in making the connection between the Panopticon and the Block Mills, I believe spelling it out too clearly may bore others. The solution could be to edit the exhibition text towards underlining the connection more, or perhaps even to include a Fact File poster to summarise the idea schematically with images.

Most visitors found the exhibition layout and text easy to follow. A 67-year-old man said he had most enjoyed “The clear descriptions and easy flow”, and a woman, 64, enjoyed “Its simplicity – it was succinct”. These comments indicate that not all visitors are as averse to reading as some of the expert opinions would suggest. Instead, the readability of the text is a key issue. These comments also demonstrate that I have managed to present the exhibition in the way I intended: clear enough for a non-expert audience to enjoy.

5.6 The Panopticon and social history in museums

The Panopticon was mentioned 103 times in the written comments on the form and in the visitor book, in addition to being the most popular answer in most of the multiple choice questions. Some of the comments were, of course, negative, visitors not understanding the principle and how it was applied in the dockyard, or not agreeing with the interpretation. The vast majority, however, were expressions of interest. It is therefore safe to say that the Panopticon was a talking point, which is an achievement in itself.
The *Panopticon* section was particularly favoured by the middling age groups, the youngest and the oldest preferring other things. Women were slightly more interested in *Panopticon* than men. This could be taken as confirmation of the idea put forward in the museum professionals’ focus group that women are less interested in technology than men, and might therefore appreciate this kind of conceptual social history over technology. It could also reflect on the fact that women who visited the exhibition were on average more highly educated than their male counterparts. 37% of women and 31% of men had a postgraduate degree. The highly educated tended to express a preference towards *Panopticon* more often than the less educated. The respondents who preferred *Panopticon* were most interested in economic and social history and maritime and naval history. On the whole they were more interested in history than in technology.

The reception of the Panopticon concept was overwhelmingly positive. Because the concept is somewhat abstract and academic, I had expected more people to be bored by it, but the majority of visitors enjoyed being introduced to new ideas and concepts in this way. Many visitors made connections between the Panopticon and knowledge or experience from their own lives. A man, 47, commented on what he found most interesting in the exhibition: “Panopticon! I can’t say I was aware of it – but very interesting. Please don’t suggest it to my boss!” This comment illustrates the success of my exhibition in both introducing the visitor to a new concept and getting him to see the concept in the context of his own experience. The name of George Orwell and his novel *Nineteen Eighty-Four* which explores similar issues also came up in the questionnaires and were mentioned in conversation by a few visitors. I made no reference to Orwell in the exhibition, which indicates that visitors were able to relate what they had seen in the exhibition to their own prior knowledge.
It would seem that having a theoretic framework built around the concept of the Panopticon worked well in this exhibition. Museums seem to shy away from this kind of exhibitions. It is not easy to accomplish, as demonstrated by the example of Making the Modern World in the Science Museum: an overall framework exists in this exhibition, but it is lost in the detail and sheer number of objects in the gallery. In the case of Making the Modern World I believe the problem relates to scale. The exhibition is simply too big for the visitor to get a comprehensive view of what the curators are trying to say. With Portsmouth Panopticon, I arranged the exhibition around the Panopticon concept. At least on a small scale, with an easily manageable number of themes and sections, this approach was successful. “I liked the different themes sectioned out that together interpret the block mills and the period of time they relate to – cross reference each other”\textsuperscript{299} was one woman’s answer to what she had most enjoyed in the exhibition. Visitors also enjoyed the interpretation that brought technology and abstract concepts together. A 63-year-old woman had most enjoyed “The mixture/cohesion of concepts – panopticon, management & tech practice”.

Thus it appears that the audience enjoyed a new interpretation of a familiar story, the industrial revolution, as well as learning a new concept, the Panopticon. The feedback also indicates that conceptual social history interested visitors. This kind of social history in exhibitions is rare, as museums tend to opt for the kind of social history that concentrates on daily lives of people in the past. This is often done through displaying for example home interiors, as in Portsmouth City Museum, or as Divall and Scott

\textsuperscript{299} Woman, 29.
describe social history of transport: aspects that are not obviously technological. In the focus groups, both historians and museum professionals expressed a wish to see more social history in the exhibition. What was meant by this is the kind of social history usually employed in museums, rather than the academic counterpart I displayed. The curators discussed the possibility of including more of what they understand as social history at length, suggesting ideas for displaying a human connection, or as they put it, giving the exhibition a human face. This type of social history is easily approachable and very effective in conveying impressions of life in the past. Ideas put forward included displaying the life of a family, with their employment history, wages and daily home life, to illustrate issues of the apprentice system, wages and perquisites like chips, as well as work-related injuries and illness. The historians also believed there to be source material to make this kind of exhibition possible.

My original plan for the exhibition did, in fact, include this type of social history as well. The part that would have dealt more closely with everyday life, with the working title of People of the Yard, was abandoned because of constraints of time and available published research for material, as mentioned in Chapter 4. However, my plan never included a family or a character whose life in and out of the dockyard would be followed. There were two reasons for this. Firstly I believed it would not fit well with the section format I had chosen. This kind of personal story could not have run through all of the sections. As such a story would have been very different from the more conceptual history displayed, I believe it would have disrupted the structure of the exhibition. Secondly, and more importantly, this kind of history tends to dilute issues, as the focus is often on the mundane. Exhibitions employing human characters, whether

fictional or real, tend to offer a squeaky clean image of idealised family life. This is counterproductive to the aim of conveying how ordinary people lived in the past. This could be because curators as well as visitors have a tendency to identify with the protagonists and see them in a favourable light. More importantly, such stories only offer one person’s perspective to daily life. Therefore, unless it is firmly embedded in a wider context, a story of a family or character will inevitably offer a narrow interpretation of the past. As I have tried to look at the history of the Block Mills and the dockyard from a wider angle, focusing on a family would have been counterproductive in this context.

It is clear the conceptual, more academic approach appealed to the public. Many of the comments both in the focus groups and from independent visitors were favourable to an exhibition displaying rather theoretic social history. What one focus group participant found most interesting in the exhibition was the “Idea that it’s not just technological advances that created blockmills but that there were social control theories behind it as well”.301 A 52-year-old man commented on what he had found most interesting with “The way that these separate aspects (mechanisation and panopticon) were brought together”. What these and other comments indicate is that visitors are interested in learning new concepts and seeing different approaches to history in museums. The approach I have taken appealed to at least some members of the public and focus group participants precisely because it was different from what is usually seen in museums.

301 Woman, 37.
5.7 Conclusions: Implications of the visitor feedback

The number of visitors and the tone of questionnaire answers indicates that *Portsmouth Panopticon* was a successful prototype exhibition design. Visitors enjoyed the exhibition and found it interesting, and I learned that displaying academic concepts is possible, at least within the scope of my experiment. The Panopticon concept in particular was a favourite with the audience, and the interpretation was even more successful than I had expected. I had anticipated more criticism for not following a narrative format, and for displaying academic material that could perhaps be deemed too high-brow or complex for an exhibition. That the audience enjoyed the exhibition and found it easy to follow indicates that my attempt at converting abstract material into an understandable and stimulating format without diluting the issues was successful.

Although museum visitors enjoy learning theoretic concepts such as the Panopticon, these concepts should be clearly explained, as I found out from the feedback concerning the connection between the Panopticon and the Block Mills. Many visitors had not been able to see the connection, and found that it was insufficiently explained in the exhibition. I chose a more subtle approach rather than explaining the connection outright. The issues I presented were complex and difficult to make simple. By spelling the connection out in the exhibition, I would have risked boring the visitor with lengthy explanations. I also wanted to avoid a didactic tone that would have delivered my interpretation as the only correct version of the story. Instead, I tried to stimulate the visitors to think and make the connections themselves. The majority of visitors found the exhibition easy to follow, and many said they had understood the connection between Panopticon and the Block Mills. Developing a full-scale exhibition I would seek ways of making the point slightly more explicit without diluting the overall idea of
the exhibition. However, the balance between too much explanation and not enough is
delicate, and as the majority of feedback was positive, I would not wish to change the
expression too much.

In a full-scale exhibition I would also underline that what is displayed is one possible
interpretation, and that historians do not always agree on the interpretation of facts. I
encountered an excellent example of this kind of display, shortly after my exhibition
was staged. The Hidden Treasures exhibition in Whitgift Conference Centre in Croydon
displayed artefacts from Henry VIII’s flagship, the Mary Rose. In one room, four
different theories of why the Mary Rose sank were explained, and the visitor was given
a token to put in a container next to the theory they found most convincing. This is a
good method of audience engagement. All deposited tokens were visible to other
visitors, and none of the theories was a clear winner, demonstrating how successful the
curators had been in providing even handed accounts of the various theories. In the case
of the Block Mills, the idea put forward in the historians’ focus group, regarding a
puzzle for placing the block machines inside the Block Mills, would illustrate a similar
point. Making this point could, I believe, help visitors to think of history and the process
of academic research in a different way.

In the focus groups, two competing views were expressed about the complexity of the
content on display. These views illustrate the different approaches of academics and
curators to the kind of history that should be presented to the public. The curators
suggested a people-centred approach. From a display point of view this is very
approachable and inclusive, but it is not particularly analytical or scholarly, and
although it would be possible to incorporate some academic work into such an
exhibition, it would inevitably be in a minor role. This, in turn, would reinforce rather than narrow the gap between academic history and museums. The other approach suggested came from the student group. It represents the kind of view I associate with the academic profession rather than museums. A Heritage and Museum Studies graduate with a background in naval history had prepared a detailed critique, arguing that the approach I had taken was not academic enough. He had very detailed specialist knowledge of the subject, and called for more evidence to be presented in the exhibition to support points relating for example to the use of machinery, and Samuel Bentham’s role in the dockyard. This critique would be valid in the case of an academic essay, but I believe many of the details suggested would simply bore most museum visitors. This, in turn, would defeat the object of presenting academic work to a wider audience, as those not accustomed to academic argumentation would be unlikely to enjoy the experience.

The main concern arising from the discussions with professionals, and from the visitor data, was that the exhibition mainly appealed to the well educated. The topic probably attracted a self-selected educated audience. Inclusiveness is an important issue in museums. As publicly funded institutions they can be expected to serve a wide section of the public. Attracting an audience from a wide socio-economic base also brings more visitors through the museum’s doors, which can translate into more funding, ticket sales and more takings in the museum café and shop. In recent years, the trend in museums has been towards increasing inclusiveness. In some museums, for example the Science Museum, this has resulted in an attempt to make every exhibition suitable to as many visitor groups as possible. This kind of thinking also manifested in the curators’ focus group with regard to including children in every exhibition. I see this as

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problematic, as it tends to create rather bland displays. Having several smaller exhibitions aimed at different groups, for example as changing exhibitions, would achieve the same goal. The audiences for targeted exhibitions could then be more satisfied than with larger “one size fits all” type shows. On the basis of the visitor feedback, *Portsmouth Panopticon* would work very well as such a niche exhibition. It appealed to a relatively highly educated audience, but also succeeded in stimulating thought in visitors who were not familiar with the concepts or ideas presented.

A crucial element in making a full-scale version of *Portsmouth Panopticon* more accessible to a wider audience would be displaying objects. As a medium, a poster exhibition is less accessible to visitors whose reading skills in English are not adequate to enjoy the activity of reading posters. As discussed in the previous chapter this was not an option in the context of this study, but the poster exhibition was created as a kind of pilot for a possible full-scale one. What this experiment demonstrates is that displaying the kind of conceptual social history I used in *Portsmouth Panopticon* could appeal to museum visitors, and thus reach a far wider audience than the readership of academic literature.

Another way that was suggested by both curators and historians for making the exhibition more accessible was the inclusion of the kind of social history typically seen in museums. Adding more everyday life aspects to the existing story could make it more approachable. I could include elements from the sections that were left out of the final version, such as typical clothing or food, and more details about certain dockyard traditions, such as meals brought into the yard by the workers’ wives. I would wish to avoid including so many details of everyday life as to make the exhibition mundane.
The audience feedback demonstrates that visitors enjoyed *Portsmouth Panopticon* precisely because the approach to social history was different from what is usually seen in museums. The idea was to trust the visitors’ ability to place themselves in the framework of history I provided, rather than showing that life was different in the past. Judging by feedback from visitors who related their own memories to what was on display, I accomplished this task.

Building an exhibition around a theoretic concept is unusual, but it seems to have worked well. This was especially true with visitors who enjoyed the Panopticon concept and found the more traditional elements of the exhibition (the Machinery poster and *Dockyard Economy*) less interesting in comparison. This suggests that museum audiences are open to new ideas and new ways of displaying history. Although many of the visitors appreciated the factual information on display, and some would have liked more of it, the Panopticon provoked by far the most positive response. Similarly, the non-narrative structure of the exhibition was well received, with only a few visitors wishing to have a clear starting point. What I would conclude from these results is that museums could be bolder in moving away from details, facts and clear storylines, as it is not the only thing audiences want to see. Furthermore, the popularity of the Panopticon concept demonstrates that a people-centred storyline looking at daily life is not the only way to display social history in a way that audiences can relate to. The main purpose of *Portsmouth Panopticon* was not to impart knowledge about the Block Mills or even the Panopticon. It was to provoke thoughts and ideas, and suggest new ways of viewing history. A considerable proportion of the audience reported gaining a new perspective on at least some of the themes I displayed. I find it encouraging that so many visitors felt they had gained something so substantial from the exhibition.
Chapter 6
Conclusions: an evaluation of the process

This study has explored the museum exhibition as an interface between academic history and the wider public. For this purpose I created an experimental exhibition drawing upon academic literature on the Portsmouth Block Mills, and evaluated the audience response. Overall, the exhibition was viewed very favourably and the experiment was a success. In this chapter I draw some final conclusions about the project and its relevance to museums and the academic world. I start with a brief overview of the aims I set at the beginning of the dissertation, and the extent to which they were met. I then draw some more general conclusions.

The four key aims I set for the dissertation were:

(I) To present academic history in a museum environment in an accessible way;
(II) To display a new view of the Portsmouth Block Mills;
(III) To describe and analyse the process of creating this exhibition;
(IV) To discover, via visitor feedback, whether the chosen approach appeals to a relevant audience.

I believe my study has shown that these goals were successfully met.

The very positive audience feedback indicates that I was successful in conveying complex academic ideas in an accessible way to a varied audience. Visitors enjoyed the exhibition, and many of them felt they had gained new perspectives on the topics
displayed. These results show conclusively that museum visitors do not shun more complex topics, but instead enjoy the challenge.

The accessibility of the exhibition was largely accomplished through the way the ideas were presented. The text was short and repeatedly edited during a long process of paring down and refining. The images were very carefully chosen and ordered. This made the posters easy to read and the messages clear and understandable. Although some curators and Museum Studies students argued that there was too much text, visitor feedback suggested otherwise. The school group and many independent visitors praised the balance of text and images. I conclude from this that the quantity of text and complexity of issues conveyed are in fact secondary to the quality of presentation. Text needs to be accessible and engaging at an appropriate level for the audience, and issues require imaginative presentation. This is one of the key challenges museums face. The need to engage and entertain an audience is crucial, but must also be balanced with informative content.

I presented the story of the Block Mills in a wide historical context in order to make it more accessible to a diverse audience. I chose well-known historical events – the Napoleonic wars and the industrial revolution – as a background against which to display more complex issues. The key concept of the exhibition, the Block Mills as a manifestation of the Panopticon principle, was intellectually demanding: both the principle and the Block Mills are largely unknown beyond academic circles, so it was important to provide a sound and accessible background without boring the visitor with too many details.
I chose to build the exhibition around the notion of the Panopticon because it offered an interpretation of the Block Mills that was significantly different from the way the machinery has been displayed before. I was fascinated by the idea of interpreting such tangible objects as the block making machinery through the abstract concept of the Panopticon. Although I first encountered this interpretation in the works of Peter Linebaugh and William Ashworth, my aim was to translate the interpretation into one suitable for a wide audience in a museum context.\(^{303}\) My goal was not to investigate the interpretation through additional primary-source research, but to find and organise materials suitable for an exhibition. This resembles exhibition work done in museums, as all but the largest museums do not have the resources for extensive primary-source research.

Although some components of the story I presented have been displayed in museums before, the way I combined them was, as far as I know, unique. The Workers’ Museum in Copenhagen touches the subject of workforce control very briefly.\(^{304}\) The *Madness & Modernity* exhibition at the Wellcome Collection in London displayed a model of a mental institution built on the Panopticon principle, intended to communicate the inhuman treatment of mental patients.\(^{305}\) The exhibition sought neither to explain the Panopticon principle nor to place it in a wider, contemporary social and intellectual context. Exhibitions displaying working lives and communities in the nineteenth century, such as the *Wooden Walls of England* exhibition at Chatham Historic Dockyard or the Big Pit Museum in Wales, typically focus on the hardships of workers.

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and the labour that produced ships or coal. They do not display the dynamics of the workplace. These examples demonstrate that the several contexts in which I displayed the Panopticon concept were unique in a museum exhibition.

Since such a presentation has rarely been tried it is not surprising that descriptions of the creative process are absent from museological literature. In Chapter 4 I aimed to describe the process as accurately and helpfully as possible. My aim was both to analyse the process and to make it as easy as possible for someone else to replicate. Unlike curators in large museums who normally work with teams of experts, I carried out each phase of the process myself. I believe this has given me a unique understanding of the various challenges faced at each stage, as well as an overview of the whole process. The description reflects this: I divided the long and complex process into four key phases (Material Gathering, Interpretation, Expression and Production). These phases did not reflect the division of labour in museums, but arose naturally from the process as I realised it. The phase model is intended as an analytical tool, examining the kinds of problems, challenges and solutions I encountered along the way.

The various phases involved in communicating complex academic material will provide some guidance to others facing similar interpretation issues. On a more general level I would like to highlight four elements that I think will be crucial for any project attempting to interpret academic work for a museum audience. These are:

(I) The need for a special combination of skills

(II) The investment of time


307 For example in the V&A, each member of the team responsible for the British galleries worked on a specific part of the process. Consequently they each write about the process from the perspective of their own role in Wilk and Humphrey (eds.) (2004): Creating the British Galleries at the V&A.
(III) Cooperation with institutions and people

(IV) Design issues

The combination of skills

Academic history is generally presented in a way that makes it very difficult or impossible for a non-expert to understand. This means that anyone embarking on a project displaying such content to a wider public must have the skills and expertise to understand and interpret the relevant literature. The skills required to produce academic text are quite different from those required to communicate it to a lay audience. Likewise the skills required to read and understand academic literature are different than those required to express ideas through a museum medium using objects, images and text. I required both of the latter skills, and so will anyone attempting to replicate my project. Many academics are not fully aware of the skills possessed by curators. Conversely, although some curators, especially in large national museums, come from academic backgrounds, academic skills are not always relevant in a museum context, and not all curators are fully aware of such skills either. A major part of my project has been to mediate between the two groups.

The need for specialist skills also places requirements on the academic supervision necessary for museological projects fulfilled as part of academic study. Expertise from both the academic world and the museum world is crucial. Researching, designing and building what I have termed my “experiment” would not have been possible without support from the disciplines of both history and museology. In creating the exhibition, I also consulted museum professionals. Although this was mainly in the context of locating materials, I also discussed my ideas for display and received helpful feedback.
The only historians I consulted in person were my supervisors. I received very useful feedback from experts when discussing my ideas at conferences and seminars, but I did not actively seek the advice of those historians whose work I was using. With hindsight seeking such advice may have been useful as a means of finding and understanding relevant material more quickly.

The investment of time

The process of creating the exhibition was very time-consuming. Finding and extracting a meaningful story from a large amount of complex literature required careful consideration and several readings of the material. I also discussed the material at length with my supervisors. Because the medium of expression was very different from the original medium of the messages, translating the one into the other took a considerable amount of time. Most of this time was spent drafting, rewriting and editing the messages, thinking of ways to express them briefly and clearly, discarding unrealistic or otherwise unworkable ideas, discussing the outcome with my supervisors, and repeating the process. The text and images in the posters were revised numerous times, and were pared down and clarified in order to express the complex concepts involved for a wide audience while avoiding over-simplification.

Some of the difficulties I encountered can be attributed to my inexperience and the lack of a guiding literature. For example, my search for the right methods to express abstract ideas on posters was largely done through trial and error, which is very time-consuming. It is far more difficult to invent new methods and ways of thinking than to apply and develop existing or familiar ones. Once I had developed successful methods on the early posters, the subsequent ones were easier and faster to create. My description of the
process will, I hope, be of use to others by offering a series of approaches and strategies that can be followed. However, the process is still likely to be slow. Consulting the academic material and refining the final expression, for example, must be done very carefully. Attempting to speed up these parts of the process will probably result in poorer quality and unclear expression. The project would be undermined from the start. The originality of my project made it difficult to finish in the three to four years normally allowed for a PhD, but I hope the experience I have recorded here will enable others to complete similar projects much more quickly.

Collaboration

As well as the relevant expertise and a significant investment of time, an exhibition project displaying academic research requires extensive collaboration between museums and academic institutions. In my case this meant initially having supervision from historians at Imperial College and curators at the Science Museum. It was helpful that my academic supervisor had a strong interest in museology and public engagement, and my museum supervisor was also a historian. However, at a crucial moment in my project, the latter decided to leave the Science Museum. As noted in Chapter 1, this had serious consequences for my exhibition. Dr Albert’s departure seriously undermined my collaboration with the Museum and deprived me of an important mentor with expertise in museums, and maritime and technological history. This episode highlighted the importance of the enthusiasm and support of an engaged and committed supervisor, and the difficulties inherent in carrying out research, in part, with a non-academic institution.
I had the good fortune to find a suitable new supervisor in Dr Ann Coats at the University of Portsmouth. Her input to the project is a positive example of the importance of connections and cooperation. Her expertise in both naval dockyards and museum studies enabled her to comment on both the content and presentation of the exhibition. Her connections also proved crucial for the successful completion of the project: the exhibition space at Portsmouth Historic Dockyard was obtained through her connections, and she played a large part in coordinating the setup and scheduling of the final display. I believe it is not an exaggeration to say the exhibition would probably not have been completed and staged without Dr Coats’s help.

My own contacts at Portsmouth City Museum and the Royal Naval Museum were also an advantage when sourcing materials for display. I had worked briefly at both museums, and knew the curators, who kindly offered help and advice. Most museum collections are too large for one person to know thoroughly, and thus it was important to find the people with expertise in the area I required. As curators get requests for information and use of collections frequently, they are unable to devote the same amount of time to every inquiry. Having previous contact with the curators and a project that appealed to them was a great advantage.

*Design issues*

It is important for anyone embarking on a project of this kind to keep in mind that the final display is central to the whole undertaking. One must avoid spending too much time on reading and research to the detriment of planning and mounting the exhibition. A further issue I encountered was how much of the actual design and layout of the posters I would undertake myself. In order to maintain control over the project and the
messages the exhibition delivered, I took the decision to design the layout and colour scheme of the posters myself. This was potentially risky, as I have no training in visual communication. Had the design been poor, it would have seriously impaired the messages I was trying to communicate. In the end the design was a success though the process was time consuming, as I had to develop yet more skills myself. For a full-scale exhibition with material objects, however, it might well be better to seek the help of a designer. Three-dimensional objects require more careful consideration than posters, for example regarding how they are placed within the exhibition space. With this kind of material, collaboration with an experienced designer would speed up and improve the process considerably. That said, it would be important to find a designer who was sympathetic to the project’s aims and able to produce a design that enhanced the communication process.

Thanks to my prior skills in museum work and support from supervisors I was able thoroughly to assess the intellectual accessibility of my exhibition and to modify it through the careful editing of text and poster layout. For practical reasons physical accessibility received much less attention. As we saw in Chapter 4, although the space was assessed as carefully as possible the choices were highly constrained. Similarly, the final design of the exhibition layout could not be tested beforehand. As a result, there were problems with wheelchair access and the size and level of the posters, problems that could have been avoided with more experience and the opportunity to test the designs in the Production phase.

In summary, someone attempting to replicate this project might find it productive to collaborate with an appropriate expert in exhibition design. In a collaboration between a
designer and a historian, the latter would probably focus on intellectual matters and textual content, things that are on balance best left to the person developing the project overall. Intellectual content and historical accuracy are very important, of course, but a good designer might bring key skills to the project that would be otherwise very difficult to obtain. Such collaboration would have the additional advantage of leaving the project coordinator to focus on intellectual content development.

6.1 The contribution of this study

The original contribution of my study has two main elements: the content of the exhibition, and the process and method of creating it. My interpretation of the Block Mills in the wider context of war and industrialisation was original. Even the academic literature does not develop this theme explicitly, although the Block Mills are seen in wider historical context. This is probably because academic historians focus on narrower issues, such as the development of the Mills, and more theoretical issues, such as the origins of wage labour, instead of interpretation. My aim has been to interpret the Block Mills in a way that will help a wide audience understand the changes that took place in the dockyard, and the ideas behind them. Relating the abstract idea of the Panopticon with the usually very tangible and object-focused history of machine tools was also new, even in the academic literature. Most historians tend to focus either on the idea or on the machines, but few look at both. Furthermore, the description of the process and method of creating the exhibition is more thorough and detailed than has been hitherto done in museological literature. I shall now examine these two elements in turn.

My aim was to display and interpret the Block Mills in a broad historical context. My starting point was the block machines themselves. I used concepts from nineteenth-century social theory to interpret contemporary machine tools. I then expanded from the nineteenth-century concept to include later incarnations of mass production and workplace surveillance, for example Taylorism. I also used modern imagery such as CCTV cameras and Chaplin’s *Modern Times* to widen the visitor’s understanding of the concept.309 Contrasting modern and contemporary images to emphasise a point is not new, but I am not aware of this kind of interpretation being used with such tangible, functional objects as the block making machinery. Presenting the Block Mills in the wide context of war and industrialisation, and using the Panopticon principle as the central concept were also original ideas.

From a museological perspective, the original work in this study consists of the methods and analysis of the exhibition process. Although literature exists on the process of creating exhibitions, this does not address the kind of issues I have examined. The existing literature, discussed in Chapter 4, typically consists of general ideas about the role of museums and exhibitions in society, practical guides for designers or conservators, or case studies of particular exhibitions or galleries. The more general, theoretical literature about museums examines the role of exhibitions from a wide perspective. The exhibition is seen as a function of the museum, and as communication between the museum and the public. These studies focus on the broad concept of communication, not on the particulars of how it is accomplished.

The case studies, by contrast, go into great detail about how specific exhibitions were created. They may include explanations of what the intended messages and concepts of these exhibitions were, and some of the solutions used to convey them. However, such accounts are usually specific to the exhibitions they describe, and do not generalise. For example in an account of developing the British galleries at the V&A, the various parts of the process are described by those staff members who carried them out. The process is divided according to museum departments rather than analysed as a whole. One strength of my work is that I carried out each part of the exhibition project myself. Thus I have both a general overview and an in-depth knowledge of the process. Although my work is a case study, I have attempted to analyse the process systematically, and go beyond mere description. I have tried to analyse the emerging patterns and methods in a way that will help others follow in my footsteps.

Creating a museum exhibition is a complex process that involves interaction with many different groups of professionals. The initial ideas may come from curators, but very soon other professionals from within the museum as well as external parties must be included. For the Science Museum’s Food for Thought gallery, academic advisers and industry representatives were involved with the content development. This was described by the curators involved as a very creative phase where many ideas were brought forward and included in the exhibition plan. Sharon Macdonald’s account of this phase of developing the gallery conveys a feeling of enthusiasm. After the initial creative phase, the ideas must be turned into a physical exhibition, and this requires the involvement of more professional groups. In a booklet describing the exhibition process of the National Gallery of Finland, sixteen different professional groups involved in the

310 Wilk and Humphrey (eds.) (2004): Creating the British Galleries at the V&A.
process are identified, including education, marketing, conservation, administration and content planning.\textsuperscript{313} Each of these groups has a different agenda, and the process of creating an exhibition involves a great deal of cooperation and management of the various interests.\textsuperscript{314}

Practical problems arise in the course of the project and must be dealt with. Such problems can include convincing museum Trustees, director and colleagues of the exhibition team’s ideas, as Sharon Macdonald describes.\textsuperscript{315} Problems can also arise if sponsors or lenders decide to withdraw from the project, as I witnessed at the Maritime Museum of Finland. One exhibition was eventually cancelled due to the main sponsor withdrawing. Another exhibition, the 2012 \textit{Spoil of Riches} had to be adjusted when a lending museum withdrew and objects became unavailable. Lending and borrowing objects between museums is a complicated process that involves careful assessment of for example atmospheric conditions in the exhibition space and security issues. As my exhibition was realised in poster format, I did not have such matters to deal with. Borrowing images is a very different issue, and much easier for both parties to accomplish. Once the practicalities of turning an idea into an exhibition came to play, one of the Science Museum curators involved in the \textit{Food for Thought} gallery project described the process as “a hard slog” because of all the different obstacles in the way of realising the original ideas.\textsuperscript{316} This is also very much how I felt about the project of realising\textit{ Portsmouth Panopticon}, for example when materials became unavailable or it was difficult to find a suitable space. I also experienced the enthusiasm of the creative

phase Macdonald describes in the early part of the process. The process of creating *Spoil of Riches* seemed to follow a similar pattern for the part that I witnessed.\footnote{317} As discussed in Chapter 1, this process has not been analysed in museological literature. Macdonald’s work, although very thorough, is primarily descriptive, not analytical. Other, more systematic descriptions also exist but they tend to be very general. For example the process description in the Finnish National Gallery’s booklet could be applied to almost any project, not only the creation of an exhibition.

Since I found no guidelines or models for expressing ideas in museum exhibitions, much less interpreting academic material through them, most of my methods were devised for the purpose. I recorded and described these, including the types of images I used, my reasons for choosing one image rather than another, and cases in which I was forced to find substitutes for images that were simply not available. To the best of my knowledge, this process has not been described in any detail in museological literature to date.

What I found the most interesting and challenging to describe was the process of converting the abstract messages into concrete ideas for images. It was also by far the most difficult process to record, as much of it was intuitive. I often had to backtrack my thinking process to remember exactly where certain ideas came from. This meant searching the notes I had scribbled on the backs of envelopes, my tool of choice for a number of creative and design tasks as shown in figure 6.1. Whether it is common among curators to keep such self-reflective notes I do not know. As I argued in Chapter 4, the process of creating exhibitions reminds me more of technical and creative

\footnote{317} I left the Maritime Museum of Finland four months before the opening of *Spoil of Riches*. The project was already under way when I joined the Museum in January 2011.
thinking than academic reasoning. This makes it difficult to verbalise. Along with the
lack of curators’ time, I believe this to be a key reason why there is no literature
describing the process of interpretation in detail. My study is in part an attempt to
address this shortcoming in the existing literature.
Figure 6.1: Part of the content of the Dockyard Economy poster arranged on the back of an envelope using notes and blue-tack. I used draft versions like this at the Production phase to be able to move the components around, as it was sometimes faster than moving them on a computer. Some of this content was cut: for example, I could not find a suitable image of an adze.

My study is not the first to try to convey academic literature to a lay audience through an exhibition, but it is unique in the respects outlined above. Louise Thorn has carried out a project under the AHRC Knowledge Transfer Partnerships program at Imperial
College and the Science Museum. Her work is concerned with the AHRC’s wish for wider public dissemination of academic work, and focuses on the very different ways in which academics and curators approach history. Thorn worked closely with the Science Museum throughout her project and was originally connected to a team working on a new permanent exhibition at the Museum. This is reflected in her findings. One of her main conclusions is that while knowledge transfer between academic historians and curators is attainable, there are major institutional barriers constraining the kind of exhibition that can be mounted. As I was not in the end closely connected to a museum, my findings centre far more on the content, the audience response and the process of creating the exhibition. As my project was carried out outside the institutional framework of a museum, I did not face some of the constraints to exhibition work that the museum environment presents. For example, I did not have to attract as diverse an audience as possible, but could target my exhibition more closely to adults interested in history. The different perspectives in our work shed light on different aspects of museum work, but are otherwise compatible and complementary.

Thorn’s exhibition explored the concept of trust through a number of case studies from the history of science. She displayed two different versions of her exhibition, one with objects and posters in the Science Museum’s stores in Blythe House in London, the other with posters alone, at Imperial College and in the Science Museum. The former was displayed to groups of experts, the latter to physics students and Science Museum visitors. Overall, her audiences were fairly similar to mine. Compared with naval and maritime history and the industrial revolution, which are very popular among museum

318 Thorn: ‘Knowledge transfer in action’; http://www.ahrc.ac.uk/FundingOpportunities/Pages/KTPartnerships.aspx ; I am also aware of other students working with collections at the V&A and the Museum of London, although I do not know their work well.
visitors, the history of science is a specialist topic. This may have contributed to the kind of feedback her exhibition received. She had fewer visitors overall, and their views were more mixed than those of my audience. Visitors reported having enjoyed the topic, but few claimed to have gained a genuinely new perspective on science and trust.

The challenge of Thorn’s project was very different from mine. She wished to communicate the importance of the abstract notion of trust in science using material objects. By contrast I wished to say something about the block making machines using abstract concepts. I believe the carefully designed combination of abstract and tangible contributed significantly to the success of my exhibition. My findings support Thorn’s in the sense that audiences enjoy challenging exhibitions. However, they also modify hers by emphasising the importance of maintaining a connection to widely understood ideas and familiar concepts while introducing abstract and unfamiliar ones.

Although Thorn and I both found that our audiences enjoyed the interpretation of abstract and conceptual history, there are obstacles that make this kind of history difficult to display on a wider scale. Partly this is due to the way museums operate, but the wider issue is the role or function of museums and public history in general. This role has been debated in “new museology” literature, which places a key emphasis on the social function of museums. The focus is on the group identity of visitors rather than individual learning outcomes. This makes presenting academic history difficult, as it

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319 For example the Ironbridge Gorge is visited by approximately 600 000 visitors a year (http://www.ironbridge.org.uk/about_us/ironbridge_gorge_museum_trust/facts_and_figures/ retrieved 12/5/2011) and the National Maritime Museum with over 2.4 million visitors in 2010 is one of the top 10 visitor attractions in the country (http://www.alva.org.uk/visitor_statistics/retrieved 12/5/2011). The Science Museum also belongs to that category, but it displays science, rather than the history of science, as its main attraction.

is perceived to rely on the individual’s learning and understanding of the concepts on display. According to advocates of new museology, visitors should construct their own meaning in the exhibition, instead of following the curator’s agenda.\textsuperscript{321} In some respect this idea is similar to early museums, where, according to Tony Bennett, the ability to see meaning hidden in the objects was important.\textsuperscript{322} However, this view takes into account visitors’ diverse backgrounds, rather than imposing values on them, and is thus more democratic.\textsuperscript{323} However, the notion of visitors constructing their own meaning sits uncomfortably with academic history. This kind of history requires specific prior knowledge before certain ideas can be understood, and it may thus be necessary to explain the context. However, my results seen in Chapter 5 demonstrate that it is possible to combine academic history with visitors constructing meaning. Some visitors to \textit{Portsmouth Panopticon} explicitly related what they saw with events in their own lives.

Allowing visitors to construct their own meaning in exhibitions undermines the notion of the museum as a deliverer of given truths. Although museums have had this role in the past, it is no longer considered sufficient. Museums must be aware of their visitors and take their needs into account, rather than displaying what they believe the public needs to know.\textsuperscript{324} Museum visitors expect entertainment as well as education and this is reflected in exhibitions. For example the \textit{Food for Thought} gallery in the Science Museum, described by Sharon Macdonald, contained elements from fairgrounds, such

\textsuperscript{322} Bennett (1995): \textit{The Birth of the Museum}, p.35.
as distorting mirrors, and a giant chocolate mousse, designed for entertainment rather than informative content.  

**6.2 Could the exhibition have been realised differently?**

Some of the curators and one or two independent visitors criticised my use of posters as the medium of the exhibition. In this section I will consider whether my exhibition could have been realised in a different format, and how this would have affected the audience and the creative process. The criticism I received was based on two distinct assumptions: that too much text is undesirable in an exhibition, and that visitors come to museums to see objects. These are both valid arguments, and points I considered carefully when making the decision to use posters. In the end the choice was made for practical reasons, but I believe in this context the medium served its purpose well. The posters conveyed my ideas to the intended audience and text is closer than objects to the methods of academic production on which I was drawing. The medium also gave me more control over how the messages were conveyed, as the choice of images available was much wider than the choice of objects I could have obtained. These are practical constraints to the process of creating exhibitions that curators face with every exhibition.

The argument that exhibitions should keep text to a minimum is common in museum related debate. Exhibitions are frequently accused of being too wordy. Text is seen as non-inclusive and potentially boring as it requires more effort from the viewer than do

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three-dimensional objects. This is especially true for children, those with learning difficulties and those who are reading in a foreign language. It is an important concern, as museums must also appeal to these groups of visitors. Whereas the bad reputation of exhibition text is not wholly undeserved, I believe the main problem is not the quantity of text, but the quality. Text is not intrinsically unappealing to wide audiences, or even children, as indicated by the huge success of best-selling authors like J.K. Rowling or Dan Brown. By developing clear, well-written exhibition text that unfolds an engaging story, it is also possible to hold the audience’s interest and convey even very complex concepts. Indeed, exciting new ideas are a positive advantage, once they have been translated into an appropriate form. That has been the essence of my experiment.

The argument that visitors wish to see, and should see, objects is nevertheless an important one. Object collections are what separates museums from other institutions, and what visitors cannot see elsewhere. Moreover, the learning experience acquired through interacting with material objects from the past is very different from that acquired through text. An exhibition with three-dimensional objects might also increase the intellectual accessibility of an exhibition like mine.

This leads me to the important question: could my exhibition have been realised using a different medium: objects together with text and images? I believe the answer is a qualified “yes”. The messages I formulated could certainly be communicated using objects as well. However, this would be very different from communicating them through text and images alone.
From an audience perspective, displaying material objects would certainly have enhanced my exhibition. Objects captivate visitors’ attention and interest in a very different way from images and text.\textsuperscript{327} Obvious choices for objects to display include the block machines themselves, and a model of a Panopticon. CCTV cameras with monitors in the exhibition could illustrate the principle of surveillance: visitors would in essence be watching each other or themselves on the monitors.\textsuperscript{328} The messages of my poster exhibition could thus be expressed using objects alongside images and text, which is the most common way of expressing ideas in museum exhibitions.

However, from an exhibition design perspective, the very different mode of communication would require a significantly different approach to the Expression and Production phases. It is unlikely that simply replacing some of the images used in the poster exhibition with objects would produce good results. It would probably be necessary to rewrite the script almost entirely in order to include objects in expressing the messages. Communicating a message is a complex and delicate creative process. Balancing the available means of expression can have a strong impact on how the message is conveyed. Objects command visitors’ attention much more directly than images do. As discussed in Chapter 4 in connection with the omitted images of a bombed London bus, powerful images can distract attention from the intended messages. Similarly I believe objects may focus or distract attention from the message, and it is thus important to consider very carefully which objects to use and how to use them. Including objects would thus almost certainly result in a very different exhibition from the one I created.

\textsuperscript{327} Falk and Dierking (1992): \textit{The Museum Experience}, p.69, 76-77.
\textsuperscript{328} An installation with a CCTV camera in an exhibition has been displayed before, for example in the Museum of Brighton.
One further point about using material objects is their availability. This is quite different from the availability of images. As described in Chapter 4, I sometimes had problems finding suitable images for the posters even with extensive image banks at my disposal. In the case of objects the choice would most likely be limited to those in a museum’s collections, possibly supplemented with borrowed material. This would limit the expression in very practical ways. Objects might not be readily available, as I discovered when searching for a model of the Panopticon in the Science Museum’s collections, for example. More importantly, using a very limited range of objects would seriously constrain the way complex ideas could be expressed. For some ideas, images and text alone are likely to be the better option.

In assessing the effectiveness of the exhibition, the messages and the medium of expression cannot be considered separately. The expression is the interface through which the messages are conveyed and understood. Thus although my aim was to discover how audiences respond to scholarly content and abstract ideas, my experiment inevitably tested this in the context of a poster exhibition. This emphasises my earlier point about the centrality of the finished exhibition. My experiment was based on a poster exhibition, and it would be unwise to extrapolate my conclusions to exhibitions based on other media.

Attempting to recreate my exhibition with the added medium of objects would be an interesting exercise, which could be explored further in another study. Creating such an exhibition would enable me to test the methods I used to convey the messages through images, and see to what extent they can also be applied to object communication. A key advantage of an approach that includes objects would be in its wider appeal to
audiences. Comparing visitor reactions to a poster exhibition and one that included objects would allow further exploration of the exhibition as an interface between scholarly history and a wider public. The differences and similarities in creating the exhibitions and the audience response could highlight problems in the uses of different media in conveying scholarly content, and deepen the findings of this study.

6.3 The implications of my results

The results of my audience survey suggest that the simplest stories displayed in exhibitions do not always produce the most visitor enjoyment. The least challenging and most traditional section of my exhibition, the *Machinery* poster, was also the least favoured by the audience. By contrast the *Panopticon* section, with the most abstract and complex ideas, was by far the most popular. Admittedly, my exhibition appealed to a relatively educated audience, which may not have been the case had the audience been more diverse. Nevertheless this is an important finding, because it suggests that choosing the easiest topics or opting for the lowest common denominator underestimates many visitors. Those who enjoy a challenge are likely to be bored in an exhibition with simplified information and a lack of stimulating intellectual content. Displaying a wider range of exhibitions targeted at different visitor groups could thus reach a wider audience overall than attempting to reach everyone with the same display. Reaching a wide audience is essential for museums to serve their purpose, and a condition for receiving funding.329

As I have argued throughout this study, academic historians and museum professionals operate in two distinct disciplines. The two professions both seek understanding of the

329 For example the MLA Accreditation scheme requires museums to provide for a wide audience. This scheme is used by funding bodies as a standard. MLA (2004): *The Accreditation Scheme for Museums in the United Kingdom*, Accreditation Standard, p.23-24.
past, but in different ways. Their methods and ways of thinking are very different and as a consequence, the two professions do not always see eye to eye in matters of presentation and interpretation. Academic ideas can be seen as too complex, dull or wordy for museum purposes, whereas museums are sometimes criticised for focusing on entertainment at the expense of the quality of history displayed. As my study has shown, this perception is not accurate. It is possible to effectively display academic thinking through an exhibition and still entertain the audience.

The difference between academic and museum history is particularly prominent in the field of social history. Museums tend to aim to create a human perspective in exhibitions. Focus is typically on family life and social interaction, including elements like local customs, food culture or division of labour. Portsmouth City Museum for example displays household interiors from different eras and leisure activities in the form of objects relating to the local beaches or Portsmouth Football Club. This is representative of how social history is seen within the museum profession. In museum exhibitions, social history is shown as a representation of how people used to live. This is intended to make it easier to identify with people from the past. In the case of more recent history it also allows visitors to reminisce, and shows elements from their past as part of a shared story. It does not help the visitor to connect with a wider context of society, past or present, nor is this its purpose. Instead, the local history display serves a social purpose for the surrounding community.

The academic discipline is very different. The focus is often much wider and more intellectually demanding, as in the case of the Panopticon and its applications. Peter
Linebaugh for example looks at dockyard customs in the context of wage labour.\footnote{Linebaugh (2003): The London Hanged, Chapter 11.} As another example, *Uncommon People*, a collection of essays by Eric Hobsbawm, looks at the development of cultural phenomena such as May Day celebrations, jazz music, or the traditions of shoemakers, from an analytical social history perspective.\footnote{Hobsbawm, E. (1998): Uncommon People: Resistance, Rebellion and Jazz, London: Weidenfeld and Nicolson.} They are seen as elements of a wider society that have shaped our world. If such elements were included in a museum setting, they would be likely to be displayed either as curiosities, or as general representations of life in the past.

In this study I have shown that visitors can enjoy the analytical type of social history if it is presented in the right way. However, the museum’s normal media of communication – objects, images and small amounts of text – make the interpretation of conceptual social history difficult. It is much easier to set up an interior of a working class home than to analyse the ways in which workers’ lives were controlled by an employer at the workplace. It is also less controversial and thus less likely to cause upset in visitors, sponsors and other constituents, an important concern for museums, as they must attract audiences in order to serve their purpose. As academic history is more complex than simple stories from the past, it is more likely to bring out aspects some will deem unpleasant and controversial. This is evident for example from cases like the *Enola Gay* exhibit at the Smithsonian Institution’s National Air and Space Museum. The museum’s interpretation of the use of the atomic bomb caused such huge controversy and protests that the Museum’s director eventually resigned.\footnote{Dubin, S. (1999): Displays of Power: Controversy in the American Museum from the Enola Gay to Sensation!, New York and London: New York University Press, p.189-200, 218; Meyer, E. L. (1995): ‘Air and Space Museum chief resigns; Harwit cites furor over A-bomb exhibit’, The Washington Post, May 3, 1995.}
Disagreement is part of the nature of academic history. Indeed, academic knowledge is often created by revising earlier accounts. Like other humanities’ disciplines, history is not an exact science. For most historical questions there is no single, correct answer. Interpretation plays an important role, and causes disagreement among academics. My experiment has shown that it is possible to create such a debate in the context of an exhibition. Although I portrayed a strong interpretation of the Block Mills as a manifestation of the Panopticon principle, I attempted to display a variety of angles in order to emphasise the varied nature of historical interpretation. This appealed to the visitors, as this comment from a 29-year-old woman illustrates “I liked the different themes sectioned out that together interpret the block mills and the period of time they relate to – cross reference each other”. There were several such comments, and 25-30% of visitors said they had gained a new perspective on industrial, social or naval history. This demonstrates that my audience was receptive to the different interpretations of history.

However, I believe I could have made the differences more explicit and underlined them more by stronger juxtaposition of the different perspectives. Including the omitted section *Fame* would have provided a very different aspect and enhanced the notion of many possible interpretations. Similarly, the imaginary exhibition in the Block Mills building, described in Chapter 4, could have underlined the differences simply by displaying my interpretation of the block machines in one space, and a more traditional, technological interpretation in another. Overall, however, my approach was successful in conveying the nature of historical debate. I believe such portrayals of history should be displayed in museums more often.
There are key benefits both museums and the academic world could gain from closer interaction. For museums, it would be a wider perspective on history, which could result in more varied interpretations in exhibitions, and possibly better engagement with certain audience groups. Academic history, by contrast, would benefit from the wider audience that visits museums. More people could potentially access scholarly exhibitions than scholarly books written for a tiny academic audience. As academic research is mostly publicly funded, greater access for the public and more exposure would be advantageous. This is also in line with what funding agencies such as the Arts and Humanities Research Council (AHRC) and governing bodies like the Museum, Libraries and Archives Council (MLA) are trying to achieve. Through its Knowledge Transfer Partnerships, the AHRC promotes collaboration between arts and humanities in universities and what they call creative industries, including museums.

6.4 What I learned from the process

Some visitors disagreed with the interpretation of the Block Mills as a manifestation of the Panopticon, despite the fact it is accepted among academic historians. For example, one argument presented by one or two visitors in conversation was that the building does not have the circular shape of a Panopticon. It should be kept in mind, however, that disagreeing with the intellectual content of the exhibition is not the same as disagreeing with how it is displayed or presented. There were visitors who would have liked a more traditional display with more technical details, for example, and visitors who would have liked to see objects. This kind of critique does not require the same level of engagement with the exhibition as disagreeing with the key concept of interpreting the Block Mills as a Panopticon. Thus it is encouraging to see that some visitors engaged with the topic enough to form an opinion of the fairly complex idea at its core. It is moreover, an inevitable aspect of my attempt to convey the idea that history has many possible interpretations that some visitors will disagree with the interpretation I favour.

The vast majority of those who expressed their views on the content nevertheless agreed with the interpretation I presented. On the one hand this is a good sign, as I have conveyed the message I intended to a receptive audience who enjoyed the interpretation. On the other hand, I may have presented my case in such authoritative manner that most visitors simply took it at face value. If this is the case, I would regard it as counterproductive because my intention was to stimulate thinking not simply to convince an audience of my views. I had intended that visitors would measure my view against their own experience and expectations. I anticipated more scepticism on account of the unconventional way I presented the dockyard and the industrial revolution. The
explanation may be that I expected the visitors to be more knowledgeable about the industrial revolution than they actually were.

There is perhaps a paradox here. It is difficult to convey a new and demanding historical interpretation, and simultaneously allow for disagreement. There may be a risk of undermining the validity of the interpretation if too much doubt is expressed in the exhibition. If an interpretation taken from academic literature that is not mainstream or widely known outside of academic circles is seen as doubtful or wrong, it could strengthen the notion of there being one true version of history. This would be counterproductive to the aim of presenting history as an analytical discipline with many different interpretations. However, although combining challenging content with the opportunity for a non-expert audience to express their views is difficult, it is not impossible. As we saw in Chapter 5, the Hidden Treasures exhibition at the Whitgift Conference Centre in Croydon in 2009 successfully conveyed the idea that historians had no definitive explanation of why the Mary Rose sank in 1545. The results of my audience survey also show that visitors were stimulated to think about the issues on display in my exhibition. This is most visibly demonstrated by the visitors who disagreed with my interpretation, and by the 65% of respondents who said they gained a new perspective on one or more of the issues on display. I consider this a very good result, and it clearly demonstrates that museum exhibitions can stimulate audiences to think in new ways and about complex topics.

Using text and images to explain complex ideas without oversimplifying them was for me an exciting and ultimately satisfying challenge. The skills needed for this kind of knowledge transfer are very specific because combining the expertise of the historian...
with that of the curator takes more than either profession alone can provide. I was able to do this because of my background in both academic history and museums, and because I was jointly supervised by people with academic and museum expertise. This combination of skills and support was essential to success and might mean my project will be hard to replicate despite my attempts to describe the process. I believe it is nevertheless worth cultivating this kind of expertise in museums and academic institutions, as the benefits are clear: for the museum, the chance to engage audiences in new ways and potentially attract new visitor groups, and for the academic world, a chance to communicate the findings of history to a much wider audience.

The success of my experiment with *Portsmouth Panopticon* shows that such exhibitions can benefit both the academic and the museum professions. From a museum perspective, the positive response from the audience demonstrates that such exhibitions appeal to the public, thus fulfilling the museum’s aim for entertaining and informing audiences. The interpretation I displayed was new, and based on the work of academics, fulfilling educational aims. From an academic perspective the exhibition reached a new audience and presented a new angle to a familiar topic, contributing to the general understanding of the past. I have thus accomplished those challenging goals that I believe are worth pursuing in both museums and the academic world. With this success in mind, equipped with the skills I acquired and honed in the process of creating the exhibition, and with the encouraging feedback I received from the audience, I can say with confidence that I will take on a similar challenge again when the opportunity arises.
Appendix A: Portsmouth Panopticon exhibition script

Script for Portsmouth Panopticon – June 2009

Poster 0 (Intro, A1):

Introduction

What do a microchip, a Ford Model T and a pulley-block have in common?

They were all mass-produced

Mass production, a method for producing large quantities quickly and cheaply, has brought cars, microchip technology and those countless other things modern consumer society is based on within the reach of all.

A key element of the industrial revolution, mass production changed more than the availability of consumer goods. It created a new outlook towards work. Control over the process shifted from workers to factory management, as machines were designed to replace skill.

Mass production was first used here in Portsmouth Dockyard, a hundred years before Ford made the Model T, the first mass-produced car. This exhibition shows how changes in the making of pulley-blocks started the Navy’s industrial revolution.

Production line at Triumph Works in Coventry, 1933

Production line at the Portsmouth Block Mills around 1900

The Panopticon Principle

The mass-production of pulley-blocks started in the Portsmouth Block Mills in 1803. Blocks were needed in large quantities, so mass-producing them was sensible. But the key aim was to control the independent dockyard workforce. Created by Samuel Bentham, the Mills were based on the Panopticon Principle, a system of surveillance made famous by his brother, Jeremy Bentham’s prison model.

Jeremy Bentham’s sketch for the Panopticon.

Samuel Bentham, Inspector General of Naval Works
The industrial revolution of the Navy

The Block Mills were based on new ideas and visions, many still around today. Block Mills work practices influenced later factory production lines. **The industrial revolution changed the way people work.** For the Navy, the industrial revolution started here.

![Using a boring machine in the Block Mills, 1890s](image1)

![CCTV, a modern version of hidden surveillance](image2)

![Clocking in, 1955](image3)

How the Exhibition works.
The *Portsmouth Panopticon* tells the story of how the navy’s industrial revolution began.
It is divided into four sections, each telling a different part of the story:

- War and Industrialisation
- The Panopticon
- Block Making
- Dockyard Economy

The sections are displayed in a design inspired by the panopticon. View them in any order.

Fact Files and Concept Files are smaller posters with key information on the people, events and mechanisms referred to in the main posters.

This exhibition is a pilot for a larger display in the Block Mills building.

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**Section 1 – War and Industrialisation**

Poster 1.1 (A3, Fact File):

**Timeline**

1495 First Portsmouth dry dock
1691 Edmund Dummer builds reservoir on the future site of the Block Mills

1712 Newcomen’s steam engine
1740-1748 War of Austrian Succession
1756-1763 Seven Years’ War

1764 Spinning Jenny
1771 Arkwright’s water powered mill
1775-1782 War of American Independence
1789 French Revolution
1791 Jeremy Bentham’s *Panopticon or the Inspection House*
1792-1802 French Revolutionary War

1796 Samuel Bentham Inspector General of Naval Works

1799 Napoleon seizes power
1803-1815 Napoleonic War
1805 Block Mills

1805 Battle of Trafalgar
1815 Battle of Waterloo
1821 Millbank Prison in London, influenced by the Panopticon
1822 The navy’s first steam ship *Comet* launched at Deptford
1839 Steam Factory, Woolwich Dockyard

1908 Ford starts mass production of Model T
1960s The Block Mills cease operating

--

Poster 1.2 (A1):
**War**

‘Under Pressure’

Frequent warfare throughout the 18th century stretched resources and put dockyards under enormous pressure. Ships needed repairs, stores and men. Maintaining a fighting fleet was expensive and labour-intensive. See the Fact File for more information on the fleet.

*Cavalry embarking at Blackwall, 24 April 1793. Moving and maintaining troops was a huge operation. In this image a horse is being lifted on board a transport vessel.*

*The artificers of this dockyard worked the whole of Christmas-day, a circumstance which has not happened before since the peace of 1763… So great is the emergency for getting the ships ordered ready, that the shipwrights and caulkers afloat, and in the yard, were obliged to work during the dinner hour, and they are to be put immediately on double time*’

Salisbury Journal 31st December 1792

Fears

France was extending her power throughout Europe. There were real fears of French invasion. Revolutions in America and France also made the ruling classes uneasy.
Images like this caricature by James Gillray played on fears of invasion and revolution. They were used as pro-war propaganda.

Press gangs were manning the navy by force. Their presence on the streets of cities like London (pictured) and Portsmouth, brought the war to every doorstep.

The first global war

The French Wars were waged on a global stage for 21 years. Britain emerged as the global superpower. See the Timeline for more on 18th century wars.

This 1789 caricature shows Jack Tar representing the Navy, and Napoleon struggling over world domination

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Poster 1.3 (A1):

**Industrialisation**

A New Order

Industrialisation changed the way work was done:

- Portable tools and independent workshops gave way to machines in factories
- The workforce was reorganised

Steam powered cotton mills used iconic new machines

Independent artificers had more control over their work time and space than factory hands

Ideas of work

The industrial revolution changed the practice and perceptions of work, with fundamental changes to people’s working lives. These changes are examined more closely in the posters on Blockmaking and Work.

Making electric cookers, 1932. Production line work started with the Block Mills.

**Building Site**

Shipbuilding was centralised work by nature. Unlike factory work it required skill and training. The Block Mills began to change this.

A sixth-rate on the stocks in 1758
Dockyards employed many specialised craftsmen, including sailmakers

Controlling the Lower Orders

Reorganising the workforce created a mass of urban poor that the authorities sought to control, for fear of revolution. The Panopticon Principle brought a strong element of control to the Block Mills.

The image the ruling classes had of the working population was often less than flattering, as Thomas Rowlandson’s Portsmouth Point illustrates

Background image: Nasmyth’s steam hammer 1871 © Science Museum, London/SSPL

Poster 1.4 (A3, Fact File):

**The Fleet**

The Navy needed more ships during the war than ever before. Portsmouth dockyard specialised in refits and repairs. In a typical year over 50 ships would pass through the yard.

Ships at Sea:

<table>
<thead>
<tr>
<th>Year</th>
<th>Total of the navy’s ships</th>
<th>Ships commissioned at sea</th>
<th>% of total</th>
<th>Ships in ordinary or in port</th>
<th>% of total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1793</td>
<td>390</td>
<td>135</td>
<td>35</td>
<td>255</td>
<td>65</td>
</tr>
<tr>
<td>1800</td>
<td>729</td>
<td>468</td>
<td>64</td>
<td>261</td>
<td>36</td>
</tr>
<tr>
<td>1805</td>
<td>726</td>
<td>508</td>
<td>70</td>
<td>218</td>
<td>30</td>
</tr>
<tr>
<td>1809</td>
<td>979</td>
<td>709</td>
<td>72</td>
<td>270</td>
<td>28</td>
</tr>
</tbody>
</table>

Source: Roger Morriss *The Royal Dockyards during the Revolutionary and Napoleonic Wars*, 1983

This chart from 1806 lists the types of vessels used by the navy

The British fleet at the Battle of Trafalgar, October 1805

- 3 first rates
- 5 second rates
- 18 third rates
- 4 fifth rates
- 1 armed schooner
- 1 armed cutter
- 2370 guns
- 17000 men
The Navy’s consumption of wood was enormous. The 33 ships at Trafalgar were built of 115,725 trees, the equivalent of 2.97 square miles of woodland. There had been a growing shortage of timber since at least the 17th century.

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**Section 2 – The Panopticon**

Poster 2.1 (A3, Fact File):

**Samuel Bentham, Inventor of the Panopticon**

Sir Samuel Bentham (1757-1831), Inspector General of Naval Works 1796-1812

Samuel Bentham served as the first and only Inspector General of Naval Works from 1796 to 1812. He played a crucial role in the navy’s industrial revolution.

Bentham trained as a shipwright at Woolwich dockyard in the 1770s, but was more interested in reforming shipbuilding than wielding an adze. He travelled to Russia, where he managed an industrial estate and invented the Panopticon Principle to control the large unskilled workforce.

On his return in 1791, he built experimental woodworking machines where mechanical guides replaced skill. These machines had no commercial success, but he implemented the ideas at the dockyard.

When introduced to Marc Brunel and his block machines, Bentham recognised their superior design and persuaded the navy to buy them.

Marc Brunel (1769–1849) inventor of the block making machines

Jeremy Bentham (1748–1832) author of *Panopticon or the Inspection House* (1791). Based on Samuel’s idea, the brothers developed the Panopticon Principle together.

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**Poster 2.2 (A0):**

**The Panopticon**

What is a Panopticon?

A Panopticon is a system of surveillance. It means ‘all-observing’.
Its best-known application is as a prison. In 1785 philosopher Jeremy Bentham designed a round prison where inmates were monitored by an unseen guard in a central tower.

However, the first use of the Panopticon was not a prison, but a factory.

Jeremy Bentham’s plan for the Panopticon

Jeremy Bentham’s blueprint for a panoptic prison

Origins

Samuel Bentham, Jeremy’s brother, had the initial idea. He designed a factory where the management controlled work processes and workers needed no skill. He called it the Panopticon. This idea influenced the dockyard reforms, particularly the Block Mills.

For more about Samuel Bentham, see the Fact File

The idea of the Panopticon was similarly developed a hundred years later as Scientific Management:

‘Thus all of the planning which under the old system was done by the workman, as a result of his personal experience, must of necessity under the new system be done by the management...’

Frederick Winslow Taylor, The Principles of Scientific Management, 1911

‘I'll be watching you’

Samuel Bentham aimed to eradicate malpractice and inefficiency by making processes visible and transparent. The Eye, or the supervisor, remained hidden. The workers were supervised but did not know when.

Shoppers under surveillance, 1968. They don’t know when they are being watched.

Page from Jeremy Bentham’s notes illustrating the architectural principle of the Panopticon. The Eye is at the centre.

Who guards the guards?
The records and accounts of the Panopticon were scrutinised and published. Selected dignitaries and tourists visited. The aim was to alleviate fears of tyranny, and place the public at the top of a hierarchy of supervision.

‘My prison is transparent, my management no less so’
Jeremy Bentham

Storebook from the Block Mills. Accountability was an important part of Bentham’s dockyard reforms.

‘A mill for grinding rogues honest and idle men industrious’

In the Panopticon work was separated into simple repetitive tasks. Stops and guides replaced the skill of the craftsman. Workers were now merely parts of a great machine. Surveillance ensured these parts functioned as planned.

A prisoner praying in front of a watchtower. Plan for a panoptic penitentiary, 1840.

Working a knitting machine, 1931. Using machinery to reduce production skill was the key to the Panopticon Principle.

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Poster 2.3 (A3, Concept File):
Seeing without being seen

View from a walkway window above the Block Mills. The workers below couldn’t see if they were being watched. On the right, the window seen from below.

Bentham’s idea of managing behaviour by surveillance remains in use today.

Scene from Charlie Chaplin’s Modern Times (1936): an all-seeing factory manager catches the Little Tramp loitering

Surveying shoppers, 1975

Did you notice this sign at the entrance? Did it affect your behaviour?

Background image: “The Divine Eye” concept sketch by Willey Reveley, 1791 (The Bentham Project, UCL)
Script Section 3 – Blockmaking

Poster 3.1 (A3, Fact File):

**Blocks**

Pulley blocks, rigged with rope are used to lift heavy loads. On ships their main use is in the rigging to manoeuvre sails.

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A 3-sheaved block

**Uses of blocks**

The weight of sails and wind force are so great that large sails could not be handled without blocks. Blocks come under considerable strain, and spares are needed when they break.

---

Blocks are a crucial part of rigging, as this model shows

HMS *Victory* needed 768 blocks for her 37 sails, and another 628 to control the recoil of her 100 guns. In addition she carried spares, and blocks for boats, anchors and other lifting. The Navy needed 100,000 blocks a year.

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HMS *Victory*


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Poster 3.2 (A0):

**Blockmaking**

The Industrial Revolution in action

Building the Block Mills changed the blockmaking industry. Machine tools required new skills and the trade moved from small workshops outside the yards into the new Block Mills. This change also brought new practices and a new group of workers into Portsmouth Dockyard.

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This pendulum was used for cutting logs in the Block Mills

The block maker’s skill
Block makers were skilled artisans who had served a seven year apprenticeship. The machinery in the Block Mills had stops and guides that replaced the need for a trained hand, and was operated by unskilled men. The machines formed a line of production, and each part of the process was reduced to a simple, repetitive task.

Making a block by hand requires skill

A shaping engine in use in the 1890s. Little or no skill is needed to operate the machine.

Indentures of William Haswell, a shipwright’s apprentice. Apprenticeship contracts were called indentures because of their shape. Block Mills did not need to serve apprenticeships.

New trade in the yard spreads to ships

The new steam powered machinery in the dockyards acquired skilled engineers from trades outside the yards. They trained new engineers whose skills enabled the Navy to build and maintain its own steam ships some decades later.

A reconstruction of the workshop of the engineer James Watt. Machine maintenance was highly skilled work. In the Block Mills, engineers replaced artisans at the top of the skills hierarchy.

A naval stoker at work in the 1920s

Under the Admiralty’s eye

Before the Block Mills, blocks were made by private contractors outside the yards. Building the Mills brought blockmaking under direct naval control.

A horse powered block machine, 1794. The largest private contractors, Taylor of Southampton and Dunsterville of Plymouth, used simple machinery like this.

A new way of working

The way blocks were made in the Block Mills was completely different from hand crafting. The tools and skills changed, and the location and pace of work were no longer determined by the worker.
Floorboards in the Block Mills, worn by the repetitive movements of workers’ feet.

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Poster 3.3 (A3, Concept File)

Work

The Industrial Revolution changed people’s experiences and perceptions of work

A joiner with his apprentices at work, 1849. The small workshop was typical of time. Dockyard scale was exceptional.

Clocking in, 1949. Management control of the worker’s time increased with industrialisation.

Modern Times. Charlie Chaplin’s iconic film shows the monotony of production line work.


Background image: © NRM/SSPL

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Section 4 – Dockyard Economy

Poster 4.1 (A3, Fact File):

Portsmouth yard and town

Portsmouth was the largest and most important if the six naval dockyards during the French wars.

A view of Portsmouth Harbour 1772. The yard closest to the theatre of war, Portsmouth was best placed for repairs and refits.

A 1793 map of Portsmouth Harbour. Portsea town grew on the Common next to the yard.

Figures show the Dockyard employed a large part of the Portsmouth workforce. Many more provided food, drink and supplies to the yard. The new Dockyard settlement of Portsea outgrew Portsmouth in the 18th century.
Portsmouth Population

<table>
<thead>
<tr>
<th>Year</th>
<th>Portsmouth</th>
<th>Portsea</th>
</tr>
</thead>
<tbody>
<tr>
<td>1801</td>
<td>7,839</td>
<td>8,348</td>
</tr>
<tr>
<td>1811</td>
<td>7,103</td>
<td>11,004</td>
</tr>
</tbody>
</table>

Men employed at the yard:

<table>
<thead>
<tr>
<th>Year</th>
<th>Men</th>
</tr>
</thead>
<tbody>
<tr>
<td>1782</td>
<td>2,445</td>
</tr>
<tr>
<td>1790</td>
<td>2,219</td>
</tr>
<tr>
<td>1805</td>
<td>3,000</td>
</tr>
</tbody>
</table>


Tourism

The dockyard attracted a lot of visitors. A 1823 tourist guidebook describes the yard:

“The first and most earnest wish of visitors to this celebrated Port, is a view of the Dock yard and, we believe, whatever their imaginations of it may be, they cannot, before they have seen it, form any just idea of its grandeur and importance. Here, every thing is conducted on a scale to the full extent that the genius of man ever devised...”

Naval sails looming over Spice Island at the entrance to Portsmouth Harbour signified the dominance of the Dockyard over the town

Background image: Map of Portsmouth 1793 © Royal Naval Museum

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Poster 4.2 (A0):

**Dockyard Economy**

The world's largest employer

At the end of the eighteenth century, British naval dockyards were the largest industrial enterprises in the world. They employed thousands, even in peace time. Bentham’s dockyard reforms aimed to control this large workforce beyond the Block Mills.

![Image of French shipyard](image-url)

The number of workers involved in building a ship were considerable, as this 18th century image of a French shipyard illustrates.

A comparison with cotton mills, the icons of early industrialisation, demonstrates the enormous scale of dockyards. Even the largest cotton mills only employed a few hundred, while thousands worked at the royal dockyards.

The ‘people of the yard’
The dockyards were established in the 16th century and employed a large part of Portsmouth’s working population. Their distinct culture and the balance of power between management and workers were based on long traditions. Bentham’s reforms changed this balance.

Because of their numbers and distinct culture, dockyard workers were referred to as ‘the people of the yard’. Leaving work at Portsmouth Dockyard, 1939.

The dockyards were established in the 16th century and employed a large part of Portsmouth’s working population. Their distinct culture and the balance of power between management and workers were based on long traditions. Bentham’s reforms changed this balance.

Because of their numbers and distinct culture, dockyard workers were referred to as ‘the people of the yard’. Leaving work at Portsmouth Dockyard, 1939.

Chip on your shoulder

One of the most controversial traditions of the yards was the workers’ right to collect chips. These were pieces of waste wood, no longer than 3 feet, ‘such as fall from the axe’. Bentham objected to the practice of collecting chips as wasteful. The wood could have been used for smaller items, like blocks.

This 1830s caricature shows a dockyard worker protesting over the loss of his chips, while his family smuggle more out. Waste wood was valuable to both the Navy and the workers.

Men in woodworking trades were allowed the amount of chips they could fit under one arm. To prevent them from taking more, carrying a bundle on the shoulder was forbidden. Some used it as an act of defiance, giving rise to the saying ‘to have a chip on your shoulder’.

Woodworking produced waste wood too small for shipbuilding. This painting shows a boatyard in Brittany with chips and tools in the foreground.

Accountability

Earnings from chips were independent of the workers’ performance. This did not sit well with Bentham’s regime of efficiency and accountability. He particularly disliked the waste of wood and time to cut it up that could have been used for other purposes.

This trades book shows the weekly numbers of people employed at the Dockyard in 1806. Records like this were important to Bentham, who aimed to run the dockyards like a business, with transparent accounts.

Lifeline or lucrative business?

Because of the large scale of the operation, the collection of chips represented huge losses for the Navy. The right was also often abused. For the workers, chips were a necessity.
“Let the reader fancy...2000 men leaving off work at ½ past 11 o’clock, to make up their bundles of chips. Nor were the chips made in the fair processes of their labour enough to satisfy them; they actually employed themselves in cutting up good and serviceable spars, even under the eye of their officers. But this was not all – these precious bundles contained copper bolts and other valuable articles concealed in them.”

Captain E.P. Brenton: Life and correspondence of the Earl of St Vincent (1838)

Deposition document for two dockyard workers caught with nails and iron rings taken from the dockyard in 1747. For the navy, pilfering was a serious problem.

Dockyard earnings

A family of four would spend approximately:
- 6d a week on vegetables
- 3d a day on bread
- up to £7 a year on rent

Daily rates of pay in the 18th century:
- Shipwrights, Caulkers and Joiners: 2s 1d
- House carpenters and Sailmakers 1s 10d
- Riggers 1s 6d
- Labourers 1s 1d


Pay was reasonable, and frequently boosted by overtime, but the workers were paid quarterly in arrears. This meant they relied on credit between paydays. A bundle of chips could fetch as much as a shilling (5p). This money was necessary for the families’ day-to-day subsistence. Weekly pay was introduced during Bentham’s time.

Between paydays dockyard workers relied on credit, including pawn shops. A 17th century pamphlet describes how the poor “…muster up the pence, on the Saturday night, to redeem their best riggings out of captivity; but on Monday morning, infallibly bring them back… Thus they are forced to purchase the same clothes seven times over; and, for want of a chest to keep them in at home, it costs them thrice as much as they are worth, for their lodging in his [the pawn-broker’s] custody.”

Background image: Sheerness Dockyard, 1830 © Science Museum, London/SSPL

Poster 4.3 (A3, Fact File):

The Block Mills Building

The Block Mills housed a number of wood workshops. The block machines were installed in 1805.

This aerial view, taken from the Spinnaker Tower, shows the location of the Block Mills
The Block Mills, with recent restoration work by Defence Estates clearly visible.

Bentham built the Mills over Edmund Dummer’s 1691 reservoir to save space. The yard between the original two buildings was covered to accommodate the machines.

This plan shows the reservoir under the Mills. The navy’s first steam engine, housed in the South Range, pumped water from the docks into the reservoir and powered the Mills.

Blocks were made in the Mills until the 1960s. The building remained in workshop use until the 1980s. For more about the current state of the Block Mills see Where are they now?

The middle range of the Mills, where the block machines were. The power transfer system overhead remains intact.

Background image © K. Mauranen

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Poster 5 (centre display, A0):
The Block Making Machinery

Making blocks

Blocks were made in different sizes, and with a varying number of sheaves. The Block Mills had separate machines for three standard sizes of blocks. Each machine was designed for one specific task. There were 45 machines in all. The components were made separately and the block assembled by hand.

The components of a block: a sheave or pulley, set in a shell and turning on a pin

The shell
1 The elm logs that the shells of blocks were made of were first cut to a suitable size

A Pendulum Saw

2 A hole for the pin and a guide for making the slot for the sheave were drilled through the piece

Boring Machine
3 The guiding hole was enlarged to accommodate the sheave. The slot had to be straight or the sheave might snag.

Mortising Machine

4 The shells were roughly shaped by cutting the corners of the piece

Engraving of a Boring Machine (top) and Corner Saw

5 The blocks were clamped into the rotating drum of the Shaping Engine in batches of ten to receive their final form

Shaping Engine

6 Scores to hold the rope strap in place were cut. The final polishing was done by hand.

Scoring Machine

The sheave

1 Sheaves were made of *lignum vitae*. Gaining control over the supply of this tropical hardwood was an important argument for the Navy to start making its own blocks.

Lignum vitae saw

2 The sheave was cut into a circular shape and simultaneously a hole was drilled for the pin

Rounding Saw

3 Recesses were cut in the sheave to accommodate the metal coak or bearing. Importantly for mass-production, these parts were interchangeable: any coak would fit any sheave.

Coaking Machine

4 The sides of the sheave were smoothed and a groove made for the rope with a face turning lathe. The coak was fastened with a riveting hammer.

Engraving of a face turning lathe (right) and a riveting hammer

Making the machines
The machines were designed by Marc Brunel, the French-born engineer, with input from Samuel Bentham and the Mills manager, Simon Goodrich. They were built in London by the famous machine tool maker Henry Maudslay, whose input was crucial. The machines were made innovatively with metal, not wooden frames. This allowed them to withstand the vibration of the steam engine and keep their shape.

Marc Isambard Brunel (1769-1849) designed the block machines. His son Isambard Kingdom Brunel became a famous engineer.

Henry Maudslay (1771-1831) is considered the father of machine tool technology

Background image: The Block Mills ca 1900 © Science Museum, London/SSPL
All images of blocks are from K. R. Gilbert: The Portsmouth Blockmaking Machinery. HMSO, 1965. Reproduced under the terms of the Click-Use Licence

Background image: The Block Mills ca. 1900 © Science Museum, London/SSPL

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Poster 6 (the last wall of the ‘Panopticon’ A3):

*Where are they now?*

The Block Mills

In 1965 block making was moved to Boathouse No.6. The building remained in other use until the 1980s. It deteriorated, and was placed on the English Heritage Buildings at Risk Register in 1998. Under English Heritage guidance, Defence Estates carried out a major restoration works, completed in 2008.

There is currently no public access to the building, but you can see it beyond HMS *Victory*

Some of the machinery used in the Mills still remains in place like this Log Cutter

The machines

The Science Museum collected eight machines of different sizes. This Boring Machine is one of those on display.
This Scoring Engine is one of the machines acquired by Portsmouth City Museum, currently on display in the Dockyard Apprentice exhibition in the Historic Dockyard.

Background image: Block Mills floor worn by workers’ feet © K. Mauranen

CCTV sign, A4
Appendix B: Message document

Portsmouth Panopticon Exhibition Messages

Main Messages

- Machines are part of a wide human context, and I will interpret them through people and their thinking
- The Industrial Revolution created fundamental workforce changes and shifted control of the work process
- Samuel Bentham saw dockyards as machines for maintaining warships
- His dockyard reforms were based on the panopticon principle and his new vision of work
- Dockyard changes affected the Navy, war and the empire, as well as dockyard workers

Section Messages

1) War and industrialisation

Level 1
- The key to the industrial revolution was workforce control.
- Wars against France between 1793 and 1815 put enormous pressure on the dockyard to fit out and repair warships.
- These factors motivated the navy’s industrial revolution in the Block Mills.

Level 2
- War
  - The dockyards were under huge pressure to return warships to sea
  - Fears of French invasion and Jacobin revolution were widespread
- Industrialisation
  - Shipbuilding and repairs required centralisation and skills
  - The industrial revolution changed perceptions of work

2) The Panopticon

Level 1
- Bentham’s new principles drove workforce reorganisation
- Key panopticon components: control, visibility, machinery, unskilled labour
- Bentham’s dockyard was transformed from a shared workspace for autonomous trades to an integrated machine
Level 2
- Under the new work methods the worker no longer controlled how, where and when each task was performed
- This control was essential to developing the Block Mills
- Bentham advocated more businesslike and transparent dockyard administration and accounting

Section 3: Blockmaking

Level 1
- The Block Mills introduced two changes:
  o Changes to the blockmaking industry
  o Changes to Portsmouth Dockyard
- The defining change was the shift of control from the blockmaker to the Block Mills management.

Level 2
- Changes to the blockmaking industry:
  o Who?
  o Where?
  o How?
- Changes to the dockyard:
  o A new trade and set of workers were brought into the yard
  o New steam skills
  o A new building

Level 3
- Taylor and Dunsterville, the largest contractors, used water- and horse powered machinery
- The steam-powered machines in the Block Mills represented a technological revolution

Section 4: Dockyard economy

Level 1
- Bentham’s reforms changed dockyard culture beyond the Block Mills
- Bentham aimed to improve efficiency, eradicate waste and run the dockyards as a business, with transparent accounts
- The traditional balance of power between dockyard management and workers was changed
- British naval dockyards were the largest industrial enterprises in the world, employing thousands even in peace time

Level 2
- Chips were an economic necessity and a traditional right to the workers
- Management saw them as waste, because the right was often abused
- Money substituted for chips was a more formal mode of remuneration. It was more reliable, but also meant a loss of independence.
- The navy improved efficiency and workforce control with chip money
The exhibition puts the Block Mills into a social context. The key purpose is to show motivations behind introducing new technology, and its consequences to the lives of ordinary workers.
Appendix C: Exhibition leaflet for Portsmouth Panopticon

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English Heritage
British Library
John Hayes, IAMS Victory Rigging Supervisor
National Portrait Gallery

Katarina Mauranen is a student at Imperial College London and the University of Portsmouth.

The Portsmouth Panopticon forms part of her PhD project: Presenting academic research in a museum: Portsmouth Block Mills. The aim of the project is to display themes and concepts taken from academic literature to a museum audience.

This display is a pilot for a larger exhibition of the machines themselves which can be seen next door in the Dockyard Apprentice exhibition.

Visitors will be asked to comment on the exhibition through questionnaires and a visitor book.

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Portsmouth Panopticon

The world’s first steam powered factory was built in 1805 right here, in Portsmouth Dockyard to produce pulley-blocks for the sailing Navy. This exhibition explores the social context that produced the Block Mills, from the pressures of war to Utilitarian ideals, and changes the dockyard reforms brought to workers’ lives.

A principle best known as a prison design influenced the new mode of production, and machines for making pulley-blocks produced a new kind of worker.

Plan for a Panopticon prison by Jeremy Bentham. His brother, Samuel, as Inspector General of Naval Works, created the Block Mills.

The Black Mills today

War and Industrialisation
War put the dockyards under enormous pressure. Factory production increased productivity and management centralised over the workforce.

Panopticon Principle
A system of surveillance, embodied in Millbank prisons, was first applied to a factory - Portsmouth Block Mills.

Blockmaking
Building the Block Mills profoundly changed the block making industry as well as the dockyard.

Dockyard Economy
Dockyard reforms changed the traditional balance of power in the largest industrial establishment in the world.

The Blockmaking Machines
The process of making blocks was broken down and a machine designed for each phase.

Pulley-blocks, crucial parts in a sailing ship’s rigging

Blocks in a shaping engine in the Dockyard Apprentice exhibition, Portsmouth Historic Dockyard

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Appendix D: Visitor questionnaire

**Portsmouth Panopticon**
A Poster Exhibition about Portsmouth Block Mills

**Katarina Mauranen**, PhD student, University of Portsmouth and Imperial College London
PhD project: *Presenting academic research in a museum: the Portsmouth Block Mills*

**VISITOR QUESTIONNAIRE**

By taking part in this survey, you will help my research on presenting academic research through exhibitions. The purpose of the survey is to evaluate the effectiveness of the exhibition design and content. The poster display is a pilot for a larger exhibition. The questionnaires are anonymous, but you will be asked to provide some information about your background. Thank you for taking part!

**A) About the Exhibition** (Please circle your answer or write your answers)

1. Did you find the subject of the exhibition interesting?  
   - Yes  
   - No
2. Was the layout of separate ‘cells’ easy to follow?  
   - Yes  
   - No
3. Was the text easy to follow?  
   - Yes  
   - No
4. Did you find the ideas and concepts displayed clearly presented?  
   - Yes  
   - No
5. What did you most enjoy in the exhibition?

_____________________________________________________________________

6. What did you find most interesting?

_____________________________________________________________________

7. Was there a part you did not enjoy or understand?

_____________________________________________________________________

**B) About the subject** (Please tick any that apply)

1. Which section of the exhibition did you find **most** interesting?

<table>
<thead>
<tr>
<th>War and Industrialisation</th>
<th>The Dockyard Economy</th>
</tr>
</thead>
<tbody>
<tr>
<td>The Panopticon</td>
<td>The Machinery</td>
</tr>
<tr>
<td>Blockmaking</td>
<td></td>
</tr>
</tbody>
</table>

Why?_________________________________________________________

2. Which section of the exhibition did you find **least** interesting?

<table>
<thead>
<tr>
<th>War and Industrialisation</th>
<th>The Dockyard Economy</th>
</tr>
</thead>
<tbody>
<tr>
<td>The Panopticon</td>
<td>The Machinery</td>
</tr>
<tr>
<td>Blockmaking</td>
<td></td>
</tr>
</tbody>
</table>

Why?_________________________________________________________
3. Which of these topics covered in the exhibition did you find interesting?

<table>
<thead>
<tr>
<th>Mechanisation and perceptions of work</th>
<th>Naval shipbuilding</th>
</tr>
</thead>
<tbody>
<tr>
<td>The dockyard workforce</td>
<td>Surveillance and Control</td>
</tr>
<tr>
<td>How the machinery works</td>
<td>Early 19th century thinking</td>
</tr>
</tbody>
</table>

4. This poster exhibition is a pilot. Would you go to another exhibition about:

<table>
<thead>
<tr>
<th>Block Mills</th>
<th>Industrial revolution of the navy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Social history of work</td>
<td>Panopticon</td>
</tr>
</tbody>
</table>

5. Would you like to find out more through other media (eg. books, television, the Internet)

<table>
<thead>
<tr>
<th>Block Mills</th>
<th>Industrial revolution of the navy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Social history of work</td>
<td>Panopticon</td>
</tr>
</tbody>
</table>

C) About your exhibition experience (Please tick any that apply or write your answer)

1. Did you learn something from your visit?

_____________________________________________________________________

2. Was there something a) you felt was left unclear or b) you would have liked more information about?

______________________________________________

3. Have you gained a different perspective on some of the themes or issues displayed?

<table>
<thead>
<tr>
<th>Industrialisation</th>
<th>Naval shipbuilding</th>
</tr>
</thead>
<tbody>
<tr>
<td>The dockyard workforce</td>
<td>Surveillance and Control</td>
</tr>
<tr>
<td>Perceptions of work</td>
<td>Machinery</td>
</tr>
</tbody>
</table>

4. Have you gained a different perspective on these related subjects?

<table>
<thead>
<tr>
<th>Naval history</th>
<th>Social history</th>
</tr>
</thead>
<tbody>
<tr>
<td>History of technology</td>
<td>Academic history</td>
</tr>
</tbody>
</table>

D) About you

1. Are you: Female Male

2. Please state your age:_____

3. Your educational background (please tick one)

<table>
<thead>
<tr>
<th>GCSE</th>
<th>A-Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>NVQD</td>
<td>Professional qualification</td>
</tr>
<tr>
<td>University degree</td>
<td>Postgraduate qualification</td>
</tr>
<tr>
<td>Other, please specify:_______________________________</td>
<td></td>
</tr>
</tbody>
</table>

4. Would you describe yourself as being mostly interested in (please tick any that apply)

<table>
<thead>
<tr>
<th>Social or economic history</th>
<th>Military history</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maritime or naval history</td>
<td>History of technology</td>
</tr>
<tr>
<td>Local history</td>
<td>Current technology</td>
</tr>
<tr>
<td>None of the above</td>
<td>Other, please specify:</td>
</tr>
</tbody>
</table>
5. How many times a year do you visit museums?

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Once</td>
<td>5-10 times</td>
</tr>
<tr>
<td>2-4 times</td>
<td>Over 10 times</td>
</tr>
</tbody>
</table>

Thank you for your time!
If you would like to find out more about my findings, please don’t hesitate to contact me.
You will find my contact details on the exhibition brochure.

Please use the visitor book for feedback and additional comments.
Appendix E: Research ethics form

All materials submitted will be treated confidentially.

Project Title: Presenting academic research in a museum: the case of the Portsmouth Block Mills / 'Portsmouth Panopticon' Exhibition.

Principal Investigator / Supervisor: Dr Ann Coats.

Student Investigator: Katarina Mauranen

Department/School: EDAM

Proposed Dates: Start. 9/02/09 Completion. 30/09/10

RESEARCH ETHICS CHECKLIST

1. Is the study likely to involve human subjects or participants? If no, go to Q 11 & 12. X

2. Will the study involve NHS patients or staff? X

3. Do human participants/subjects take part in studies without their knowledge/consent at the time? X
   Or will deception of any form be used? X

4. Does the study involve vulnerable or dependent participants e.g. children, learning disabilities? X

5. Are drugs, placebos or other substances (e.g. food, vitamins) to be administered to participants? X

6. Will blood or tissue samples be obtained from participants? X

7. Is pain or more than mild discomfort likely to result from the study? X

8. Could the study induce psychological stress or anxiety in participants, or third parties? X

9. Will the study involve prolonged or repetitive testing of participants? X

10. Will financial inducements other than reasonable expenses be offered to participants? X

11. Are there risks of significant damage to physical and/or ecological environmental features? X

12. Are there risks of significant damage to features of historical or cultural heritage X

13. Are there risks of harm to any animal? X

14. Could the research outputs potentially be harmful to third parties? X

If you have answered ‘yes’ to any of questions 1, 3, 4 or 9 to 12 you must add additional details of how you plan to minimise any risks identified.

I confirm that the information provided is a complete and accurate record of my plans at present and that I shall resubmit an amended version of this form should my research alter significantly such that there is any significant variation of ethical risk. I confirm that I have read the University Ethics Policy (2001) and Research Integrity circular 26/ET Nov. 2001 – see front page for access to these documents.

Signed: ____________________________ Principal Investigator or Student

Signed: ____________________________ Countersignature of supervisor (if student research)

Date: ________________________________

B. APPROVAL RECORD (completion by Faculty REC or School/Department Representative)

Approved as INSIGNIFICANT risk

Approved as INSIGNIFICANT subject to comments listed below

Risks assessed as SIGNIFICANT referred for DETAILED Ethics Review

25/06/09

Jonathan S. [Signature]
Presenting academic research in a museum: the case of the Portsmouth Block Mills / “Portsmouth Panopticon” Exhibition – Ethics form

The participants of my study will take part in focus groups, lasting up to two hours, evaluating a poster exhibition I have created. They will be asked to provide some information of themselves. The discussion will be recorded with a camera and audio equipment. The participants will be asked to sign an informed consent form, and will be given information on how to find out more about the project, how the data will be used and stored, and how to access their data. The data will be kept in a secure place according to University regulations.

Casual visitors to the exhibition will also be asked to fill in questionnaires. These will be anonymous.
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Portsmouth University events calendar:


*Wooden Walls* at Chatham Historic Dockyard:

[http://www.thedockyard.co.uk/Plan_Your_Day/Wooden_Walls/wooden_walls.html](http://www.thedockyard.co.uk/Plan_Your_Day/Wooden_Walls/wooden_walls.html)

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