

THESES
F
9980



1328984

**THE ROLE OF THE GOVERNMENT IN THE IMPORT SUBSTITUTION OF
SAILCLOTH, CORDAGE AND GUNPOWDER IN ENGLAND,
1558-1642**

Martha Morris

A thesis submitted for the degree of Doctor of Philosophy

September 2000

The London School of Economics and Political Science

University of London

UMI Number: U615741

All rights reserved

INFORMATION TO ALL USERS

The quality of this reproduction is dependent upon the quality of the copy submitted.

In the unlikely event that the author did not send a complete manuscript and there are missing pages, these will be noted. Also, if material had to be removed, a note will indicate the deletion.



UMI U615741

Published by ProQuest LLC 2014. Copyright in the Dissertation held by the Author.
Microform Edition © ProQuest LLC.

All rights reserved. This work is protected against
unauthorized copying under Title 17, United States Code.



ProQuest LLC
789 East Eisenhower Parkway
P.O. Box 1346
Ann Arbor, MI 48106-1346

THESIS ABSTRACT

This thesis examines the role of the Crown in the import substitution of munitions of warfare in England from 1558 to 1642. It will attempt to determine whether the Crown was responsible for their introduction and subsequent development, and if it was, why. The cordage, sailcloth and gunpowder industries were chosen as case studies in order to examine this issue. All three were first determined to have been import substituted during this period. While the Crown clearly thought these goods were necessary for national security, it cannot be assumed that it assisted these industries and that it did so because it was concerned that supplies coming from the continent might be difficult to procure.

Important aspects to consider are first, the impact of the Crown on these native industries through its direct purchasing behaviour, and secondly, the impact on the industries of government acts and ordinances. If the Crown was interested in reducing dependence on foreign suppliers for these goods, then it would be expected that the Crown would, through purchasing behaviour and through legislation, support the domestic industries.

It is argued here that when the Crown did act with the domestic industries in mind, fiscalism and personal finance were important considerations. It often appears to have done nothing at all. This is particularly true of the sailcloth industry. Cordage appears to have received its initial impetus as a result of personal financial concerns, but subsequent Crown support appears to have been fiscal. While interest in a domestic source of gunpowder seems apparent, fiscalism runs like a thread throughout all Crown interactions with the industry.

CONTENTS

	Page	
List of Tables	4	
List of Figures	7	
Abbreviations	8	
Acknowledgements	9	
Chapter One	Introduction	10
Chapter Two	A Quantitative Examination of the Import Substitution of Sailcloth, Cordage and Gunpowder	64
Chapter Three	Crown and Contemporaries' Arguments for the Import Substitution of Sailcloth, Cordage and Gunpowder	138
Chapter Four	Direct Crown Investment in Sailcloth	163
Chapter Five	Direct Crown Investment in Cordage	212
Chapter Six	Direct Crown Investment in Gunpowder	255
Chapter Seven	Indirect Measures and Their Impact on the Import Substitution of Sailcloth, Cordage and Gunpowder	310
Chapter Eight	Conclusion	347
Sources and Bibliography		355

LIST OF TABLES

		Page
Table 2.1	Munitions required for various Royal ships 1602	67
Table 2.2	Gunpowder requirements per weight of shot 1591	67
Table 2.3	English merchant shipping 1560-1640	70
Table 2.4	Ships upon which bounties were paid 1572-97	71
Table 2.5	Number of new ships requiring ordnance 1625-38	72
Table 2.6	Shipping of the East India Company 1601-1640	85
Table 2.7	Ships Belonging to the Crown 1500-1640	93
Table 2.8	Ships added to the Royal Navy 1556-1640	95
Table 2.9	Imports of cordage into London at 1604 book of rates valuations 1)as a per cent of imported manufactured goods and 2)as a per cent of total imports 1559/60 - 1639/40	114
Table 2.10	Imports of cordage into London by English and alien merchants at 1604 book of rates valuations 1)as a per cent of imported manufactured goods and 2)as a per cent of total imports for the merchants specified 1568 - 1639/40	115
Table 2.11	Total imports of cable yarn into London and imports by English merchants at 1604 book of rates valuations 1)as a per cent of imported semi-manufactured and raw goods and 2)as a per cent of total imports 1559/60 - 1639/40	117
Table 2.12	Imports of canvas into London at 1604 book of rates valuations 1)as a per cent of imported manufactured goods and 2)as a per cent of total imports 1559/60 - 1639/40	121

Table 2.13	Canvas shipped between London and Ipswich (in numbers of pieces) 1565/6 - 1642/3	124
Table 2.14	Total imports of hemp into London and imports by English merchants at 1604 book of rates valuations 1)as a per cent of imported semi-manufactured and raw materials and 2)as a per cent of total imports 1559/60 - 1639/40	127
Table 2.15	Imports of hemp from the Baltic 1600-1649 (lasts)	128
Table 2.16	Amounts (lbs) of foreign and domestic gunpowder purchased by the Ordnance Office and proportions to total 1547 - 1563	132
Table 4.1	Canvas shipped from Ipswich to London by type (pieces) 1565 -1637	168
Table 4.2	Sailcloth purchases and as a proportion of total Naval allowances 1555-1640	174
Table 4.3	Shipments of sailcloth from Ipswich to London, Crown purchases of Ipswich sailcloth 1)for that year 2)for the year following and Navy purchases as a per cent of Ipswich sailcloth shipped 1)for that year and 2)for the year following (in bolts) 1565-1637	208
Table 5.1	Royal Navy cordage and hemp purchases (lbs) and as a proportion of total Naval allowances 1560-1635	219
Table 5.2	Royal Navy purchases of cordage in pounds sterling and in weight 1610-8	243
Table 5.3	Cost to produce a hundredweight of cordage in the Navy ropery and cost of imported cordage 1620-38	248
Table 6.1	Gunpowder and saltpetre purchases 1560-1640 and as a proportion of total ordnance account spent on gunpowder 1560-1610	261
Table 6.2	Gunpowder purchased by the Crown, by type (lbs) 1559-1587	267

Table 6.3	The Evelyn contract: gunpowder delivered 1592-1607 (1)amount supplied by the Evelyns (2)amount contracted to be delivered (3)total cost (£s) (4)amount paid yearly (£) (5)price per lb	285
Table 6.4	The Earl of Worcester's contract: gunpowder delivered 1607 - 1619 (1)amount supplied by Worcester (2)amount contracted to be delivered (3)total cost (£) (4)amount paid yearly (£) (5)price per lb	289
Table 6.5	The Evelyn contract: gunpowder delivered 1621 - 1636 (1)amount supplied by the Evelyns (2)amount contracted for (3)total cost (4)amount paid yearly (5)price per lb	293
Table 6.6	Expenses and net profit per unit accruing to the Crown for gunpowder production 1636-39	301
Table 6.7	The Collins/Cordewell contract: gunpowder delivered 1636 - 1640 (1)amount supplied by Collins/Cordewell(2)amount contracted for (3)total cost (4)price per lb.	303

LIST OF FIGURES

		Page
Figure 4.1	Crown purchases of sailcloth 1559-1642 (number of bolts)	173
Figure 5.1	Crown purchases of cordage and hemp 1571-1642 (lbs)	218
Figure 6.1	Crown purchases of gunpowder and saltpetre 1559-1640 (lbs)	260

ABBREVIATIONS

Add. MSS.	Additional Manuscript, British Library
APC	Acts of the Privy Council
B.L.	British Library
CSPC	Calendar of State Papers, Colonial Series
CSPD	Calendar of State Papers, Domestic Series
CSPV	Calendar of State Papers, Venetian Series
E	Exchequer, Public Records Office
PC	Privy Council
P.R.O.	Public Records Office
SP	State Papers, Public Records Office
WO	War Office, Public Records Office

ACKNOWLEDGEMENTS

No extensive work can be completed without the accumulation of debts of gratitude and this thesis is no different. I must begin by offering my thanks to Mr. Dudley Baines, my supervisor. While the errors are mine, his advice and suggestions were most helpful, and his humour and unending patience most appreciated. Secondly, I wish to thank Dr. Peter Earle for suggesting import substitution as a viable topic of research, for reading the first draft and for offering valuable advice. Dr. David Ormrod kindly read the final draft and his comments were most helpful and appreciated. Dr. Derek Keene read each chapter as it was produced and most kindly offered advice and suggestions. Peter Coton deserves recognition for listening and making worthwhile suggestions. I wish as well to thank Dr. Peter Howlett for his support and advice, particularly during the early period of my research.

I must thank the organizers and promoters of the ESTER seminars for allowing me to present papers based on my research. The resulting discussions and questions were most helpful and the experience gained goes well beyond the mere completion of this thesis.

Finally, I must thank the staff at the British Library and at the Public Records Offices who proved very helpful, particularly when the thesis first demanded the reading of Elizabethan numbers.

CHAPTER ONE

INTRODUCTION

I

England's industrial base prior to the mid sixteenth century was very narrow, with the heavy woollen cloth and leather industries providing the bulk of industrial employment. Many of the finished consumer goods desired by the populace such as linen cloth, thread and canvas, silk, paper and items made of glass were available only or primarily as imports from continental Europe. Military supplies such as sailcloth, gunpowder, cordage, ironware and copper were also predominately continental in origin. By the mid seventeenth century the industrial base had diversified, and many of the imports were now manufactured in England.

That import substitution, or industrial diversification, took place in England is not disputed. Historians have attributed the development of various industries to one or more factors, particularly the growth of domestic demand, immigration of skilled foreign craftsmen and government legislation.¹ They have given only marginal credit to the government for assisting new and developing industries producing consumer goods but have more enthusiastically applauded its efforts to promote those industries producing

¹The government in this context refers to the Crown, Ministers, Privy Council and other public servants.

munitions.² Broadly speaking, it has been suggested that when the Crown did act to assist industrial development the general aims were to reduce dependence on foreign countries for military supplies, improve the balance of trade, increase employment and generate revenue for the Crown. If the Crown indeed behaved in this way then one would expect to see signs of protection for those industries producing goods for warfare.

This thesis seeks to test the notion that the government, indeed, acted to establish the import substitution of armaments and stores from the accession of Elizabeth to the Civil War. Can the survival and expansion of the industries producing these goods be attributed to Royal demand? And did the government through investment, legislation or statute provide assistance for these industries? It will be argued that Crown involvement in the import substitution of munitions was primarily a result of fiscal concerns: of the government's urgent need to raise revenue and economize. Crown officials either bought military goods wherever cheap sources were available or they purchased goods that profited them directly. Indirect measures were motivated in large part by fiscal concerns and were either not seriously intended to assist home industries or the efforts themselves were insufficiently effective.

The products which were import substituted at this time include sailcloth, cordage,

²See, for example, L.A. Clarkson, The Pre-Industrial Economy in England 1500-1750 (London, 1971), p. 194; C.G.A. Clay, Economic Expansion and Social Change: England 1500-1700 ii (Cambridge, 1984), Chapter Ten; D. C. Coleman, Economy of England 1450-1750 (London, 1977), Chapter Ten; Nesta Evans, The East Anglian Linen Industry: Rural Industry and Local Economy 1500-1850 (Aldershot, Hants., 1985), p. 52; B. Supple, Commercial Crisis and Change in England, 1600-1642 (Cambridge, 1959), p. 226; Joan Thirsk, Economic Policy and Projects (Oxford, 1988), p. 34; R.B. Wernham, The Making of Elizabethan Foreign Policy 1558-1603 (Berkeley, 1980), pp. 25-6.

gunpowder and metalwares.³ This thesis is focused on the first three. The raw materials used in their manufacture will also be examined because either an increasing amount of the raw materials was being imported, thus supporting the notion that an increasing amount of the good was being produced domestically, or the raw materials themselves were subject to import substitution. These goods were chosen because there has been relatively little research on gunpowder and hemp, and essentially none on cordage and sailcloth, and what has been written comes to rather different conclusions from those to be made in this thesis. In comparison, more has been written about metalwares and little further contribution can be made to the ideas on this product.⁴

The government could have fostered import substitution in various ways: directly, by investing in domestic production and indirectly, by imposing tariff walls and prohibitions against manufactured imports and exports of raw materials. It might also manipulate the exchange rate mechanism by enhancing or debasing the coinage, develop an infrastructure, induce foreign craftsmen to immigrate, grant monopoly rights on terms advantageous to the industry and favourably distribute the tax burden. It will be necessary to determine whether when Crown officials acted, they did so with the intention of establishing or assisting these new and developing industries. Government activities may have been simply fiscal devices and import substitution merely a by-product. No comprehensive work has been published for this period on this topic.

³Chapter Two, below, will quantitatively demonstrate this for the first three goods.

⁴G. Hammersley, 'The State and the English Iron Industry in the Sixteenth and Seventeenth Centuries', D.C. Coleman and A. H. John, (eds.), Trade, Government and Economy in Pre-Industrial England (London, 1976), pp. 166, 169, 172-3, 180.

This chapter will, firstly, present the outline of the thesis together with a brief discussion of the sources. Secondly, it will explain why the period that runs from the accession of Elizabeth to the outbreak of the Civil War was chosen. Finally, it will survey the literature that examines the debates concerning Crown policy and specifically that relating to fiscalism and the munitions industries within the context of the model of mercantilism.

II

The thesis has been structured in three parts. The following chapter will demonstrate that cordage, sailcloth and gunpowder were import substituted during this period. Chapter Three seeks to discover what role the Crown thought it should play in the development of these industries. The remainder of the thesis will examine what the Crown actually did. Chapters Four, Five and Six will be devoted to Crown purchasing behaviour and direct involvement in the production process. Chapter Seven will examine Crown directives aimed at cordage, gunpowder and sailcloth. This format will serve to highlight any gap between what the Crown claimed they wanted to do and what they did do. This section will now more fully discuss the contents of the chapters and will briefly describe the primary sources used for each. A fuller analysis of the sources will be included within the chapters.

Chapter Two will demonstrate that it is possible to illustrate quantitatively that the import substitution of these industries was occurring, although the methodology for each

product will vary. Two pieces of information are necessary for every product under analysis - import figures and domestic output. Import figures for manufactured products and raw materials came predominately from Annie Millard's work on the import trade of London,⁵ the coastal port books (P.R.O. E190) and from Ordnance Office purchase records (P.R.O. E351). Various manuscripts such as Lansdowne (B.L.) and government papers such as Exchequer (P.R.O. E351) and State Papers Domestic, Foreign and Venetian (P.R.O. SP) provide supporting evidence.

Domestic output can at best only be estimated and then for very few industries because production records were not kept. A proxy, therefore, was created for total supply by estimating domestic demand in order to demonstrate that total supply did not decline. This was done by calculating the number of ships in various sectors of the shipping industry, including the Royal Navy. Sources for these estimates include ship lists, port books and government papers.

The third chapter will examine the way in which the government and contemporaries viewed the role of the state in the import substitution of munitions and how this might have changed over the period. It will seek to determine whether the government wanted to establish the munitions industries domestically and if so, the reasons why and the ways in which it thought it might be done. This chapter will also examine the factors that influenced its attitudes and actions.

Chapters Four, Five and Six consider direct Crown investment in munitions. Each

⁵Annie Millard, 'The Import Trade of London 1600-1640' (Unpublished Ph.D. thesis, University of London, 1956).

chapter looks at one of the three products: sailcloth, cordage and gunpowder. Together they will examine the kinds and quantities purchased and the patterns in purchases in order to demonstrate what specifically was purchased. It will also show whether an important part of the finances available to the Navy and Ordnance Office was spent on these goods. The sources from where they were purchased and the individuals or organisations responsible for making the decisions will follow. At the same time, each chapter suggests reasons why the various sources were chosen. Did the government's purchasing behaviour reflect a serious interest in developing the industries domestically? The sources of government purchases and the consequences of the purchasing patterns on domestic industries have been neglected by historians. There are two almost complete series of military purchase records. Gunpowder was purchased through the Ordnance Office and these records were kept by the Lieutenant of the Ordnance (P.R.O. E351). This record is substantiated for the period following 1592 in a series of debenture books (P.R.O. WO49). Sailcloth and cordage were purchased by the Royal Navy and are recorded in Treasury of the Navy papers (P.R.O. E351).

Chapter Seven will examine the legislative acts imposed by the government relating to munitions. The acts refer to patents of monopoly and other inducements to entrepreneurs, the setting of manufacturing standards, land use, wage and price controls and prohibitions on imports and exports. They may be found in the Tudor and Stuart Royal Proclamations, the Acts of the Privy Council, Statutes of the Realm and Calendar of Letters Patent. Further evidence is found in manuscript papers. This chapter will discuss not only the decrees concerning these industries but the effectiveness of the

government in enforcing them. Evidence from the Acts of the Privy Council, State Papers and manuscripts debating and discussing the validity and effectiveness of the legislation will be used to determine whether the government's directives were in fact enforced.

The concluding chapter will summarize the role of the government in the import substitution of munitions. It will consider the extent to which the government actively promoted the import substitution of munitions. If the state did not play a major role, what, then, accounted for the growth in the proportion of domestically produced to total supply? It will also examine any potential gap between what the Crown claimed it wanted to do, and what it in fact did do.

III

There are several reasons why this period was chosen. First and foremost, crucial developments were made shortly before and during this period in shipbuilding, navigation and armament, setting in motion a sixteenth century 'arms race' that England could not afford to ignore.⁶ These developments also made possible long-distance voyages of exploration, trade and plunder to the far corners of the world. Due to the fact that England was for the most part separated from her enemies by water, it had always been to the Navy and merchant shipping that she turned to for self defence. Developments in

⁶The period was referred to an 'arms race' in Michael Duffy, 'Introduction: The Military Revolution and the State 1500-1800' in Michael Duffy (ed.), The Military Revolution and the State 1500-1800 (Exeter Studies in History no. 1, Exeter, 1981) and in Paul Kennedy, The Rise and Fall of British Naval Mastery (London, 1983), p. 16.

naval technology and its particular relevance for England, then, explains both Crown interest in gunpowder, cordage and sailcloth and why these goods were chosen as case studies for this thesis.

Cannon and gunpowder had been in use since at least the early decades of the fourteenth century.⁷ Cannon posed major problems during field battles, however, as they could only be aimed with rough approximation, they lacked mobility and the rate of fire was slow.⁸ As a result their use was limited to blasting down fortification walls.⁹ On the other hand, mobility was not a problem at sea. Small, light guns had been in use on large ships since the early fifteenth century but their introduction did not lead to any changes in warship design, tactics or strategy.¹⁰ The early cannons were built out of bars of wrought iron welded into barrel-like tubes, open at both ends and reinforced with iron hoops shrunk around them. The cannon were breech-loaders in that powder and shot was normally loaded into a separate chamber, placed at one end. The chamber and tube were not capable of sustaining high pressures and so the powder charge had to be weak. As

⁷Carlo Cipolla, Guns and Sails in the Early Phase of European Expansion 1400-1700 (London, 1965), pp. 21-2, fn. 2. While a cannon refers specifically to a type of muzzle-loading gun, distinguished by heavy metal in relation to calibre, firing a shot of 30-50 lbs, the term is used here and in the following pages to denote a large gun, supported by carriage. N.A.M. Rodger, The Safeguard of the Sea: A Naval History of Britain i 660-1649 (London, 1997), p. 591; Jan Glete, Navies and Nations: Warships, Navies and State Building in Europe and America 1500-1860 i (Stockholm, 1993), p. 24.

⁸Carlo Cipolla, Guns and Sails, pp. 23, 75.

⁹Ibid., p. 23.

¹⁰N.A.M. Rodger, 'The Development of Broadside Gunnery, 1450-1650', Mariner's Mirror lxxxii, no. 3 (1996), p. 302; Jan Glete, Navies and Nations, p. 24. Cipolla claimed that 'guns in Tournai were aboard the ships that Louis de Male sent to attack Antwerp in 1336.' Carlo Cipolla, Guns and Sails, p. 75.

a result they fired stone shot, which is less dense than iron, and their range was short.¹¹

The traditional method of naval warfare with cannon had been to sail alongside an enemy ship, fire on the enemy's decks in order to stun the enemy and blind him with smoke, rather than to kill him, and then mount the ship for hand-to-hand combat.¹²

Bronze, commonly referred to then as brass, began to be cast into cannon as early as 1326 on the continent and in England, during the reign of Henry VIII. Bronze had been cast as church bells for centuries and it was a pretty simple matter for bellfounders to begin casting the raw material into cannon instead. Iron was technically more difficult to cast than bronze as the iron was more liable to fracture. Bronze cannon as well were less subject to corrosion, were lighter than iron and were thick enough to withstand higher pressures from larger powder charges. When the bronze cannon did fail they tended to split rather than dangerously explode as iron cannon under pressure tended to do. As a result they could fire cheap iron balls with high velocity and force. Because they were cast it was possible to design them to load from the muzzle, a more practical way of loading because the chambers of the breech-loaders had a tendency to fail under pressure.¹³ Although bronze was more expensive than iron, the forged iron cannon was more labour-intensive, and so there was little price differential.¹⁴ By 1529 English gunfounders John and Robert Owen were casting them for the Crown and within 20 years

¹¹N.A.M. Rodger, The Safeguard of the Sea, p. 206.

¹²N.A.M. Rodger, 'The Development of Broadside Gunnery', p. 302.

¹³Jan Glete, Navies and Nations, p. 24.

¹⁴Carlo Cipolla, Guns and Sails, p. 24.

few of these 'brass' cannon were still being imported.¹⁵ Bronze cannon remained the main armament of the Royal Navy up to the latter half of the seventeenth century and most heavy cannon were made of bronze.¹⁶

Further developments in the manufacture of iron cannon led to the production of cast iron muzzle-loaders, occurring first in England. The earliest pieces, cast around 1508, were of doubtful quality.¹⁷ When in 1543 war with France was fast approaching, Henry VIII enlisted the services of the French gunfounder Pierre Baude, 'the best founder of bronze guns in the King's service', the King's 'gunstone maker' William Levett and an ironmaster, Ralph Hogg, to cast iron into cannon.¹⁸ Although iron was still more fallible than brass, it was now substantially cheaper by one-tenth to one-fifth and the raw material was easily available in England. The price more than made up for the disamenities. By the reign of Elizabeth small and medium-sized guns could be manufactured cheaply and in quantity. By 1573 eight furnaces in Sussex and one in Kent produced roughly 500-600 tons of cast guns and shot per year. Around 1600 that figure had risen to 800-1,000 tons.¹⁹ Cannon were no longer only possessed by the rich and powerful, but were available for use to the wider seafaring population, becoming very popular throughout

¹⁵N.A.M. Rodger, The Safeguard of the Sea, p. 213.

¹⁶Jan Glete, Navies and Nations, p. 25.

¹⁷David Loades claimed that the attempts to cast iron guns in this year were unsuccessful. David Loades, 'From the King's Ships to the Royal Navy', J.R. Hill (ed.) The Oxford Illustrated History of the Royal Navy (Oxford, 1995), p. 25. Cipolla suggested a later date of between 1509 and 1513. Carlo Cipolla, Guns and Sails, p. 37.

¹⁸N.A.M. Rodger, The Safeguard of the Sea, p. 213; Carlo Cipolla, Guns and Sails, p. 39.

¹⁹Carlo Cipolla, Guns and Sails, p. 39-40.

Europe.²⁰

The technical problems of employing large cannon at sea were solved first on galleys sailing in the Mediterranean.²¹ From the 1470s the Venetians began to mount a single, iron, breech-loading gun towards the bow of the vessel, a useful position when attacking. Others followed suit, and by the beginning of the sixteenth century these guns began to be replaced by the stronger, bronze, muzzle-loaders firing 30 to 60 pound balls or stone shot over ranges as long as 500 yards.²² In the 1520s the sliding carriage and two supplementary (and later four) light guns began to be employed. The addition of the heavy gun firing forward and at great range now gave the galleys an advantage in combat over the sailing ships, previously protected by their high freeboard and thick sides. As a result Henry VIII began to build galleys but they proved limited in range and seaworthiness, especially as a heavy gun mounted forward compromised stability.²³

The traditional northern sailing ship until the fifteenth century was built with one mast and carried one square sail. The fully-rigged three-masted sailing ship, developed on the Iberian peninsula, had then spread north to become by 1500 the most important sailing vessel in the Atlantic.²⁴ The sail plan was normally based on six sails: the spritsail,

²⁰The casting of the large ones was only accomplished in the seventeenth century. N.A.M. Rodger, The Safeguard of the Sea, p. 214.

²¹Galleys were a type of warship employing oars. N.A.M. Rodger, The Safeguard of the Sea, p. 596.

²²Geoffrey Parker, 'The Dreadnought Revolution of Tudor England' Mariner's Mirror lxxxii, no. 3 (1996) p. 270; N.A.M. Rodger, The Safeguard of the Sea, p. 208.

²³N.A.M. Rodger, 'The Development of Broadside Gunnery', p. 302.

²⁴Geoffrey Parker, 'The Dreadnought Revolution', p. 270.

foresail, fore-topsail, main sail, main-topsail, and mizzen.²⁵ The earlier type of vessels were quick but the high rig required many skilled sailors to manage.²⁶ The addition of fore and aft rigs meant the ships could sail closer to the wind and the sails could be handled from the deck by less experienced sailors where it was safer, particularly in cold conditions.²⁷ Jan Glete thought this ship design was ‘one of the great innovations of the second millennium after Christ.’²⁸ During this period three masts and square sails was essentially the only rig for warships down to 100 tons or less, thereby increasing the demand for sailcloth.²⁹

These ships, particularly the carrack with a large superstructure fore and aft, while strong enough to withstand the recoil of cannon, were not designed for carrying one in the bow for forward firing.³⁰ As large guns could only be safely mounted on the lower decks, after 1500 a pair of large, long guns, or stern chasers, began to be mounted aft through hinged gunports cut into the hulls.³¹ The *Henry Grace à Dieu* carried two of

²⁵G.J. Marcus, A Naval History of England vol. 1: The Formative Centuries (London, 1961), p. 57.

²⁶Ibid.

²⁷Jan Glete, Navies and Nations, p. 43.

²⁸Ibid., p. 42.

²⁹Ibid., p. 43.

³⁰The carrack was a large ocean-going merchantman of the fifteenth and sixteenth centuries. N.A.M. Rodger, The Safeguard of the Sea, p. 592.

³¹Geoffrey Parker, ‘The Dreadnought Revolution’, p. 270; N.A.M. Rodger, ‘The Development of Broadside Gunnery’, pp. 303-4.

these forged iron breech-loading stern chasers.³² By the 1530s the cannon were mounted on compact, four-wheeled truck carriages, making it possible to extend the muzzle of the gun further out of the gun ports, reload more efficiently and aim more accurately than was possible with the traditional two-wheeled field-type of carriage.³³

Shortly after stern-chasers began to be employed, other guns began to be mounted in ports on the broadside, aimed to fire towards the fore or aft, until by at least the 1540s large ships had a complete line of gunports.³⁴ By this date, then, large sailing warships were heavily armed. It was still not possible, however, to fire guns directly forward for the broadside guns, aimed to the fore, left a blind arc to the immediate front.³⁵

The weight of the guns made for poor manoeuvrability, however, and beginning in mid century a ship known as the galleon was developed more or less simultaneously in England, Scotland, Portugal, France, Denmark and elsewhere which combined ability to manoeuvre with speed and firepower.³⁶ These ships were designed to unite the forepart of the galley and the afterpart of the sailing ship so that guns could be mounted to the fore. It seems that two guns were placed on each of the two gundecks as bow and stern-

³²N.A.M. Rodger, 'The Development of Broadside Gunnery', p. 304.

³³Geoffrey Parker, The Military Revolution: Military Innovation and the Rise of the West, 1500-1800 (Cambridge, 1988), pp. 93-5. For historians supporting the argument regarding the change in ship type see *Ibid.*, p. 192, fn. 31.

³⁴N.A.M. Rodger, 'The Development of Broadside Gunnery', pp. 304.

³⁵N.A.M. Rodger, The Safeguard of the Sea, p. 209.

³⁶For this date see N.A.M. Rodger, 'The Development of Broadside Gunnery', p. 305. Geoffrey Parker argued that the first of these sailing battleships was the 700-ton Dreadnought, launched in 1573 with 31 tons of ordnance. Geoffrey Parker, 'The Dreadnought Revolution', p. 270. N.A.M. Rodger, The Safeguard of the Sea, p. 212.

chasers and the rest were located on the broadsides.³⁷ The ships were slimmer, the forecastle had been reduced to accommodate the two guns in the bow and the gundecks were longer, thus facilitating more weight on the broadside.³⁸ The larger ships carried two additional heavy guns on the gun deck below and frequently had four masts.³⁹ The normal sail plan included a square spritsail under the bowsprit, square foresail and topsail, square mainsail and main topsail, and main and bonaventure mizzen.⁴⁰ The ships required, as well, fewer crew members.⁴¹

There was, finally, a fast ship with powerful guns firing forward. According to Cipolla:

‘those who adopted and perfected the new type of vessel most quickly and got the best out of it were eventually the English and the Dutch.’⁴²

N.A.M. Rodger argued that:

‘it was clearly this advance which inspired and permitted the English building-programme of the 1570s and it was ships built or rebuilt in this style which formed the principal strength of the English fleet in 1588.’⁴³

³⁷Geoffrey Parker, ‘The Dreadnought Revolution’, p. 272.

³⁸N.A.M. Rodger, ‘The Development of Broadside Gunnery’, p. 306.

³⁹Geoffrey Parker, ‘The Dreadnought Revolution’, p. 270.

⁴⁰G.J. Marcus, A Naval History of England, p. 57.

⁴¹Geoffrey Parker, The Military Revolution, p. 93.

⁴²Carlo Cipolla, Guns and Sails, pp. 83-4.

⁴³N.A.M. Rodger, ‘The Development of Broadside Gunnery’, p. 306.

By 1588 two-thirds of the English Navy had been built or were converted to galleons.⁴⁴

The tactics of naval warfare improved to take advantage of firepower from fore, aft and broadside by firing all of the guns in succession. First the prow guns were fired, and once parallel to the ship being attacked, the broadsides were fired, then the stern-chasers. The ship then bore off to the other tack to fire the other broadside. It finally withdrew to reload. With the fleet organized into squadrons in line-ahead formation, the enemy could be kept under almost continuous bombardment.⁴⁵ While more commonly ships had been used to transport troops for land combat, these developments meant that battles could now be fought and won at sea.

Ships continued to be used to transport troops and supplies for combat on land, of course. The advent of gunpowder changed the way battles were fought here as well. The much loved English longbow was not officially discarded in the field as an English weapon until 1595 when the Privy Council issued an order that it would no longer pass as a competent weapon for any man enrolled in the regular trained bands of any shire.⁴⁶ Arquebuses, calivers and the newer, more modern muskets were now the hand weapons, personal weapons and field weapons of choice. As well, Swedish engineers developed a light, movable cannon that could be carted about on the battlefield. The change in

⁴⁴Geoffrey Parker, The Military Revolution, pp. 93-5. For historians supporting the argument regarding the change in ship type see *Ibid.*, p. 192, fn. 31.

⁴⁵N.A.M. Rodger, 'The Development of Broadside Gunnery', p. 309.

⁴⁶Carlo Cipolla, Guns and Sails, p. 36; Charles Oman, The Art of War in the Sixteenth Century (London, 1937), pp. 381-2. For contemporary debates on the pros and cons of the bow see Charles Oman, The Art of War, pp. 382-4.

weapons also led to changes in military formations and tactics.⁴⁷

The alterations in the methods of warfare outlined above demonstrate that not only were the English justified in having an interest in gunpowder, sailcloth and cordage for purposes of national defence, but a greater interest than they may have had a century before. The changes were important enough to be coined a 'revolution' by Michael Roberts in 1956.⁴⁸ He envisioned four important developments in the art of war. First was a 'revolution in tactics', when the lance and pike were replaced by the arrow and musket. Along with this was an increase in the size of armies, by ten times in several states. As well, military strategies became more ambitious and complex. Finally, the military revolution meant that war made a greater impact on society as they became more expensive, inflicted more damage and created more of a burden on administrations. To facilitate these military developments there was a major growth in state bureaucracy, state finance and state intervention in the economy and society.

Robert's thesis initiated a debate with the first real challenge coming in 1976 from Geoffrey Parker in 'The "Military Revolution", 1560-1660 - A Myth?'.⁴⁹ Parker argued

⁴⁷It is beyond the scope of the thesis to discuss them here but they have been covered elsewhere. See, for example, Geoffrey Parker, The Military Revolution, ad. passim.

⁴⁸Republished as M. Roberts, 'The Military Revolution, 1560-1660', C.J. Rogers (ed.), The Military Revolution Debate: Readings on the Military Transformation of Early Modern Europe (Oxford, 1995), pp.13-35. Weston F. Cook, Jr., The Hundred Years War for Morocco: Gunpowder and the Military Revolution in the Early Modern Muslim World (Boulder, 1994), p. 8. Cipolla claimed that 'within Europe herself, supremacy was gained by those nations which shifted more completely to guns and sails.' Carlo Cipolla, Guns and Sails, p. 89.

⁴⁹G. Parker, 'The "Military Revolution", 1560-1660 - A Myth?' Journal of Modern History xlviii, no. 5 (1976) pp. 195-214 and reprinted in C. J. Rogers (ed.), The Military Revolution Debate, pp. 37-49.

that a revolution had occurred earlier in Europe - from the late fifteenth century, and that developments in artillery effectiveness led to the Italian creation of an artillery fortress less vulnerable to bombardment. Large armies were then needed to conduct the sieges which in turn required governments to revolutionize their financial administrations. His ideas were expanded in The Military Revolution: Military Innovation and the Rise of the West, 1500-1800 to include the naval sphere as well.⁵⁰ In it he argued that:

‘a revolution in naval warfare occurred in early modern Europe which was no less important than that by land, for it opened the way to the exercise of European hegemony over most of the world’s oceans for much of the modern period.’⁵¹

It was the control of strategically important waters, he argued, that decided the balance of power both in Europe and beyond. The important element was the adoption of guns, ‘which the West used at sea with ruthless skill to control or destroy all its maritime rivals...’⁵² He claimed that as a result of the implementation of these developments in England, the Elizabethan Navy, while not the largest in Europe, was the strongest.⁵³

Other contributions to the debate followed. In 1993 Jan Glete, while in general

⁵⁰Geoffrey Parker, The Military Revolution.

⁵¹Ibid., p. 83.

⁵²Ibid.

⁵³In 1588 Elizabeth possessed 18 capital ships, while Philip II of Spain possessed 21. Philip’s ships, however, belonged to three distinct classes - galleons, guardships and Neapolitan galleasses - and they had never before performed together. Parker argued that England’s success over Spain in 1588 was the result of four factors: "the ‘race built’ design of the Queen’s ships (and a few others); the remarkable concentration of heavy guns aboard the principal ships; the ability to fire those big guns with great speed and effect; and the Crown’s sustained financial commitment to the fleet." Geoffrey Parker, ‘The Dreadnought Revolution’, pp. 273, 286.

agreement with Roberts's work, instead called the process a 'state building activity with the monopolization of violence as a crucial phenomenon.'⁵⁴ This phenomenon included technical innovations such as gunpowder, guns and gun-carrying ships, organizational changes and the rise in administrative bureaucracies. The latter is used in the sense that military officers feel loyalty towards the state and the aims pursued by the state. Their own political views were not supposed to interfere with their professional duties and they were not supposed to use the power of the state to promote their own goals. The process, he added, took centuries.⁵⁵

'If the first phase in the establishment of a state monopoly on armed forces may be termed the "gunpowder revolution", the second may with equal right be called the "bureaucratic revolution."⁵⁶

Jeremy Black argued in 1995 that there was not one military revolution but two in early modern Europe, spanning the years from c. 1470 - 1530 and 1660-1720, and a further one at the end of the *ancien régime*, from c. 1792-1815. He claimed that many of the organizational and technological developments of Robert's and Parker's thesis were not unique to Europe or to the years covered by their revolutions. Changes, as well, took decades and so he questioned whether the word 'revolution' was, in fact, correct.⁵⁷

Cliff Rogers entered the debate with the argument that the really important changes took place earlier, during the Hundred Years War between France and England, 1337-

⁵⁴Jan Glete, Navies and Nations, p. 7.

⁵⁵Ibid., p. 12.

⁵⁶Ibid., p. 8.

⁵⁷Jeremy Black, 'A Military Revolution?' in C.J. Rogers (ed.), The Military Revolution Debate, pp. 110, 111.

1453. His analysis focused on the 'Infantry Revolution' of 1300-1360 and the 'Artillery Revolution' of 1420-1460.⁵⁸ In the light of so many identified revolutions, Rogers developed his theory of 'punctuated equilibrium evolution' - there was a series of revolutions, each one attempting to rectify the imbalance created by the previous revolution. Each revolution, then, not only broke with past practice, but made an impact on future developments. Rodger argued that the series of developments in ships was not a 'simple historical "revolution"' but rather a 'long and complex process of interconnected changes, in the course of which the design of warships and merchantmen parted company.'⁵⁹

The debate had developed to question if, or to what degree, England had participated in the 'Military Revolution' by 1660. Some countries were able to meet the challenge posed by the 'revolution' by increasing the power and wealth of the central state at the expense of traditional liberties by eliminating or reducing the input from representative institutions and creating a powerful, centralized 'absolute' monarchy.⁶⁰ Other countries were not able to make the transition and were absorbed by their more powerful neighbours. It has been argued that England was one of the failures, but was saved from destruction by the difficulties inherent in invading an island nation and because the big

⁵⁸Cliff Rogers, 'Military Revolutions of the Hundred Years' War', C.J. Rogers, The Military Revolution Debate, p. 56.

⁵⁹N.A.M. Rodger, 'Guns and Sails in the First Phase of English Colonization, 1500-1650', Nicholas Canny (ed.), The Oxford History of the British Empire, Vol. 1, The Origins of Empire: British Overseas Enterprise to the Close of the Seventeenth Century (Oxford, 1998), p. 80.

⁶⁰N.A.M. Rodger, The Safeguard of the Sea, pp. 430-31.

powers were busy elsewhere.⁶¹

Rodger argued that a sixteenth century 'naval revolution' did take place in England.⁶² While the new armies cost a lot of money, navies were much more expensive and required more long-term planning and commitment.⁶³ The development of a strong navy required the support, the political participation, the integration and the commitment of the segments of the population indispensable to sea power - ship owners, seafarers, merchants, financiers, industrial investors and skilled craftsmen - 'all classes, in short, which absolutist government least represented and least favoured.'⁶⁴ Navies needed consensus as to the nature of a fleet, its goals and the methods of raising money to support it. However, he added, the consensus in England was not continuous during the seventeenth century. While the naval administration, discipline, professional skills, ships and weapons of the 1630s was as successful as Elizabeth's Navy, it lacked national support which 'helped to fracture the country and lead to civil war and the collapse of the regime.'⁶⁵

John Brewer argued that England was not a participant. England was not a world power between 1453 and 1689 because active engagement was limited to occasional overseas expeditions, to naval warfare and to Civil War. He does not seem to consider

⁶¹Ibid., p. 431.

⁶²Ibid.

⁶³Ibid.

⁶⁴Ibid., p. 432.

⁶⁵Ibid., p. 433.

naval developments as relevant to the debate.⁶⁶

James Scott Wheeler disagreed, believing that although Elizabeth did not possess a professional military force in peacetime, her military efforts and policies accomplished more than Brewer believed. Quoting Parker, he argued that the Royal Navy had been developed 'into the strongest maritime force in the Narrow and North Seas and "the most powerful battlefleet afloat anywhere in the world."' ⁶⁷ Many of the tactical and technical advances of the Military Revolution came to England during the late sixteenth century war with Spain. The Tudors developed the naval dockyards, created a permanent administration, the Navy Board, and 'adopted purpose-built warships as the core of the fighting fleet.' The English militia and expeditionary forces were armed, organized and commanded according to the latest continental practice.⁶⁸ However, he argued that the most important aspects of the Military Revolution in early modern Europe were its effects on the development of state finance and administration and these only changed dramatically during the 1640s and 1650s.⁶⁹

An essential element of the 'Military Revolution' was the ability of the state to raise large sums of money for long periods of time in order to wage prolonged warfare and

⁶⁶John Brewer, Sinews of Power: War, Money and the English State, 1688-1783 (New York, 1989), p. 7.

⁶⁷James Scott Wheeler, The Making of a World Power: War and the Military Revolution in Seventeenth Century England (Gloucestershire, 1999), p. 11.

⁶⁸Ibid.

⁶⁹Ibid., p. 53.

England during this period was not able to do this.⁷⁰ The system of Crown financing was essentially that the King was expected to 'live of his own' during times of peace. The realm was an estate and, like other landowners, the King was expected to spend no more than he collected.⁷¹ The income was derived primarily from rents, customs and various feudal dues. During periods of exceptional need - normally war - additional money was obtained primarily from the sale of land, from forced loans and from grants of parliamentary taxation. The fifteenth and tenth was a medieval tax charged on moveable property, while subsidies were assessed on movables and land. The fifteenth and tenth was a fixed amount and two were granted with each subsidy. Land assessments, however, tended to be well below actual values and their yields were declining during this

⁷⁰For an analysis of the fiscal capacity of the English state to compete and defend itself, based on Crown revenues as shares of national income, see Patrick K. O'Brien and Philip A. Hunt, 'The Rise of a Fiscal State in England, 1485-1815', Historical Research: The Bulletin of the Institute of Historical Research lxvi, no. 160 (1993). O'Brien and Hunt argued that 'no enduring revolution or long-term enhancement in the fiscal capacity of the English state occurred until after the Civil War.' Ibid., p. 154. The Tudor and Stuart monarchs prior to Charles II were unsuccessful in generating sufficient income through direct taxation and so revenue at that time represented a particularly low proportion of national output. The Crown's ability to regulate and defend the realm as a result declined over the sixteenth and for much of the seventeenth centuries. Ibid., p. 160. For additional analysis of this argument see Michael J. Braddick, The Nerves of State: Taxation and the Financing of the English State, 1558-1714 (Manchester, 1996), Chap. One and pp. 27-34. Braddick argued that 'The accumulating deficits of the early Stuart period, caused by inflation in civil expenditures, weakened the capacity of government to respond to these shocks, but even without that inflation the shocks would have been severe.' Ibid., p. 28. See, as well, H.V. Bowen, War and British Society 1688-1815 (Cambridge, 1998), pp. 20-33. Bowen, while discussing this debate, does not venture into the period before the Civil War.

⁷¹F. Dietz, English Public Finance, 1485-1641 ii (New York, 1964), pp. vii-viii and Chapter One.

period in both real and monetary terms.⁷² Parliament may have supported a war or even encouraged the King to go to war, but it did not always willingly provide the funds.⁷³ These financial constraints would seem to suggest that the Crown would be attracted to sources of cordage, sailcloth and gunpowder that promised savings.

The difficulties involved in attempting to finance a Navy during peacetime as well as in war are well documented in the literature.⁷⁴ Wheeler claimed that lack of money caused most of the logistical problems in the Elizabethan Navy and that as a result Elizabeth did everything as cheaply as possible. She 'was notorious for not feeding her crews properly and for not paying them...'⁷⁵ Her reluctance to spend money has even been described as 'pathological.'⁷⁶ Elizabeth depended to a great extent on the active participation of private interests in maritime warfare. It was, as well, cheaper and more expedient to hire armed merchantmen and private warships in times of emergency rather than maintain a large Navy.⁷⁷ Jan Glete thought the sixteenth and seventeenth century

⁷²David Dean, Law-Making and Society in Late Elizabethan England: the Parliament of England, 1584-1601 (Cambridge, 1996), pp. 34, 38-40; D.C. Coleman, The Economy of England, p. 191.

⁷³Wheeler argued that the members of the Parliaments 'refused to accept the responsibility for raising the money needed to support modern military forces.' James Scott Wheeler, The Making of a World Power, p. vi.

⁷⁴Michael Duffy, 'The Foundations of British Naval Power', Michael Duffy (ed.), The Military Revolution and the State 1500-1800, p. 49; James Scott Wheeler, The Making of a World Power, pp. 23-4.

⁷⁵James Scott Wheeler, The Making of a World Power, pp. 23-4.

⁷⁶David Loades, 'From the King's Ships', p. 51.

⁷⁷Michael Duffy, 'The Foundations of British Naval Power', p. 49.

state navies were small because the states could not afford to keep a huge fleet in readiness during periods of peace. Therefore, they had to rely on hiring or requisitioning merchantmen.⁷⁸

The strongest criticism of naval finance was reserved for the early Stuarts because while a shortage of money remains the dominant theme, it was felt that negligence was also a factor. ‘The early Stuarts never cared for their navy the way the Tudors did.’⁷⁹ James disbanded the fleet upon the conclusion of the war with Spain and Ireland and thereafter, it is argued, naval preparedness fell into sharp decline. Wheeler thought that ‘the Jacobean state could have afforded a properly maintained navy, but James chose not to spend enough of his income and personal time for that purpose.’⁸⁰

The second reason this period is being examined is that the average size and the total number of ships owned by Englishmen was increasing. While no figures are extant to allow concrete calculations of totals, the evidence suggests that more ships were available in each of the major spheres of maritime shipping: the coastal coal trade, the fisheries, overseas trade and the Royal Navy.⁸¹ The domestic production of particularly cordage and sailcloth, then, would have become increasingly important to the economy by generating employment and reducing imports, thus contributing to a positive balance of payments.

⁷⁸Jan Glete, Navies and Nations, p. 51.

⁷⁹David Loades, ‘From the King’s Ships’, p. 55.

⁸⁰James Scott Wheeler, The Making of a World Power, p. 28.

⁸¹Chapter Two, below, will describe this more fully and will demonstrate that the numbers of ships were increasing within these spheres.

Thirdly, the industries producing munitions were either new to England or were contributing an increasing proportion of goods to total supply in this country during this period. The development of these industries in England also affected the development of the corresponding raw materials industries. Fourthly, the Civil War ushered in a new form of government, when Parliament played a more active role in decision making. Finally, the period following the Civil War is perhaps better known for being a time of innovation and improvement in existing industries, rather than creation.

IV

The concept of mercantilism was developed by historians who, regardless of the role they felt the Crown should play within the economy, tended to support the notion that the Crown either should, or did, encourage the domestic production of munitions. Historians have since questioned the validity of the model on several points but continue, when addressing the development of the munitions industries, to stress the positive role played by the Crown. They argue that Crown interest was stimulated by concerns for national security rather than fiscal constraints, and suggest that deliberately chosen policies were enforced. At the same time, historians concede that the government made some initial efforts to establish consumer goods industries early in the reign of Elizabeth but thereafter support is thought to have been negligible. Fiscalism is thought to play a role here but not in relation to the munitions industries. This thesis will demonstrate that, on the contrary, the development of the munitions industries more closely follows the model

created for the consumer goods industries. There was no long-term policy, and fiscalism was of such great importance that directives were often not in the best interests of the domestic industry.

The following literature survey will present these debates, beginning with the creation and subsequent development of the model of mercantilism. This model makes a useful framework for examining the literature that appraises the role of the Crown within the economy as a whole. Following this is a discussion of the literature that examines and criticizes the model and the debates surrounding policy and fiscalism. The survey will then examine the literature that addresses specifically national security and the munitions industries. Finally, the debate surrounding the effectiveness of the Crown to successfully implement its directives will be discussed. While most aspects of mercantilism have at some point been countered, the prominent role assigned by the model to the Crown in the import substitution of munitions has seldom been challenged. This thesis will seek to do just that.

The literature on the subject can be said to originate with Adam Smith and then follows the full course of economic history as it developed in England from the end of the nineteenth century. Smith wrote Book Four of An Inquiry into the Nature and Causes of the Wealth of Nations in 1776 in order to discredit the current policy of direct government regulation of the economy. Smith called this the 'mercantile system'. While he saw this system as prevailing from the end of the seventeenth century, economists, historians and economic historians, writing more than a century later, expanded the concept to include a broader definition of the system. They also extended it backward

in time through to the Tudor period and beyond. The evolution of the mercantilist model was essentially finished by the 1930s and its validity has been debated ever since.

Smith wrote during a period when government control of economic policy was increasingly coming under attack. The prevailing doctrine of economic theory and government policy during his time was that national wealth lay in bullion - gold and silver. An increase of wealth could be attained by a favourable balance of trade, where the value of exports was greater than imports. It was thought that government should regulate trade in order to achieve this favourable balance. This could be done through the implementation of a system of tariffs and subsidies. Colonial markets were treated as sources of vital raw materials and as markets for English manufactures. Smith called these policies the mercantile system of political economy because they insulated merchants from the effects of open competition. He argued that the mercantilists wrongly confused money with wealth and the favourable balance of trade with an annual balance of income over consumption. The real wealth of a country lay in its consumable goods and in the labour which produces them.⁸² He did not, however, claim that the government should never interfere with the workings of the economy. He identified two cases when domestic industry should be supported at the expense of foreign. The first was 'when some particular sort of industry is necessary for the defence of the country.'⁸³

'If any particular manufacture was necessary, for the defence of the society, it might not always be prudent to depend upon our neighbours for

⁸²Adam Smith, The Wealth of Nations (London, 1991 edition), pp. xvii-iii, introduction by D.D. Raphael.

⁸³Ibid., p. 406. The second refers to taxing goods. p. 408.

the supply.’⁸⁴

The argument for free trade was successful and became the political philosophy of the time.

This view was left relatively untouched for a century, when again changing economic conditions reactivated interest and further interpretations of mercantilism and early modern economic history took place. Germany’s wealth and power were growing with substantial government protection towards the end of the nineteenth century, and the challenge to British economic supremacy forced a re-think of the value of laissez-faire economics.⁸⁵ The first important redefinition of mercantilism occurred in 1884 when the German Gustav Schmoller wrote The Mercantile System. He used the term to mean direct government involvement in the economy in order to establish a strong nation-state.⁸⁶ Following him was William Cunningham, a founder of economic history in England.⁸⁷ Cunningham’s interpretation of the mercantilist system was to have important repercussions in the field of economic history and on the role of the government in the development of the munitions industries as well.

Cunningham redefined the model in 1919 to portray mercantilism as a policy of

⁸⁴Quoted in Eli F. Heckscher, Mercantilism ii (London, 1935), p. 16.

⁸⁵D.C. Coleman, ‘Eli Heckscher and the Idea of Mercantilism’, The Scandinavian Economic History Review v (1957) No. 1, p. 5.

⁸⁶Gustav Schmoller, The Mercantile System and Its Historical Significance (London, reprinted 1914), pp. 50-1.

⁸⁷D.M. Palliser, The Age of Elizabeth: England Under the Later Tudors 1547-1603 (London, 1992), p. 373.

power in Growth of English Industry and Commerce.⁸⁸ He argued that the ideas it espoused were new to England during the reigns of the Tudors. According to Cunningham the mercantile system aimed not only at securing plenty of foreign products, but also tended to increase the power of the realm.⁸⁹ The convenience of producers and the comfort and tastes of consumers were subordinated to promote the political power of the realm. This, he argued, was the aim which dominated English economic policy for centuries.

‘The mercantile system, as completely thought out, rested on the principle, not of fostering industry and commerce for their own sakes, but of trying to guide them into such directions that they should subserve the political power of the realm...An island realm can only be strong either for defence or offence when it is a naval power; and hence, the development of our shipping and the encouragement of our commerce gradually came to be the most prominent features in the economic policy of the realm.’⁹⁰

He argued that three elements were important in creating political strength. First, sufficient food must be available to maintain the population from which soldiers and sailors are drawn. Secondly, a sufficient supply of money or treasure must be available to meet any emergency. Because England has no mines of gold or silver this, he argued, could only be achieved through the careful regulation of industry and trade. If England developed her industries then fewer goods would be imported, leading to a favourable balance of trade. If goods of less value were imported than exported, the balance of

⁸⁸W. Cunningham, The Growth of English Industry and Commerce in Modern Times: the Mercantile System 2/1 (Cambridge, 1919).

⁸⁹W. Cunningham and Ellen A. McArthur, Outlines of English Industrial History (Cambridge, 1898), pp. 79-80.

⁹⁰Ibid., p. 80.

imports would have to be made up in bullion. Industry, as well, was a source of national wealth and a prosperous nation would be able to provide a 'fund' of money which could be extracted when necessary for the defence of the realm.⁹¹

Thirdly, it was necessary to develop shipping and its subsidiary employments.⁹² This included 'the training of seamen, the development of shipbuilding and the providing of materials and naval stores.'⁹³ For naval stores he mentioned the promotion of flax and hemp cultivation, the manufacture of canvas and the iron trade.⁹⁴ 'In the regulation of industry, as on all other sides of economic life, the promotion of national power was a paramount consideration.'⁹⁵ He claimed that:

'Burghley was actively interested in reviving or re-introducing metallurgical industries and in working up useful metals, especially those which were necessary for providing ordnance and munitions.'⁹⁶

The next important work on the subject, Mercantilism, was written by the Swedish economist Eli Heckscher in 1931 and published in English four years later. He expanded the concept of mercantilism to include five characteristics: the desire for unification, the pursuit of power as an end, protectionism, a monetary theory linked with the balance of trade and a concept of society. Heckscher believed that government policy worked

⁹¹Ibid., p. 130.

⁹²Ibid., p. 81.

⁹³Ibid., p. 124.

⁹⁴Ibid., p. 126; W. Cunningham, The Growth of English Industry, p. 65.

⁹⁵W. Cunningham and Ellen A. McArthur, Outlines, p. 89.

⁹⁶W. Cunningham, The Progress of Capitalism in England (Cambridge, 1916), p. 87.

independently of the economic environment and so was not influenced by short-term disruptions to the economy. Like Smith and Cunningham before him, he argued that the pursuit of power was the first interest of the state. He claimed that as the state has the final word on the exercise of force in society, the state's first interest must, therefore, be power. Mercantilist ideas would have all economic activity subservient to the state's interest in power.⁹⁷ He approved of the view that goods necessary for the defence of the nation should be produced domestically.⁹⁸

While Smith, Cunningham and Heckscher may have approached the concept from quite different viewpoints, they were in agreement as to the importance accorded by the state to the pursuit of power and the resulting need for munitions with which to assert that power.⁹⁹ They had, however, opened fertile grounds for others to ponder, and ponder they did. Opposing voices were raised upon the publication of Cunningham's ideas and again, with increased vigour, upon the arrival in English of Heckscher's work. The model had been defined differently a number of times, and as a result economic historians have been free to approach it as either a model of economic thought, or as a model of economic policy. Mercantilism had become 'a chameleon - like creature able to change its colour to match the hue of any argument' and 'as difficult to abolish as sin.'¹⁰⁰

⁹⁷Eli F. Heckscher, Mercantilism ii, p. 15.

⁹⁸Ibid., pp. 32-33.

⁹⁹Smith, however, thought power was a means to a different end, while Cunningham and Heckscher believed power was an end in itself.

¹⁰⁰L.A. Clarkson, The Pre-Industrial Economy, p. 159; Sir John Clapham, A Concise Economic History of Britain (Cambridge, 1949), p. 282.

Much of the attack has been directed at the concept of mercantilism as a model of long-term policy plans which were formulated independently of the economic environment. Economic historians now tend to argue that there was no coherent, long-term policy; directives were either a reaction to the economic environment or were promoted by vested interests. Paul Kennedy thought that there was no sustained national maritime policy, based on a coherent strategy of sea power, when the Navy was not yet distinct from the seaforges, in functions or in personnel, of the nation as a whole.¹⁰¹

Both Barry Supple and Christopher Clay argued that violent, short-run variations in the economy best explains the dynamic elements of policy.¹⁰² J.K. Fedorowicz thought that there was never any effort to intervene in the Baltic, or 'Eastland' trade, that the Crown was 'merely reacting to crisis rather than forestalling them.'¹⁰³ Although Clay argued that legislative activity can not be said to represent a coherent economic policy, he added that during the early years of Elizabeth's reign the government had a coherent program of economic and social measures which it wished to see enacted but this was blocked by opposition groups.¹⁰⁴ Peter Ramsey questioned whether the Tudor governments had an economic policy or even if they 'knew where they were going.'¹⁰⁵

¹⁰¹Paul M. Kennedy, The Rise and Fall of British Naval Mastery, p. 33.

¹⁰²Barry Supple, Commercial Crisis and Change, pp. 227-8; C.G.A. Clay, Economic Expansion and Social Change ii, p. 205.

¹⁰³J.K. Fedorowicz, England's Baltic Trade in the Early Seventeenth Century (Cambridge, 1980), p. 260.

¹⁰⁴C.G.A. Clay, Economic Expansion and Social Change ii, pp. 203, 204.

¹⁰⁵Peter Ramsey, Tudor Economic Problems (London, 1966), p. 165.

All the same, the majority of historians suggested that the government did have some vague, general aims and these are, in many ways, similar to the policies envisioned by the mercantilists. Supple identified government aims as relating to the maintenance of social order, public peace, national security and the achievement of economic prosperity ‘simply defined.’¹⁰⁶ In comparison, Donald Coleman identified these aims as meant to effect social stability, encourage and regulate the internal economy, encourage and regulate overseas trade and shipping, and raise revenue.¹⁰⁷ Ramsey argued that the dominant concerns of the Tudor governments were the maintenance of order, the waging of war, and the collection of money to make war possible.¹⁰⁸ Clay thought general aims were to make the country secure against external enemies, maintain order and tranquillity within the country and raise money in order to carry on government.¹⁰⁹ R.B. Wernham clearly thought Elizabeth subscribed to a foreign policy. Any government’s foreign policy is made up of day-to-day reactions to events, and the form the reaction takes is bound up in what the government thinks and feels are the nation’s essential interests. In time, these responses build up into a policy, even though the initial responses were not part of a greater plan. ‘It is only the very powerful or the very aggressive or the very doctrinaire who start out with a foreplanned policy.’¹¹⁰ Like the framers of the original model,

¹⁰⁶Barry Supple, Commercial Crisis and Change, p. 226.

¹⁰⁷D. C. Coleman, Economy of England, p. 173.

¹⁰⁸Peter Ramsey, Tudor Economic Problems, p. 165.

¹⁰⁹C.G.A. Clay, Economic Expansion, p. 206.

¹¹⁰R.B. Wernham, The Making of Elizabethan Foreign Policy, pp. 3-4.

these historians do not entirely agree on what exactly the aims were. The most frequently mentioned, however, tend to relate to fiscalism and to concerns for national security and these loosely correspond to Cunningham's second and third points, the supply of money and the development of shipping and related trades. When munitions are discussed it is normally in reference to the latter. It is argued in this thesis that fiscalism was an important force in the establishment of the munitions industries. Historians, however, do not commonly recognize the fiscal motive in relation to their development.

Mercantilist writers were keenly aware of the government's need for a ready supply of money. Gold and silver were the 'sinews of war'. It has already been seen that war was expensive, and was becoming more so during this period when prices were rising faster than incomes, wartime technology was changing to firepower and a growing Navy needed to be maintained. Without a ready supply of bullion with which to procure wartime materials a nation would be vulnerable to any aggressive neighbours. At the same time, Royal courts and, after Elizabeth, Royal families needed to be kept in a style appropriate to their positions. Mercantilist writers such as William Cunningham and Arnold Toynbee argued that policy was directed to enriching the entire country so that there would always be a ready supply of money which could be drawn upon when necessary. This could be done by encouraging trade and industry and protecting the native from foreign competition.¹¹¹

Historians tended to agree that there were numerous other ways in which the

¹¹¹See W. Cunningham and Ellen A. McArthur, Outlines, p. 130; Arnold Toynbee, Lectures on the Industrial Revolution in England (London, 1884), p. 76.

government directed the economy in order to enhance its income. Some historians saw this motive as being the dominant one.¹¹² George Unwin, writing in 1913, argued that mercantilism, rather than being a deliberate plan for promoting economic success, had its source ‘in the fiscal exigencies of short-sighted and impecunious governments.’¹¹³ G.N. Clark continued this trend of thought when he argued very pertinently, in 1947, that ‘in all their dealings with economic things the fiscal motive may be traced.’¹¹⁴ More recently and just as generally, L.A. Clarkson thought that the government’s need for money was a major factor in determining economic policy.¹¹⁵

The literature identifies the fiscal motive in relation to industrial development most frequently with the granting of patents of monopoly and the collection of customs duties. Mercantilist writers such as E. Lipson recognized the granting of monopolies as an attempt to free England from dependence on foreign supplies of goods and raw materials.¹¹⁶ Others generally recognized patents of monopoly as being a positive attempt to establish infant industries during the early part of the reign of Elizabeth, but towards the end it is almost universally recognized that fiscal concerns played a hand in

¹¹²See, as well, G. R. Elton, Studies in Tudor and Stuart Politics and Government: Papers and Reviews 1946-7 (Cambridge, 1974), p. 285.

¹¹³George Unwin, Studies in Economic History (London, 1966), p. lxiv.

¹¹⁴G.N. Clark, The Seventeenth Century (Oxford, 1947), p. 24.

¹¹⁵L. A. Clarkson, The Pre-Industrial Economy, p. 191.

¹¹⁶E. Lipson, A Planned Economy or Free Enterprise: the Lessons of History (London, 1944), pp. 39-40.

who would be awarded these grants.¹¹⁷ Monopoly grants and new projects have been described most thoroughly by William Price and Joan Thirsk.¹¹⁸

Price argued that during the early Tudor period the patents were ‘promises of protection’ to foreign artisans introducing new industries. He believed, however, that scandal was beginning to become apparent in the 1570s. The practice of reissuing patents for established industries had begun, he argued, and patents were no longer confined to new trades. The duration of the patents had been extended as well, from ten years to twenty or even thirty. By 1581-90, he added, abuses were more obvious.¹¹⁹ He recognized the fiscal motive behind the granting of monopolies although he argued that there were a number of other reasons, including the desire to encourage invention, the advancement of political power by means of the regulation of industry and the desire to reward servants and favourites. The desire to encourage invention, he added, although important, became less so as time went on. Price argued that the granting of patents was, as a rule, prompted by the monetary interest either of the Crown or of the patentee and the system, designed originally to foster new arts, became ‘degraded into a system of plunder.’¹²⁰ He did not believe, however, that the Crown profited much directly from

¹¹⁷See, as well, Sybil M. Jack, Trade and Industry in Tudor and Stuart England (London, 1977), p. 134.

¹¹⁸William Hyde Price, The English Patents of Monopoly (Cambridge, Mass., 1913) and Joan Thirsk, Economic Policy and Projects.

¹¹⁹William Price, The English Patents of Monopoly, p. 8.

¹²⁰*Ibid.*, pp. 14, 17.

it, but that patents were granted in lieu of salaries.¹²¹

Philip Lawson, writing about the East India Company, thought that monopolies appealed to the Crown because they ‘provided much-needed capital to a monarchy verging on bankruptcy.’ As well, monopolistic trading companies stimulated economic activity and enterprise when the economy was depressed.¹²² Ramsey argued as well that by 1601 grants of monopolies had become, for the government, a form of profit or pension awarded to royal servants.¹²³ Price had little to say regarding monopolies granted for munitions, except that the saltpetre licenses were ‘a constant source of popular resentment’ because the deputies dug for the raw material on private property.¹²⁴

Thirsk’s arguments were in essence similar to Price’s. She divided the period from 1540 to 1624 into two periods of projects - a constructive phase, during the first forty years when monopolies were new and projects proliferated, and a scandalous phase, divided into two periods of about twenty years apiece. During the constructive phase, she claimed, the government supported projects out of a desire to increase employment and improve the balance of trade.¹²⁵ She added that by the 1580s, a decade later than Price, the good intentions were waylaid by the Crown’s fiscal interests, by local authorities’ need

¹²¹Ibid., p. 16.

¹²²Philip Lawson, The East India Company (London, 1993), p. 15.

¹²³Peter Ramsey, Tudor Economic Problems, p. 156.

¹²⁴William Price, English Patents of Monopoly, p. 8.

¹²⁵She argued that Commonwealthmen were interested in promoting employment, and Cecil upheld the ideals of the Commonwealthmen. Joan Thirsk, Economic Policy and Projects, pp. 33, 34, 51.

to relieve the poor, and by private speculators whose motivation was a share of the profit.¹²⁶

Historians have suggested that grants of monopoly were necessary when the industry was capital intensive and start-up costs were so prohibitive as to discourage the entrepreneur without guarantees of protection from competition, foreign or domestic.¹²⁷ It is yet to be determined, however, whether cordage, sailcloth, hemp, gunpowder or saltpetre were in fact particularly expensive to produce or that large scale production was in fact necessary. Charles Wilson argued that the effects of a monopoly grant on an industry requiring one would serve to check, rather than expand, the area of large-scale enterprise.

‘If demand could barely justify one firm, let alone two, the effect of such a project was to create infant industries which, precocious as they might have been, would never achieve adulthood until the market situation justified it on purely economic grounds.’¹²⁸

It is important to note that it is not generally suggested that the motive for the granting of monopolies during the first few decades of the reign of Elizabeth, when the first gunpowder and saltpetre monopolies were awarded, was fiscal. It is argued that only during her final years and the reigns of James and Charles did the fiscal motive become important. Early Elizabethan patents were few and far between and were granted almost

¹²⁶*Ibid.*, p. 51.

¹²⁷No comprehensive discussion on this subject for this period has come to light. For discussions touching on this issue see C.G.A. Clay, Economic Expansion and Social Change ii, p. 215; E.E. Rich and Charles Wilson, (eds.), Cambridge Economic History of Europe, v, (Cambridge, 1977), p. 430.

¹²⁸E.E. Rich and Charles Wilson, (eds.), The Cambridge Economic History of England v, pp. 430-2.

entirely for new products. A fiscal motive, then, may have been less obvious than it was to be later when patents were granted to individuals without the technical know-how or for industries already established.

The collection of customs is also identified with the fiscal motive. Mercantilist ideas would suggest that customs duties were used to encourage industrial development and create a positive balance of trade. A more direct fiscal incentive for the collection of customs is now generally acknowledged. Ramsey and Wilson both argued that customs were a main source of revenue.¹²⁹ Ramsey argued as well that ‘the customs system was purely fiscal in aim and character.’¹³⁰ Clarkson recognized that commercial policy was not used to stimulate industrial development prior to the end of the seventeenth century. Instead, it had a more immediate fiscal expediency; duties from overseas trade were an important source of government funds. The government regulated overseas trade in order to raise revenue and not to ‘enrich the country.’¹³¹ While nothing has been said regarding commercial policy and munitions, it cannot be implied that historians would have argued a fiscal motive here as well.

Much of the income generated from various fiscal measures was spent on national security and this is the second general aim attributable to the Crown. Hence, historians have argued that there was a link between government revenue raising and national

¹²⁹Ramsey’s remark was in reference to the Tudor period. He claimed that another main source of revenue was direct taxes on land and movable goods. Peter Ramsey, Tudor Economic Problems, p. 167. Wilson was referring to the reign of Charles I. Charles Wilson, England’s Apprenticeship 1603 - 1763 (London, 1966), p. 97.

¹³⁰Peter Ramsey, Tudor Economic Problems, p. 184.

¹³¹L.A. Clarkson, The Pre-Industrial Economy, pp. 179-80.

security. Both those who argued that economic policy was proactive and those who argued that its aims were only general clearly believed that the Crown acted to protect itself and the country from threats both internal and external.

Internal threats may stem from riots occurring normally during periods of economic deprivation and from rebellions. Christopher Hill argued that Elizabethan economic policy, 'if policy is not too strong a word,' should be attributed to a fear of social disorder, especially from the lower classes.¹³² Historians attribute to the government a strong interest in providing the lower classes with employment as a means of fostering contentment. This sometimes involved encouraging the development of various types of industries. Products made from hemp, such as cordage and sailcloth, were particularly labour-intensive and so the literature tends to acknowledge their relevance to the employment debate.¹³³

England had much to fear from invasion by a foreign country in a world where dynastic ambitions, religious conflict and rivalries over trade provided the fuel for aggression. The Royal Navy during this period was dependent on the merchant marine for a supply of sailors and ships that could be commandeered when the need arose, and hence much Crown activity in the economic sphere is thought to have been aimed at developing native shipbuilding and guaranteeing an adequate supply of servicemen.¹³⁴

¹³²Christopher Hill, Reformation to Industrial Revolution: A Social and Economic History of Britain, 1530-1780 (London, 1967), p. 73.

¹³³See, for example, C.G.A. Clay, Economic Expansion and Social Change ii, pp. 213-4, 235, 245; Joan Thirsk, Economic Policy and Projects, pp. 160-1; Sybil Jack, Trade and Industry, p. 54; Nesta Evans, East Anglian Linen Industry, p. 68.

¹³⁴Paul M. Kennedy, The Rise and Fall of British Naval Mastery, p. 34.

Legislation was, therefore, passed in support of long-distance overseas trade, fishing and the preservation of native sources of timber.

The East India, Barbary, Eastland and Russia Companies imported the strategically necessary raw materials, saltpetre and hemp, and prior to import substitution, cordage and some of the sailcloth. But the literature does not suggest that the Crown supported them for this reason. While a number of reasons are provided for Crown interest in the East India Company, the fact that it supplied saltpetre is not one of them. K.N. Chaudhuri argued that 'the motives of the Crown in supporting the East India Company were not always consistent and its attitude to the company varied.'¹³⁵ It did, however, provide some assistance because the Company imported oriental commodities, paid customs, could be tapped for loans and promoted shipbuilding which the Crown could call upon when necessary.¹³⁶ In contrast, Lawson thought the Elizabethan government 'timid' because the mariners and merchants trading to the East Indies did not receive official encouragement like the Dutch received from their government.¹³⁷

Some saltpetre came from Morocco and there seems to be more interest in the literature in this. There is little indication that the Crown was interested in Morocco because it was a source of saltpetre. T.S. Willan suggested that while the Crown supported ventures to import saltpetre, the initiative rested with private individuals.¹³⁸

¹³⁵K.N. Chaudhuri, The English East India Company: The Study of an Early Joint-Stock Company 1600-1640 (London, 1965), pp. 29-30.

¹³⁶Ibid.

¹³⁷Philip Lawson, The East India Company, p. 11.

¹³⁸T.S. Willan, Studies in Elizabethan Foreign Trade (Manchester, 1959), pp. 163-4.

He added that Elizabeth's support for the Barbary Company, established in 1585, was secured when Leicester promised her that an agent would be stationed there, ultimately to act as ambassador, at no charge to her.¹³⁹ He suggested as well that Elizabeth's interest in Morocco and an agent was a result of her struggles with Spain and her interest in enlisting the Sharif's help in placing Don Antonio, whom she felt was rightful heir, on the throne of Portugal. The agent was to negotiate with Ahmad Al-Mansur, (Sharif 1578-1603) for aid.¹⁴⁰ Willan said nothing of any desire on the part of Elizabeth to establish the company in order to facilitate the import of saltpetre. Dahiru Yahya claimed that England was interested in an alliance with Morocco in the 1570s for strategic purposes in the face of declining relations with Spain.¹⁴¹

With one exception, there seems to be little indication in the literature that the Crown was interested in the Eastland or Russian trades because they were sources of hemp, cordage and some of the sailcloth. R.W.K. Hinton believed that prior to 1650 there were no shortages of naval stores and so the Crown was 'little troubled about their supply.' He argued that the Crown supported the Eastland merchants because they employed ships, thereby increasing the number of vessels available to the Crown during times of need.¹⁴² Henryk Zins believed that the employment of English ships was not an issue before 1620,

¹³⁹Ibid., p. 225.

¹⁴⁰Ibid., p. 183.

¹⁴¹Dahiru Yahya, Morocco in the Sixteenth Century: Problems and Patterns in African Foreign Policy (Harlow, 1981), p. 130.

¹⁴²R.W.K. Hinton, The Eastland Trade and the Common Weal in the Seventeenth Century (Cambridge, 1959), p. 61.

however, for the Eastland Company had before then made use of Dutch shipping, which was better adapted for the transport of heavy and bulky goods and cheaper as well.¹⁴³ Willan thought that the Russia explorations were undertaken in order to find new markets for English cloth and to find a northern route to the Indies for spices and gold.¹⁴⁴ Only Fedorowicz suggested that there was government interest in overseas supplies of munitions when he claimed that the Crown supported the origins of the Eastland Company because the Baltic supplied most of the hemp entering England.¹⁴⁵

Other defensive action attributed to the Crown included the development of the industries producing military equipment and stores, especially armaments. While historians agreed that the government acted to encourage the munitions industries, they tended to focus on the armaments aspect of munitions, rather than industries producing stores. This section will now examine the literature that discusses gunpowder, cordage and sailcloth and will explain why these particular industries were chosen for further research. The first industry to be examined is gunpowder and of the three industries, more has been written on this.

An increase in the number of guns during this period necessitated a corresponding increase in gunpowder. Many historians have something to say about this, although there is no detailed study for this period of the manufacture and supply of gunpowder for the

¹⁴³Henryk Zins, England and the Baltic in the Elizabethan Era (Manchester, 1972), p. 143.

¹⁴⁴T.S. Willan, The Early History of the Russia Company (Manchester, 1956), pp. 1-2.

¹⁴⁵J.K. Fedorowicz, England's Baltic Trade in the Early Seventeenth Century, p. 52.

Ordnance Office or of demand for the purposes of private trade.¹⁴⁶ Historians have pointed out that national security necessitated that England be free of dependence on foreign supplies of powder or saltpetre.¹⁴⁷ E. W. Bovill thought this dependence on overseas supplies was 'intolerable'.¹⁴⁸ Sybil Jack argued that 'the manufacture of gunpowder was one which had strategic rather than economic significance.'¹⁴⁹

Historians have focused their attention on the most important ingredient of gunpowder - saltpetre, which was a scarce and expensive ingredient and needed originally to be imported. They claimed that domestic production of gunpowder essentially had to wait until the English were taught how to make saltpetre in 1561.¹⁵⁰ The Crown is said to

¹⁴⁶Carlo Cipolla, Guns and Sails, pp. 151-2; Jenny West, Gunpowder, Government and War in the Mid Eighteenth Century (Irthlingborough, Northants., 1991), p. 4.

¹⁴⁷See, for example, Jenny West, Gunpowder, Government and War, pp. 2, 10; Richard Stewart, The English Ordnance Office: A Case-Study in Bureaucracy Royal Historical Society Studies in History n. 73 (Woodbridge, 1996), p. 85-6; C.G.A. Clay, Economic Expansion and Social Change ii, p. 215; Richard Stewart, 'Arms and Politics: the Supply of Arms in England 1585-1625'(unpublished Ph.D. thesis, Yale University, 1986), pp. 177-8, 187. E.W. Bovill, 'Queen Elizabeth's Gunpowder', Mariner's Mirror xxxiii (1947) No.3, p. 182; Christopher Hill, Reformation to Industrial Revolution, p. 75. C.S.L. Davies appeared ambivalent, arguing that efforts to encourage the immigration of skilled foreigners suggests that 'Henry VIII, as much as Burghley, pursued a definite policy of military self-sufficiency.' Yet a survey of the legislation of the period 1509-50 'hardly suggests that military self-sufficiency was a conscious aim of the government.' C.S.L. Davies, 'Supply Services of English Armed Forces 1509-50' (Unpublished D. Phil. thesis, Oxford, 1963), p. 62. While clearly seeing a strategic rationale for the development of munitions, Stewart identified a decline in these industries during the reign of James and Charles which he blamed on declining demand. Richard Stewart, 'Arms and Politics: the Supply of Arms in England 1585-1625', p. 378.

¹⁴⁸E.W. Bovill, 'Queen Elizabeth's Gunpowder', p. 182.

¹⁴⁹Sybil Jack, Trade and Industry, p. 83.

¹⁵⁰C.G.A. Clay, Economic Expansion and Social Change ii, p. 215; J. W. Gough, Rise of the Entrepreneur (London, 1969), pp. 206-7; Sybil Jack, Trade and Industry, p. 83-4.

have enlisted the skill of a German named Gerrard Honrick in that year and this single act is the evidence for numerous historians who claimed the government was interested in the import substitution of gunpowder.¹⁵¹

The government controlled supplies of the raw material and the market for much of this period. Clay thought the industry was consequently dependent upon the government for its survival and expansion.¹⁵² Richard Stewart argued that a monopoly grant to produce gunpowder ensured that the industry would not be vulnerable to economic forces such as market fluctuations. The industry was then not allowed to collapse ‘as did many war industries in the years 1604-20’ or to develop unregulated, ‘which might have resulted in an inferior product.’ While competition could ‘theoretically’ reduce the price, it may be at the expense of quality and regular delivery.¹⁵³ Wernham argued that the Crown, anxious to reassert England’s independence, attempted to develop new industries, and encouraged old ones, that would make England no longer dependent on foreign suppliers for gunpowder and ‘other necessities of defense and subsistence.’¹⁵⁴

Some historians maintained that domestic supply was not sufficient to meet demand for some decades, however. J.W. Gough argued that native supplies of gunpowder were probably not sufficient for home demand before the end of the sixteenth century, although almost a decade earlier the council had determined that all gunpowder should be made

¹⁵¹ibid.

¹⁵²C.G.A. Clay, Economic Expansion and Social Change ii, p. 215.

¹⁵³Richard W. Stewart, The English Ordnance Office, p. 88.

¹⁵⁴R.B. Wernham, The Making of Elizabethan Foreign Policy 1558-1603, pp. 26-7.

within the country.¹⁵⁵ Stewart claimed that ‘self-sufficiency in gunpowder for England in the early seventeenth century was virtually impossible.’ The government could not plan adequately for increased demand and could not come up with the money quickly enough.¹⁵⁶

The only historian who appears to have identified a fiscal motive behind the domestic production of gunpowder was Gough, who claimed that as foreign powder cost much more than domestically produced powder, the Privy Council in 1589 decided that all the gunpowder needed should be made within the country.¹⁵⁷

There are many gaps in the historiography of this industry which this thesis will seek to fill. There has been no analysis of the changing proportions of domestic to total supply and, hence, how successful domestic production was in superseding foreign supplies and then in keeping up with demand. The sources of government purchases and particularly the reasons for choosing those sources have not been examined. Finally, the impact of varying Royal demand, together with monopoly grants and other indirect investment made on the industry have yet to be analyzed.

Historians had less to say about other industries producing goods necessary to the military, specifically cordage and canvas for sailcloth. When they are discussed they are often referred to collectively, along with other goods, as ‘naval stores’. The literature suggests that these goods were considered to be important ones for the government. Both

¹⁵⁵J.W. Gough, Rise of the Entrepreneur, pp. 206-7.

¹⁵⁶Richard W. Stewart, The English Ordnance Office, p. 95.

¹⁵⁷J.W. Gough, The Rise of the Entrepreneur, p. 207.

Nesta Evans and R.W.K. Hinton thought hemp, from which both sailcloth and cordage were made, was a vital naval store and during the seventeenth century was the most important requirement of the Navy.¹⁵⁸ Evans believed that the chief motive for enforcing the growing of hemp during the sixteenth century was the need to supply the navy with these products.¹⁵⁹ Most of the hemp came from the Baltic and there was a potential danger that conflicts in this region might cut off access. Clay thought that imports of ship-building materials, and above all hemp for sails and cordage, had become essential to the continued functioning of both the merchant marine and the Navy. However, foreign supplies of cordage and raw materials, he added, were plentiful and cheap.¹⁶⁰

Next to nothing has been written specifically on the cordage industry although cordage was 'as essential as oil is to a modern fleet.'¹⁶¹ Most of what has been written is a narrative view of the medieval industry in Bridport.¹⁶² When the product was referred to in relation to the Crown, historians tended to focus on government efforts to promote the cultivation of raw materials rather than the industry itself.¹⁶³ This suggests

¹⁵⁸Nesta Evans, The East Anglian Linen Industry, p. 96; R.W.K. Hinton, The Eastland Trade, pp. 47, 97.

¹⁵⁹Nesta Evans, East Anglian Linen Industry, p. 52.

¹⁶⁰C.G.A. Clay, Economic Expansion and Social Change ii, p. 221.

¹⁶¹T.S. Willan, The Early History of the Russia Company, pp. 280-1.

¹⁶²Geraint Jenkins, The Craft Industries (London, 1972); William Page, (ed.), The Victoria History of the County of Dorset ii (London 1908), pp. 344-8.

¹⁶³C.G.A. Clay, Economic Expansion and Social Change ii, p. 245; Nesta Evans, East Anglian Linen Industry, p. 52.

that either there has not been enough research to say whether the government believed the skills necessary for making rope were present in sufficient quantity, and/or it was more concerned with the balance of trade, rather than domestic production of a naval store. Rudolph Robert thought that cordage was so vital a naval store that it was produced in Russia for shipment to England.¹⁶⁴ Michael Duffy argued that military demand was responsible for the beginning of the rope making industry in Russia.¹⁶⁵ Michael Oppenheim, who has written more than any other historian on the Royal ropeworks, said little except that there was an attempt to seek independence in cordage.¹⁶⁶ He argued that the government made a few false starts in promoting the domestic manufacture before it was finally produced in the naval dockyard.¹⁶⁷

Andrew Thrush suggested that during the reign of Charles I much of the cordage required by the Navy, if not all, was imported from the Baltic rather than manufactured domestically because the government could not get enough hemp. Because imports of the raw material declined during the years 1625-9 when Sweden invaded Poland, then cordage must have been in short supply. 'Faced with a dwindling source of supply,' Thrush argued, 'the Admiralty was thus forced to choose between buying poor quality rope and

¹⁶⁴Rudolph Robert, Chartered Companies and their Role in the Development of Overseas Trade (London, 1969), p. 60.

¹⁶⁵Michael Duffy (ed.), The Military Revolution, p. 6.

¹⁶⁶Michael Oppenheim, Administration of the Royal Navy and of Merchant Shipping in Relation to the Navy: from mdix to mdclx (London, 1896), p. 150.

¹⁶⁷*Ibid.*, pp. 92, 113.

buying nothing at all.’¹⁶⁸

There are several reasons why it is important to examine the cordage industry. Firstly, this vital naval store consumed a large proportion of the Royal Navy budget. Eight per cent or more of Navy allowances was regularly spent on cordage, and the cost sometimes surpassed £13,000.¹⁶⁹ Secondly, this was probably the only import substitution industry to develop during this period in which the government directly invested as manufacturer. Rope works were set up under Crown management at the Royal shipyard at Woolwich in 1620 and then at Chatham in 1624.¹⁷⁰ Finally, it appears that direct Crown investment in production made a direct impact on imports of this product.

The final product to be examined will be sailcloth. This industry has also been rather neglected by historians. When sailcloth is discussed it is seldom separated from the linen industry as a whole.¹⁷¹ Secondly, like the literature on the cordage industry, the literature focuses on the promotion of the raw material. Evans, who wrote what is probably the most comprehensive study on the subject, examined the domestic production of linen and the growing of the raw materials, flax and hemp, primarily using probate inventories.¹⁷² She argued that there were three reasons put forward time and again

¹⁶⁸Andrew Derek Thrush, ‘The Navy Under Charles I 1625-40’ (Unpublished PhD thesis, University of London, 1991), p. 359.

¹⁶⁹See Table 5.1, below.

¹⁷⁰P.R.O. E351 2258, 2262.

¹⁷¹See, for example, Nesta Evans, East Anglian Linen Industry.

¹⁷²*Ibid.*

over a period of three centuries to explain why the government enforced the growing of hemp and flax: to supply the Navy with essential materials, provide employment to the poor, and to decrease imports both of yarn and of materials made from hemp and flax.¹⁷³ Thirsk thought that domestic canvas production was an unsuccessful Edwardian project, designed to place less reliance on imported wares. She added that by the seventeenth century domestic sailcloth had gained a reputation as the best sailcloth only for 'our small ketches and vessels under 100 tons.'¹⁷⁴ Other historians argued in addition that sailcloth was promoted to reduce reliance on foreign supplies.¹⁷⁵

It is important to examine this product because, like cordage, little has been written about it, yet this product was a vital and expensive store. For example, no research has been done on the development of the Ipswich industry producing for the market outside of the region and the degree to which the Royal Navy utilized this market.

It will be necessary to look briefly at the literature about other industries producing munitions. Those normally mentioned include cannon, ironware and the raw materials, brass, copper and iron. The cannon industry, iron or brass, will not be examined because it was established prior to the period with which this thesis is concerned.¹⁷⁶ Moreover, preliminary analysis suggests that it would not be possible to significantly alter G.

¹⁷³Ibid., pp. 51-2.

¹⁷⁴Joan Thirsk, Economic Policy and Projects, pp. 34-5, 40, 41.

¹⁷⁵See, for example, C.S.L. Davies, 'Supply Services of the English Armed Forces', p. 62. He uses the term canvas, rather than sailcloth, here. Michael Reed, 'Ipswich in the Seventeenth Century' (unpublished Ph.D. thesis, University of Leicester, 1973), p. 30.

¹⁷⁶See above, pp. 17-20 and C.S.L. Davies, 'Supply Services of the English Armed Forces', pp. 35, 38, 39.

Hammersley's conclusions on the iron industry, as discussed below.

Most of the literature supports the notion that the Crown was interested in these industries because they were vital goods.¹⁷⁷ Royal attention given to the brass and copper industries is often quoted as evidence of Crown efforts to support the domestic bronze cannon industry. Henry Hamilton suggested, however, that the Germans who came to England and began production early in the reign of Elizabeth did not come by Royal invitation, but made the trip rather as an entrepreneurial venture; the individuals involved recognized an opportunity to make money. He then claimed that they were happily received by Elizabeth and her minister Cecil because of the strategic value of the material.¹⁷⁸ Clarkson argued the opposite; some grants like that for brass and copper were rather intended to establish import-saving industries.¹⁷⁹

A study of the production of iron, generally considered vital for strategic purposes, has disclosed some different results. Hammersley, in 'The State and the English Iron Industry' appeared rather surprised to discover that the Crown was decidedly not interested in the iron industry when, he argued, it gave a great deal of attention to the founding and export of iron guns and shot. Interest in the sole buying and selling of iron ordnance only occurred when the Crown discovered that a market had developed for it on the continent. The domestic industry, he added, then became a monopoly venture.

¹⁷⁷See, for example, Christopher Hill, Reformation to Industrial Revolution, p. 74; J.W. Gough, The Rise of the Entrepreneur, p. 106.

¹⁷⁸Henry Hamilton, The English Brass and Copper Industries to 1800 (London, 1926), pp. 1, 4.

¹⁷⁹L.A. Clarkson, The Pre-Industrial Economy, p. 161.

Interest in the production of iron on Crown land, he argued, was fiscal.¹⁸⁰

Mercantilist concepts on a clear government policy continue to be recognized, then, where the munitions industries are concerned. While fiscal concerns were identified both in the Navy and as important reasons for Crown involvement in the economy, they are seldom recognized as providing a rationale for the establishment of the munitions industries. Historians have only argued for a fiscal motive in the iron industry. This opens up an important question. Why should fiscalism be important for this industry and not so for others producing munitions? It is the argument of this thesis that fiscalism was also an important motive in the development of the gunpowder, sailcloth and cordage industries. Because the literature suggests that the import substitution of munitions was a clear policy, the question remains as to whether it was enforced and if so, was the Crown effective in achieving desired results?

Those who wrote first about mercantilism believed that implementation naturally followed the directive. However, much of the more recent literature suggests that the government was generally ineffective in enforcing its will. Clarkson thought that measures were for the most part unworkable with the exception of poor relief. 'Much of the economic policy was not enforced at all, or was enforced only sporadically.'¹⁸¹ Ramsey claimed that much of the legislation was ineffective because there was no machinery to enforce it.¹⁸² Some thought that this was fortunate, fearing a system of

¹⁸⁰G. Hammersley, 'The State and the English Iron Industry in the Sixteenth and Seventeenth Centuries', pp. 166, 169, 172-3, 180.

¹⁸¹L.A. Clarkson, The Pre-Industrial Economy, pp. 207, 209.

¹⁸²Peter Ramsey, Tudor Economic Problems, p. 165.

regulation and control would have ruined industrial development.¹⁸³ Thirsk, on the other hand, concluded that the deliberate government policy to foster the domestic production of consumer goods was successful.¹⁸⁴

The assumption in the literature is that directives made to establish the munitions industries in this period by contrast must have been effective and that they were planted in England because of these directives. Sybil Jack, for example, argued that the gunpowder industry was one of the more immediately successful promotions.¹⁸⁵ This thesis will argue, however, that directives relating to the munitions industries were no more effective than the literature on the subject would expect them to be in other areas of the economy.

V

Cunningham had argued that government policy to effect national power required attention to the production of food so vital for the creation and subsistence of military personnel, attention to trade and industry in order to stimulate wealth for the service of the state and thirdly, attention to shipping and subsidiary employments to create naval strength. The dominant theme in the literature written in response to the mercantilist writings holds that governments of early modern England did not implement or even form

¹⁸³See, for example, Christopher Hill, Reformation to Industrial Revolution, p. 74.

¹⁸⁴Joan Thirsk, Economic Policy and Projects, p. v.

¹⁸⁵Sybil Jack, Trade and Industry, p. 84.

distinct, cohesive economic policies independent of the exigencies of the day. While it was argued that the governments held general aims, implementation was influenced and swayed by more immediate needs and by special interest groups. At the end of the day Crown efforts were, for the most part, ineffective. The literature relating to munitions, on the other hand, maintains that a clear policy existed to import substitute munitions of warfare for strategic reasons independent of the economic environment. The efforts, it is suggested, were successful. This thesis will argue that, while the governments may have held a general desire to be independent of foreign suppliers, more immediate needs had to be satisfied during the years of peace that overwhelmingly dominated this period. As in the case made by Hammersley for the iron industry, government interest in gunpowder, sailcloth and cordage was primarily fiscal. Their interests were in cutting costs and saving money. And much of the time there appears to have been no interest at all.

CHAPTER TWO

A QUANTITATIVE EXAMINATION OF THE IMPORT SUBSTITUTION OF SAILCLOTH, CORDAGE AND GUNPOWDER

I

Historians have presented import figures and sometimes estimates of manufacturing output for a number of different industries, but they make no attempt to demonstrate quantitatively that import substitution has taken place. The industrial narratives of early modern England primarily used qualitative material to describe the origins and development of the various industries. This chapter will demonstrate quantitatively that cordage, sailcloth and gunpowder were import substituted during the latter half of the sixteenth and early decades of the seventeenth centuries.

A useable definition was provided by G.K. Helleiner who wrote on twentieth century Latin America. Import substitution has occurred when the proportion of total supply of a product which is obtained through imports rather than through domestic production has declined in the country concerned.¹ It occurs when imports of a product have declined and consumption is stable or growing. It also occurs when imports are growing but domestic consumption is increasing even faster. The quantitative aspect poses little problem in the modern world of corporate and commercial record keeping. For the early modern period the problems associated with this definition may be formidable, for

¹G.K. Helleiner, International Trade and Economic Development (London, 1972), p. 97.

sources are often missing or incomplete. However, it is still possible to compare imports to total supply in order to demonstrate that the import substitution of cordage, sailcloth and gunpowder has occurred.

In order to do this, the following chapter will be divided into two sections. The first section will determine whether the total supply of munitions was stable or increasing. Levels of domestic output throughout the period are generally unavailable due to the absence of production records. A proxy for total supply, however, will be built by estimating domestic demand for the relevant goods. The munition requirements of shipping will be used to demonstrate this demand.

In order to verify that import substitution had occurred, it is necessary to calculate not only total supply but the sources of that supply as well. The second section will examine trade statistics and purchase records for trends in supply. It will demonstrate that an increasing proportion of supply was obtained domestically. This section will be divided into three parts, each part devoted to the specific products and the corresponding raw materials.

II

This chapter will now demonstrate that domestic demand, or total supply, did not diminish. Shipping, including the Crown Navy, will be used as a proxy for domestic demand because first, the products examined were all employed on ships at sea. Canvas types such as poldavis and medrinacks (mildernix) were used almost exclusively for sails.

Some sorts of cordage, such as large, bulky cables, found comparatively few uses on land. While a greater proportion of gunpowder may have been employed on terra firma than on the water, naval warfare had by the beginning of this period come into its own as a dominant force to be reckoned with. Also, ocean transport depended on the protection provided by guns and gunpowder against pirates, privateers and hostile powers. Secondly, private shipping requirements for stores and to a lesser extent armaments were qualitatively much the same as that for the Royal Navy. Finally, the English merchant fleet was, almost exclusively, English built.²

This section will, first, discuss the munitions required by ships of varying sizes. It will then examine the data available for estimating the total number of ships. This will be followed by an analysis of the growth in different types of marine transport: the shipping of merchant corporations new to this era, privateering, the coal transport, the fishing industry and finally, the ships of the King's Navy.

Evidence on the munitions requirements for ships of varying sizes was drawn from the State Papers. These were used to compile Tables 2.1 and 2.2, which indicate the volume of ordnance and stores needed for Royal ships in 1602 and for gunpowder per shot in 1591. Table 2.1 can be taken as a general indicator of the needs of private ships as well as the Crown's, for English ships of almost any size down to 50 or 60 tons were heavily masted and most were well-gunned in proportion to their size for mercantile purposes, for privateering and for the Navy during at least the half century before the

²Ralph Davis, The Rise of the English Shipping Industry in the Seventeenth and Eighteenth Centuries (Newton Abbot, 1972), p. 47.

TABLE 2.1: MUNITIONS REQUIRED FOR VARIOUS ROYAL SHIPS 1602

Tonnage	Canvas For Sails in Bolts ^a	Anchors No./lbs	Cables No./lbs	Weight of Rigging Tackle in lbs	Weight of Ordnance in Tons
955	95	7/15,000	7/32,500	18,000	68
855	85	7/15,000	7/30,000	17,000	61
777	78	7/14,400	7/26,300	17,000	54
648	62	7/13,000	7/22,800	14,400	46
552	60	7/12,200	7/19,000	12,300	41
450	52	6/8,200	6/15,400	9,800	32
343	44	4/6,000	4/11,000	7,300	24
306	47	5/7,300	5/12,600	8,300	26
253	40	4/4,300	4/8,500	5,400	18
216	36	4/3,700	4/7,400	4,600	15
165	31	4/3,200	4/5,600	3,500	11
80	20	4/1,800	4/3,000	2,000	7
52	15	3/1,600	3/2,000	1,100	3 1/2

Source and Notes: SP12 286/36 ^aThe size of a bolt varied. R.E. Zupko, Dictionary of English Weights and Measures (Madison, 1968), p. 21. The bolt is estimated at 36 yards long. It was recorded as 38 yards in P.R.O. E351 2274 and 33 yards in P.R.O. E351 2270.

TABLE 2.2: GUNPOWDER REQUIREMENTS PER WEIGHT OF SHOT 1591

Type of Cannon	Weight of Shot in lbs	Weight of powder per shot in lbs ^a
Cannon	27	28.23
Bastard Cannon	20	19.24
Demi - Cannon	18	17.79

Source and Notes: P.R.O. SP12 239/55 ^aWeight of powder per shot was calculated by dividing total pounds of powder by the total amount of shot.

Civil War.³ This is not by any means a complete list, but it does serve to suggest the amounts of the items that were required. While the amount of cannon and powder required by either Royal or private shipping varied according to the international political climate, the degree of Royal protection and the incidence of pirate and privateering attacks, the requirements for stores were, in comparison, relatively consistent over time for both Royal and private ships when active.⁴ The larger ships generally required more munitions than smaller ones but slightly less in proportion to their size. Therefore, both the tonnage and numbers of ships are important factors to consider.

One of the most notable achievements of Elizabethan England was the dramatic expansion of trade and of total shipping. Ralph Davis referred to the opening of the Elizabethan era as ‘the nadir of English merchant shipping.’⁵ After this point it expanded and grew, both in numbers of ships and in total tonnage, as the coastal trade developed, new regions for trade opened up, the English captured a larger portion of the established trades, the fishing industry expanded to Newfoundland and the coal industry catered to a growing market. This development has clear implications for the development of demand for the relative goods. Finally, the Royal Navy was increasingly

³Ibid., p. 45.

⁴Davis claims that ‘the new masting and sail plan is found in quite small English ships at least as far back as the 1530s.’ Ibid., p. 44.

⁵Ralph Davis, The Rise of the English Shipping Industry, p. 2. N.A.M. Rodger took a more positive stance on the state of the navy during Queen Mary’s reign, claiming that arguments suggesting that her reign was associated with neglect of the Navy and consequent loss of Calais were exaggerated. While Philip II was interested, important changes in English naval administration that occurred during the reign were not his work. N.A.M. Rodger, The Safeguard of the Sea: A Naval History of Britain i (London, 1997), pp. 194-5.

becoming less dependent on requisitioned or hired merchantmen as the Crown acquired more of its own ships.

The data relating to total English shipping are at best only an estimate. Government officials kept some statistics which at least supply us with a hint as to the number of English ships extant. Some ship counts were made during this period so that the government would know the number of ships that were available to supplement the Crown Navy when needed.⁶ Secondly, from the mid fifteenth century the government paid a bounty of five shillings a ton for newly-built vessels of 100 tons and more and the details have been salvaged.⁷ Bounty payments were discontinued in 1618 and were then restored in 1625 for vessels over 200 tons. Finally, records were kept of new ships needing ordnance.⁸ In the absence of a complete, accurate annual series, the sources mentioned above can be used to examine the state of the English shipping industry.

The data for Table 2.3 are drawn from the surveys made by the government of available ships and collated by Davis. It strongly suggests that the number and size of ships and total tonnage was growing. Table 2.4 records the number of ships of 100 tons and more built in England and awarded bounties. The figures are based on ship lists collated by Brian Dietz. While Dietz claimed that the bounty policy was primarily a wartime phenomenon and that some selectivity and restraint in payments was occurring, he added that the records afford 'valuable insights into the growth and development of

⁶See, for example, P.R.O. SP12 96/267, 111/30, 156/45; SP16 137 the complete volume; SP16 138/11, 60, 155/31.

⁷Calendar of State Papers, Domestic Series: 1547-1640 (hereafter CSPD), passim.

⁸Trinity House Certificates: P.R.O. SP16 16 and 17, the complete volumes.

TABLE 2.3: ENGLISH MERCHANT SHIPPING 1560-1640

Year	Total Tonnage ^a	Number of Ships 100 - 199 Tons	Number of Ships 200 Tons and More
1560	^b	Over 71	6
1572	50,000	72	14
1577	^b	120	15
1582	67,000	155	18; 1 being over 350 tons
1629	115,000	More than 178	More than 145
1640	^b	^b	30 ships over 350 tons

Source and Notes: Ralph Davis, The Rise of the English Shipping Industry In the Seventeenth and Eighteenth Centuries (Newton Abbot, 1972), pp. 7, 10, 46. ^aTonnage here refers to tons burden, deadweight tonnage, carrying capacity - nearly synonymous terms. Ibid., p. 7, fn. 1. Total tonnage includes boats of less than 100 tons and so calculations for average tonnage based on the figures available in the above table are unreliable. ^bData are unavailable.

a native-built merchant marine.⁹ It also suggests that a growing number of large ships was being built. The expansion in trade after the confines of the Antwerp market and the reduction of dependency on foreign merchants encouraged this development.

Finally, Table 2.5 was drawn from the Trinity House certificates of ships needing ordnance. One certificate was issued for each ship for which the owner desired the protection of ordnance.¹⁰ The data suggest first, that new ships were built yearly, albeit

⁹Brian Dietz, 'The Royal Bounty and English Merchant Shipping in the Sixteenth and Seventeenth Centuries' The Mariner's Mirror, lxxvii, no. 1 (1991), pp. 6, 9.

¹⁰As the forms are 'extremely numerous', the totals have been published as the final entry of each year between 1625 and 1638 inclusive in the Calendar of State Papers Domestic. See, for example, Ibid., 1625-6, p. 212.

TABLE 2.4: SHIPS UPON WHICH BOUNTIES WERE PAID 1560-1615

Years	Number of Ships	Average Tons per Ship
1560-4	7	224 ^a
1565-9	21	150
1570-4	42	160
1575-9	36	190
1580-4	12	217
1585-9	12	219
1590-4	40	209
1595-9	114	241
1600-4	92	254
1605-9	101	215
1610-4	103	263
1615-8 ^b	103	361

Source and Note: Brian Dietz, 'The Royal Bounty and English Merchant Shipping in the Sixteenth and Seventeenth Centuries' *The Mariner's Mirror*, lxxvii, no. 1 (1991), pp. 14-20. ^aOne ship, the *Elizabeth Bonaventure*, was 600 tons. Another was 240 tons. The remainder were 160 and below. ^bData are for four years.

in greatly varying numbers. Secondly, the private sector, as well as the Royal Navy, required cannon and gunpowder.

These tables clearly suggest that the number of ships and the total tonnage of shipping was growing over the period. A look at the different sectors of shipping - overseas trade, coastal coal shipping, fishing and the Royal Navy - serves to support the notion that demand for, and hence total supply of munitions was increasing. Ships belonging to monopoly companies trading overseas are useful indicators of the growth of domestic demand because the companies were required by the government to use only

TABLE 2.5: NUMBER OF NEW SHIPS REQUIRING ORDNANCE 1625-38^a

Year	Number of New Ships	Year	Number of New Ships
1625	5	1632	11
1626	121	1633	12
1627	23	1634	12
1628	5	1635	24
1629	55	1636	25
1630	37	1637	24
1631	18	1638 ^b	5

Source and Notes: P.R.O. SP16 16 and 17. ^aOf these 380 ships, 15 were prizes and 22 were purchased, mostly from the Dutch. ^bThree months only.

native built vessels.¹¹ Merchant ships used by the East India and Levant Companies are of particular interest because they were large and heavily gunned in order to meet the threat of attack from both pirates and privateers during periods of international conflict.¹² They would, therefore, have required the whole range of munitions, the extent of which we are trying to estimate.

Prior to the 1560s English overseas trade had focused almost entirely on Antwerp, the commercial metropolis of Europe. The Merchant Adventurers shipped predominately undressed woollen broadcloths there, where they were then dyed, dressed and resold, and traded them for products from all over Europe and beyond. Other trading activities

¹¹C.G.A. Clay, Economic Expansion and Social Change: England 1500 - 1700 ii (Cambridge, 1984), p. 217.

¹²'All this group of ships of over three hundred and fifty tons was engaged normally in the East India or Levant trade.' Ralph Davis, The Rise of the English shipping Industry, p. 46.

antedate the expansion of English shipping. Ships moved goods between towns along the coast of England. Others were employed in the fisheries in the North Sea and until 1475 off the coast of Iceland.¹³ In 1551 the booming export trade in English textiles collapsed, and this was followed by stagnation and further periods of depression.¹⁴ It has been argued that much of the expansion in trade that followed was attributable to a desire to find new foreign markets for the woollen cloth, the staple of English exports.¹⁵

Robert Brenner disputed this export-led explanation for the expansion of foreign trade, arguing that much of the expansion developed instead as a response to periodic physical disruptions to traditional trade routes. These disruptions encouraged merchants with an interest in imports to attempt to purchase the goods at their source. This was possible in part, he added, because Spain and Portugal were finding their hold over their

¹³The herring migrated from the Baltic Sea into the North Sea and English water in the early fifteenth century, making the North Sea fisheries the most important in Europe. G.J. Marcus, A Naval History of England: The Formative Centuries i (London, 1961), pp. 25-8. Kurlansky argued that British interests in the Icelandic fisheries were pushed out that year by the Hanseatic League after a brief fight. Mark Kurlansky, Cod: A Biography of the Fish That Changed the World (London, 1998), pp. 52-3, 142. Cooper thought, however, that some fishing was carried on with Iceland as late as 1665. Ernest R. Cooper, 'The Dunland Iceland Ships' Mariner's Mirror xxv, no. 2 (1939), p. 171.

¹⁴ Robert Brenner argued that the trade crisis was really more short-lived and less severe than it has been assumed. There was a decline in the numbers of those cloths principally exported by aliens, particularly in 1552 when the government cancelled the trading privileges of the Hanse merchants. Robert Brenner, Merchants and Revolution: Commercial Change, Political Conflict, and London's Overseas Traders, 1550-1653 (Princeton, 1993), pp. 6-8.

¹⁵F.J. Fisher, 'Commercial Trends and Policy in Sixteenth Century England' Econ. Hst. Rev. x, (1940), pp. 105-7; G.D. Ramsay, English Overseas Trade during the Centuries of Emergence (London, 1957), pp. 20-30; T.S. Willan argued that the expansion of trade could be partially explained this way. T.S. Willan, The Early History of the Russia Company 1553-1603 (Manchester, 1956), p. 2.

commercial empires weakening.¹⁶

Products from the East traditionally found their way westward on routes running via the Caspian to the Black Sea, via Persia and Aleppo to the Syrian coast, or via the Red Sea to Alexandria, and all routes then met at Venice.¹⁷ Venetian merchants then shipped the goods to Western Europe, including England. Spain and Portugal became interested in circumventing this trade pattern and gaining direct access to the source of the goods by following a sea course to the islands, possible due to the advances made in ship design, navigation, munitions and cartography.¹⁸ A sea route around the Cape of Good Hope would enable Eastern goods to be brought to Europe cheaper, safer and more easily. Because the Spice Islands lay on the other side of the world the merchants had a choice of going either east or west, and so in the 1490s the two countries partitioned the world between themselves in order to monopolize the routes and at the same time avoid conflict. The arrangement received papal sanction and was formalized with the Treaty of Tordesillas in 1494. Portuguese control eventually became focused on the coasts of Africa, the west coast of India and the East Indian islands of modern-day Indonesia. Spain's influence became concentrated in the Caribbean, Central and South America, and eventually the Philippines.¹⁹ The Portuguese now dominated the spice trade, and Venice's trade drastically declined. The English then found their supplies at

¹⁶Robert Brenner, Merchants and Revolution, p. 5.

¹⁷A.C. Wood, A History of the Levant Company (London, 1964), p. 3.

¹⁸John Keay, The Honourable Company: A History of the English East India Company (London, 1991), p. 6.

¹⁹Philip Lawson, The East India Company (London, 1993), p. 7.

the Antwerp market, which now superseded Venice as the depot of Eastern goods.²⁰ Much of the expansion of English trade can be attributed to attempts by the merchants to participate directly in the spice trade of the East. There was little market for English textiles there and so interest was on imports.²¹

The first direction of expansion was northward where merchants and explorers attempted to find a new route to the East and the rich spice markets there and yet avoid the routes claimed by Spain and Portugal.²² In 1553 an expedition of three ships led by Sir Hugh Willoughby with Richard Chancellor as his second in command and chief pilot sailed northeast in search of a passage. Willoughby did not survive the trip and a passage was never found but the voyage held important implications for the future development of trade in naval stores.²³ Chancellor found the entrance to the White Sea and journeyed overland through Russia to meet Ivan IV, residing in Moscow. Philip and Mary granted the Russia Company a charter in 1555 and the trade that ensued provided an outlet for some English dyed and dressed woollen cloth and led to the import of cordage, pitch, tar and hemp.²⁴

²⁰A.C. Wood, A History of the Levant Company, p. 5.

²¹K.N. Chaudhuri, The English East India Company: A Study of an Early Joint-Stock Company 1600-1640 (London, 1965), p. 13.

²²T.S. Willan, The Early History of the Russia Company, p. 1.

²³The Company then made six voyages down the Volga River in an attempt to develop the Persia trade from that direction. *Ibid.*, pp. 57-8, 59-61, 79, 90-91, 145-8, 149-55.

²⁴See T.S. Willan for a summary of the development of this trade. *Ibid.* For the original members and trading activities of the early members see T.S. Willan, The Muscovy Merchants of 1555 (Manchester, 1953).

It is difficult to assess the numbers of ships employed in this trade but it appears that between two and four ships or more set sail yearly for Russia in most years, ranging in size from 60 to 240 tons burden. Almost all of the ships employed were chartered and most of those appear to have been English.²⁵

J.K. Fedorowicz has argued that English merchants' interest in actively participating in the Baltic trade was primarily in order to market English cloth.²⁶ The south shore of the Baltic Sea had long been important to England because it was the primary source for naval stores, particularly hemp, cordage, sailcloth, iron, tar, pitch and timber.²⁷ It was, as well, an important source for foodstuffs, especially rye.²⁸ At the start of this period most of this trade was controlled by the merchants of the Hanse, to whom England had granted extensive trading rights, including concessions on customs duties.²⁹ The Hanseatic League was a confederation centred on the Baltic, formed in the middle of the twelfth century in order to promote and protect the trade of its members.³⁰ It

²⁵T.S. Willan, The Early History of the Russia Company, p. 51. Wernham thought about 12 to 15 ships set sail each year. R.B. Wernham, Before the Armada: the Growth of English Foreign Policy 1485-1588 (London, 1971), p. 285.

²⁶J.K. Fedorowicz, England's Baltic Trade in the Early Seventeenth Century (Cambridge, 1980), p. 103.

²⁷Sven-Erik Astrom, From Cloth to Iron: the Anglo-Baltic Trade in the Late Seventeenth Century (Helsingfors, 1963), p. 25; Henryk Zins, England and the Baltic in the Elizabethan Era (Manchester, 1972), p. 218; J.K. Fedorowicz, England's Baltic Trade, pp. 50-1.

²⁸Henryk Zins, England and the Baltic, p. 218.

²⁹T.H. Lloyd, England and the German Hanse, 1157-1611: A Case Study of Their Trade and Commercial Diplomacy (Cambridge, 1991), pp. 373-4.

³⁰*Ibid.*, pp. 2, 10-11.

was originally comprised of merchants trading overseas but by the middle of the fourteenth century this membership of merchants became a membership of cities and towns.³¹ The League as an institution began to decline in the late fifteenth century as conflicts of interest and international developments in trade patterns undermined its role until, by 1669, it had ceased to function.³²

Substantial inroads were made by English merchants into this trade during the second half of the sixteenth century after a long struggle with the League.³³ In 1578 the Hanse lost their trading rights in England and were forced to trade there under the same terms as other aliens. In the same year the Eastland Company was formed with its staple established at Elbing.³⁴ For years the Eastland Company preferred to use Dutch shipping as it was cheaper and better adapted to carrying bulky Baltic goods. Not until the English trade crisis of the 1620s did the Company support restrictions on Dutch intermediaries.³⁵ It is unlikely, then, that the Baltic trade made much of an impact on domestic demand for cordage, sailcloth and gunpowder before that date, although refitting may have occasionally been carried out in England.

The geographical expansion of maritime commerce was probably bolstered further

³¹It is impossible to say how many towns were members, as the Hanse refused to provide this information, but there may have been 70 that were active. Ibid., pp. 8, 365.

³²Ibid., pp. 363-6.

³³Henryk Zins, England and the Baltic, p. 5.

³⁴J.K. Fedorowicz, England's Baltic Trade, pp. 15, 52, 65. Zins claimed that the basic cause of the founding of the Company was, 'at least in part, England's desire to deal a final blow to the German Hanse.' Henryk Zins, England and the Baltic, p. 55.

³⁵Henryk Zins, England and the Baltic, p. 143.

when trade with Antwerp was brought to a standstill in 1563 and merchants had to look further afield for their markets. In that year Cardinal Granvelle, Chief Minister with the Regent Margaret of Parma in the Netherlands, placed an embargo on cloth imports from London. This was probably a response to attacks on Spanish and Dutch shipping by English privateers but he used as a pretext the fact that plague was raging in London.³⁶ Elizabeth retaliated, and the search for a new depot for the woollen textiles began. The Merchant Adventurers left Antwerp in 1564 and moved to the North Sea area, first to Emden, briefly back to Antwerp the following year and then, following widespread riots there the previous summer, to Hamburg on a ten-year lease in 1567. Henryk Zins described this move as 'the first time a serious breach was made in the Hanse monopoly.'³⁷ The lease was not renewed and the Merchant Adventurers returned to Emden until 1587 when they had arranged to trade at Stade, on the Elbe, just below Hamburg. Some trading was pursued at Middelburg, in Zeeland, as well in 1582.³⁸

When some merchants travelled northwards others went south, and by 1551 the English were trading with Morocco, in defiance of the Portuguese who claimed a monopoly of this region.³⁹ Two years later the Guinea trade was developed. Willan

³⁶R.B. Wernham, The Making of Elizabethan Foreign Policy 1558-1603 (Berkeley, 1980), p. 31.

³⁷Henryk Zins, England and the Baltic, p. 59.

³⁸R. B. Wernham, Before the Armada, p. 346.

³⁹Willan claimed that the date when trade began was 1551. T.S Willan, Studies in Elizabethan Foreign Trade (Manchester, 1959), p. 145. Bovill, on the other hand, claimed that 'pikes, lances, coats of mail, helmets, metal for casting cannon, ammunition for small arms and artillery, sulphur, timber for building ships and a variety of marine gear such as oars, cordage and sails' were exported as far back as 1541. E.W. Bovill,

argued that while the reasons for opening this region to trade are difficult to determine, it was a potential market for cloth at a time when the European market for this good had declined. At the same time, Morocco was a potential supplier of gold and sugar.⁴⁰ This trade was unregulated, as merchants traded for themselves, individually or with partners, employing factors who resided overseas. They dealt primarily with Jewish middlemen, whose authority rested on Sharifian grant or favour.⁴¹ The trade was only organized as a monopoly in 1585 when the Barbary Company was established as a regulated company with a charter to run for 12 years, more than 30 years after the trade had developed.⁴² While unfortunately no information is available to relate the number of ships employed in the Moroccan trade, it is significant that the trade was initiated immediately prior to the period under analysis. This suggests that the Moroccan trade did, therefore, contribute to the growth of English shipping.

After 1570 trade expanded throughout the Mediterranean as Venice became embroiled in war with Turkey, opening up opportunities for the English in the carrying

'Queen Elizabeth's Gunpowder', Mariner's Mirror xxxiii, no. 3 (1947), p. 180.

⁴⁰T.S Willan, Studies in Elizabethan Foreign Trade, p. 94. Some saltpetre was imported from Morocco. See below, Chapter Six, for further discussion of the Moroccan trade in this raw material.

⁴¹T.S. Willan, Studies in Elizabethan Foreign Trade, p. 145. For this use of the title 'Sharif' as ruler see Dahiru Yahya, Morocco in the Sixteenth Century: Problems and Patterns in African Foreign Policy (Harlow, 1981), p. 4.

⁴²T.S. Willan, Studies in Elizabethan Foreign Trade, p. 162.

trade between western Europe and the Mediterranean.⁴³ English merchants, as Davis claimed, 'took over more and more of the functions of the weakening mercantile and industrial cities of Italy.'⁴⁴ English shipping was sought not because it were cheap but because the ships were well armed and so could adequately protect themselves from the pirates, who preferred attacking prey of a more vulnerable nature.⁴⁵ Italy developed into a market for English cloth and for re-exports and English merchants became established at Leghorn, declared a free port in 1593 where foreign merchants could live and trade on the same terms as the natives.⁴⁶

The English had seen very little success in trading with the East via the White Sea and attempts to find a north-western passage had failed. In the meantime Portugal, having traded in the East for a century, was losing effective control of the region. It had stretched itself too far and it lacked the resources necessary to hold the far-flung empire together.⁴⁷ In 1580 the country amalgamated with Spain. Spain could, then, go some way towards restricting the flow of goods from the East to her enemies. It was the Dutch who first took advantage of these developments in the East.

It has been argued that the English merchants were no longer willing to tolerate

⁴³Ralph Davis, 'England and the Mediterranean, 1570-1670', F.J. Fisher (ed.), Essays in the Economic and Social History of Tudor and Stuart England (Cambridge, 1961), p. 117.

⁴⁴Ibid., p. 118.

⁴⁵Ibid., pp. 129-30.

⁴⁶Ibid., pp. 134-5.

⁴⁷Philip Lawson, The East India Company, p. 10.

exclusion from the trade and demanded from their government an aggressive foreign policy.⁴⁸ The Elizabethan government chose what it thought was the safest political and economic option, one that was the least hazardous and provocative to Spain.⁴⁹ Instead of a sea route, trade was to be concentrated on the old overland route.⁵⁰ English merchants sailing in English ships had traded along this route in the first half of the sixteenth century but had then ceased to do so.⁵¹ The Turkey Company was formed in 1581, the Venice Company was formed in 1583 and in 1592 the two companies, overlapping in jurisdiction and commodities, joined together to form the Levant Company⁵² with ships trading to at least ten of the Levant ports, including Constantinople, Aleppo, Chios, and Egypt. The Company then carried out a profitable trade with Europe in silk, indigo, mohair, yarn, carpets, drugs, currents and spices.⁵³

⁴⁸Ibid., p. 12.

⁴⁹Ibid., p. 13.

⁵⁰Ibid.

⁵¹Willan argued that there was probably no single reason. One reason, however, may have been the fact that Levant goods were then finding their way to the Antwerp market, rendering it easier for the English to purchase them there. An unknown, unfavourable circumstance may have encouraged merchants to divert capital into other enterprises, notably the Russian route to Persia and the development of trade with West Africa and the West Indies. T.S. Willan, 'Some Aspects of English Trade with the Levant in the Sixteenth Century', English Historical Review lxx, no. 276 (1955), pp. 399, 400, 403, 404. The English had probably never completely vacated the Mediterranean, however. Ralph Davis, 'England and the Mediterranean', p. 126.

⁵²M. Epstein, The Early History of the Levant Company (New York, 1908, reprint 1968), pp. 16, 22, 36; A.C. Wood, A History of the Levant Company, p. 18.

⁵³A.C. Wood, A History of the Levant Company, p. 17; K.N. Chaudhuri, The English East India Company, p. 11.

Exports consisted of a little tin, kersies and, around the turn of the seventeenth century, finished broadcloths.⁵⁴ T.S. Willan argued that the Levant trade was import-led; few English goods could find a market there.⁵⁵ Ralph Davis argued instead that the trade 'fulfilled all the dreams of the mercantilist'. The exchange was of English manufactured goods for raw materials, primarily silk, and large ships were used on long voyages.⁵⁶

Data on the number and sizes of ships used by the Levant Company trading to the Eastern Mediterranean are unfortunately scarce. It is thought that no English ships sailed into this body of water between 1553 and the early 1570s,⁵⁷ however, and so the information that does exist clearly demonstrates growth in demand within this period. The Company employed the largest of the English merchantmen at the end of the sixteenth century, being on average 300-450 tons when the average vessel in European waters was around 50 or 100 tons.⁵⁸ In 1581, 14 ships between 200 and 350 tons were

⁵⁴T.S. Willan, 'Some Aspects of English Trade with the Levant in the Sixteenth Century', p. 410; Ralph Davis, 'England and the Mediterranean', pp. 119-120.

⁵⁵T.S. Willan, 'Some Aspects of English Trade with the Levant in the Sixteenth Century', p. 410.

⁵⁶Ralph Davis, 'England and the Mediterranean, 1570-1670', p. 125.

⁵⁷T.S. Willan, 'Some Aspects of English Trade with the Levant in the Sixteenth Century', p. 401; Millard argued the latter date as being 1580. Annie Millard, 'The Import Trade of London 1600 - 1640' (Unpublished Ph.D. thesis, University of London, 1956), Vol. One, pp. 61-2. Millard's thesis is comprised of three volumes. Vol. One includes an appendix which is paginated separately. The second volume is entitled Appendix Two. The third volume is Vol. Two. This is a large, thin volume and is made up of tables. It does not have page, folio or table numbers so references to this volume can be found by referring to the table corresponding to the year being sought.

⁵⁸Ralph Davis, The Rise of the English Shipping Industry, pp. 251-2; K.N. Chaudhuri, The English East India Company, pp. 95-6.

used. By 1583-8, the number had grown to 19. The Company's demand for shipping had increased again by 1600 when it owned 29 ships.⁵⁹ The ships were employed in the carrying trade as well, freighting goods between Mediterranean ports.⁶⁰ It built some of its own vessels in addition to leasing them.⁶¹

The Company, however, proved unable to protect its interests on the long overland caravan route from Southeast Asia and India to the Mediterranean.⁶² At the same time it was becoming clear to the English that the Dutch were making inroads on the Portuguese spice trade and they were alive to the possibility that the Dutch might then control the continental market in Eastern goods. In 1599 the Dutch returned from the East Indies with six ships and English merchants greeted the news with grave concern. Once in control of the market the Dutch, with superior naval technology and financial organizations, would be difficult to dislodge.⁶³

⁵⁹M. Epstein, The Early History of the Levant Company, pp. 217-20.

⁶⁰Ralph Davis, The Rise of the English Shipping Industry, p. 253.

⁶¹A.C. Wood, A History of the Levant Company, p. 17.

⁶²Keay pointed out that sixteenth century calculations determined that if only one sixth of the cargo arrived safely its owners could still expect to reap a profit. John Keay, The Honourable Company, p. 6.

⁶³Philip Lawson, The East India Company, p. 13. One Dutch expedition returned from the East Indies in 1597 and profits were modest. By 1598/9 Dutch trade in the East Indies had rapidly and successfully taken hold so that by the end of 1601 at least 14 fleets totalling 65 ships had sailed to the region. Jonathan I. Israel, Dutch Primacy in World Trade 1585-1740 (Oxford, 1999), pp. 67-8, 72-3. Niels Steensgaard, 'The Companies As a Specific Institution in the History of European Expansion', Leonard Blusse and Femme Gaastra (eds.), Companies and Trade: Essays on Overseas Trading Companies During the Ancien Regime (Leiden, 1981), p. 249. For English East India Company operations see K.N. Chaudhuri, 'The English East India Company in the 17th and 18th Centuries: A Pre-Modern Multinational Organization', *Ibid.*, pp. 29-46.

In response, the East India Company was formed the following year as an off-shoot of the Levant Company. Its expected purpose was to take over the Levant Company's interest in the spices of the East Indian islands by following a sea route and the latter would then continue to concentrate on the durable goods like textiles, gems and silks.⁶⁴ The interests of the Company developed so that by the 1620s ships loaded with bullion and trade goods, some re-exported from the continent, sailed to the Red Sea, Persian Gulf or western India and traded for, primarily, textiles. The ships then traded the textiles in the islands for spices, particularly pepper, before returning home.⁶⁵

Like the Levant Company, the East India Company employed some of the largest ships in England on the route to India, preferring ships of 300-700 tons.⁶⁶ Between one and nine ships belonging to the East India Company set out each year.⁶⁷ Because it took an average of two years overseas before a ship returned to England, these figures under - represent the number of merchantmen employed by this company.⁶⁸ With the exception of 1617, the greater number of yearly voyages occurred after the first decade of the seventeenth century (Table 2.6).⁶⁹

⁶⁴Philip Lawson, The East India Company, p. 16; K.N. Chaudhuri, The English East India Company, p. 12.

⁶⁵Philip Lawson, The East India Company, p. 24.

⁶⁶K.N. Chaudhuri, The English East India Company, pp. 95-6.

⁶⁷Ibid., pp. 226-32.

⁶⁸I wish to thank Dr. Peter Earle for this information.

⁶⁹Annie Millard, 'The Import Trade of London' Vol. One, Appendix, pp. 45-53, Tables XVI and XVII. Table XVII lists ships by name sailing from London and their arrivals back to this port between 1590 and 1604.

TABLE 2.6: SHIPPING OF THE EAST INDIA COMPANY 1601-1640

Year	Ships Sent Out	Ships Returned
1601-1610	18	10
1611-1620	63	25
1621-1630	50	38
1631-1640	37	31

Source: K.N. Chaudhuri, The English East India Company (London, 1965), p. 91.

The Company built all of its vessels until 1639, when the first ship was freighted, apart from less than a dozen ships purchased by the Company early in its history. Its two dockyards were at Deptford and Blackwall, and together they made the Company one of the largest employers in London. The peak in construction occurred between 1610 and 1620, when each dockyard produced over 30 sizable ships. Table 2.6, compiled by K.N. Chaudhuri, clearly suggests that the number of ships required had risen sharply over the preceding decade. 20 more were constructed during the following six years and only half a dozen were built during the remainder of the period, probably a consequence of financial difficulties.⁷⁰

The Eastland and Barbary Companies and the Merchant Adventurers were organized as regulated companies. The regulated company did not of itself trade, but each merchant within the company traded individually, providing his own trading capital and assuming the risk. The members of a regulated company were not restricted in that trade except by general principles which provided the structure and organization of the

⁷⁰K.N. Chaudhuri, The English East India Company, pp. 90-1.

company, its area of trade and at times the nature of the trade. The company's purpose was to ensure that the general principles were abided by, and that the merchants were protected from interlopers. Regulated companies tended to develop for trade that was nearby, where economic conditions were stable and risks minimal.

The joint stock company, on the other hand, like the Russia, Levant and East India Companies, was a centralized company that traded directly through agents within their prescribed area. The members of this type of company were shareholders who received a proportion of the profits. Joint stock companies were developed for long distance commerce, where navigation was more dangerous and the trading risk greater.

Shipping also found employment with pirates and privateers. The former preyed on whatever shipping suggested quick remuneration. The latter is a seventeenth century term but it is frequently used to describe the lawful capture of ships, permissible for two reasons. First, a general proclamation allowed seizures to be made of shipping belonging to countries at war with England. Secondly, a merchant, traveller or shipowner who had been robbed at sea or in a territory at peace with England and who had been unsuccessful in obtaining justice within that region, could receive through the Admiralty Court a letter of reprisal. This granted him the legal right to seize the goods of people from that territory up to a specific sum.⁷¹

Privateering expeditions worked to expand the geographical range frequented by the English as Elizabethans sailed the Atlantic to the West Indies and beyond in search of

⁷¹N.A.M. Rodger, The Safeguard of the Sea, p. 199; Kenneth R. Andrews, Elizabethan Privateering: English Privateering During the Spanish War 1585-1603 (Cambridge, 1964), p. 3.

foreign prizes, particularly Spanish treasure. Some of these expeditions were backed by the wealthy and well-connected, including individuals within government circles. They were, as well, occasionally semi-official, where the Crown invested ships and money and stipulated goals in a venture that might be dominated by private investments and concerns. Privateering was an important means of fighting an enemy because it captured and destroyed its shipping and confiscated specie and trade goods necessary for the waging of war. At the same time privateering activities did not make demands on the Exchequer. Customs were paid on prize goods, and ten per cent of the value on the goods was due to be paid to the Admiral.⁷² The value of these goods was quite extensive during Elizabeth's war with Spain, and estimates suggest that it amounted to 10 to 15 per cent of the country's imports.⁷³

Kenneth Andrews suggested that privateering encouraged the further development of trade as capital came into the hands of those who would then use it for that purpose. He argued that it contributed as well to a shipping boom during the late sixteenth century war with Spain. Expeditions particularly during wartime were quite numerous, and during the Elizabethan conflict with Spain, when privateering was the characteristic form of maritime warfare, there were probably more than 100 such voyages in each year.⁷⁴ Few ships were built specifically for privateering. Most were merchantmen of between

⁷²Kenneth R. Andrews, Elizabethan Privateering, p. 22.

⁷³It appears that Kennedy is referring to the Spanish war of the Elizabethan period. Paul M. Kennedy, The Rise and Fall of British Naval Mastery (London, 1983), p. 33.

⁷⁴Kenneth R. Andrews, Elizabethan Privateering, pp. 4, 6, 32-3.

30 and 300 tons, easily converted with the addition of a few guns and more men.⁷⁵ The vessels might be employed in trading one year, privateering the next, they might combine trade with privateering on the same voyage, or they might be privateering on an ongoing basis because normal trade patterns were interrupted.⁷⁶ While privateers were well-armed, the largest guns were seldom employed. It was not to the privateer's benefit to sink a merchant ship. They seldom met with enemy warships, and they preferred to grapple with the small, more vulnerable merchantmen than with large, well-armed ones. One or two demi-culverins, guns 10 or 12 feet long and firing nine-pound shot, and a dozen and a half of the guns firing 4 and 5 pound shot were common.⁷⁷

Merchant shipping also included two low value-to-bulk trades which made few demands for ordnance, although they did require armament and Royal protection during periods of international conflict.⁷⁸ According to Davis, the east coast coal trade and the fisheries were the two enterprises that provided the main impulses to the expansion of the total tonnage of English shipping during this period so it is important to include them.⁷⁹

The coastal trade was an important element in English shipping. Already

⁷⁵Ibid., p. 34.

⁷⁶Ibid.

⁷⁷The large guns of the men-of-war might fire 20 or 30 or even 60 pounders. Ibid., p. 38.

⁷⁸For example, in 1626 a convoy of ten colliers armed with fourteen guns each and two Royal ships for additional protection was planned. T.S. Willan, English Coasting Trade 1600-1750 (Manchester, 1967), p. 25.

⁷⁹Ralph Davis, The Rise of the English Shipping Industry, p. 4.

considerable prior to this period, before the end of the reign of Elizabeth it had increased to about four times the growing export trade.⁸⁰ An important item was Newcastle coal. Ships used to transport coal along the coast were most likely all built in England.⁸¹ At the same time, international coal shipments were nearly all carried on foreign ships.⁸² Data for coastal shipments of coal will therefore be used to illustrate the increased need of the English coal industry for shipping and the related munitions. Figures provided by John Hatcher suggest that the coal trade by tonnage accounted for 11.1 per cent of total English shipping in 1582 and 27.8 per cent in the period 1609-15. By 1660 43.9 per cent of the tonnage of English shipping was made up of coal.⁸³ Hatcher provided data for the amount by weight of coal shipped from the north east, and as this region produced almost 40 per cent of the coal nationwide in the 1560s and almost half in 1700, shipments from the north east were an important component of demand for ships.⁸⁴ At the same time, production in this region of England increased 14 fold during the above period.⁸⁵ Roughly two thirds of the coal produced in the north east was shipped to other markets in the earlier period, and roughly half was shipped during the latter

⁸⁰G.J. Marcus, A Naval History of England i, p. 55.

⁸¹T.S. Willan, The English Coasting Trade, p. 15.

⁸²Ralph Davis, The Rise of the English Shipping Industry, p. 207.

⁸³John Hatcher, The History of the British Coal Industry i (Oxford, 1993), p. 471, Table 13.1.

⁸⁴*Ibid.*, p. 68, Table 4.1.

⁸⁵*Ibid.*

period.⁸⁶

The tonnage of coal shipped yearly from the north east increased almost ten fold between 1564/70 and 1655-60, from 62,510 tons to 570,810 tons. It had tripled by 1591-5, and had more than doubled again by 1625-30 to 391,010 tons. By 1655-60 the amount of coal shipped annually from north east ports had reached 570,810 tons.⁸⁷

Both the size and the number of ships engaged in this trade were increasing. The average size of a cargo of coal imported into London increased after 1592 from 56 tons to 73 tons in 1606, 83 tons in 1615 and 139 tons in 1638.⁸⁸ In 1592 approximately 1,214 shipments imported 68,080 tons of coal into London. By 1606 approximately 1,978 shipments imported 144,393 tons. The number of shipments remained relatively stable while the tonnage increased substantially to 283,375 by 1638.⁸⁹

Ships employed in the fisheries were predominately, if not entirely, English.⁹⁰

⁸⁶Ibid., p. 68, Table 4.1 and p. 497, Table 14.2.

⁸⁷Ibid, p. 497, Table 14.2.

⁸⁸John Nef, The Rise of the British Coal Industry i (London, 1932), p. 390; T.S. Willan, English Coasting Trade, p. 11; The figures presented by Hatcher for 1377-91, 1508-9 and 1574/5 are 56 tons as well, so that growth in collier size seems to have occurred only after 1592. John Hatcher, The History of the British Coal Industry i, p. 473, Table 13.2.

⁸⁹John Nef, The British Coal Industry ii, Appendix D, Table IV; John Hatcher, The History of the British Coal Industry i, p. 501, Table 14.6. Approximate number of shipments were arrived at by dividing Hatcher's figures for tonnage by Nef's average size of shipment. While Hatcher provided figures for tonnage, only one figure relates to the period under consideration - that for 1574/5. Ibid., p. 473, Table 13.2.

⁹⁰According to Davis, English merchant shipping 'met the requirements of the fisheries' in the North Sea, off the coast of Iceland and increasingly so, the Newfoundland Banks. Ralph Davis, The Rise of the English Shipping Industry, p. 3.

Unfortunately, little information exists to relate the number or the size of the ships participating in this extractive industry. It is thought that the fisheries were depressed during the mid sixteenth century.⁹¹ While the cod banks off of Newfoundland were discovered in 1497 and in 1502 a syndicate known as 'The Company Adventurers to the New Found Land' was formed, English participation here was small until the late sixteenth century.⁹² Religious changes during the reign of Edward VI had reduced the consumption of fish in England. Although revived during the reign of Mary and a return to Catholicism, decline set in once more when the nation returned to Protestantism upon the ascension of the Protestant Queen Elizabeth. No boats belonging to Plymouth appear to have been used for fishing in 1568-9 or in 1570-1. In the early 1570s the number of Bristol boats employed in the Newfoundland fisheries probably only numbered about four small ones. Three Dartmouth boats were employed in the fisheries in 1574 and none in 1575-6.⁹³ Then, the North Sea and the cod fisheries of the Newfoundland Banks all underwent expansion.⁹⁴ W.B. Stephens argued that by the seventeenth century the prosperity of many of the West country ports was based primarily on the cod fisheries

⁹¹Ibid.

⁹²Ralph Greenlee Lounsbury, The British Fishery at Newfoundland 1634-1763 (Yale, 1969), p. 21; G.J. Marcus, A Naval History of England, pp. 25-8.

⁹³Gillian T. Cell, English Enterprise in Newfoundland 1577-1660 (Toronto, 1969), p. 22.

⁹⁴Ralph Davis, The Rise of the English Shipping Industry, p. 3. Innis claimed that the second half of the sixteenth century was a period when the English fisheries expanded, from a position of minor importance in 1550 to one of major importance by 1600. H.A. Innis, The Cod Fisheries (New Haven, 1940), p. 30.

of New England and Newfoundland.⁹⁵ By 1578 40 or 50 boats were probably active in Newfoundland and 50 or 60 boats by 1580.⁹⁶ Fourteen years later the fleet numbered about 100 vessels, and 150 by 1604.⁹⁷ The numbers continued to increase so that during the period 1615-40 200 to 300 ships were active annually.⁹⁸

Gillian Cell thought that the growth in the fisheries was due to increased demand. First, war-time conditions created a demand for a portable protein food like cod that could be carried by troops in the field and stored on ships at sea. Secondly, the Iberian Peninsula market for Newfoundland cod expanded with the same war-time conditions. Finally, the government took measures to encourage the fisheries and so increase both the number of available ships and the number of men with seafaring experience that could be called upon to serve with the Queen's ships when necessary. In order to increase domestic demand the number of fish days was raised from one to two and in order to encourage native shipbuilding, fish could be exported without paying customs if shipped in English vessels.⁹⁹

⁹⁵W.B. Stephens, 'The West Country Ports and the Struggle for the Newfoundland Fisheries in the Seventeenth Century', Percy Russell (ed.), Report and Transactions of the Devonshire Association lxxxviii (1956), pp. 90-1.

⁹⁶Gillian T. Cell, English Enterprise in Newfoundland, pp. 22, 23.

⁹⁷W.B. Stephens, 'The West Country Ports', pp. 90-1; Gillian T. Cell, English Enterprise in Newfoundland, pp. 22, 23.

⁹⁸W.B. Stephens, 'The West Country Ports', pp. 90-1.

⁹⁹Gillian T. Cell, English Enterprise in Newfoundland, p. 23. Cell added, however, that the increase in the number of fish days was essentially not effective because fish days were not observed and Newfoundland fish did not find its way throughout the country. *Ibid.*, p. 26.

TABLE 2.7: SHIPS BELONGING TO THE CROWN - 1500-1640

Year	Tonnage				Galleys (oared vessels)	Total Ships
	1,501-2,000	1,001-1,500	501-1,000	100-500		
1555	-	-	5	21	2	28
1560	-	2	6	18	3	29
1565	-	4	5	15	3	27
1570	-	4	6	10	3	23
1575	-	4	8	8	3	23
1580	-	4	10	7	1	22
1585	-	4	11	7	1	23
1590	-	7	15	14	1	37
1595	-	6	14	15	1	36
1600	-	9	15	10	1	35
1605	-	7	13	10	4	34
1610	1	6	13	10	4	34
1615	1	6	12	10	4	33
1620	1	8	11	9	4	33
1625	1	12	12	9	4	38
1630	1	11	12	14	-	38
1635	1	16	12	12	-	41
1640	2 ^a	15	14	12	-	43

Source and Notes: Jan Glete, Navies and Nations: Warships, Navies and State Building in Europe and America 1500-1860 (Stockholm, 1993) Vol ii, Appendix 2, pp. 549-50.

^aGlete placed one of these two ships as being between 2,501 and 3,000 tons.

The final sector of domestic demand is the Royal fleet. Jan Glete's work was utilized for evidence relating to the size of the Navy at five-year intervals in Table 2.7, and for yearly acquisitions in Table 2.8. Unfortunately, there is no indication from these data as to the quality of the fleet or the number in active commission. However, these

tables do suggest that not only was the Navy permanent throughout the period, but that both the number of ships and the total tonnage increased during this period, albeit inconsistently.

The number of ships in Elizabeth's possession appears to have declined somewhat, however, particularly after 1565 to 22 ships in 1580 and 23 in 1585 and the reduction seems to have been primarily of ships between 100 and 500 tons. The number of ships above that size increased. War preparations after 1585 increased the total by 14 ships so that by 1590 Elizabeth possessed 37, almost half being 100 to 500 tons and almost the same number being 501 to 1,000 tons. Seven of the ships were greater than 1,000 tons. Although 1590 appears to have been a peak year, the numbers of ships remained near this level during the following decade.

Oppenheim thought that James began his reign with a fleet 'fit to go anywhere and do anything' but 'he allowed it to crumble away while spending on it more money during peace than Elizabeth did during war.'¹⁰⁰ James Scott Wheeler argued that rather than purposefully deciding to run down the Navy, 'he simply treated it like most other parts of his government, allowing neglect, peculation, and lack of supervision to rot the fleet.'¹⁰¹ C.D. Penn claimed that 'the Navy (since 1603) had become but a shadow of its former greatness.'¹⁰² There does not appear to have been a decline in the number

¹⁰⁰Michael Oppenheim, Administration of the Royal Navy and of Merchant Shipping in Relation to the Navy: from mdix to mdclx (London, 1896), p. 185.

¹⁰¹James Scott Wheeler, The Making of a World Power: War and the Military Revolution in Seventeenth Century England (Phoenix Mill, 1999), p. 26.

¹⁰²C.D. Penn, The Navy Under the Early Stuarts and Its Influence on English History (Manchester, 1913), p. 10.

TABLE 2.8: SHIPS ADDED TO THE ROYAL NAVY 1556-1640

Year	Number	Total displacement (tons)
1556-60	11	8,000
1561-65	4	5,000
1566-70	4	2,000
1571-75	4	2,000
1576-80	3	2,000
1581-85	6	4,000
1586-90	16	11,000
1591-95	4	2,000
1596-00	8	10,000
1601-5	6	3,000
1606-10	6	6,000
1611-15	4	2,000
1616-20	11	10,000
1621-25	8	8,000
1626-30	17	5,000
1631-35	6	7,000
1636-40	6	4,000

Sources and Notes: Jan Glete, Navies and Nations i, p. 130.

of ships in his possession, however, and large ships remained important. For the first time since 1535 the Crown possessed a ship of between 1,501 and 2,000 tons. Jan Glete argued that the decline was relative, rather than absolute, and had been compared

unfavourably with the naval success of the Netherlands.¹⁰³

By the end of the period the Crown appears to have been in possession of more ships than at any time in the previous 140 years. The increase is noticeable by the beginning of the reign of Charles in 1625 when the Crown possessed five additional ships over the 1620 figure. After 1635 the quality of the fleet improved as well, because along with the addition of five ships, operations became more continuous and so experience grew and this can be attributed for the most part to the funding provided by Ship Money.¹⁰⁴

Traditionally, the number of ships possessed by the Crown had in times of need been supplemented by additional ships belonging to the various maritime communities. At various times levies were distributed to the ports specifying the number and sizes of ships each port was to contribute. The ports were expected to fit out the ships and man them as well. While the system worked well for years, for various reasons this arrangement became less tenable.

The bounty payments on new ships over 100 tons had ceased in 1618, and although re-introduced in 1625, when the bounty was not paid the Crown was unable to exert any influence over the style in which the ship was built. Warships were becoming more specialized, requiring portholes for guns, raised decks and forecastles and more space between decks for the gunners. Merchant ships, therefore, now required costly modifications if they were to be of great use. As well, the requisitioning of ships

¹⁰³Jan Glete, Navies and Nations: Warships, Navies and State Building in Europe and America 1500-1860 i (Stockholm, 1993), p. 132.

¹⁰⁴Kenneth R. Andrews, Ships, Money and Politics: Seafaring and Naval Enterprise in the Reign of Charles I (Cambridge, 1991), p. 152.

hindered trade, and discouraged some from building ships. Finally, ship owners conspired to cut corners when equipping and manning ships called up by levy and so quality was often poor.¹⁰⁵

In 1635 for the first time the whole nation, the inland counties as well as the coastal regions, were called upon to provide money to pay for the support of the Navy. Levies were issued yearly through 1640. The idea was not then new, and had been contemplated first by Elizabeth in 1603 immediately prior to her death. Money was needed to resist the incursion of the Dunkirk pirates, particularly active during the war years. The conclusion of hostilities with Spain and the ascension of a new king interested in peace left the proposal without support.¹⁰⁶

An intermediary step between the ship levies and Ship Money was instigated in 1627. In that year Charles levied a tax of 6d on every chaldron of coal to be transported from Newcastle or Sunderland in order to provide the coal colliers with protection during the wars with Spain and France. The money did not pay for the King's ships, but rather the ships belonged to the members of the community who paid the tax. The tax was not continued the following year as it had been decided to call a Parliament and people were unwilling to pay if the tax might then be overturned by Parliament.¹⁰⁷

In 1634 Charles took the idea one step further by purposefully levying ships larger

¹⁰⁵Andrew Thrush, 'Naval Finance and the Origins and Development of Ship Money', Mark Charles Fissel (ed.), War and Government in Britain, 1598-1650 (Manchester, 1991), p. 136.

¹⁰⁶Ibid., p. 141.

¹⁰⁷Ibid., p. 142.

than those available to the ports. The ports were therefore required to send money instead, with the exception of London, which sent its quota of five ships.¹⁰⁸ It is likely that plans to extend the writs to the whole nation the following year were envisioned at this time. International pressures were mounting, and the amount brought by this levy, although successful, was less than the cost of equipping the fleet.¹⁰⁹

There are a number of reasons why the introduction of Ship Money throughout the country was seen as necessary the following year. Charles had not turned to Parliament during this period for grants of supply. He had ended the Parliament of 1629 without financial satisfaction, and he had then embarked on 11 years of personal rule. While traditional sources of income such as tonnage and poundage, rents and feudal dues enabled him to live without Parliamentary subsidies, this was impossible during periods of conflict.¹¹⁰

While the country may have been at peace, it was not at ease. A threat was posed by the growth of the Dutch, French and Spanish navies. English claims to domination of the Channel were threatened by Cardinal Richelieu's development of the French Navy beginning in 1626. The Dutch, with the largest navy in the world, threatened or hindered English trading interests, particularly in the East Indies and in the North Sea fisheries. In the 1620s Spanish activity in the Channel increased as conflict with the

¹⁰⁸Ibid., p. 145.

¹⁰⁹Kevin Sharpe, The Personal Rule of Charles I (London, 1992), p. 554.

¹¹⁰Roger Lockyer, The Early Stuarts: A Political History of England 1603- 1642 (London, 1989), p. 231. It should be noted that Parliament had not granted Tonnage and Poundage to Charles at the opening of his reign, as was tradition.

Netherlands resumed. As well, England was at war with both France and Spain during the latter half of the decade.

Ship Money was also seen as necessary to combat the incursion of pirates, a particular problem during periods of international conflict. Dunkirk pirates again made an appearance during the war years of 1625-30, Barbary corsairs from the middle of James's reign and pirates from Salée by the early 1630s.¹¹¹

Kevin Sharpe argued that 'Ship Money indeed, for all its problems, must qualify as one of the most successful taxes, indeed governmental enterprises, in early modern history.'¹¹² The first three levies brought in about £190,000 a year.¹¹³ Thereafter disillusion, distrust, plague and hardship set in which worked to increase collection times and decrease the amount of money generated. The Ship Money fleets had not been able to protect shipping and the coastal regions from pirates. Problems in Scotland explain an air of uncertainty. In 1638 only £40,000 had been collected, 60 per cent of a much smaller sum charged. Money continued to be delivered, however, and 1639 saw a much better collection rate. This may have been a response of the Treaty of Berwick, which brought promise of the end of the conflict in Scotland. By the end of the year only £16,739 was owing of the £69,750 charged. In 1640 \$55,690, or 80 per cent, had been collected. The collapse came the following and final year when only £53,000 of the

¹¹¹Andrew Thrush, 'Naval Finance', p. 137.

¹¹²Kevin Sharpe, The Personal Rule of Charles I, p. 585.

¹¹³Roger Lockyer, The Early Stuarts, p. 265.

£210,000 charged was collected.¹¹⁴ Although the judges had ruled the levy legal during an emergency, it was not intended to be an annual tax and so they had been hesitant to imprison debtors for failure to pay. Goods were confiscated but this proved of little value when they could not be sold. According to Sharpe the greatest block to its collection was the expectation of the calling of Parliament. 'Ship Money', Sharpe added, 'was perceived to be again on trial and by most condemned in anticipation of parliament's judgment.'¹¹⁵

There is nothing to suggest from the data above that domestic demand, or total supply, declined during the period from the accession of Queen Elizabeth to the Civil War. Davis suggested that total shipping more than doubled from 1572-1629 (Table 2.3). Each monarch during this period built or re-built very nearly the same number of ships as a yearly average over each successive reign so that, all factors being equal, demand for munitions probably averaged out to be fairly consistent. Essentially every activity requiring ships made use of more of them, and larger ships as well. This translates into a growing demand, and hence, supply of munitions. If the additional requirements were not fulfilled by foreign countries, and it will be shown that they were not, then the products must have been produced domestically, in increasing amounts.

¹¹⁴Kevin Sharpe, The Personal Rule of Charles I, p. 589.

¹¹⁵Ibid., p. 591.

III

The previous section demonstrated that domestic demand, or total supply, grew in essentially every sector of shipping. This section will establish that the proportion of imports to total supply declined for the industries studied. Cordage, sailcloth and gunpowder along with the related raw materials will be examined individually as the methodology for each case differs. The first commodity to be examined will be cordage, which was the general description used for all forms of rope, cord, lines and twines.¹¹⁶

The domestic cordage industry dates back to at least the early years of the thirteenth century when Bridport was granted a charter to supply the Royal Navy with cordage. By 1388 the industry had spread outward from there to the Tyne. Evidence from wills clearly demonstrates that ropes were being manufactured during the medieval and early modern periods in and about London as well.¹¹⁷ D.M. Loades argued that Bridport ropemaking had declined by 1530, possibly because it had priced itself out of the market.¹¹⁸ Geraint Jenkins, however, thought that by the end of the sixteenth century

¹¹⁶Geraint Jenkins, The Craft Industries (London, 1972), p. 19.

¹¹⁷There are numerous references to the Ropery, in All Hallows, in wills and probate inventories. For example, To Johanna Vyel, her [Isabella Bokrel] sister, quitrents in the ropery. Reginald R. Sharpe (ed.), Calendar of Wills Proved and Enrolled in the Court of Hustings, London i (London, 1889), p. 49. To Stephen de Preston a shop in the ropery (footnoted, 'in Corderia'). Ibid., p. 284; John Braghing, corder, 'tenement in the Ropery, London'. Ibid., p. 698; Richard de Wycombe, corder, '...he leaves to each of his apprentices in the ropery 10s...' Ibid., ii, pp. 19-20; Alex Davidson, ropemaker. Marc Fitch (ed.), Index to Testamentary Records in the Commissary Court of London iii (London, 1985), p. 117; Ralph Giles, ropemaker. Ibid., p. 167.

¹¹⁸D.M. Loades, The Tudor Navy: An Administrative, Political and Military History (Aldershot, Hants., 1992), p. 87.

Bridport still had a virtual monopoly of rope production in England.¹¹⁹

In order to determine that cordage was import substituted during this period, it is necessary to bear in mind that the total supply of cordage was increasing. This was discussed above. In this case, if imports of cordage were stable or declining during the period, then import substitution must have been occurring. Data for the import trade into London as recorded in the London port books and collated by Annie Millard were utilized for this purpose because London was receiving the bulk of cordage imported from overseas.¹²⁰

Much of what we know about sixteenth and seventeenth century English trade was extracted from the records of customs paid at the various English ports, for modern trade statistics only started in 1696 with the ledgers of the Inspectors-General of Imports and Exports. For summary information on trade prior to this period historians can refer to the annual customs accounts enrolled in the Office of the Kings Remembrancer¹²¹ but for detail, they need to turn to the port books.¹²² Blank parchment books were first distributed in 1565 to three Royal customs officials of each port - the controller, customer or collector and searcher - in an attempt to prevent fraud on the customs. Customs receipts were particularly important to the Crown because they were a major

¹¹⁹Geraint Jenkins, The Craft Industries, pp. 15, 16.

¹²⁰For a yearly comparison of the profits of the custom and subsidy for cordage for five towns and cities 1592-1595, see B.L. Lansdowne MSS. 78, 86. Annie Millard, 'The Import Trade of London'.

¹²¹P.R.O. E356.

¹²²P.R.O. E190.

source of royal revenue and moreover, their collection did not require Parliamentary approval. The port officials were each required to record within the books assigned to them overseas and coastal trade transactions. Additional books were issued to officials in the port of London for some individual goods and for goods imported by nationality, specifically alien¹²³ and English. Each port book entry recorded the port of destination or origin, the names of the ship, captain and merchants and a description of trade items. The customer and controller books also recorded the amount of customs paid and the value of the product. The books were then returned to the Exchequer at the end of the accounting year. With the exception of interruptions during the Civil War and the Interregnum the port books continued until 1799 when the series was ended by a Treasury order.¹²⁴ While the purpose of the port book was limited, the historian can derive a great deal of information about trade from them.

There are a number of problems which need to be borne in mind when attempting to draw conclusions from import data. Those listed below are general, rather than relating specifically to cordage. Firstly, there are great gaps in the series of port books. Some of the books that do survive are too badly damaged for the public to handle. Others show mould or water damage severe enough to make pages or parts of pages

¹²³Aliens were those who were born in a foreign country. The Crown awarded some of these individuals certain rights of citizenship. These denizens paid the same overseas customs rates as the aliens, however. Children of immigrants born in England were normally thought of as foreign as well so all of these groups of individuals will be referred to simply as 'aliens'.

¹²⁴D.M. Woodward, 'Short Guide to Records: Port Books', History lv, no. 184 (1970), p. 208.

unreadable. Many of the available books show imports by aliens and denizens alone. A complete series of imports into England is simply not available.¹²⁵

Secondly, it is impossible to estimate the amount of merchandise that was smuggled. Incidences of smuggling by merchants are recorded in other sources only for those individuals unfortunate enough to be caught.¹²⁶ Customs officials, as well, may have been accepting bribes or pocketing some of the duties paid in order to supplement their somewhat meagre wages.

Historians have discussed and debated the extent to which smuggling occurred rather extensively in the literature but it is a subject which allows no firm conclusion to be drawn. Some feel that the incidence of smuggling was so frequent that it greatly reduces the value of the port books as commercial statistics. N.J. Williams argued, for example, that probably at least a half of the trading between England and France in the sixteenth century was illicit.¹²⁷

These historians claimed that officials were bribed, absent or were themselves smuggling, merchants unloaded and loaded by cover of night, documents were falsified and goods belonging to alien merchants, which paid a higher rate of customs, were passed off as native.¹²⁸ Smugglers may have been seeking to evade the customs

¹²⁵G.N. Clark, Guide to English Commercial Statistics 1696-1782 (London, 1938), p. 54.

¹²⁶See, for example, Acts of the Privy Council (hereafter APC) and CSPD passim.

¹²⁷N.J. Williams, 'Francis Shaxton and the Elizabethan Port Books' The English Historical Review lxxvi, no. 260 (1951), p. 393.

¹²⁸N.J. Williams, 'Francis Shaxton and the Elizabethan Port Books', pp. 387-95; N.J. Williams, The Maritime Trade of the East Anglian Ports 1550-1590 (Oxford, 1988), pp. 25-7, 41-49. G.D. Ramsay, 'The Smugglers' Trade: A Neglected Aspect of English

payment, were shipping goods which required a licence or which were prohibited from exportation or importation, were shipping to a region banned from trade or were seeking to trade with a region controlled by a company trading with a monopoly granted by the Crown. If a customs official was smuggling or enabling the illicit activity to take place, he may have been trying to augment his wages.

The volume of smuggling probably varied over time and between ports. If trade barriers were added or removed or the amount of customs due to be paid increased or decreased, both legitimate trade and smuggling might increase or decrease accordingly. Total supply would not decline. Some ports were probably more conducive to illicit trade because of their location or because the effort and honesty of the customs officers varied.¹²⁹ London was under a higher level of scrutiny than the outports and so smuggling may have been less common there.¹³⁰

D.M. Woodward argued that 'it is clear the port books do not provide trade statistics but only a record of a part of the trade passing through particular ports.' He warned the users of port books to be on their guard but does not discard port books out of hand. 'The port books may not provide an accurate series of data, but without them it would be extremely difficult, and often impossible, to make any meaningful statement about the

Commercial Development' Transactions of the Royal Historical Society 5th series, ii (London, 1952), pp. 137-157; D.M. Woodward, 'Short Guide to Records: Port Books', pp. 209-10.

¹²⁹D.M. Woodward, 'Short Guide to Records: Port Books', p. 210.

¹³⁰Brian Dietz (ed.), The Port and Trade of Early Elizabethan London Documents (London Records Society, 1972), p. xii.

development of trade, especially in the sixteenth and seventeenth centuries'.¹³¹

Others felt that while smuggling undoubtedly occurred, contemporary accounts of the extent of smuggling was frequently exaggerated.¹³² As Peter Ramsey put it, 'In Tudor England it never rained but it poured.'¹³³ He added that trading companies would be unwilling to lose prestige and privilege by becoming involved in illicit trade.¹³⁴ The overwhelming majority of apprehensions were for goods of less than £20, and cases of large-scale smuggling were rare. Many cases proved unfounded after investigation and few customs officers were ever convicted of smuggling or fraud.¹³⁵

Historians justify this position by suggesting that smuggling was generally not cost effective. They argue that goods most frequently smuggled were the high-value to bulk items or goods prohibited from trade, thereby leaving most of English trade untouched. Bulky and heavy commodities like Baltic products and cloth, the latter dominating the English export trade during this period, made smuggling burdensome, being difficult to load and unload undetected.¹³⁶

¹³¹D.M. Woodward, 'Short Guide to Records: Port Books', p. 210.

¹³²Henryk Zins, England and the Baltic, pp. 154-5.

¹³³Peter Ramsey, 'Overseas Trade in the Reign of Henry VII: the Evidence of Customs Accounts', Econ. Hist. Rev. 2nd series, vi, no. 2 (1953), p. 175.

¹³⁴*Ibid.*, p. 176.

¹³⁵*Ibid.*, p. 175.

¹³⁶Baltic goods listed by Zins as too heavy and bulky for convenient smuggling include: pitch, tar, timber, cables, iron, grain, wax and potash. Henryk Zins, England and the Baltic, pp. 154-5. W.B. Stephens, 'The Exchequer Port Books as a Source for the History of the English Cloth Trade', Textile History i, no. 2 (1969), p. 209; E.M. Carus-Wilson and O. Coleman, England's Export Trade (Oxford, 1963), pp. 21-22;

Historians have argued that smuggling was not cost effective because customs duties were not high, bribes had to be paid and detection, resulting in the confiscation of goods, was very possible. The probability that low customs duties acted as a deterrent to smuggling was frequently mentioned in the literature.¹³⁷ The customs duties on goods were at most five per cent of the officially rated values.¹³⁸ The goods were appraised and recorded in the Book of Rates and the values given to them were adjusted at the beginning of this period (1558) and then only once more during this period -1603. As the period was one of rapid inflation, the goods were, in reality, taxed at a rate much less than five per cent of their market values.

The benefits to be gained by avoiding the payment of customs duties could easily be offset by the additional costs incurred in smuggling. There were a number of officials at any port who would need to be bribed very heavily to ensure their collaboration. Accomplices, as well, would have to be paid wages. Ramsey thought 'It was hardly worth their while to do so.'¹³⁹

A greater cost of smuggling, of course, was the possibility of getting caught. Detection would result in the confiscation of the smuggled goods, half the value of which would be awarded to the individual raising the alarm and the other half to the Crown.

G.N. Clark, Guide to English Commercial Statistics, p. 34; Brian Dietz (ed.), The Port and Trade of Elizabethan London, p. xiv; T.S. Willan, A Tudor Book of Rates (Manchester, 1962), pp. xvii-xviii.

¹³⁷E.M. Carus-Wilson and O. Coleman, England's Export Trade, pp. 18-43; W.B. Stephens, 'The Exchequer Port Books', p. 209; Peter Ramsey, 'Overseas Trade', p. 176.

¹³⁸Brian Dietz (ed.), The Port and Trade of Elizabethan London, p. xi.

¹³⁹Peter Ramsey, 'Overseas Trade', p. 176.

The customs officials, far from being obvious accomplices, had, therefore, a personal interest in the apprehension of smugglers.¹⁴⁰ Informers, as well, were happy to report the activity in return for a share of the goods if the customs official did not.¹⁴¹ Others seem to have had a vested interest in restricting the activities of smugglers. Henryk Zins argued that because the customs were a very important part of Royal income, the Crown was concerned to see that the system operated efficiently. As well, the governors of the trading companies, anxious to restrict interloping into the monopoly trade granted to them by patent, were also interested in seeing a high level of customs control.¹⁴² Fraudulent collusion with the customs officers must have been made more difficult because the system of customs control required several customs officers to independently record the trade data.¹⁴³

It was, then, probably cheaper to trade through legitimate channels than to pay out bribes to customs officials, wages to accomplices, and run the risk of confiscation.¹⁴⁴ If that was the case then it is reasonable to suppose that the port books recorded most of the trade passing through the ports. Brian Dietz argued that ‘The evidence does not...provide conclusive proof of widespread smuggling by merchants or of endemic

¹⁴⁰Ibid., p. 176; Henryk Zins, England and the Baltic, pp. 154-5.

¹⁴¹Henryk Zins, England and the Baltic, pp. 154-5.

¹⁴²Ibid.

¹⁴³Ibid.

¹⁴⁴Peter Ramsey, ‘Overseas Trade’, p. 176.

fraud by officials.¹⁴⁵ Williams, while adamantly opposed to the use of port books for statistical purposes, argued that smuggling was much more prevalent in the outports than in London because ‘the port of London was too complex, too near the centre of administration to allow merchants to pass uncustomed goods up and down the Thames and expect to remain undetected for long.’¹⁴⁶ He added that the figures in the coastal port books ‘are generally nearer the truth than those for foreign trade...’¹⁴⁷

A third problem is that reading the port books can be laborious because the entries, particularly during the sixteenth century, were written in a mix of Latin, English and Norman French which Woodward described as ‘a kind of dog Latin.’¹⁴⁸ Words were spelled phonetically, making names, in particular, variable. Königsberg, for example, might be written as Quenborough or variations of this.¹⁴⁹ There are, as well, numerous abbreviations of weights and measures. Much of the amounts and values were recorded in the less familiar Roman numerals, which slowly changed to Arabic as the seventeenth century wore on.

Fourthly, the source does not mention the quality of the product. The valuations

¹⁴⁵Brian Dietz (ed.), The Port and Trade of Elizabethan London, p. xiii.

¹⁴⁶N.J. Williams, The Maritime Trade of the East Anglian Ports 1550-1590, pp. 25-6.

¹⁴⁷Ibid., p. 47.

¹⁴⁸D.M. Woodward, ‘Short Guide to Records: Port Books’, p. 208.

¹⁴⁹D.M. Woodward, ‘Short Guide to Records: Port Books’, p. 209. The handwriting, as well, is at times difficult to read. Astrid Friis pointed out that uneven handwriting might be due to the quality of the parchment, as one Bristol customs clerk wrote at the end of the first quarter of 1621, ‘God send better parchment or none at all for money.’ Astrid Friis, Alderman Cockayne’s Project and the Cloth Trade: The Commercial Policy of England in its Main Aspects 1603-1625 (London, 1927), p. 440.

recorded were not market values but rather the official valuations as recorded in the Book of Rates and they made no allowance for varying degrees of quality. If the imported value increased it may be that the only good available was of a higher calibre. However, it is expected that the Naval and Ordnance offices maintained specific minimum requirements of quality. If they bought higher quality products than what they traditionally bought it may be that only the better quality was available.

Fifthly, the ships' destinations when recorded in the port books may not be reliable. Ships frequently traded with more than one port and multiple destinations were not listed. As well, a different destination, rather than the actual one, might have been recorded if the ship was destined for a region at war with England or where trade was dominated by a company with monopoly rights.¹⁵⁰

In the case of coastal port books which recorded the trade between two domestic ports, it was not necessary to record some types of goods. Goods shipped between domestic ports were issued with either cocquets or transpires. Cocquets were required when there was a substantial risk of loss of customs revenue. They were issued for goods that would be liable to a high rate of duty if exported, for especially large cargoes, for those on long voyages and for goods whose export was prohibited. A transpire was used for goods of low value, such as slate and stone, carried short distances. Goods carried by cocquet were always recorded in the port books, while those with transpires

¹⁵⁰Sven-Erik Astrom, 'The Reliability of the English Port Books' The Scandinavian Economic History Review xvi, no. 2 (1968), pp. 130-1.

were often not. The practice varied from port to port.¹⁵¹

Finally, imports were recorded in the port books by ship and by merchant so that in order to arrive at the total imports for a particular good for a particular year, the entire book must be examined and the various entries for that product added up. There was a lack of standardization for recording the weights and measures of various items and so conversion is necessary. The specific identification of some measures are no longer known. Local names for the same type of cloth varied and changed over time.¹⁵² Ships and destinations were not always identified in every entry, and so it is necessary to scan back through the various entries in order to find the names. The information may have been recorded in the book distributed in the previous year and if that book is missing, the information may no longer be available.¹⁵³ As well, ships with the same name were common. The London port books tend to be bulky, and the historian examining these books is not to be envied. Only one book has been published.¹⁵⁴ As a result historians, hesitant to spend the time ploughing through the various entries, rely to a great extent on the material collected by Millard.¹⁵⁵

In spite of the problems associated with using port books for quantitative evidence, historians find much useful information that can be gleaned from them. Zins argued that:

¹⁵¹J.H. Andrews, 'Two Problems in the Interpretation of the Port Books' Econ. Hist. Rev. 2nd series, ix, no. 1 (1956-7), p. 120.

¹⁵²W.B. Stephens, 'The Exchequer Port Books', p. 211.

¹⁵³Ibid.

¹⁵⁴Brian Dietz (ed.), The Port and Trade of Elizabethan London, Documents.

¹⁵⁵Annie Millard, 'The Import Trade of London'.

‘ despite these various reservations the English port books form an invaluable source material, enabling us to make a more exact analysis of the main trends of English foreign trade, its character, dimensions and directions.’¹⁵⁶

D.M. Woodward stated that port books would be useful to historians of industrial development because the import of raw materials and the export of finished goods can be traced.¹⁵⁷ Millard claimed that the development of national industries can be derived from port books.¹⁵⁸ Stephens thought that ‘the port books provide more information, in more usable a form than any other type of record for the history of the English cloth trade.’¹⁵⁹

It is necessary to say something about the monetary valuations for the figures from the port books and the method whereby it was possible to increase the number of years for which there are totals. All import data are here presented in pounds sterling at 1604 Book of Rates valuations. As stated above, the Crown affixed a specific value on each product in 1558 for tax assessment and then changed the rates in 1604.¹⁶⁰ The values listed, then, do not necessarily reflect the market value of the item. They are, however, a measure of quantity expressed in money values and so are valid for purposes of

¹⁵⁶Henryk Zins, England and the Baltic, p. 154.

¹⁵⁷D.M. Woodward, ‘Short Guide to Records: Port Books’, p. 209.

¹⁵⁸Annie Millard, ‘The Import Trade of London’, i, Appendix, p. 2.

¹⁵⁹W.B. Stephens, ‘The Exchequer Port Books’, p. 212.

¹⁶⁰Queen Mary’s Book of Rates 1558: B.L. Lansdowne MSS. 3, 70; 1604 Book of Rates: E122 173/3; enrolled Memoranda Rolls, P.R.O. E159 427 m.301 et.seq.

comparison. Millard listed imports for 1565 in 1558 values only (Vol. Two). These figures were converted into 1604 values by multiplying by 1.39, the difference between the 1559/60 figures with 1558 values in Vol. Two and the 1604 values for that year in Appendix Two Table 3.

Two of the totals are essentially a compilation of two years. The figures for 1621/22 were derived by combining imports by English merchants for 1620/21 with imports by alien merchants for 1621/22. The same was done for 1633/34, when alien imports for the year 1632/33 was combined with English imports for 1633/34.

Total imports of cordage and the percentage of cordage imported to manufactured goods and to total imports for these years will now be presented in order to demonstrate that the proportion of imports to total supply was declining. The findings will be supported by additional import data from English and from alien merchants separately. Imports by merchant group are not available for the years 1559/60 and 1564/65. Few years in early modern English overseas trade could truly be called typical. It is expected, however, that with the additional data from English and alien imports, trends will become evident.

It may be seen from Tables 2.9 and 2.10 that the import substitution of cordage was probably occurring during this period. Table 2.9 suggests that imports were increasing up until at least the early 1620s and then declined to a very low level in the 1630s. This conclusion is supported by the evidence cited in Table 2.10, which suggests that imports of cordage by English and alien merchants were in decline by the early 1620s. Data are available for imports by English merchants for only three of the months in 1604. If this

TABLE 2.9: IMPORTS OF CORDAGE INTO LONDON AT 1604 BOOK OF RATES VALUATIONS 1)AS A PER CENT OF IMPORTED MANUFACTURED GOODS AND 2)AS A PER CENT OF TOTAL IMPORTS 1559/60 - 1639/40

Year	Value (£)	(1) (%)	(2) (%)
1559/60	3,202	0.83	0.37
1564/5	3,835	1.03	0.59
1621/2	5,209	1.04	0.4
1633/4	213	0.05	0.01
1639/40	140	0.03	0

Source: Annie Millard, 'The Import Trade of London'. Appendix Two, Table 3 and Vol. Two for £ values.

figure was adjusted to a full year this would yield a value of £12,471.¹⁶¹ By contrast, the last four observations for this group are all less than £1,000.

The data on alien imports are more variable. However, of the first six years for which we have data, three have a value in excess of £200 while for three of the last four observations there were no alien imports. According to the above figures for cordage, then, the three decades after the turn of the seventeenth century may have seen the peak level of imports of this product.

The level of imports of cordage does not appear to be contingent upon imports of

¹⁶¹Import data for munitions by English merchants in 1604 is available for October, November and December only. Very rough values for the full year were created by dividing £71,207, the total of imports by English merchants for the three months, by £631,885, the total imported by this group for the full year 1603/04. Annie Millard, 'The Import Trade of London,' Appendix Two, Table 1 for total for year, Appendix Two, Table A, p. 1 for imports of cordage and for total for three months by English merchants. The three-month figure for cordage was then multiplied by the resulting 8.87.

TABLE 2.10: IMPORTS OF CORDAGE INTO LONDON BY ENGLISH AND ALIEN MERCHANTS AT 1604 BOOK OF RATES VALUATIONS
1)AS A PER CENT OF IMPORTED MANUFACTURED GOODS AND 2)AS A PER CENT OF TOTAL IMPORTS FOR THE MERCHANTS SPECIFIED
1568 - 1639/40

Year	English			Alien		
	value (£)	(1)	(2)	value (£)	(1)	(2)
1599/1600				17		
1604 ^a	1,406	4.36	1.97			
1608/09				385	0.18	0.11
1610/11				207	0.1	0.06
1614/15				37	0.02	0.01
1616/17				2		
1620/21	4,742	1.35	0.45			
1621/22				467	0.31	0.19
1623/4				0		
1625/6 ^b	124	0.06	0.02			
1626/7				48	0.04	0.03
1629/30	956	0.3	0.09			
1632/3				0		
1633/4	213	0.07	0.02			
1639/40	140	0.04	0.01	0		

Source and Notes: Annie Millard, 'The Import Trade of London' vol. Two, for £ values and for totals. ^aThree months: 29 September to 29 December 1604. ^bTen months: 29 Dec. 1625 - 4 Nov. 1626.

either manufactured goods or imports as a whole. The proportions of cordage to both total manufactured imports and total imports follow the same pattern. The first three

observations in Table 2.9 are substantially higher than the final two observations when the proportion of cordage to manufactured imports is below 0.1% and that for total imports barely registers. Proportions by English merchants in Table 2.10 declined and reached their lowest point at the end of the period, with values below 0.05%. Proportions by alien merchants only registered for one of the final four observations, and the proportions for that year were below 1/2 of 1%. It appears, then, that domestically produced cordage was substituting for imports during the years after 1621/2.¹⁶²

Cable yarn is a semi-manufactured material that provides further evidence for the import substitution of cordage. The yarn was created by spinning the prepared hemp fibres. They then need only to be laid into rope and tarred if desired. Spinning was one of the most skilled of all processes in the rope yard.¹⁶³ If import substitution of cordage was occurring during this period, it would be expected that the simpler steps in the production process were being accomplished domestically first. Therefore, it would be expected that imports of cable yarn would increase, at least initially. Table 2.11 examines imports of cable yarn by English merchants.¹⁶⁴ It suggests that cable yarn was not imported at the beginning of the period. Because rope production was not new to England, the initial absence of imports of cable yarn suggests that available labour and skill was sufficient for local needs. Domestic production and possibly domestic demand

¹⁶²There is no evidence in the outport port books to suggest that substantial amounts of cordage were entering England via the outports, rather than through London.

¹⁶³Geraint Jenkins, The Craft Industries, p. 21.

¹⁶⁴Alien imports of cable yarn were negligible with the exception of one year - 1610/11, when £2,233 worth were imported. The data for this year includes all yarn, however. Annie Millard, 'The Import Trade of London', Volume Two.

TABLE 2.11: TOTAL IMPORTS OF CABLE YARN INTO LONDON AND IMPORTS BY ENGLISH MERCHANTS AT 1604 BOOK OF RATES VALUATIONS 1)AS A PER CENT OF IMPORTED SEMI - MANUFACTURED AND RAW GOODS AND 2)AS A PER CENT OF TOTAL IMPORTS 1559/60 - 1639/40

Year	Total			English		
	Value (£)	(1)	(2)	Value (£)	(1)	(2)
1559/60	0					
1564/5	0					
1604 ^a				1,566	6.59	2.2
1620/1				435	0.1	0.04
1621/2	501	0.11	0.04			
1625/6 ^b				0		
1629/30				1,332	0.26	0.13
1633/4	5,004	0.61	0.27	4,099	0.66	0.31
1639/40	1,297	0.15	0.08	1,297	0.16	0.09

Source and Notes: Annie Millard, 'Import Trade of London,' Vol. Two for £ values. ^aThree months: 29 September to 29 December 1604. ^bTen months: 29 December 1625 to 4 November 1626.

may have expanded enough that imports of the semi-manufactured good were feasible and practical as yarn was certainly imported during the first half of the seventeenth century. A minimum of £1,566 was imported in 1604, and this figure came to £5,004 in 1633/34. The figure then declined to £1,297 in 1639/40, making a pattern difficult to detect. The important point to notice, however, is that there is no evidence to suggest that yarns were imported before 1604, and that thereafter significant amounts were.

The raw material, hemp, was used to manufacture sailcloth as well as cordage. Sailcloth, then, will be examined next and hemp will follow. Canvas had a large variety

of purposes. It was used to throw over the tilts of wagons and barges and as wadding for cartouches (cartridges). It was manufactured into sacks, coarse clothing and sailcloth. The Navy used canvas principally for making into sails and it is for this purpose that this thesis is interested. Various types of canvas were made into sails during this period, most commonly medrinacks, poldavis, noyalls and Ipswich sailcloth, the names referring to the regions of origin. The first two types were the most common. There is little evidence to suggest that these types of canvas were used for anything else but sailcloth.

Both qualitative and quantitative evidence suggests that sailcloth was import substituted during this period. As with cordage, the port books were used to demonstrate quantitatively that imported canvas constituted a declining proportion of total supply. Millard's data on the import trade of London were again utilized because the bulk of imported goods flowed first through the port of London. London carried over four-fifths of the nation's overseas trade at the beginning of the period¹⁶⁵ and increased to about 90 per cent around 1650.¹⁶⁶ The data for overseas trade into London, however, are not sufficient in themselves to prove that sailcloth was increasingly being manufactured in England for Millard's figures for canvas are not itemized by type.¹⁶⁷ Movements

¹⁶⁵L. Stone, 'Elizabethan Overseas Trade' Econ. Hist. Rev. 2nd series, ii, no. 1 (1949-50), p. 36.

¹⁶⁶Dietz is referring specifically to the cloth trade here, of which cloth dominated the export trade. Brian Dietz, 'Overseas Trade and Metropolitan Growth' in A.L. Beier and R. Finlay (ed.), The Making of the Metropolis: London, 1500-1700 (London, 1986), p. 119.

¹⁶⁷Annie Millard, 'The Import Trade of London,' *passim*.

of these types of canvas between Ipswich, a centre of shipbuilding and the only developing centre of sailcloth production in England, and London as recorded in the Ipswich Coastal Port Books demonstrate more clearly that sailcloth was import substituted.¹⁶⁸ This section will now look at the qualitative evidence and then the two sets of trade figures.

The qualitative evidence suggests that the production of canvas for sailcloth was new to England during the latter half of the sixteenth century. The literature which describes the early history of this industry does so primarily through the stories of a very few key individuals.¹⁶⁹ The earliest attempt to produce sailcloth domestically was probably made by John Orwell and Peter Tort (sic) in 1547. In that year officials of Edward VI paid the two men and three other Bretons £94 16s 1d for their charges and for 12 pieces of poldavis made by them.¹⁷⁰ Joan Thirsk thought they probably settled in Ipswich, as Orwell's name associates him with the Orwell estuary in and about that town.¹⁷¹ This area then became the centre of poldavis and medrinack production in England.¹⁷²

Eric Kerridge suggested that John Collins of Ipswich may have been the first man

¹⁶⁸P.R.O. E190 587/2 - 605/12.

¹⁶⁹See, in particular, Joan Thirsk, Economic Policy and Projects (Oxford, 1978), pp. 40-41 and Eric Kerridge, Textile Manufactures in Early Modern England (Manchester, 1985), p. 123.

¹⁷⁰P.R.O. E351 2194.

¹⁷¹Joan Thirsk, Economic Policy, p. 40.

¹⁷²Eric Kerridge, Textile Manufactures, p. 123.

in England to weave poldavis and medrinacks.¹⁷³ His presence there in 1558 apparently hindered two other promoters of the industry who were supported by the Royal government. In that year Queen Mary loaned £100 to poldavis weavers Francis Owdrey and William Blackwall upon surety to produce sailcloth in Ipswich. They found Collins and his brother Richard already producing in that town. Owdrey and Blackwall were then restricted to buying supplies by contract with the Collins brothers.¹⁷⁴ £40 of the loan was repaid in two payments in 1560 but the remainder was never collected.¹⁷⁵ The Collins brothers obtained a patent to make poldavis and medrinacks in 1574 and John was given rights of search and seal in the area around Ipswich and Woodbridge.¹⁷⁶ John was clearly active a year later, shipping poldavis to other regions in England.¹⁷⁷ The Port Books do not suggest that the Collins brothers were in any way monopolistic, however, for other individuals were trading at least by 1565, either for themselves or, more likely, for a number of producers.

Two quantitative sources - the overseas inward bound port books of London and the London and Ipswich coastal port books - support the notion that canvas was being import substituted during this period. Import data into London as shown in Table 2.12 were

¹⁷³Ibid, p. 123.

¹⁷⁴Ibid.

¹⁷⁵P.R.O. E351 2197, 2198.

¹⁷⁶Eric Kerridge, Textile Manufactures, p. 123. 'Search and seal' normally referred to the rights of an individual to examine the pieces of cloth, and then to affix a seal to it, signifying that it met quality standards.

¹⁷⁷P.R.O. E190 590/11.

TABLE 2.12: IMPORTS OF CANVAS INTO LONDON AT 1604 BOOK OF RATES VALUATIONS 1)AS A PER CENT OF IMPORTED MANUFACTURED GOODS AND 2)AS A PER CENT OF TOTAL IMPORTS 1559/60 - 1639/40

Year	Values (£)	(1)	(2)
1559/60	54,310	14.36	6.37
1564/5	44,652	11.95	6.88
1621/2	36,605	7.33	2.83
1633/4	33,189	7.51	2.16
1639/40	40,583	8.7	2.41

Sources: Annie Millard, 'Import Trade of London' Vol. Two, Appendix Two Table 3 for £ values.

drawn from Millard's work. As a result of her method of grouping all canvases together, it is impossible to determine whether canvas specifically destined for manufacturing into sails was import substituted. Her data do suggest, however, that total imports of canvas in general were declining until the final period when imports again rose, although not as high as in the mid sixteenth century. It can also be seen that the relative importance of canvas to the import trade was declining. The proportion of this product to total manufactured goods and total imports declined significantly by at least 1621/22, from more than 14 per cent of manufactured goods in 1559/60 to less than 8 per cent, and from 6.37 per cent of total goods in 1559/60 to under 3 per cent.

A closer examination of imports by English and alien merchants for various years from 1599/1600 does not provide additional evidence that canvas was import substituted. Imports of canvas by aliens almost tripled from 1599/1600 to 1639/40 when canvas

valued at £13,392 was shipped to London.¹⁷⁸ Monetary values of canvas imported by English merchants do not show any sort of defensible pattern.¹⁷⁹ While Table 2.12 supports the notion that the import substitution of canvas was occurring, it tells us little about sailcloth. A stronger argument for the import substitution of this product can be made from evidence found in the coastal port books recording trade between London and Ipswich.

Coastal trade, although recorded in different port books from overseas, contained much the same sorts of information. No duties were collected on the goods because if they had been imported, they would already have paid. The purpose of recording coastal trade and issuing cocquets or transires was to ensure that the goods went to the English or Welsh port stipulated and not overseas.¹⁸⁰

The London and Ipswich coastal port books suggest that an increasing proportion of total supply was acquired from domestic sources rather than overseas. In order to demonstrate this, it is necessary to examine the movements of canvas between London and Ipswich, determine that canvas sent from London was itself imported from overseas and finally, demonstrate that the canvas shipped was sailcloth and not some other product.

Table 2.13 shows the volume of trade in canvas between London and Ipswich in

¹⁷⁸Annie Millard, 'The Import Trade of London' Vol. Two.

¹⁷⁹Computations based on import figures in Annie Millard, 'The Import Trade of London' Vol. 2.

¹⁸⁰W. B. Stephens, 'The Exchequer Port Books', p. 210.

numbers of pieces.¹⁸¹ A change in the direction of canvas shipments can clearly be detected by comparing columns two, three and four. Shipments from London to Ipswich declined from 403 pieces in 1565/6 to a complete cessation by 1603/4, while shipments from Ipswich to London increased by leaps and bounds from a negligible seven pieces in 1565/6 to 157 less than a decade later. By 1585/6 the figure was well over a thousand. Fifteen years later it had more than doubled over the 1585/6 figure, clearly indicating that imports were making up a declining proportion of total supply in both London and Ipswich. The net flow from Ipswich to London appears to have changed from a negative to a positive flow in 1579/80.

It is likely that shipments from London originated overseas. There is nothing to suggest that London or for that matter any region in England other than the Ipswich area

¹⁸¹Conversion was necessary, for some canvas was measured by pack, bolt, bale, bundle and truss. The piece was about 24 yards in length and 1 3/4 yards in breadth. R.E. Zupko, Dictionary of English Weights and Measures (Madison, 1968), p. 123. The term 'roll' was occasionally used in place of the piece as a measure and so one roll is counted as one piece here. Ibid., p. 145. The ell was generally 1 1/4 yard. Ibid., p. 53. There are, then, approximately 19 ells to the piece. The pack was generally 10 pieces. Ibid., p. 115. The size of a bolt depended on the quality and weight of the good being shipped. Ibid., p. 21. A bolt is estimated here at 1 1/2 pieces. It was recorded as 38 yards in P.R.O. E351 2274; 33 yards in P.R.O. E351 2270 and equal to a piece in P.R.O. E351 2232. A bale also varied but probably averaged 296 yards, or 12 1/3 pieces. See, for example P.R.O. E351 2227; 2262; 2270; 2276 for this measure of a bale. This measure is rounded to 12 pieces to the bale here. Truss, trussell and bundle were essentially the same measure. Trussell, or bundle, was the amount of cloth that formed a convenient bundle. R.E. Zupko, Dictionary, p. 174. Short cloths shipped overseas from Ipswich contained an average of 17 pieces to the trussell and so this measure is used here. P.R.O. E190 603/2. Three of the seldom used fardells were listed as together containing 5 short cloths and so 1 2/3 pieces to the fardell is used here. P.R.O. E190 603/2.

**TABLE 2.13: CANVAS SHIPPED BETWEEN LONDON AND IPSWICH
(IN NUMBERS OF PIECES) 1565/6 - 1642/3^a**

Year	to London from Ipswich	to Ipswich from London	Net flow to London
1565/6	7	403	-396
1569/70	16	445	-429
1574/5	157	233	-66
1575/6	53	354	-301
1576/7	124	361	-237
1577/8	115	460	-345
1578/9	107	278	-171
1579/80 ^b	412	124	+288
1585/6 ^b	1,452	102	+1,350
1588/9	1,230	754	+476
1591/2	1,845	3	+1,842
1595/6	1,906	110	+1,796
1600/1	3,472	87	+3,385
1603/4	2,180	0	+2,180
1618/9	2,460	0	+2,460
1628/9	2,017	0	+2,017
1636/7	641	0	+641
1638/9	225	0	+225
1641/2	140	6	+134
1642/3	165	0	+165

Source and Notes: P.R.O. E190 6/8, 18/1, 163, 15/5, 587/2 - 605/12. ^aConversions of measure are as stated in f.n. 177. The London coastal port book for 1587/8 was omitted here because it recorded merchandise on inward-bound ships only. It is interesting to note that sailcloth does not appear. Either Ipswich was not able to meet the increased demand from London as well as its own, or the order was made and filled late in 1588. P.R.O. E163 15/5. Canvas includes goods recorded as canvas, sailcloth, poldavis and medrinacks. The exact dates for the years vary, some being from Easter to Easter, some Christmas to Christmas and some Michaelmas to Michaelmas. ^bThis figure was arrived at by doubling the six month figure available for this year. The dates were significant and so they were included here. P.R.O. E190 593/2.

was a centre of sailcloth production during the second half of the sixteenth century.¹⁸²

Secondly, overseas imports of canvas into London continued throughout the period, and it is unlikely that London-manufactured canvas of comparable quality would have been sent to the provinces while foreign canvas was imported into London.

Finally, canvas shipped from Ipswich was almost without exception listed by the piece. Canvas shipped from London to Ipswich was sent by the 'fardell', 'pack', 'truss', 'ell' and less frequently, 'pece'. Canvas imported into London from overseas was recorded by the ell, bolt and truss as well as piece.¹⁸³ This difference in the nomenclature suggests that the 'piece' was the common English measure of canvas, and imported canvas was quite often measured differently.

Canvas shipped from Ipswich to London was almost entirely of the sorts used for sails - predominately medrenacks, with some poldavis and some pieces listed simply as sailcloth. Additionally, small amounts were listed as canvas. The canvas shipped from London was noted only by the generic 'canvas' and so it is impossible to determine what sorts were shipped. However, the number of pieces shipped from London to Ipswich declined during the same period that shipments of sailcloth types out of Ipswich increased. It is highly likely, then, that the canvas shipped to Ipswich from London was predominately of the same type, sent to supply shipbuilders in the area, and the

¹⁸²Some striped canvas was produced in London beginning around the 1560s, (Eric Kerridge, *Textile Manufactures* p. 123) and this product, when imported, was recorded in the London port books as 'striped canvas'. There is no mention of striped canvas in the Ipswich port books. It is unclear, of course, whether all striped canvas was recorded as such.

¹⁸³See, for example, P.R.O. E190 3/2, 8/1 and 15/5.

developing domestic sailcloth industry successfully competed with external sources.

It can be shown, then, that sailcloth was almost certainly import substituted during the second half of the sixteenth century. Ipswich developed its sailcloth industry during this period and the process was essentially complete before the arrival of the Spanish Armada. Imports of foreign sailcloth via London were no longer needed to supply the local shipbuilding industry. Ipswich could now provide for the domestic market over and above its own local needs.

Both sailcloth and cordage were produced from hemp. It must be noted that hemp was used for various sorts of canvas which was then made into a wide variety of articles such as shirts and sacks. However, if sailcloth and cordage were being import substituted, a greater demand would be placed on this product. Either imports of hemp, domestic cultivation or both must have increased.

While some of the hemp needed was grown domestically, it was necessary to import much of it because English soil was generally unsuitable to its cultivation. Most of the hemp originated in the Baltic region.¹⁸⁴ Almost 90 per cent of the Baltic hemp was transported in English ships from Polish ports, originally from Danzig, and after 1580 it arrived from Elbing when the Eastland Company had established their staple there. Some was shipped from Narva during the years from 1563-1574, and hemp was shipped from Konigsberg and Riga towards the end of the century as well.¹⁸⁵ The Baltic supplied 77 per cent of the hemp entering London in the years 1620-1, 1625-30, and

¹⁸⁴Henryk Zins, England and the Baltic, p. 222.

¹⁸⁵Ibid., p. 223.

TABLE 2.14: TOTAL IMPORTS OF HEMP INTO LONDON AND IMPORTS BY ENGLISH MERCHANTS AT 1604 BOOK OF RATES VALUATIONS 1)AS A PER CENT OF IMPORTED SEMI-MANUFACTURED AND RAW MATERIALS AND 2)AS A PER CENT OF TOTAL IMPORTS 1559/60 - 1639/40

Year	Total			English		
	Value (£)	(1)	(2)	Value (£)	(1)	(2)
1559/60	4,572	2.62	0.53			
1564/5	5,613	3.69	0.86			
1604 ^a				137	4.79	1.6
1620/1				20,062	4.97	1.92
1621/2	22,179	4.85	1.72			
1625/6 ^b				12,363	5.37	1.69
1629/30				11,810	2.3	1.11
1633/4	17,500	2.6	1.14	15,679	2.51	1.19
1639/40	25,228	2.91	1.5	24,313	2.99	1.68

Source and notes: Annie Millard, 'The Import Trade of London' Appendix Two, Table 3 and Vol. Two for £ values. ^aData are for three months. ^bData are for ten months.

1633-4.¹⁸⁶ Data from the port books for the import trade into London as recorded in Millard's thesis were used in Table 2.14 to examine levels of imports as there is no way to determine output from domestic cultivation.

Table 2.14 suggests that imports of hemp increased during each period for which data exist except for one year -1633/34 -when the figure was still almost four times the figure of £4,570 for 1559/1560. While a pattern can not be deduced from the

¹⁸⁶J.K. Fedorowicz, England's Baltic Trade, p. 52. Zins, quoting Beveridge, claimed that the majority of hemp then came from Russia from 1621 onwards. W. Beveridge, Prices and Wages in England (London, 1939), p. 635. Henryk Zins, England and the Baltic, p. 278.

TABLE 2.15: IMPORTS OF HEMP FROM THE BALTIC 1600-1649 (LASTS)

Year	Total
1600-9	2,890
1610-19	3,483
1620-9	10,056
1630-9	12,083
1640-9	13,082

Source: J.K. Fedorowicz, England's Baltic Trade in the Early Seventeenth Century (Cambridge, 1980), p. 110. ³Fedorowicz stated that one last equals six shippounds. *Ibid.*, p. 108. The shippound was a unit of weight used in the Baltic trade, and equalled roughly 200 to 300 lbs. The Compact Edition of the Oxford English Dictionary ii (Oxford, 1971), p. 2,790.

proportions of hemp to raw and semi - manufactured materials, the proportions of hemp to total imports increased over the original period as well. This table suggests as well that imports by English merchants increased dramatically during the period, although inconsistently. Imports for 1604 may have been around £1,215,¹⁸⁷ and the highest recorded figure occurred in 1639/40 when £24,313 was imported. Alien imports of hemp were not included because a pattern is not recognizable.¹⁸⁸ We are forced to rely on total imports and imports by English, which strongly suggest that imports were

¹⁸⁷Import data for October, November and December only. Very rough values for the full year were created by dividing £71,210, the total of imports by English merchants for the three months, by £631,885, the total imported by this group for the full year 1603/04. The three-month figure for hemp was then multiplied by the resulting 8.87. Annie Millard, 'The Import Trade of London' Appendix Two Table 1 and Vol. Two.

¹⁸⁸Alien imports of hemp totalled £3,061 in 1599/1600 and £470 in 1608/0. Thereafter, imports averaged £1,500 for years available until 1639/40 when £915 were imported. *Ibid.*, Vol. Two.

growing.

J.K. Fedorowicz utilized the Sound Toll Registers to compile the figures in Table 2.15 for hemp passing through the Baltic on its way to England. The figures show significant growth in imports of the raw material, particularly from 1620. Because the Baltic was such an important source of hemp his figures have particular relevance for the argument that sailcloth and cordage were import substituted during this period.

Evidence suggesting that gunpowder was import substituted during this period was derived from qualitative sources and from government purchase records. The literature on gunpowder, principally the Victoria County Histories, pays scant attention to gunpowder production prior to the reign of Elizabeth. References to this earlier period simply state that production was carried out domestically since the fourteenth century although the primary source of supply was overseas. The initial development of the domestic gunpowder industry is said to date from the mid sixteenth century.¹⁸⁹ In 1555, production became water powered and in 1561 the English learned how to make the most important raw material, saltpetre, thus freeing dependence on foreign supplies of this material.

The qualitative sources, principally the State papers and the Acts of the Privy Council, reflect concerns with existing stocks, anticipating demand and arranging future supplies. They are particularly useful for identifying years when gunpowder was

¹⁸⁹Malden, H.E. (ed.), The Victorian History of the County of Surrey ii (London, 1905), pp. 306-7; Jenny West, Gunpowder, Government and War in the Mid Eighteenth Century (Irthlingborough, Northants., 1991), pp. 1-3. West is probably referring to the application of waterpower to gunpowder production.

imported from overseas. It is striking that there are numerous references to foreign supplies during the reign of Elizabeth, but with one exception reference to overseas supplies are no longer in evidence during the remainder of the period under question.¹⁹⁰

No trade pattern for gunpowder can be gleaned from the port books as there are few entries. Lieutenant of the Ordnance accounts and debenture books, therefore, were used to examine the sources of gunpowder supplies used by domestic consumers. The Ordnance Office during this period received and distributed guns, gunpowder and other related supplies. It was effectively under the control of the Lieutenant, who received treasury payments and writs for the issue of stores, inspected fortifications and designed new ones. The accounts kept by the Lieutenant provide an almost unbroken record of these purchases.¹⁹¹ Purchased powder is differentiated in the accounts from powder made domestically with the King or Queen's saltpetre, and reference is occasionally made to powder purchased overseas. Powder purchases were no longer recorded in the accounts after 1624, when payments for gunpowder appear to have been made directly from the Exchequer, and so data for the remaining years were drawn from the Debenture books. These ledgers are a record of the receipt of goods and services for the Office of the Ordnance and cover the years from 1593 to 1640.¹⁹²

The Ordnance Office without doubt purchased the bulk of this product and so its

¹⁹⁰See, for example, P.R.O. SP12 1/31, 7/4, 5, 95/84, 115/7, 147/50, 183/78, 195/112, 213/48, 216/71, 224/28, 110, 225/45, 253/103, 254/64. The exception is for the years 1627 and 1628, when Philip Burlamachi imported gunpowder. P.R.O. SP16 56/38.

¹⁹¹P.R.O. E351 2614-63.

¹⁹²P.R.O. WO49 17-75.

purchasing patterns may suggest national trends. Also, the output of most of the domestically produced gunpowder can be ascertained from these sources for most years following 1588. A monopoly to produce gunpowder was initially granted in that year to George and John Evelyn, who were expected to sell, when paid promptly, all of the powder they manufactured to the government. Outside of temporary licences granted to the East India Company and another small producer, all other domestic gunpowder manufacturers were, to some degree, suppressed until 1641 when the monopoly ended. Finally, by 1637 when imports of gunpowder were forbidden, the government became the only legal supplier of this product and so the source of all gunpowder, foreign or domestic, can then be determined. As a result of monopoly production being tied to government purchasing and the restriction on imports, other domestic consumers needed to buy their supplies, directly or indirectly, from the Royal stores.

There are problems inherent in using government records for this purpose. Firstly, information relating to the sources of gunpowder purchased by the government is complete only for the period after 1593. Secondly, the records tells us little about the sources of gunpowder bought by other consumers before 1635, the year when the Crown became sole manufacturer and wholesale distributor of gunpowder in England. Nothing can be said of illegally imported or domestically manufactured gunpowder. The only known infringements of the monopoly are of those individuals who, like the smugglers, were unfortunate enough to be caught. Finally, when payments for powder were delayed the contract gave the manufacturers the right to sell the powder to private parties. It is difficult to determine the extent to which this might have occurred. In spite of these

**TABLE 2.16: AMOUNTS (LBS) OF FOREIGN AND DOMESTIC
GUNPOWDER PURCHASED BY THE ORDNANCE OFFICE AND
PROPORTIONS TO TOTAL 1547 - 1563**

Year	Total	Foreign Powder		Domestic Powder		% of Powder Identified
	lbs	lbs	% of total	lbs	% of total	
1547-53	334,451	141,222	42	153,600	46	88
1557	329,407	140,717	43	165,600	50	93
1559-61	336,150	48,000	14	276,000	82	96
1563	30,568			5,245		

Source: P.R.O. E351 2614-6, P.R.O. SP12 7/5.

problems, the sources of gunpowder delivered into the Ordnance stores can be used to demonstrate that import substitution has occurred.

Table 2.16 was derived from a document in the State Papers entitled 'Provisions to be made overseas' and from the Lieutenant of the Ordnance accounts. The table provides amounts of both imported and domestically produced gunpowder purchased by the Ordnance Office prior to and at the beginning of the period under consideration and the proportions of each to total powder. During the years 1547 to 1553, 42 per cent of the gunpowder can be identified as foreign, as compared to 46 per cent identified as domestic. The figures for 1557 are similar. For the years 1559 to 1561, foreign powder made up only 14 per cent while 82 per cent was domestic. From 1562 until 1592 the sources for gunpowder are incomplete. Data for the year 1563 clearly demonstrate the problem. Gunpowder was purchased overseas at numerous times during these years but it is impossible to determine what proportion of total purchases was made up of imports

and what proportion was domestic. In 1592 the Evelyns' contract becomes visible in the records and the powder can now be identified as domestically produced. Debenture books beginning in 1593 faithfully record the source of each purchase of gunpowder.¹⁹³ Further overseas purchases occurred in 1595 and 1596, when the source of all the gunpowder purchased by the government can now be identified on a yearly basis. A paltry 318 lbs were purchased in 1604 and the final purchase overseas occurred in 1627 and 1628. In 1627 26 per cent of total supply was foreign, or 135 lbs, and 14 per cent, or 30,000 lbs, the following year.

Purchases of gunpowder from foreign suppliers were numerous and frequent before the turn of the seventeenth century. The relative absence of overseas supplies after that date suggests that gunpowder had in fact been import substituted.

Gunpowder was composed of three raw materials: saltpetre, or potassium nitrate, six parts, brimstone, or sulphur, one part and ash, or coal powder, one part. Brimstone was never difficult to procure overseas, although at times it became quite expensive. The procurement of ashes was only a problem when soap makers hoarded available supplies. Saltpetre, however, was the dominant ingredient and the most difficult to acquire and so the story of gunpowder is closely intertwined with that of saltpetre. Saltpetre, excluding small amounts sold to the goldsmiths for use in their industry, went exclusively into the production of gunpowder.

¹⁹³P.R.O. WO 49/17 - 76. P.R.O. E351 Lieutenant of the Ordnance reports record gunpowder purchased through 1625. The accounts overlap from 1593 to 1625 so that the totals can be compared. The similarities of the accounts during this period suggest a reliable continuity.

Saltpetre occurs naturally in the soil in places such as India and Persia, but not in England. It can, however, be produced artificially and so once the knowledge was acquired, domestic supplies became available. First, soil rich in animal urine was collected from covered places out of reach of the snow and rain. Sites such as outhouses, dove-cotes and barns were thought to be the closest to ideal although the urine of those 'whiche drink either wyne or strong beer' was recommended.¹⁹⁴ The soil was then loaded into barrels or tubs and moved by cart to some central location for further processing. Lime, preferably made from oyster shells, and wood-ash was then added to the soil. The compound was watered with urine and mixed repeatedly, and the salt began to crystallize.

If gunpowder was being import substituted, there must have been a growing demand for this raw material. As in the case of hemp, total supply, whether imported and/or produced domestically, must have increased.

The evidence clearly suggests that domestic production increased and imports remained significant. There was probably no domestic production of saltpetre prior to 1561, when Englishmen were instructed in the art.¹⁹⁵ Once production began, the saltpetremakers were expected to sell their produce to the official powder maker/s so it is possible to trace what should be the greater part of their output. In 1589 saltpetremen delivered 65,236 lbs to the gunpowder makers.¹⁹⁶ Between 1623 and 1637 an

¹⁹⁴P.R.O. SP12 16/29. The original spelling was retained while the capital letters were normalized on this and all following quotes.

¹⁹⁵Malden, H.E. (ed.), The Victoria History of the County of Surrey ii, p. 307.

¹⁹⁶P.R.O. SP12 227/3.

approximate average of 313,200 lbs of saltpetre were produced yearly in England and delivered through the appropriate official channels.¹⁹⁷ By 1637 saltpetre makers were contracted to produce 433,200 lbs yearly with a further 240,000 lbs hopefully coming from overseas.¹⁹⁸

Imports of saltpetre remained significant during this period. Like gunpowder, it is necessary to rely during the earlier part of the period on the supposition that the Crown was the most important consumer. With this in mind, some understanding of import levels prior to 1560 can be achieved by examining Ordnance Office purchase records (Table 2.16). The saltpetre necessary for domestic production before this date came from overseas. At least 115,200 lbs of saltpetre was imported during the years 1547 - 53 for an average of 19,200 lbs yearly and 124,200 lbs for 1557. During the years 1559-61 at least 207,000 lbs of saltpetre was needed, or 103,500 lbs per year, although some of this may have been produced domestically.¹⁹⁹ By 1637:

‘all the saltpetre made in the Kingdom is not enough by above 40 lasts (96,000 lbs) to make the proportion of powder which the maker is by contract to make [yearly]’.²⁰⁰

¹⁹⁷John Evelyn, the gunpowder maker, complained in 1637 that for the previous 14 years the saltpetremen had failed to deliver to him 1,680,000 lbs. of saltpetre. The contracted rate below was multiplied by 14. Evelyn’s figure was then deducted from this total and the result was divided by 14 for an average yearly production figure. P.R.O. SP 16/292/76.

¹⁹⁸P.R.O. SP16 292/76.

¹⁹⁹See Table 2.15. The figures for saltpetre are 3/4 the total for domestically produced powder. The figures was probably higher because first, wastage may have claimed a further 1/4. Secondly, they only represent Crown purchases.

²⁰⁰P.R.O. SP16 292/97.

The contractor more often than not met his quota and so this saltpetre was imported, primarily from the East Indies and Barbary.

The total supply of saltpetre, then, increased significantly during this period as a result of the demands made by the domestic gunpowder industry. Trends in overseas and domestic supplies support the contention that gunpowder was import substituted during this period.

IV

In conclusion, in order to demonstrate that cordage, sailcloth and gunpowder were import substituted, it was necessary first to determine that total supply was either static or growing. Had supply been declining, then decreasing levels of imports of the product under question would not have shown that domestic production was capturing an increasing proportion of total supply. All of the goods considered were used on ships; sailcloth exclusively, cordage and gunpowder less so. While it is impossible to determine what proportion of the cordage and powder was used on the ocean as compared to land, it does not seem unreasonable to assume that large cables were employed primarily on ships. Gunpowder was expended on land, but it had important uses on the sea as well. Naval warfare had come into its own by the Elizabethan era and shipping found cannon a necessary means of defense. Therefore, shipping was used as a proxy for domestic demand.

Once it had been established that total supply was growing, it was then possible to

examine each of the three industries and the related raw materials and demonstrate that each product was import substituted. The methodology used varied for each commodity. Port books provided the evidence to demonstrate that cordage and sailcloth were import substituted. Overseas imports of cordage increased to a peak and then declined to a very low level by the third decade of the seventeenth century. Cable yarn, the semi-manufactured product, does not appear to have been imported at the beginning of the period but imports were certainly in existence during the first half of the seventeenth century. Shipments of foreign produced canvas sent to Ipswich via London had fallen off entirely by 1602-3 at the same time that the growth of the sailcloth industry around Ipswich was becoming evident in the coastal port books. Imports of the raw material used in both products, hemp, increased substantially during the period.

In order to prove that gunpowder was import substituted, it was necessary to use the records of the largest consumer, the Royal Ordnance Office. The Ordnance Office reports and debenture books are useful for demonstrating that powder was sought overseas on a regular basis until the advent of the seventeenth century. Then, imported supplies were rare and, by the end of the period, not even legal. Domestic saltpetre production developed in response to domestic demand but, failing to meet orders, imports of this vital raw material remained substantial. Both the quantitative and the qualitative evidence presented in this chapter demonstrates that the industries examined above were but infants which grew up during the Elizabethan and early Stuart period.

CHAPTER THREE

CROWN AND CONTEMPORARY ARGUMENTS FOR THE IMPORT SUBSTITUTION OF SAILCLOTH, CORDAGE AND GUNPOWDER

I

Chapter One explained that both the historians of the mercantilist school of thought and its critics argued that the Crown became active in the economy partly to defend and protect the country from hostile foreign powers. As a result, the government attempted to raise money, encouraged shipbuilding and the training of seamen and developed the munitions industries domestically. The Crown was concerned that foreign supplies and suppliers of munitions were unreliable and so a domestic supply was crucial to prepare for times of war. Historians tend to rely on the justifications in the preambles of statutes, proclamations, petitions and grants of monopoly plus expressions of interest in miscellaneous state papers in an effort to demonstrate that the Crown wanted to establish the munitions industries for strategic purposes.¹

There are problems inherent to these sources, however, as they may be proclaiming what the Crown said it wanted to do and this may not be an accurate reflection of its

¹Of those historians using primary sources to discuss gunpowder, cordage and sailcloth, the state papers were used most frequently. See, for example, Nesta Evans, The East Anglian Linen Industry: Rural Industry and Local Economy, 1500-1850 (Aldershot, 1985), pp. 51-4. Eric Kerridge relied more on the Acts of the Privy Council (hereafter APC) and various papers from manuscript collections. Eric Kerridge, Textile Manufactures in Early Modern England (Manchester, 1985), pp. 123-4.

intentions. This chapter will examine the explanations put forth by the Crown and subjects for establishing and then controlling the domestic munitions industries. It might be expected that the conclusions drawn in this chapter would support the arguments found in the literature, and that there would be a discrepancy between what the Crown claimed they wanted to do, what they did do, and why they did it.

The government provided two reasons for procuring gunpowder, sailcloth and cordage. The first was that these goods, and particularly gunpowder, provided security against invasion and depredations committed by the overseas enemies of England. Secondly, the Crown wanted to thwart domestic unrest. There are a number of reasons, however, for why the Crown would want to, or should, invest time, money and effort in the actual production of munitions domestically. The Crown may have been concerned that during periods of war supplies might be intercepted by the enemies. Secondly, the supplier may become the enemy of England and so refuse to trade. In addition, suppliers at war with another power would require these vital goods themselves and so might not have allowed their export. The Crown may also have wanted to increase domestic employment in order to reduce domestic unrest and to increase the wealth within the realm so that it would have available a reserve of funds from which it could draw when necessary. The Crown may have then wanted to control the industries in order to oversee quality and suppress the unlawful elements of society. Finally, the Crown may have wanted to reduce the cost of procuring these goods and perhaps profit from these industries as well. It is this final point which is absent in the literature and is the interest of this thesis. The first part of this chapter will examine the sources and evaluate their

usefulness for this purpose. The second part will examine the extent to which the Crown believed first of all that cordage, sailcloth and gunpowder were vital military goods. Finally, this chapter will examine the reasons provided by the Crown and subjects for why these goods should be manufactured domestically.

II

The very nature of the primary sources makes it difficult to know where the Crown's real interests lay. The justifications in the preambles of parliamentary statutes, Royal proclamations and grants of monopoly were written for a purpose. That purpose was probably not to inform but to convince others of the necessity or desire to act. Their inclusion was meant to convince the public that the government would remedy an existing problem.² Enforcement of Crown initiatives was limited for it depended, for the most part, on the government's ability to persuade minor officials and the public at large of the need for a particular action. Early modern English governments prior to the Civil War did not possess a standing army and police outside of the Royal bodyguards, the Yeomen of the Guard and the Gentlemen of the Pensioners (about 100 each). As well, county militias, in theory comprised of all able-bodied men between the ages of 16 and 60, were expected to be armed and trained and could be called upon to repel invasion and suppress rebellion. The Crown also had available the retinues of leading nobles and gentlemen and

²Paul L. Hughes and James F. Larkin (eds.), Tudor Royal Proclamations i (New Haven, 1964), pp. xxvi-ii.

could hire mercenaries as well.³ These forces, however, did not exist for the purpose of enforcing general day-to-day law and order. Statutes, proclamations and occasionally the acts of the Privy Council therefore tended to include a rationalization for their existence to encourage justices of the peace and other individuals to comply. While this method of administration may have been the bane of early modern Crown officials, it does provide the historian with some explanation for their actions.

Other important sources utilized by historians are grants of monopoly and monopoly proposals and petitions. Like the statutes and proclamations, grants of monopoly tend to include justification for their award. Justification could prove useful for keeping interlopers at bay and for appeasing members of Parliament who opposed these grants and that is probably why they were included. Again, then, the reasons have only limited use in determining why the Crown was interested in cordage, sailcloth and gunpowder. A slightly better source for understanding Crown motivation might be the monopoly proposals. Subjects interested in acquiring a monopoly grant often drew up a proposal for a project in writing for presentation to the king or other high official. These were naturally worded in such a way as to attract the attention of the Crown. While the reasons presented may not be an accurate reflection of Crown interests, they are at least

³D.M. Palliser, The Age of Elizabeth: England Under the Later Tudors 1547 - 1603 (London, 1992), p. 361. See, as well, Michael Hawkins, 'The Government: Its Role and Its Aims', Conrad Russell (ed.), The Origins of the English Civil War (London, 1981), pp. 44-5, 54-5; Ann Hughes, 'Local History and the Origins of the Civil War' Richard Cust and Ann Hughes (eds.), Conflict in Early Stuart England: Studies in Religion and Politics 1603-1642 (London, 1989), p. 234; J.S. Morrill, The Revolt of the Provinces: Conservatives and Radicals in the English Civil War 1630-1650 (London, 1980), pp. 14-31.

an accurate reflection of what contemporaries thought Crown interests were. The historian using this source, then, would need to assume that the subject writing the proposal really did know what they were.

Finally, the sheer bulk of material available in the Acts of the Privy Council and the State Papers would lead one to suspect that cordage, sailcloth and gunpowder were vital to the survival of the state. Unfortunately, these two sources seldom provide explanations for Crown interest. As well, the mere existence of proclamations and other directives made for these goods is taken as evidence that the Crown was interested in them and that interest is normally taken to be strategic.

While all of these sources do provide possible explanations for Crown actions, they should be used with caution. They were not written with the intent of informing either the population of early modern England or future economic historians of their motives. It will be interesting, however, to see whether a close examination of these sources related to cordage, sailcloth and gunpowder conform to conclusions already drawn. Did the Crown believe in the strategic value of cordage and sailcloth as well as gunpowder? And did the Crown claim an interest in these goods in order to reduce reliance on foreign suppliers? It is to the former issue that this chapter will now turn.

III

There is ample evidence to show that both the Crown and subjects believed gunpowder, cordage and sailcloth were strategically important to England and to her

enemies. They were the 'chefe juels of his Majestie.'⁴ When a country was at war it was common to attempt to restrict supplies of commodities deemed vital from reaching the opponent. This meant that exports of what the Crown felt were vital were disallowed, and foreign ships trading munitions with the enemy could be justifiably captured as prize. Lists were drawn up so that mariners and port officials would be aware of what was considered contraband. These lists consistently included such items as sailcloth, cordage, gunpowder and the associated raw materials.⁵ Contemporaries agreed that military goods included:

'all ammunition for the defence of our cuntry, and for the offence of our enemies, as horses, armes, powder, cannon, muskets, bullets, match, and all provision for shipping, as planks, timber, masts, pitch, cordage, iron, sailcloth and the like...'⁶

Ordnance, cordage, sails and anchor were thought to be so valuable that when an enemy ship was captured, it was customary to award to the captain the best piece of ordnance, to the master the best cable and anchor, and to some others, sails.⁷ If a foreign ship ran aground in the Cinque Ports, the best anchor and cable went to the Lord Warden.⁸ Powder, in particular, was felt to be so important that the English were forbidden to sell

⁴The quote refers to the provision of cordage for the Navy. P.R.O. SP14 12/30.

⁵See, for example, James F. Larkin and Paul L. Hughes (eds.), Stuart Royal Proclamations i (Oxford, 1973), pp. 206, 575; James F. Larkin (ed.), Stuart Royal Proclamations ii (Oxford, 1983), p. 209.

⁶Lewes Roberts, 'The Treasure of Traffike or a Discourse of Forraigne Trade,' J.R. McCulloch (ed.), Early English Tracts on Commerce (London, 1952), pp. 77-8.

⁷P.R.O. SP16 173/8.

⁸P.R.O. SP16 223/34.

it to the Irish, and anyone making powder or the raw material, saltpetre, in Ireland was to be executed.⁹

Other directives were issued in order, it was claimed, to maintain weapons and gunpowder in the armouries in order to train the county militias to defend their region and suppress rebellion. It was argued in 1617 that supplies of saltpetre for the Royal stores, merchant ships and 'all inwarde uses at musters and otherwise' were necessary for the 'defence and safety' of England.¹⁰ A patent was issued to the Earl of Worcester in 1618 'for furnishing the realme with saltpetre as shall be necessary for the defence and safety of the same, and for merchant ships, plus musters.'¹¹

There is much less evidence available to suggest that the Crown and subjects felt that the development of native cordage and sailcloth industries were necessary for national security. These concerns are noticeable prior to the reign of Elizabeth when Philip and Mary demonstrated interest in the domestic production of sailcloth. The setting up of the industry was considered 'a thinge very commodiouse for this realme to be practised and hadd in vse' although it is not clear that the reason was defence or to reduce reliance on foreign suppliers.¹² The domestic cultivation of hemp would somehow mean the 'better

⁹J.S. Brewer and William Bullen, (eds.), Calendar of the Carew Manuscripts 1575-88 ii (London, 1868), pp. 285, 369.

¹⁰APC August 1616-December 1617, p. 253.

¹¹Ibid., January 1618-June 1619, pp. 247-8.

¹²John Bruce (ed.), Verney Papers Down to the end of the Year 1639 (Camden Society, London, 1853), p. 93.

furnishinge her Majesties Navye Royall...with good and sufficient cordage.’¹³

The English Crown and subjects clearly believed that cordage, sailcloth and gunpowder were munitions vital to the security of a country. They had good reason to fear attack by hostile powers and by pirates and privateers preying on English shipping during this period. Domestic unrest, as well, could spell doom for a monarchy and the quiet enjoyment of property. Given that the Crown was well aware of the strategic value of munitions, it will now be interesting to see what explanations were put forth by the Crown and subjects for establishing and then controlling the domestic munitions industries.

IV

Reasons provided by the Crown and subjects for establishing the cordage, sailcloth and gunpowder industries domestically refer first to problems procuring the goods overseas, then providing employment for the more destitute members of society. Thirdly, both the quality of the finished good and those who might have access to it should be controlled. Finally, financial reasons were provided. Domestic production would make available a less expensive product and improve the balance of payments. An essay written in 1600 by an unknown hand and endorsed by Secretary Cecil entitled, ‘Remembrance of certaine benefitts to Her Majestie and her highnes subjects, by the making saltpetre and gunpowder within this realm,’ outlines in seven points all of the

¹³P.R.O. SP12 282/63.

above reasons bar one why gunpowder should be made domestically.¹⁴ This essay was utilized here to highlight these points. The same reasons have been argued by others for the development of the sailcloth and cordage industries.

The Crown and subjects argued that problems arose procuring munitions overseas as anticipated they would be, above. Firstly, it was argued that supplies might be consumed in a foreign region during a period of conflict and so leave nothing for exportation to England. Secondly, the vital goods might be intercepted in transit by a third party. They might, as well, be lost due to shipwreck or finally, foreign supplies might be cut off because the supplier might become the enemy. The first two points of the 'Remembrance' refer directly to the problems procuring from overseas suppliers.

The first point made is that there is security when the state has the means to defend itself 'and offend the common enemies.' Otherwise, the Crown has to depend on foreign princes who have in the past refused to export for any price. The example used in the 'Remembrance' refers to attempts in 1595 to buy powder from the Duke of Pomerland who refused to export because he 'would not suffer his countrie to be weakened of a matter of such strength.' It appears he needed it for his own use. The second point was that although powder could be purchased overseas, it might be in danger of being intercepted in transit. It might, also, be delayed and lost. His contemporaries tended to support the same arguments. John Bovyat, for example, entrepreneur and powdermaker,

¹⁴The first two points relate to national defence and security. The third and fourth points relate to financial and fiscal interests. The fifth point relates to both employment and the balance of trade. The final two points support domestic production within the context of a monopoly. P.R.O. SP12 275/76. This essay appears to be a contract proposal: 'Mr. Furner, a marchant of London and nowe a patentee in this behalfe...' Ibid.

in 1581 provided several reasons why he should receive a grant to produce saltpetre, the first being that the enemies would not get it.¹⁵

James claimed, in a proclamation issued in 1624, that the making of gunpowder domestically was 'a great benefit, strength and safety and defence to us and our subjects' in that it ensured a reliable supply, as foreign powder was:

'not to be obtained but at the pleasure of other princes,... and the same being so obtained, may happen to be intercepted, or by contrary winds hindered, or utterly lost by shipwracke, or such like casualties on the seas.'¹⁶

The ideas set out in the proposal were used by others in defence of the domestic production of cordage. A contract proposal written by ropemaking entrepreneurs William Greenwell and Thomas Stiles suggests that the Crown would not want to rely on foreign suppliers, a minor reason being that the dealers may, for whatever reason, be refusing to sell.¹⁷

Thomas Mun, author of England's Treasure by Foreign Trade and merchant of the East India Company, argued in defence of the right to export bullion and claimed that munitions were at least as precious as money. Munitions:

'cannot otherwise be had (in some places) on the suddain, whereby a state may be lost, whilst munition is in providing: so that we may account that Prince as poor who can have no wares to buy at his need, as he that hath no money to buy wares; for although Treasure is said to be the sinews of

¹⁵P.R.O. SP12 147/42.

¹⁶James F. Larkin and Paul L. Hughes (eds.), Stuart Royal Proclamations i, p. 611.

¹⁷'His majestie shalbe assured at all times, of as much...for the furnishing of the navy without relying...who, besides the extraordinary gaine made...deliver, are uncertain in the making of his prad...refusing to furnish his majestie...' There is, unfortunately, heavy damage to the manuscript. B.L. Cotton MSS. Otho E 7, f. 256.

the war, yet this is so because it doth provide, unite and move the power of men, victuals, and munition where and when the cause doth require; but if these things be wanting in due time, what shall we then do with our mony? The consideration of this, doth cause divers well-governed states to be exceeding provident and well furnished of such provisions...'¹⁸

It is not surprising that the English Crown and subjects should have expressed an interest in the domestic production of gunpowder, cordage and sailcloth for purposes of state security. These munitions, they argued, were too vital to leave to the vagaries of foreign princes and overseas trade. There is much more evidence relating to gunpowder and the raw material than there is for cordage and sailcloth, yet even so it is clear that concerns for security were most normally mentioned in relation to powder.

It might be expected that when the level of employment in a region is high, there is a smaller incidence of poverty-related social disturbances such as riot and petty crime. Contemporaries believed this, and so it makes sense that they should support projects promising to increase the number of jobs available. The fifth point of the essay 'Remembrance', discussed above, argued in favour of gunpowder and saltpetre production as well because it 'setteth many people a worke.'¹⁹ Of the products mentioned here, however, the working of hemp into cordage and sailcloth employed by far the most people. Those involved in the initial preparation of the hemp and the creation of strands

¹⁸Thomas Mun, 'England's Treasure by Foreign Trade', J.R. McCulloch (ed.), Early English Tracts on Commerce, pp. 190-1.

¹⁹SP12 275/76. For further analysis of the subject see D.C. Coleman, 'Labour in the English Economy of the Seventeenth Century', E.M. Carus-Wilson (ed.), Essays in Economic History ii (London, 1962), p. 292.

were probably most numerous because hemp was often woven into products other than sailcloth and cordage, such as clothing, sacks and other goods made of canvas. This is vividly illustrated by the plaintive complaints of the flax and hemp dressers in 1630 and 1631. They argued that the Eastland Company monopoly to import the raw materials forced the prices up so that it was cheaper to procure the finished good overseas, and the Dutch imported the product semi-finished, so that there were 'manie thousands of poore people very much distressed for want of employment.'²⁰ It is not surprising, then, that the employment argument was most commonly used in relation to the cordage and sailcloth industries.

Both Crown and subjects made use of this argument. A bill was promoted in 1601 requiring the planting of hemp in order, it argued, to first, supply the Navy with cordage and secondly, 'for settinge poore people to worke.'²¹ This is without doubt the bill discussed by David Dean. He argued that 'although some felt its introduction to be against the rules of the house, clearly officials were determined to promote it...'²² James argued in a proclamation dated 1604 that abuses in the manufacture of sailcloth would hurt the makers as well the users of the cloth; they would be 'much hurte and impoverished'.²³

²⁰P.R.O. SP16 180/89; APC, 1630-1, pp. 265-6. Flax was used to make linen goods.

²¹P.R.O. SP12 282/63. The bill was probably 'dashed' after the second reading. See P.R.O. SP12 282/42.

²²David Dean, Law-Making and Society in Late Elizabethan England: the Parliament of England, 1584-1601 (Cambridge, 1996), p. 80.

²³Statutes of the Realm iv₂, p. 1,049.

The fishermen of the towns of Sheringham and Beeson, county Norfolk, in 1593 opposed the repeal of the act for sowing hemp and flax because it was funding their pier. They argued, in defence of the act, that it provided employment.²⁴ The merchant Lewes Roberts listed the commodities which he thought should be imported. This included:

‘all such commodities as may set the poor or richer sort on work...flax, hemp and the yarn thereof, of which is made all sort of linens, fine and course, all ropes, tackles, cables and such like used in shipping.’²⁵

The author of ‘Remembrance’ was not the only voice speaking for the domestic development of the gunpowder industry as a way of increasing employment. Procurement of the raw materials used in gunpowder required labourers and so employment was occasionally used in reference to this product as well. Saltpetremen scoured the countryside for appropriate soil, while people were employed carrying wood and making ash. James justified a proclamation of 1624 made to protect the gunpowder and saltpetre industries by including the fact that domestic saltpetre production would provide employment.²⁶ John Bovyat, when appealing in 1581 for a contract to produce saltpetre for gunpowder, argued that he would put many people to work.²⁷

Thomas Mun argued that Princes should set their subjects to work making:

‘ships of war, with all the provisions thereunto belonging, to build and repair forts... and to abound in gunpowder, brimstone, saltpetre, shot, ordnance, musquets,...and in many other such like provisions fitting war; all which will make them to be feared abroad, and loved at home,

²⁴P.R.O. SP12 244/112.

²⁵Lewes Roberts, ‘The Treasure of Traffike’, pp. 77-8.

²⁶James F. Larkin and Paul L. Hughes (eds.), Stuart Royal Proclamations i, p. 611.

²⁷P.R.O. SP12 147/42.

especially if care be taken that all (as neer as possible) be made out of the matter and manufacture of their own subjects, which bear the burden of the yearly contributions; for a prince (in this case) is like the stomach in the body, which if it cease to digest and distribute to the other members, it doth no sooner corrupt them, but it destroys it self.'²⁸

That there should be full employment of the able bodied was a concept agreed upon by all levels of early modern English society. The desperately poor were prone to taking measures into their own hands. There is nothing in this evidence to suggest that the problem of unemployment was perceived to be more severe during the reign of Elizabeth when population was growing at a rate faster than was to follow. It seems to have been a concern throughout the period. While much of the evidence relates to the procurement of the raw materials for all three goods, it was clearly thought that hemp held the greatest potential 'for setting poor people to work.'

The Crown and subjects argued that in order to discourage the other elements of domestic unrest - rebels, English pirates and robbers - and at the same time ensure a quality product, controls were necessary. If all gunpowder was only procurable through the Crown, then individuals and groups who might misuse it could be restrained from procuring it. As well, there was concern that goods imported from abroad were at times inferior to the quality that should be expected, and if made domestically, where production techniques could be monitored and adjusted if necessary, then a standard product of acceptable quality could be achieved.

Most of the evidence relating to the control of munitions in order to discourage

²⁸Thomas Mun, 'England's Treasure by Foreign Trade', pp. 189-91.

unlawful elements relates to guns and gunpowder. This is not surprising because with the exception of pirates, these concerns were internal affairs. The solution, it was argued, was to limit the number of suppliers to the Crown or to those appointed by the Crown. This normally meant to the holder of a monopoly contract and/or the Crown itself. Directives against the keeping of handguns first become known in 1542 during the reign of Henry VIII, it being 'contrary to good order and express laws made by Parliament.'²⁹

Gunpowder was included thereafter as well. For example, it was stated that:

'as the traitors are relieved with powder,... No merchant or other person to sell powder, armour or munition, but all furniture of war to come out of the queen's store only.'³⁰

Other goods were mentioned in reference to pirates. Naval stores were included in a reference made to this problem. In 1609 James ordered his subjects to refrain from supplying them with ordnance, powder, cordage or any provision serviceable for the war or shipping, pirates being 'most hatefull to his minde, and scandalous to his peaceable government.'³¹ The Crown also expressed concern that unlawful elements were using a scarce resource. In 1600 it was considered to be:

'very unseemly and unmeet in a well governed state, but also an extreme scarcity of all such kind of provisions both for her majesty's purveyance and for the use of principal persons.'³²

²⁹Paul L. Hughes and James F. Larkin (eds.), Tudor Royal Proclamations ii (New Haven, 1969), p. 116.

³⁰J.S. Brewer and William Bullen, (eds.), Calendar of the Carew Manuscripts iii, pp. 334, 365.

³¹James F. Larkin and Paul L. Hughes (eds.), Stuart Royal Proclamations i, p. 203.

³²Paul L. Hughes and James F. Larkin (eds.), Tudor Royal Proclamations iii, p. 219.

Another argument for controls was that poor quality goods were sometimes imported, particularly when demand for them was greatest. The Privy Council, for example, argued in 1626 that in foreign countries:

‘advantage hath beene made of the urgent necessitie and want here in such sorte as that they were forced many tymes to take ill and unservicable powder’.³³

Sir John Heydon, when asked by Parliament in 1641 why foreign gunpowder was prohibited, answered, ‘because that the powder should not be adulterated.’³⁴ On the other hand, it was thought that the quality of domestically produced goods could be controlled. The quality of gunpowder could be easily tested and so while there were always exhortations to maintain the standards, the problem was greater for cordage and sailcloth because poor quality was sometimes only detected when the product failed to perform.³⁵ Secretary Coke argued in 1625 that ‘the quality of saltpetre and gunpowder is high because of the oversight of the commission and the king’s powder makers.’³⁶

It was feared that improperly made goods, both foreign or domestic, would lead to the loss of property and lives. Poor sailcloth production standards were said to be:

‘to the greate deceite and hurte of all his highnes lovinge subects that are

³³APC March 1625-May 1626, p. 375.

³⁴Maija Jansson, Two Diaries of the Long Parliament (Gloucester, 1984), p. 17.

³⁵Powder was not always tested before it was sold. The 1623 ‘Proclamation for preventing of abuses touching gunpowder and saltpetre’ argued that unserviceable powder was being sold, ‘to the apparent and manifest danger, losse and prejudice of his loving subjects, the merchants of the same, and all others that make use of it: ships with goods and merchandises but also their persons... have been lost and surprised.’ James F. Larkin and Paul L. Hughes (eds.), Stuart Royal Proclamations i, p. 565.

³⁶P.R.O. SP16 11/24.

to use and employ the same about the ...vessels, and to the greate damage of his Highnes Navy.³⁷

A petitioner to the Crown claimed that those who purchased faulty cordage were:

‘forced to double charge for tackleing, but also...divers of your tall shippes, much rich merchandise with many hundreds of your good subjects are... cast away.’³⁸

Acts to maintain a reasonable standard of quality were, therefore, developed. An act written in 1593 to improve the quality of cordage sold was said to be ‘for the better preservation of the Navy of this realm’.³⁹ Lord Admiral Nottingham, however, proudly pointed out in 1605 that during his Admiralty of 21 years, ‘there was never any that perished by the fault of cordage.’⁴⁰ Henry Earl of Stamford, writing to Secretary Windebank in 1636, argued that the lack of controls on the numbers of people freely preparing hemp led to ‘sundrie abuses being committed.’ It was argued that no one ‘other but such as shalbe...lycensed by his Majestie shall be permitted to dress or sell hemp except it be for their owne use.’⁴¹

There was good cause for concern regarding controls on the industries. It was not generally believed that everyone should have access to guns and gunpowder. Poor quality, as well, would mean a short-lived product that could cause further damage. The evidence suggests that it was primarily the Crown which expressed an interest in controls,

³⁷Statutes of the Realm iv₂, p. 1,049.

³⁸P.R.O. SP16 288/31.

³⁹Journals of the House of Lords ii, p. 186.

⁴⁰P.R.O. SP14 12/30.

⁴¹P.R.O. SP16 313/1.1.

rather than the subjects, even though the Crown argued that they would be the beneficiary of policies designed to improve law and order and the quality of goods they used as well. This may, of course, be an accident of survival of evidence or that the subjects did not record their complaints but this was the point omitted in the 'Remembrance'.

The fourth and final reason provided by the Crown and subjects for investing in the production of gunpowder, cordage and sailcloth, the economic one, is seldom discussed in the literature. It is particularly interesting that this rationale has been so neglected when there is sufficient evidence to suggest that finance was indeed an important factor. Military intervention was expensive. Historians are well aware of that. English subjects expected the Crown to pay for its own upkeep from an income based on trade customs, land rents and sales, feudal dues and other minor means. Self sufficiency was difficult to maintain in the most peaceful of times and war could bankrupt a government. If military expeditions were to be financed, Parliament might have to be called upon to supply the extra funds. This often opened the door to Parliamentary challenges to what the Crown felt were its Royal prerogatives. It makes sense, then, that the Crown and subjects felt that the costs of cordage, sailcloth and gunpowder were important reasons for producing the goods domestically if they could be produced more cheaply.

The 'Remembrance' summarized the two financial aspects addressed by Crown and subjects for encouraging domestic production: savings to the Crown and 'wastage' of gold and silver through an unfavourable balance of trade. Of the seven points in the document, three related to the financial aspects, in numbers three, four and five. The first aspect was

that the Crown could save money by producing gunpowder domestically. The price would be less and quality would be better, meaning a longer lasting product that would not result in damage to persons or goods. The third point in the document described the savings that had accrued within the realm by making gunpowder domestically. It argued that the price of foreign powder was 12d per lb, as compared with 8d for domestic, so that in the previous eleven years all domestic users had saved £100,000 by purchasing domestic. The fourth point claimed that the Crown had saved £5,000 a year under the then current purchase requirements, or £60,000 for the next ten years at anticipated increased orders.

The Crown claimed it wanted to produce gunpowder and saltpetre because not only was it necessary for defence but that it could be made cheaper than the costs of purchasing foreign powder. A contract made between the German Gerrard Honricke and Elizabeth in 1561 to record and teach native Englishmen the art of making saltpetre states that:

‘after a little while there will be sufficient provisions so that it can be made in the realm at less cost and expense then it can be had and bought overseas.’⁴²

There is no mention whatsoever of the need to produce domestically for strategic reasons. The proclamations made in 1624 and 1625 argued that powder ‘from forraine parts, are not to be obtained but at the pleasure of other princes, at unreasonable rates and

⁴²P.R.O. SP12 16/30. I am indebted to Dr. Glenn Richardson for the translation from French to English.

prices...'⁴³ Privy Councillors argued in 1626 that gunpowder should be free for all to produce domestically because foreign powder tended to be poor and expensive when needed for an emergency.⁴⁴ In 1635 the Crown argued that powder purchased from overseas was 'dangerous, chargeable and casual.'⁴⁵

Others recognized the importance of finance in the development of these industries. The gunpowder maker Evelyn in 1635 argued that if the King held a monopoly for making gunpowder, 'the stores being furnished, the residue might be sold to the subject at 10d the pound...which amounteth to £3,000 per annum.'⁴⁶

The proposal by Greenwell and Stiles to manufacture cordage domestically suggests that domestic production would produce a less expensive product than that manufactured in Russia. Foreign cordage was:

'one of the profitable [commodities] yt is returned out of Russia' and 'besides the extraordinary gaine made...are uncertain in the making...The cordage made by a particular stock wilbe ...cheaper, then it is now...'⁴⁷

Savings would be effected because company factors, agents, shipping and Russian customs would no longer have to be paid. Savings, it was promised, would amount to '£6 in

⁴³James F. Larkin and Paul L. Hughes (eds.), Stuart Royal Proclamations i, p. 611. The proclamation issued in 1625 argued that foreign powder was 'chargeable.' James F. Larkin (ed.), Stuart Royal Proclamations ii, p. 16.

⁴⁴APC March 1625-May 1626, pp. 375-6.

⁴⁵James F. Larkin (ed.), Stuart Royal Proclamations ii, p. 454.

⁴⁶P.R.O. SP16 306/110.

⁴⁷B.L. Cotton MSS. Otho E7, ff. 254-6.

every ton at the least.⁴⁸ In 1618 Sir Richard Bingley, knight, proposed to the Privy Council that he cultivate hemp in Ireland, ‘towards the furnishing of his majestie’s store forever, aswell for cordage as for sayle canvas, at cheape and reasonable prices.’⁴⁹

Arguments concerning quality were financial arguments as well. It was said that poorly made goods would, in the long run, be more expensive. When cordage was poorly made and ‘tall ships’ and ‘rich merchandise...are... cast away’ then it was an expense merchants and shipowners could no doubt do without.⁵⁰

The second financial element to consider is the balance of trade argument. The ‘Remembrance’ claimed in its fifth point that the making of saltpetre and gunpowder domestically would reduce the amount of money and goods that would have to be exported to pay for foreign powder. This argument is based on the mercantilist doctrine that there was a fixed amount of wealth in the known world and one country could only become rich at the expense of another. It was thought that the best ways for a country to increase its share of the wealth was first, through trade. When the money value of exports was less than that of imports, then the importer would have to make up that difference in gold and silver. If some of the products imported could be manufactured domestically, then less would be imported and more gold and silver would need to be shipped to England to make up the balance. Secondly, the export of English bullion must

⁴⁸Ibid.

⁴⁹APC January 1618-June 1619, p. 63.

⁵⁰P.R.O. SP16 288/31.

not be allowed.⁵¹

Not all people at the time agreed with these ideas in their entirety, however, and of those who did not and left a written record of their arguments, the most famous was undoubtedly Thomas Mun. As merchant of the East India Company, Mun was keenly in favour of being able to export gold and silver because there was little demand in the East Indies for English goods. Bullion, therefore, was needed to pay for imports. As well, he did not support the argument that exported munitions and foodstuffs should be paid for with silver; it:

‘will not cause us to have one penny the more in the kingdom at the years end; for whatsoever is forced in one way must out again another way.’⁵²

These may have been commodities the East Indies were willing to trade for. However, steps could be taken to reduce imports. He argued that planting waste ground with hemp, flax and tobacco would prevent their importation as well as cordage ‘and divers other things which now we fetch from strangers to our great impoverishing.’⁵³

The Crown argued as well for the import substitution of gunpowder as a way of having a favourable balance of trade. James claimed in a proclamation of 1624 that gunpowder:

‘is not to be had but for ready money to be transported and paid for the

⁵¹Many historians attribute this latter idea to the ‘bullionists’, who, they claimed, equated money with wealth, rather than the mercantilists, who were to have favoured the principle of free trade in the precious metals. See, for example, E. Lipson, The Economic History of England ii, (London, 1956), p. lxxx; Leonard Gomes, Foreign Trade and the National Economy: Mercantilist and Classical Perspectives (Basingstoke, 1987), chap. 2.

⁵²Thomas Mun, ‘England’s Treasure by Foreign Trade,’ p. 157.

⁵³Ibid., p. 127.

same - the treasure of our realme would be much diminished, and other foreign realmes enriched.’⁵⁴

Charles argued in 1627 that if gunpowder was imported, then when it was most needed, the price would be highest and there would be no credit, ‘to the diminution of the treasure of our realmes.’⁵⁵

V

The writer of the essay written in 1600 and entitled ‘Remembrance of certain benefits to Her Majesty and her subjects, by making saltpetre and gunpowder within this realm’ outlined the reasons claimed by Crown and subjects for the import substitution of cordage, sailcloth and gunpowder. The issue argued first was that munitions were vital for defence and reliance on foreign supplies could be precarious. Both the Crown and subjects seem to have supported this view. Few documents which did record what people claimed to believe regarding the domestic production excluded this point. It was argued alongside this point that development and control of the industries were vital for internal peace and security. Domestic production would increase employment, and central control would increase the quality and would restrain supplies from reaching those who would use them unlawfully. Finally, it was maintained that the financial aspect was an issue. While munitions were necessary for external defence and internal security, it was argued that if

⁵⁴James F. Larkin and Paul L. Hughes (eds.), Stuart Royal Proclamations i, p. 611.

⁵⁵James F. Larkin (ed.), Stuart Royal Proclamations ii, p. 116.

produced domestically, they would be more affordable. As well, when produced domestically, the demand for munitions would not aggravate the perceived balance of trade problem.

There is nothing to suggest that the ideas expressed changed substantially over the three reigns. Much of the evidence comes from the latter part of the reign of James and the reign of Charles but this is most likely a matter of surviving evidence rather than a sign that concerns were increasing. Phrases and expressions, in fact, were so similar as to suggest that they were sometimes copied from documents written previously. At the same time there was little difference between what the Crown expressed and what its subjects claimed. It appears that the Crown may have had more interest in control than contemporaries. The fact that arguments made by the Crown and by the subjects were otherwise similar, however, suggest that comments made did indeed reflect the attitudes felt by the Crown regarding the import substitution of munitions.

These conclusions do not closely follow the arguments found in the literature regarding Crown ideas relating to cordage, sailcloth and gunpowder. Financial, and in particular fiscal reasons, were frequently presented in contemporary documents yet historians have rarely referred to them. This may be an oversight, an unwillingness to recognize the role of finance, or a belief that financial reasons were so negligible as not to deserve notice. Otherwise, the conclusions of the literature are confirmed. Concerns regarding the reliability of foreign suppliers in particular were frequent.

It is important to remember that the Crown and its subjects seldom recorded their reasons for doing things and when they did, it was generally for a purpose. The

understanding of contemporary ideas that may be gleaned from these sources, therefore, may not be an accurate one. But as it is action that speaks louder than words, it is with this that the remainder of the thesis is concerned.

CHAPTER FOUR

DIRECT CROWN INVESTMENT IN SAILCLOTH

I

The Navy officials seldom purchased ready-made sails, preferring throughout the period to purchase various types of hempen canvas and then have them sewn. It is doubtful that the manufacturing of sails from canvas was a skilful job for early in the period it was often entrusted to the mariners and ships' gunners who may have even sewed them on shipboard.¹ Purchases, then, of ready-made sails were seldom necessary when the job could be performed initially without additional pay and facilities specifically for the purpose were unnecessary.² Various types of canvas were purchased during most

¹ P.R.O. E351 2197. Wages plus food and lodging were paid sporadically to sail sewers from 1574. P.R.O. E351 2210. Extra canvas was sent on East India Company ships 'enough to make a pair or two of topsails.' Calendar State Papers, Colonial Series (hereafter CSPC) 1630-4, p. 516.

²It is not clear when sailmakers began to use shipyard facilities to sew sails. Chalkin argued that they were certainly produced in the Chatham yard by 1637. C.W. Chalkin Seventeenth-Century Kent: A Social and Economic History (London, 1965), p. 144. Coad only suggested that shipyard sail lofts were in use in the seventeenth century. Jonathan G. Coad, The Royal Dockyards 1690-1850: Architecture and Engineering Works of the Sailing Navy (Aldershot, 1989), pp. 161-2.

Chatham was first reported to have been used as anchorage in 1550, and it was probably in 1586 that ships first began to be built there. C.W. Chalkin Seventeenth-Century Kent, p. 141. By the end of the period Chatham had superseded the Deptford, Woolwich and Portsmouth yards as the most important naval base and production site. It was in close proximity to London, had plenty of safe anchorage and mud flats were available for grounding and caulking. Historians disagree as to when this occurred. Chalkin argued that this occurred by the end of the reign of Elizabeth. *Ibid.*, p. 141. Presnail placed Chatham as the most important yard much earlier. By 1570, he argued,

years in varying amounts and then made into sails as needed.

Direct government investment in sailcloth is interesting for two reasons. Firstly, if England was interested in making herself independent of foreign suppliers for vital military goods, then it would be expected that the Crown would directly invest in the domestic sailcloth industry. Sailcloth was a vital naval store; the Royal Navy could not do without it. It would also be expected that direct government investment would be reflected in the development of the domestic industry.

Secondly, virtually nothing has been published on this subject. The historiography focuses on the individuals involved in the early introduction of the industry to England and on the raw material, hemp.³ Nesta Evans and Christopher Clay thought hemp a vital naval store.⁴ Evans thought that the Crown encouraged the growing of hemp in order to provide employment to the poor and to supply the Navy with cordage and sails.⁵ In

Chatham had become 'the chief Elizabethan yard.' James Presnail, Chatham: The Story of a Dockyard Town and the Birthplace of the British Navy (Chatham, 1952), p. 75. Cull thought that Deptford was still the principal yard in 1603 but Chatham was rapidly gaining in importance. Charles's reign 'marked a period of neglect and disorganization in the dockyard.' Frederick Cull, 'Chatham Dockyard; Early Leases and Conveyances For Its Building During the 16th and 17th Centuries' in Archaeologia Cantiana lxxiii (1959), pp. 81, 85. For additional information on the dockyards for the period following the Civil War see D.C. Coleman, 'Naval Dockyards Under the Later Stuarts', Economic History Review, 2nd. ser., vi, no. 2 (1953-4), pp. 134-155; John Ehrman, The Navy in the War of William III, 1689-1697 (Cambridge, 1953), passim.

³See, for example, Nesta Evans, East Anglian Linen Industry: Rural Industry and Local Economy 1500-1850 (Aldershot, Hants., 1985), ad. passim and Joan Thirsk, Economic Policy and Projects (Oxford, 1988), pp. 40-1.

⁴Nesta Evans, The East Anglian Linen Industry, pp. 95-6; C.G.A. Clay, Economic Expansion and Social Change: England 1500-1700 ii (Cambridge, 1984), p. 221.

⁵Nesta Evans, The East Anglian Linen Industry, pp. 51-2.

reference to the government, Joan Thirsk stated that patents were granted to sailcloth weavers in 1547-48 and in 1574.⁶ No mention is made of the terms of the contracts or whether the government availed themselves of this domestic source. Domestic canvas makers, she thought, were not the best in Europe but Ipswich sailcloth was good value for hammocks and for sails on ships under 100 tons.⁷ It will be important to see whether quality or price played a role in purchase decisions.

This chapter will first identify the types of this cloth available for purchase. An attempt to identify the type of sailcloth known as Ipswich canvas will also be made. It will then look at the Royal Navy's yearly purchases of sailcloth. This chapter will next examine the types of sailcloth that were purchased, their sources, the methods of purchasing and the individuals responsible. It will also attempt to explain why they chose the sources of supply that they did. Finally, the impact Crown purchases may have made on the domestic industry will be examined. The sources employed in this analysis were predominately the Treasurer of the Navy accounts and the Ipswich port books, the latter extensively described in Chapter Two, above.⁸

II

There were a number of different types of canvas bought by the Royal Navy for sails

⁶Joan Thirsk, Economic Policy and Projects, p. 40.

⁷Ibid., p. 41.

⁸P.R.O. E351 2197-2284; P.R.O. E190 587/2-605/12; pp. 102-112 122, above.

and these were named after the original centres of production. It will be necessary to discuss the types of sailcloth available for purchase and to identify the variety known as Ipswich canvas because types varied in quality and, as will be seen below, the type was probably considered in purchase decisions. The most common were medrinacks, poldavis, noyalls and Ipswich canvas. Others included vittery, vandelle and oleron.⁹

There is little to suggest that the different types of sailcloth had specialized functions within the Navy. Sailmakers were simply sewing ‘severall sort of canvas into sundry kinde of sailes’.¹⁰ Seldom were these types made into anything but sails¹¹. Sailcloth, however, was more than simply a generic, standardized type with names to indicate the centres of production. They were, as well, names for specific identifiable varieties and both production and the name could be transferred to new regions.¹² Sailcloth made in Ipswich, for example, only became ‘Ipswich canvas’ in the Treasury of the Navy records

⁹All of the above but Ipswich were French. Medrinacks were purchased from Brittany. P.R.O. E351 2205. Poldavis originated in Poldavide in Brittany but during this period purchases of this sort were made in Gdansk. See Nesta Evans, East Anglian Linen Industry, p. 169 for the original location of poldavis. Noyals were manufactured in Noyal, in the department Ille-ét-Vilaine, Brittany. A New English Dictionary on Historical Principles vi, part 2, p. 248. Vittery and Vandelle were both produced in Brittany, France, the former in Vitré and the latter in Le Vendelais. Ibid., x, part 2, p. 266; Ibid., x, part 2, p. 35. Oleron was originally made at Oléron in France. Ibid., vii, part 1, p. 103.

¹⁰ P.R.O. E351 2269.

¹¹There were a few exceptions. For example, in 1581 Gdansk poldavis were ‘employed...about a banqueting house made at Whitehall.’ P.R.O. E351 2217. By 1622 small amounts of Ipswich canvas were being used for the borders of wasteclothes on a ship. P.R.O. E351 2260, 2261.

¹²Identification of types was not always easy. See, for example, Acts of the Privy Council (hereafter APC) 1591-2, pp. 137-8, 170 for a disagreement concerning the identification of cloth confiscated as sailcloth.

after initially being referred to as 'English medrenix'. The use of the domestic location to denote a type of cloth was gradual, 'Ipswich medrenix' being interspersed in the documents with 'Ipswich canvas.' Canvas referred to in the Treasury accounts as 'Ipswich canvas' during this transition was clearly of the medrinack type because this variety dominated sailcloth shipments out of Ipswich.¹³ Also, prices paid by the Navy for both Ipswich canvas and Ipswich medrinacks were similar. French medrinacks and English canvas prices were also similar while, in comparison, Gdansk poldavis were substantially less. The term poldavis remained in use in the port books for that sort of canvas manufactured in Ipswich throughout the period. The last reference in the Treasury reports to purchases of Ipswich medrinacks was in 1612 and the term 'Ipswich canvas' was from then on used exclusively.¹⁴

It is impossible, however, to determine whether Ipswich canvas bought by the Navy remained of the medrinack type, whether it evolved into something specific to Ipswich or whether it became a common term for both domestically produced medrinacks and poldavis.

Table 4.1 was derived from the Ipswich port books and is based on pieces of sailcloth made in the Ipswich area and shipped from there to London. It suggests that poldavis was the only type of sailcloth shipped from Ipswich during the 1560s when the industry was in its infancy. Shipments of poldavis were small, and after 1569/70 until 1618/9 they were intermittent and consistently less frequent. The numbers of pieces shipped became

¹³P.R.O. E190 587/2-605/12.

¹⁴P.R.O. E351 2250.

**TABLE 4.1: CANVAS SHIPPED FROM IPSWICH TO LONDON BY TYPE
(PIECES) 1565 -1637^a**

Year	Canvas	Medrinacks	Poldavis	Sailcloth	Total
1565/6	1		6		7
1569/70			16		16
1574/5		157			157
1575/6		20	15	18	53
1576/7		75		49	124
1577/8				115	115
1578/9		79	28		107
1579/80 ^b		240		172	412
1585/6 ^b		1,452			1,452
1588/9		1,230			1,230
1591/2		1,798	47		1,845
1595/6		1,906			1,906
1600/1	280	2,032	390	770	3,472
1603/4	320	1,730	120	10	2,180
1618/9		100	1,360	1,000	2,460
1628/9			1,097	920	2,017
1636/7			641		641
1638/9			225		225
1641/2			60	80	140
1642/3			165		165

Source and Notes: P.R.O. E190 587/2-605/12. ^aPieces were used as the unit of measure because the 'pece' was the dominant measure, thus increasing accuracy. Conversions of measures are as previously stated in Chapter Two, footnote 177. The exact period covered by the year varies, some running from Easter to Easter, some Michaelmas to Michaelmas and others, Christmas to Christmas. ^bThese figures were arrived at by doubling the six month figure available for the year. This was feasible because other Ipswich coastal port books do not suggest that trade was concentrated within any particular part of the year. P.R.O. E190 592/9, 593/2.

substantially larger from the latter date and poldavis then dominated trade to the end of the period. The medrinack type of sailcloth first becomes evident in the 1574/5 port books and this variety dominated the coastal trade of Ipswich sailcloth through 1603/4. The 1618/9 port books then reveal the rapid decline in shipments of this type and after this date they are no longer in evidence. The rapid disappearance of this type of sailcloth from the coastal trade of Ipswich coincided with growing shipments of both poldavis and of a generic term 'sailcloth'. This term first became apparent in 1575/6 and was used exclusively two years later. It seems to have fallen out of favour during the 1580s and 90s but reappeared by 1600/1. By the end of the 1620s, shipments of sailcloth, like medrinacks, with one exception are no longer in evidence and poldavis alone were transported to London.

If it could be shown that the term for medrinacks evolved into sailcloth in the port books the way it seems to have evolved into 'Ipswich canvas' in the Treasury reports, then it is reasonable to assume that the medrinacks type continued to be purchased by the Navy rather than poldavis. Unfortunately, it is impossible to be sure whether canvas described as sailcloth and shipped from Ipswich was poldavis, medrinack, a generic term for both or something entirely different. It may be that the types were standardizing into something specific to Ipswich as the domestic industry developed. The fact that merchants did not ship both medrinacks and sailcloth, or poldavis and sailcloth on the same ship suggests that sailcloth was a generic term for both types.¹⁵ It is significant

¹⁵Only one exception was found, when John Allen, merchant, shipped both medrinacks and sailcloth. P.R.O. E190 598/5.

that the term poldavis remained in use, which suggests that the label sailcloth referred to either medrinacks or a new variety that evolved in Ipswich.

III

Purchases of sailcloth tended to be sporadic, for ships laid up in harbour had no need for them. Although some were kept in store for emergencies under the protection of the dockyard 'rat killer', purchases were made as the need for them arose.¹⁶

The data for sailcloth purchases in Figure 4.1 and Table 4.2 were recorded in the Treasurer of the Navy papers. Until 1546 a single Naval official, the Clerk of the Ships, was responsible for maintaining and equipping the fleet. He had no authority to purchase the supplies necessary since the king himself signed the purchase warrants.¹⁷ The 1545 restructuring divided the responsibility between the Navy Board and the Office of the Ordnance.¹⁸ The Navy Board, comprised of seven officials, was subordinate to the Lord Admiral. He normally provided only nominal supervision, therefore allowing the board

¹⁶'Reward...ratketcher for making of banes to destroy ratts and mice in his Majesties shippes and stoarehouses for the better preserving of the sayles and other provicons.' This was an almost yearly provision. See, for example, P.R.O. E351 2243.

¹⁷C.S.L. Davies, 'The Administration of the Royal Navy under Henry VIII: the Origins of the Navy Board', English History Review lxxx (1965) No. 3, p. 270.

¹⁸M. Oppenheim, Administration of the Royal Navy and of Merchant Shipping in Relation to the Navy: from mdix to mdclx (London, 1896), p. 85.

to exercise almost total control over naval matters.¹⁹ One of these officials, the Treasurer, quickly became the chief administrative official.²⁰ He was responsible for superintendence of the work at the dockyards, building, equipping, and repairing the ships, keeping them safely moored and in good order and procuring naval stores.²¹ The next most influential officer was the Surveyor, who was in charge of building and repairing ships and maintaining stocks of stores.²²

All purchases were allowed provided the Treasurer's records were signed by two or three of the other officers. Sums were provided for the normal operating expenses of the shipyards and additional sums were assigned for extraordinary purposes such as 'setting ships forth to sea' and 'guarding the narrow seas.' It was up to the Treasurer to dispose of the sums. Money left over, or more commonly, due the Treasurer was settled in the next year's account. This administrative structure remained intact throughout the period with the exception of the years 1618-25 when the Navy was run by commission. The Treasurer normally indicated in his record the type of sailcloth bought, the unit of measure, the number of units, the unit price and the total price.

¹⁹Offices included Treasurer, Comptroller, Surveyor and Keeper of the Storehouses. N.A.M. Rodger, The Safeguard of the Sea: A Naval History of Britain (London, 1997), pp. 223-4. Admiralty, Council of the Marine and Navy Board are one and the same. Ibid., pp. 224-5.

²⁰M. Oppenheim, Administration of the Royal Navy, p. 228.

²¹Ibid., p. 145.

²²These offices were considered private property and were often purchased from their predecessor. The Crown could reward its underpaid bureaucrats by allowing them to sell offices. For example, in 1618 the incumbent to the Treasurer's post paid the outgoing official. Ibid., p. 195.

Figure 4.1 illustrates the number of bolts of sailcloth purchased yearly between 1559 and 1642 while Table 4.2 provides data in five-year increments, the number of bolts, their monetary value and the proportion of Naval allowances spent on sailcloth.²³ The Treasurer recorded canvas purchases in varying units, specifically the bolt, piece, ell, yard and bale. The bolt as a unit of measure occurred most frequently and was more standardized than the piece, which was the next most common. Therefore, the bolt was used here as the standard unit of measure for comparison and examination purposes.

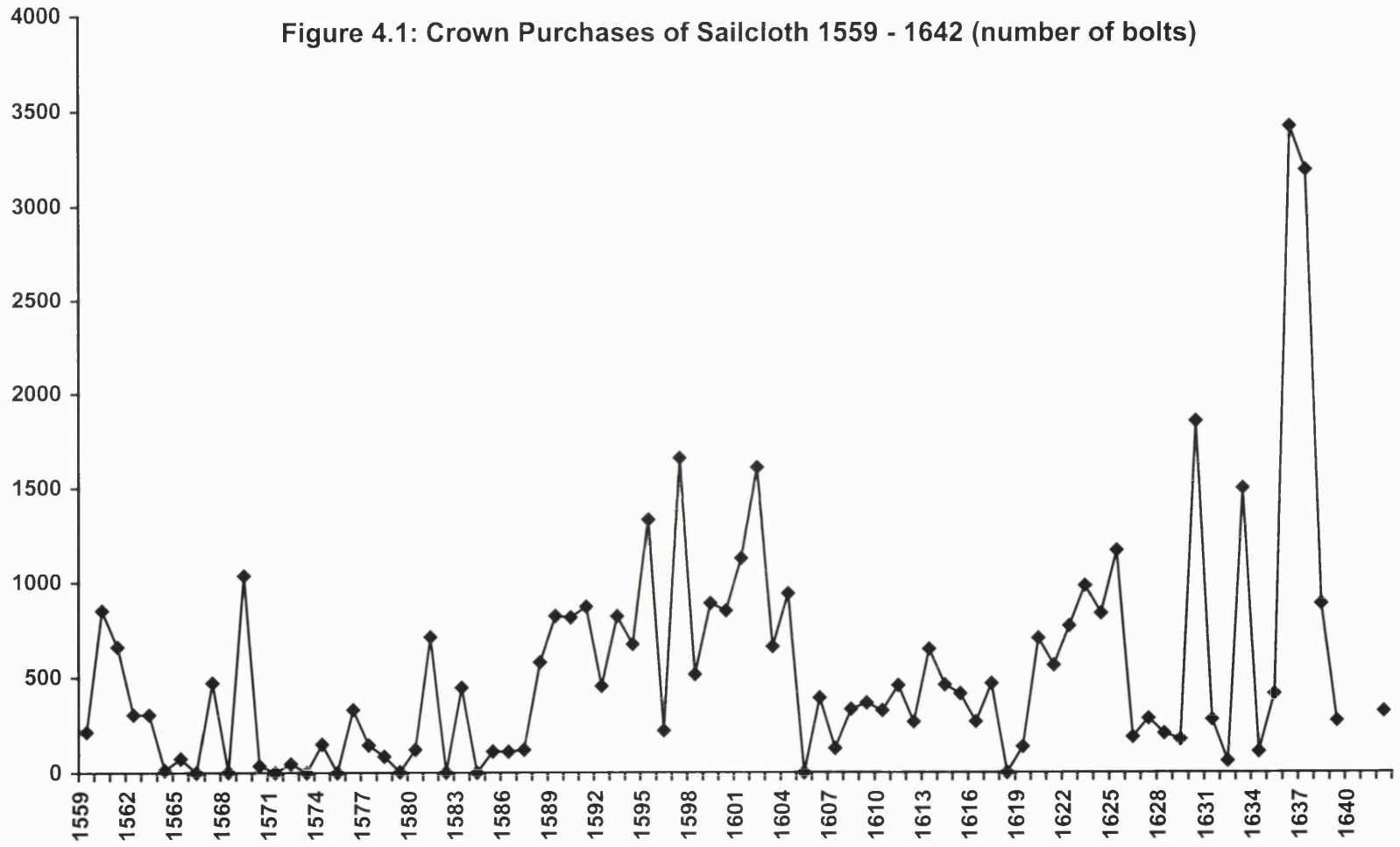
Four phases of purchase patterns can be identified during this period and these roughly correlate with the international political situation. The first phase covers the period up to 1588, the year of the Spanish Armada. The second phase covers the years of conflict, ending with peace in 1604 while the third phase includes years of both peace and war, ending in 1629. The final phase then follows to 1642, the end of the period.

While it is not the intention to describe in detail here the shifting alliances and international events that make up early modern European history, the disturbances and conflicts that led England to military preparations and hence purchases of sailcloth will

²³Conversion of units was as explained in Chapter Two, f.n. 181. Unless otherwise explained below, when an account includes more than one year then an average is presented here. Purchases during years prior to 1567 were recorded in the Treasurer records as pound sterling totals. The figures were here based on 42s per bolt, the price provided in P.R.O. E351 2203, in the year 1567, and calculated from piece rate into bolt rate. There is one account for 1560 and 1561; the total for each year is given. 1560 is 4/5 of the total; the sailcloth figures presented here are based on the same proportion. Data for the year 1569 recorded three types of canvas with differing prices totalled together without the number of units. The number of bolts was arrived at by dividing the average price by the total value. One account is for 16 months, 1 January 1594/5 to 24 April 1596; figures presented here for 1595 are averaged for one year. As well, the data for 1638 and 1639 recorded purchases by total value. The number of bolts was arrived at by dividing the total by the average price of a bolt.

£LT

Figure 4.1: Crown Purchases of Sailcloth 1559 - 1642 (number of bolts)



Source: P.R.O. E351 2169-2284

**TABLE 4.2: SAILCLOTH PURCHASES AND AS A PROPORTION OF
TOTAL NAVAL ALLOWANCES 1555-1640**

Year	Total Sailcloth Purchased (£s)	Total Allowances on Naval Accounts (£s)	Sailcloth As a Per Cent of Allowances	Units of Sailcloth (bolts)	Price per bolt
1560 ^a	1,774	84,300	2	851	41s 8d
1565	155	7,844	2	74	41s 11d
1570	50	17,528	0	36	27s 9d
1575	0	6,894	0	0	
1580	223	14,603	2	121	36s 10d
1585	242	17,908	1	111	43s 7d
1590	1,618	65,540	2	815	39s 8d
1595	2,317	59,040	4	1,332	34s 9d
1600	1,167	37,023	3	851	27s 5d
1605	0	28,672	0	0	
1610	451	36,359	1	326	27s 8d
1615	819	36,131	2	415	39s 6s
1620	925	35,873	3	708	26s 2d
1625	1,959	163,969	1	1,171	33s 5d
1630	3,024	80,746	4	1,855	32s 7d
1635	686	65,748	1	414	33s 2d
1642	458	38,578	1	322	28s 6d

Source: P.R.O. E351 2197-2284.

be related.²⁴ It is not possible, however, to allocate to each arena of conflict a specific number of sailcloths for detailed knowledge of the number and size of each ship employed in each incident would be needed and that degree of specific information is not now available. It will be clear that there is not a perfect correlation between purchases and international incidences related below. Much of the sailcloth was no doubt used for the more mundane chores of transporting goods and men between various locations and guarding and patrolling the seas.

It is most striking to note in Phase One that, outside of a few isolated years when relatively substantial purchases were made, the numbers of bolts purchased were actually quite minor. In five of the years there were no purchases and in three more the Navy procured no more than four bolts. This was offset by the consistently larger numbers of sailcloth purchased during the first five years and the unusually high numbers purchased in 1569. Purchases averaged 219 bolts per year during this phase and the number purchased ranged between zero and 1,037.

The high number of purchases in the early 1560s (Figure 4.1) is probably a reflection of the conflict with France and with Scotland. The number of bolts purchased by the

²⁴The general political history in the following pages was drawn from a number of works, the most notable being: Wallace T. MacCaffrey, Elizabeth I: War and Politics 1588-1603 (Princeton, 1992); Wallace T. MacCaffrey, Elizabeth I (London, 1993); R.B. Wernham, The Making of Elizabethan Foreign Policy 1558-1603 (Berkeley, 1980); R.B. Wernham, Before the Armada: The Growth of English Foreign Policy 1485-1588 (London, 1971); R.B. Wernham, After the Armada: Elizabethan England and the Struggle for Western Europe 1588-1595 (Oxford, 1986); R.B. Wernham, The Return of the Armadas: The Last Years of the Elizabethan War Against Spain, 1595-1603 (Oxford, 1994); Godfrey Davies, The Early Stuarts 1603-1660 (Oxford, 1967); Kevin Sharpe, The Personal Rule of Charles I (London, 1992); N.A.M. Rodger, The Safeguard of the Sea.

Navy increased from 213 in 1559 to 851 a year later as Elizabeth became embroiled in her first foreign undertaking, against Mary Queen of Scots and a French presence in Scotland. N.A.M. Rodger claimed that it was due to the possession of an efficient navy, and a measure of good luck, that allowed Queen Elizabeth to nullify the most dangerous threat to her position.²⁵ Purchases were still high in 1561, totalling 661 bolts.

Elizabeth's second foreign operation was made in 1562-4 in support of the Huguenots. While purchases of sailcloth had declined in 1562 from the previous year, for that year and the following they averaged 305 bolts a year, higher than the yearly average for this phase. The undeclared war was over by April 1564 with the Treaty of Troyes and purchases of sailcloth fell to nominal figures. While English efforts had achieved little, amity between France and England had been established.

After several years of little demand for new sailcloth, the numbers of bolts purchased rose again in 1567 and 1569 to 471 bolts in the former and to 1,037 in the latter year. Purchases probably reflect increasing tensions between England and Spain and fears of a Spanish invasion and much was probably spent as well supporting the Huguenots in France. Opposition to Spanish rule in the Netherlands erupted into violence in the summer of 1566 with image-breaking and the desecration of Catholic churches. Although the violence was tempered, in August the following year an army of 10,000 troops under the leadership of the Duke of Alba marched from Italy into Brussels in an attempt to eliminate all traces of heresy there. This number was soon increased to 50,000. R.B. Wernham described this event as one of the great turning-points of early modern history.

²⁵N.A.M. Rodger, The Safeguard of the Sea, p. 198.

The centre of gravity of Spanish military power had shifted northward to the Netherlands, close to both England and France.²⁶ The introduction of a Spanish army in such close proximity to England raised fears there of a possible invasion attempt.

In November 1568 Huguenot privateers chased into Plymouth Spanish ships carrying £85,000 worth of money borrowed from Genoese bankers, earmarked to pay Alba's Spanish troops in the Netherlands. When it was discovered that the money was a loan and it was still the property of the lenders, Elizabeth borrowed it for her own purposes. The Spanish took this as a hostile gesture which led to an embargo and the arrest of English ships and goods. This action was contrary to remedies provided by treaty, and the English seized Spanish property in return. Although within a few weeks tensions had eased and open confrontation was avoided, relations were poisoned and a Spanish threat loomed larger.

Only 36 bolts of sailcloth were purchased in 1570. In July, however, news had arrived of a large Spanish fleet at Antwerp. The English suspected that this fleet was related to a conspiracy involving the Spanish ambassador, known as the Ridolfi plot, to kill Elizabeth and place Mary Queen of Scots, then a prisoner in England, on the throne. The fleet was only intended to escort Princess Anne of Austria to Spain to marry Philip II but the appearance of the fleet caused concern and in defence the Queen's ships were mobilized and the coastal defences alerted.²⁷ This incident serves to highlight the difficulties of correlating purchases with periods of mobilization. The fit is far from

²⁶R.B. Wernham, The Making of Elizabethan Foreign Policy, p. 34.

²⁷N.A.M. Rodger, The Safeguard of the Sea, p. 203.

perfect. It is most likely that sailcloth used in this year was purchased the previous year and that some stockpiling in anticipation of future needs was occurring.

Purchases of sailcloth were then modest until the arrival of the Spanish Armada, although they were somewhat higher in 1576, and substantially so in 1581. 330 bolts were purchased in 1576. Many may have been purchased when Elizabeth prepared to send troops to support the rebellion in The Netherlands. The rebellion had spread in that year from a few towns in Holland and Zeeland to include all 17 provinces.²⁸

Purchases of sailcloth rose considerably to 713 bolts in 1581. While part of the purchases may have been made in order to re-stock after years of minor acquisitions, it probably also reflects concern with the growing naval strength of Philip II. In 1580 Philip, with the military strength to enforce his claim to the throne of Portugal upon the death of Cardinal Henry, became King of Portugal. At the same time he acquired the Portuguese Navy of 12 ocean-going galleons and 10 or 12 of the Indian guard sent to protect the convoys returning with the treasure of the New World and so he now possessed a naval force to be reckoned with. The following year the Duke of Parma and his army had returned to the Netherlands. With an army nearby and a fleet augmented by the Portuguese ships Philip had the means to attack England directly.

The collapse of the French monarchy in 1585 resulted in greater English participation

²⁸The offer of troops turned into an offer to pay £50,000 for a mercenary army the States had intended to employ, under the leadership of Duke Casimir, brother of the Elector Palatine. Outside of a willingness to negotiate, that was the extent of Elizabeth's involvement in the affairs of the continent in that year although the increased purchases of sailcloth suggest that some preparations had gone ahead. Don John died and his replacement, Alexander Farnese, Prince of Parma, paid off Casimir's troops and they returned home.

in the affairs of the continent yet little sailcloth was purchased to show for it. While no sailcloth was purchased in 1584, little more than 100 bolts a year were purchased between 1585 and 1587, inclusive, even though in 1585 Elizabeth sent the Earl of Leicester with a total of 7,000 English troops to support the Dutch in their resistance to Parma.²⁹

In the same year Spain seized the English grain fleet and news arrived that Philip was preparing an expedition against England. In retaliation Elizabeth embargoed Spanish ships and sent Sir Francis Drake with two Royal ships on a retaliatory expedition to the Spanish coast and the West Indies. While the voyage does not seem to have made extensive demands for new sailcloth, it is noteworthy as the first attempt by the English to use naval power to assault an enemy in his own territory.³⁰ Drake was at sea again two years later with four of the Queen's ships, sent to attack Spanish shipping.³¹

The Spanish conflict ushered in the second phase, which necessitated yearly purchases in greater amounts beginning in 1588 and continuing irregularly through 1604. Purchases averaged 873 bolts for this series of years, four times the figure for the previous phase. They ranged from a low of 219 bolts in 1596 and reached 1,660 the following year. The ongoing apprehension of Spanish aggression is readily apparent, as is the Irish conflict, with every year except perhaps 1596 showing substantial purchases.

Although the English mobilized first in December 1587 after reports had arrived of

²⁹R.B. Wernham, The Making of Elizabethan Foreign Policy, p. 58.

³⁰Wallace T. MacCaffrey, Elizabeth I, p. 237.

³¹N.A.M. Rodger, The Safeguard of the Sea, p. 253.

orders given for the Spanish Armada to put to sea, preparations are not clearly visible in the 1587 records of sailcloth purchases. Small patrols only were maintained at sea in 1587³² and 120 bolts were purchased. The arrival of the Armada the following year then correlates with increased purchases of sailcloth - 579 bolts - as England prepared to meet the challenge. Lord Howard of Effingham, the Lord Admiral of England, put to sea with about 80 ships, the core being made up of the fast and heavily armed galleons. Another smaller group under Sir Francis Drake then joined him.³³

Purchases of sailcloth were higher still in 1589, when 823 bolts were recorded. In that year Lord Willoughby was sent to Normandy with 4,000 troops to assist Henry IV in his battle with the Catholic League. As Henry's primary concerns were to do battle with Parma and relieve Paris, the defence of Brittany, an important centre of sailcloth production and well placed to be used by the Spanish as an invasion base to England, was a low priority.

The arrival of 3,000 Spanish troops at the Breton port of Blavet in October 1590 was alarming news for the English³⁴ and the numbers of sailcloth purchased continued to be high. Spain was now in a position to control the whole southern coast of the Channel from Flanders to Brittany, and the naval base would provide easy access to England. Elizabeth kept a substantial fleet at sea, in part to restrict Spanish access to Brittany, and

³²Ibid., p. 260.

³³Ibid., pp. 263-5. In 1599 rumours of an approaching Spanish armada fuelled intensive preparations in England- ten ships were mobilized in London - but the Spanish ships had been diverted southward in pursuit of the Dutch.

³⁴Wallace T. MacCaffrey, Elizabeth I, p. 253.

sent Sir John Norris with 3,400 troops in May the following year, later increased to 4,000.

Roger Williams was sent with troops to Normandy the month before to deliver Dieppe, the port of entry for English aid, from the Leaguers of Rouen and Le Havre. Elizabeth now had two major theatres of operations in France. English forces were withdrawn from Normandy in 1593 but the Spanish threat remained in Brittany.

The English were to spend three fruitless years in Brittany, hoping in vain for French cooperation. The only success occurred in 1594 at Brest where the Spanish, on their own, were building a fort. Norris laid siege to the fort with the support of a squadron under Martin Frobisher and in approximately six weeks it was taken. Rodger thought that this victory was as decisive as the defeat of the Spanish Armada for it 'largely dispelled English fears of Spanish expeditions to England, Ireland or Scotland, and allowed the remaining English troops to be withdrawn.'³⁵ Norris and 2,000 of his troops then went to Ireland in 1595 to face the troubles there, and the rest of the troops went home. After 1594 England participated little in the continental war, although forces remained in the Netherlands. English presence in this war was last felt in France in September 1597 when Henry recovered the town of Amiens with English help.

This period saw a number of commerce-destroying joint royal and private expeditions against Spain and these no doubt in great part explain the high level of purchases of sailcloth. Naval expeditions that included Royal ships were sent, besides Drake's voyages previously mentioned in 1585 and in 1587, every year from 1589 to 1592 and again in 1595 and 1596. The Queen, without the funds to work independently, needed private

³⁵N.A.M. Rodger, The Safeguard of the Sea, p. 275.

backing for the expeditions but this arrangement could only result in a reduction of Crown control over the enterprise and a diversification of aims and goals. Only the expedition of 1592 resulted in success when the East Indiaman *Madre di Dios*, loaded with valuable cargo, was captured.³⁶ Otherwise, most of the voyages have gone down in history as fiascos, with money, men, arms and ships expended in the fruitless pursuit of glory and riches.

The final theatre for Anglo-Spanish hostility was Ireland. Ireland was rebelling under the leadership of Hugh O'Neil, Earl of Tyrone, and in 1598 Elizabeth began full-scale military operations to crush the revolt. Preparations probably began in 1597 for 1,660 bolts of sailcloth were purchased in that year, a new record number. A relatively few 515 bolts were purchased the following year. The numbers purchased rose again the following year and remained high through 1604.³⁷

By the time James VI of Scotland had succeeded to the throne of England, France was reunited, Spain appeared exhausted, the Dutch were well established behind defensible frontiers and Ireland was pacified. The number of bolts bought then fell after 1604 with the advent of peace, rising again in 1625 with the commencement of war with Spain. Interestingly enough, purchases then dropped the following year and remained low throughout the remainder of the decade even though England remained at war with Spain

³⁶Wallace T. MacCaffrey, Elizabeth I, p. 236.

³⁷Charles Blunt, Lord Mountjoy, was finally successful in defeating Tyrone, his surrender coming only three days after Elizabeth's death.

until 1630 and was at war with France as well from 1627-9. The average over this third phase (1605-1629) was 422 bolts, being almost double the pre-Armada period of 219. With the exception of two years, 1605 and 1618, sailcloth was purchased every year.

Purchases were slightly higher for a half-dozen years after 1619. In 1620, 708 bolts of sailcloth were purchased, many probably allocated to the six Crown ships taking part in the expedition against the pirates of Algiers. English merchants and seamen were becoming increasingly troubled by pirates in the Atlantic, particularly from the Barbary states. Although English shipping got some reprieve from piratical attacks, the pirates returned almost immediately after the expedition's return.

In 1625 1,171 bolts of sailcloth were purchased, the largest number since 1602. Many of these were without doubt used to transport 12,000 troops under the command of Count Mansfield to the continent in support of the Elector Frederick V, the Protestant ruler of the Palatine and James's son-in-law. Others were probably purchased for an expedition of roughly 100 ships that sailed to Cadiz, of which 13 belonged to the King.³⁸ The Ordnance Office, in opposition to its normal practice, provided the gunpowder, shot and muskets for the merchant vessels as well as Crown ships.³⁹

Purchases remained well under 300 bolts a year for the remainder of this phase. War with France followed in 1627 although there is little to show for it in sailcloth purchases.

³⁸Godfrey Davies, The Early Stuarts 1603-1660, p. 61; N.A.M. Rodger, The Safeguard of the Sea, p. 357.

³⁹Richard W. Stewart, 'Arms and Expeditions: the Ordnance Office and the Assaults on Cadiz (1625) and the Isle of Rhé (1627)', Mark Charles Fissel (ed.), War and Government in Britain, 1598-1650 (Manchester, 1991), pp. 115-6.

In June 1627 an expedition of 8,000 levies and almost 100 ships, including ten Royal vessels, sailed under the leadership of Buckingham to the Isle of Rhé in an effort to incite the discontented Huguenots of La Rochelle into open rebellion. While only 285 bolts of sailcloth were purchased in that year, the figure is higher than the one for the previous year and for the following two years and much was probably purchased for this campaign. A new expedition was prepared in August 1628 when the inhabitants of La Rochelle were threatened by a blockade but this, too, was unsuccessful. Peace was made with France in April 1629 with the Peace of Susa and with Spain in November 1630 with the Treaty of Madrid. Purchases of sailcloth then fell slightly to 174 bolts in 1629.

Finally, purchases rose again after 1629 and they fluctuated widely. The average yearly purchase amounted to 1,120 bolts, a figure not obtained even during the strife torn years of the Spanish struggle. Record numbers of bolts of sailcloth were purchased in 1636 and 1637, 3,424 bolts in the former year and 3,195 in the latter. These were, without doubt, Ship Money purchases.

The channel had become particularly important in 1635; France and Spain were at war, and both countries depended on English alliance or at least neutrality so that they could continue communications and pursue war. The first Ship Money fleet, consisting of 42 vessels, 19 of them over 500 tons, then put to sea⁴⁰ and purchases of sailcloth rose to 414 bolts. Its stated purpose was to clear the seas of pirates, protect English commerce, prohibit the Dutch from fishing in English waters, and preserve English sovereignty over

⁴⁰Kevin Sharpe, The Personal Rule of Charles I, p. 546.

the narrow seas against the growing naval might of the French. The fleet in the Downs, composed of 19 of the King's ships and five merchantmen under the command of the Earl of Lindsey, ferried men and money to Dunkirk, under threat from France, and held off French and Dutch ships from blockading Spanish supply lines to the Low Countries.

France had entered the Thirty Years War and England began to reorientate towards France and the United Provinces. Expectations of increased naval operations threatening England's security led to an even larger Ship Money fleet being put to sea the following year. This one, with 27 of the King's ships and three belonging to merchants, was under the command of the Earl of Northumberland. The fleet was again expected to provide some protection from pirates, although the number of ships were too few and far between to be really effective. It was meant, as well, to protect English fishing waters and force the Dutch to buy fishing licences.⁴¹ Rodger argued that:

'Neither the ships nor the fleets of Queen Elizabeth had been so formidable. These fleets were effacing the memory of Cadiz and the Ile of Rhé, and restoring England's reputation as an ally worth gaining and an enemy worth appeasing.'⁴²

The Ship Money fleet probably benefited England most by raising her standing and by providing a useful bargaining chip in international politics.

Many, without doubt, were employed on William Rainsborough's 1637 Ship Money

⁴¹However, with England moving into closer relations with France, it was not feasible to offend France's allies and the fleet 'simply ceased to obstruct Dutch fishing.' Ibid., p. 597.

⁴²N.A.M. Rodger, The Sovereign of the Sea, p. 383.

expedition against the pirates of the Moroccan port of Sallee.⁴³ By the beginning of Charles's reign Salleemen had become the main threat to English shipping in the Atlantic, having moved north to attack not only Spanish shipping but now also English and French.⁴⁴ The fleet was composed of two of the King's ships plus two pinnaces and two merchant ships and were joined several weeks later by two additional pinnaces.

Charles's personal rule came to an end in 1639 when rebellion broke out in Scotland and then in Ireland and he turned to Parliament for funding.⁴⁵ Although data are missing for the years 1640 and 1641, preparations are probably visible in sailcloth purchases in 1638, when 889 bolts were purchased. More may have been purchased for this purpose in 1639, although the numbers are fewer - 272 bolts.

Sailcloth was not a major expense for the Royal Navy. No more than five per cent of the Naval allowances was ever spent on sailcloth, and that only occurring in 1595 when England was at war with Spain. Purchases normally averaged two per cent and in many years less than that. It appears, then, that sailcloth would have been more a strategic concern than an economic one.

While the number of bolts purchased between 1558 and 1642 was highly erratic, it was possible to distinguish some patterns in the amounts required and these to a great

⁴³For a comprehensive summary of the expedition see David Delison Hebb, Piracy and the English Government (Cambridge, 1994), pp. 237-65 and Kenneth R. Andrews, Ships, Money and Politics: Seafaring and Naval Enterprise in the Reign of Charles I (Cambridge, 1991), pp. 160-83.

⁴⁴Kenneth R. Andrews, Ships, Money and Politics, p. 163.

⁴⁵For a detailed summary of the Irish rebellion see M. Perceval-Maxwell, The Outbreak of the Irish Rebellion of 1641 (Montreal & Kingston, 1994), p. 286-7.

extent can be explained by varying levels of Royal demand. English participation in international events or even the expectation of that occurring seems to have been a powerful impetus behind the purchasing of sailcloth but the fit is not perfect.

IV

This section will examine when the types of sailcloth were purchased and in what amounts, their sources, the methods of purchasing and the individuals responsible. This information, plus efforts to explain why they chose the sources they did, will suggest the reasons for and the consequences of direct government investment in the domestic sailcloth industry. If England had been interested in making herself independent of foreign supplies for vital military goods, then it would be expected that the Crown would directly invest in the domestic sailcloth industry.

The types and sources of sailcloth purchased changed during the period and these can be examined in three phases. The first phase extended up to roughly 1590, and is identified by the fact that the bulk of the canvas purchased originated overseas. When demand was at its lowest level, then, the sailcloth was purchased from foreign suppliers. All of it appears to have been foreign until 1570.⁴⁶ The countries from which purchases were made were nearly always recorded in the treasury records after 1589. Identification of the sources for the years prior to this depends on several factors. First, shipments of canvas from Ipswich were negligible prior to 1575 and shipments of canvas from London

⁴⁶P.R.O. E351 2206.

to Ipswich were still in evidence in 1596.⁴⁷ It is unlikely, then, that domestic canvas made important contributions to supply before 1575.

Secondly, when English canvas was recorded as being purchased, the origins of the other sorts of canvas were recorded as well. For example, in 1581 British medrenix, English medrenix and 'Danske' poldavis were recorded.⁴⁸

Thirdly, some sorts of canvas do not appear to have ever been produced in England. This includes 'Gouldefordes', Vandelle, Vittery, Oleron and Roane canvas. It is assumed, then, that purchases of these sorts originated overseas. Domestic production of poldavis was probably quite limited prior to the turn of the seventeenth century and so purchases of that type were probably foreign as well. They were almost always recorded as being from Gdansk after 1581 and so most was probably foreign before that date.

Virtually the only canvases listed as being measured by the ell or bale were Vittery, Vandelle and Roan canvas, varieties which do not appear to have been produced in England. Generally only medrenix and poldavis, foreign or domestic, were recorded by the bolt. Unidentified types measured by the ell, then, are assumed to have been foreign.

The bolt may have been a set size for allowances were made for lack of measure at least by the 1630s.

Finally, price comparisons suggested the origins of some sailcloth which was not otherwise identified. For example, in 1595 the price of sail canvas purchased was very similar to the price of Ipswich canvas and quite dissimilar in price to French medrinack,

⁴⁷See above, Table 2.13.

⁴⁸P.R.O. E351 2217.

French oleron and Gdansk poldavis, all purchased in the same year.⁴⁹

From 1555 to 1566 the Navy bought an unidentified combination of poldavis, canvas, which was probably of the medrinack type and, occasionally, oleron. In 1567 when the number of units purchased became available, the medrinack type clearly dominated and continued to dominate until 1590.⁵⁰ Small amounts of Gdansk poldavis were purchased almost yearly. The purchases of vandelles began in 1579 and ceased after 1602. Prices during this period rose tremendously for this type and so it appears to have been a wartime necessity. The first recognized acquisition of Ipswich canvas during this period occurred in 1570 when £50 worth, or 36 bolts, of English medrinacks were purchased.⁵¹ Thirteen bolts more were purchased in 1581 and it then became a yearly, although minor, event from 1588.

Gdansk poldavis were imported from the cities now known as Danzig and from Elbing on the south coast of the Baltic. A canvas making industry had developed there producing, among other items, sailcloth.⁵² At the beginning of the sixteenth century roughly 200 individuals, including journeymen and apprentices, were involved in production and this number increased dramatically at the end of the century, partly

⁴⁹P.R.O. E351 2232.

⁵⁰This explains why the canvas in the previous sentence was identified as probably medrinack.

⁵¹Francis Owdrey, John Orwell, the Collins brothers and Peter Tort (sic) were producing to some degree prior to this period. See P.R.O. E351 2194 and above, pp. 119-120.

⁵²Henryk Zins, England and the Baltic in the Elizabethan Era (Manchester, 1972), p. 229.

because Dutch manufacturers had settled there.⁵³

There is little evidence to explain how and why specific sailcloth was purchased during this phase. The treasurers, Benjamin Gonson until his death in 1577 and then until 1595 his son-in-law John Hawkins, provided it, and it is most likely that they made contracts with various merchants to supply the canvas as required. The Queen's merchant at Danzig, Thomas Allen of the Eastland Company, probably supplied the Gdansk poldavis. It is also reasonable to suppose that foreign sailcloth was purchased because the domestic industry at this time was either not established or output was insignificant. Domestic purchases were made as the industry grew.

The development and domination of the domestic source marks the second phase and occurred roughly between 1590 and 1613, when demand was both high and low. Purchases of domestically manufactured sailcloth increased from 3.4 per cent in 1589 to 86 per cent the following year. In 1591 and 1593 roughly half was domestic and in 1592 and 1594, around two thirds. An average of 516 bolts of Ipswich sailcloth was purchased yearly. Purchases of French medrinacks ceased during this period, probably ending in 1595. The heyday of Ipswich purchases occurred during the period from the following year through 1612 when almost without exception over 90 per cent of the canvas was of domestic origin. Essentially the only other variety purchased during this period was Gdansk poldavis and these were purchased almost yearly.⁵⁴ This supports the notion that

⁵³Ibid., p. 228.

⁵⁴Very small amounts of other varieties were occasionally purchased.

there were distinct types of canvases and that imports of poldavis were necessary until domestic manufacturers produced these as well. This domination of supply occurred during a period of peaks and troughs and so domestic producers were keeping up with varying demand at this time.

The dramatic increase in the numbers of domestically produced sailcloth purchased in relation to foreign was probably to a great degree a consequence of the devastation wrought in the sailcloth producing regions of Brittany and Normandy by the civil war occurring in France at this time. Large areas of the country, particularly around Normandy and Paris, had been devastated by the rival armies and peasants were revolting.⁵⁵

An outbreak of plague and poor harvests as well coincided with the war-years. Reports of the time suggest that there were seven years when the harvests failed from 1584 to 1591 and only one harvest during the 1580s was 'reasonably fertile.' The following decade was somewhat better with three good years.⁵⁶ Rouen, a centre of sailcloth production, was badly affected by the dearth.⁵⁷ Large amounts of grain was purchased to feed the poor but the ships were taken by pirates and the grain was then sold in Southampton. In the summer of 1586 when the scarcity of food and plague had

⁵⁵R.B. Wernham, After the Armada, p. 488.

⁵⁶Mark Greengrass, France in the Age of Henri IV: the Struggle for Stability (London, 1984), p. 122.

⁵⁷See, for example, P.R.O. E351 2225, for evidence of purchases of Rouen sailcloth, this example being for the year 1588.

peaked, 14,000 people were receiving relief and many died each day.⁵⁸ Rouen was, as well, under siege in 1591-2.

Trade through the Atlantic and the Mediterranean was disrupted by the Civil War. Mark Greengrass argued that as a result, French exports collapsed. Catholic towns on the Atlantic were at times blockaded by Huguenot privateers and some merchants had ceased to trade by 1589. He added that 'only well-fortified Protestant ports like La Rochelle prospered.'⁵⁹ While evading the privateers was without doubt difficult, it is unlikely that this would entirely explain the failure of the Navy to purchase French sailcloth. Merchants tended to adapt to wartime conditions, shipping through alternate ports, employing factors from countries neutral or friendly to the foreign authority, evading or colluding with customs officials and providing false destinations.⁶⁰

In 1590 when Spanish troops had arrived at the Breton port of Blavet, the number of French sailcloth purchased by the Navy fell dramatically to 47 bolts, whereas the previous year 770 bolts had been delivered. French canvas continued to find its way into the Navy for several more years, however, in spite of the difficulties. Roughly half of the purchases in the following year, 412 bolts, were French imports. Almost a third of the purchases in 1592, or 146 bolts, were French. In 1593 416 bolts, or slightly more than half, were of French origin. The following year purchases of French sailcloth declined

⁵⁸Mark Greengrass, France in the Age of Henri IV, p. 121.

⁵⁹Ibid., p. 118.

⁶⁰See Pauline Croft, 'Trading with the Enemy 1585-1604', The Historical Journal, xxxii, no. 2 (1989), pp. 281-302 for a discussion of methods whereby merchants continued to trade between England and Spain in spite of increasing tensions and war.

to 207 bolts, less than a third. Only 69 bolts of French canvas was purchased in 1595 and no more is in evidence until 1613.⁶¹

Greengrass argued that there was a correlation between monetary instability and the vulnerability of French capitalism. Spanish subsidies to the League and the payment of Spanish troops on French soil increased the amount of circulating silver, creating inflation. Prices of basic commodities then rose. As well, additional mints were built and many produced coins with a silver content of three-quarters below face value. The impending collapse of the coinage was an indication of the economic devastation wrought by the Civil Wars.⁶²

If inflation was affecting French trade and industry it would be expected that French sailcloth was becoming more expensive, other things being equal. There is no evidence in the Treasurer of the Navy records, however, that this was the case. The price of a bolt of French-made sailcloth remained relatively stable at around 26s throughout the 1580s and even fell a shilling or two in the early 1590s.⁶³ Prices do not seem to have been an initial motivating factor in purchasing decisions, as prices of domestic sailcloth were at first high compared to French, being 4s 8d more in 1590 to 7s in 1594.⁶⁴ It is likely that domestic prices were high in response to increased demand in the wake of the Spanish conflict and of declining French productivity.

⁶¹P.R.O. E351 2226-2234, 2251.

⁶²Mark Greengrass, France in the Age of Henri IV, p. 120.

⁶³P.R.O. E351 2217-2232.

⁶⁴P.R.O. E351 2227-2231

A grant of monopoly, often given as a reward for either services or gifts rendered or expected, may have been the method whereby domestic sailcloth was purchased. Prices of English sailcloth stabilized at a more competitive 28s the bolt by 1600 when demand was still high, suggesting contract purchases with a single supplier. A manuscript from 1601 intimates the existence of grants for poldavis and medrinacks.⁶⁵ That supplier was probably Thomas Harvy, who became the leading sailcloth merchant in the Ipswich - London trade in that year. He appears to have taken the place of Thomas Barber (Barbour), whose family name can be seen shipping sailcloth types from Ipswich to London as early as 1569.⁶⁶ Barber was selling sailcloth to the Navy at least by 1593 when 1,500 bolts was ordered, 1,000 from him at 34s the piece, and 500 of French medrinacks at 25s.⁶⁷ A writer from the end of the reign of Elizabeth went further and claimed that Mr. Barber was the only buyer of all Ipswich cloths.⁶⁸ While that was most certainly an exaggeration, he did dominate the trade in sailcloth from Ipswich to London from 1578 to 1595/6. His proportion of the market varied from 28 per cent in 1578/9 to a peak of 83 per cent in 1595/6 when French imports had collapsed. Harvy then displaced him but only through 1604, shipping 68 per cent of the total in 1600/1 and 61 per cent in 1603/4. There is no evidence to suggest his successor, Andrew Harris,

⁶⁵Paul L. Hughes and James F. Larkin, Tudor Royal Proclamations iii (New Haven, 1969), p. 236.

⁶⁶P.R.O. E190 588/3.

⁶⁷P.R.O. SP12 244/57. It does not appear that the full consignment of 500 bolts of French sailcloth was delivered for, as stated above, only 416 bolts were purchased.

⁶⁸B.L. Lansdowne MSS. 108, 78.

received a Royal contract but he appears to have subsequently displaced Harvy in the sailcloth trade.

If Barber and Harvy were monopoly suppliers, it is difficult to determine who made the contracts with them and why. Grants of monopoly might come from the Crown, while a contract could come from the Treasurer of the Navy. The quality for the price may have been good. The same writer above claimed that:

‘Ipswich sailcloths are like every day to be perfecter and better made than they have been by reason there is one Mr. Barber...and the Ipswich workmen and he by agreement hath two sealers, the one by the workmen, the other by the said buyer, to survey seal and mark all true made sailcloths... and the untrue made cloths rejected and unsealed.’⁶⁹

Although the above was no doubt written for personal motives, it does suggest that while Barber was involved in the industry there was a significant amount of quality control being exerted.

The treasurers were responsible for purchasing decisions and these were numerous and served for short durations during this phase. Hawkins was not replaced after his death in 1595 until 1598 and then unofficially by his deputy, Roger Langford.⁷⁰ Langford was replaced the following year by Fulke Grevill, afterwards Lord Brooke, who remained in office through 1603. Following him was Sir Robert Mansell until 1618.

It was common during the early modern period for possessors of government offices

⁶⁹Ibid.

⁷⁰Langford completed the Treasurer of the Navy account for 1598 but, according to Oppenheim, he ‘simply worked at the accounts without authority in administrative business.’ M. Oppenheim, Administration of the Royal Navy, p. 149; Peck claimed that Langford became Treasurer in 1599. Linda Levy Peck, Court Patronage and Corruption in Early Stuart England (London, 1992), p. 112.

to work jointly for both public service and private interest. Procedure often shaded into corrupt behaviour, and corrupt practices were increasing during this phase.⁷¹ It is possible that interests in personal profit shaped contract negotiations. M. Oppenheim claimed that:

‘there was hardly one of his (Hawkins, Treasurer of the Navy) duties which at some time or another did not give occasion for a charge of dishonesty.’⁷²

A commission, in fact, had sat to examine the affairs of the office a few years previously in 1583-4 but nothing is known of the commissioners’ report.⁷³ Hawkins had convinced Lord Admiral Nottingham and Secretary Burghley of his honesty but not Queen Elizabeth.⁷⁴

The purchasing decision may not have been his, for he left the charge of the office to his deputy, Roger Langford, off and on during the crucial years when the domestic supply became dominant. He departed for active duty in 1588 and was away intermittently until his death in 1595.⁷⁵ Little is said of Langford but it is possible that his term as acting treasurer allowed him to influence purchasing. His successor, Grevill, has been described as possessing ‘a dignified indolence of temper’ and ‘a refinement in

⁷¹There is no debate regarding this development. See, for example, Linda Levy Peck, Court Patronage, p. 116.

⁷²M. Oppenheim, Administration of the Royal Navy, p. 146.

⁷³Ibid., p. 147.

⁷⁴Ibid., p. 148.

⁷⁵Linda Levy Peck, Court Patronage, p. 112.

morality which rendered him unfit for the common pursuits of mankind.’⁷⁶ Rodger thought he was ‘honest and did his best, but he was contending with a situation which was beyond his control.’⁷⁷ Oppenheim argued that real control passed into the hands of his colleagues.⁷⁸ The colleagues he referred to filled the post of surveyor, first Sir William Winter until 1589 and then, more relevantly, Sir Henry Palmer until 1598 and then John Trevor until 1611.⁷⁹ While little is known of Palmer, he appears to have been reasonably honest for in 1608 Henry Howard, Earl of Northampton, commented on the surveyor’s remark that he did not oversee the other offices ‘lamentable, since his examination and censure might have stayed Trevor’s cozening.’⁸⁰ Trevor only came to the office after the domination of the domestic source had been established.

The responsibility for official procurement decisions, then, would be difficult to track down due to the many individuals involved during this phase. It is likely that one or more of these officials turned to domestic supplies of sailcloth because the production of French sailcloth had declined. If domestic sailcloth was purchased through a supplier with a monopoly contract, it is difficult to determine why. While there was opportunity for personal profit above and beyond what was normally possible, there is no real evidence to support the notion before 1598 and Trevor’s appointment. Prices during the late 1580s

⁷⁶Oppenheim is here quoting a ‘modern writer’ who is not referenced. M. Oppenheim, Administration of the Royal Navy, p. 149.

⁷⁷N.A.M. Rodger, The Safeguard of the Sea, p. 338.

⁷⁸M. Oppenheim, Administration of the Royal Navy, p. 149.

⁷⁹Ibid.

⁸⁰Linda Levy Peck, Court Patronage, p. 113.

and 1590s probably reflected the greater demand of the Armada years and the French Civil War and a contract probably brought the price down by 1600. Ipswich sailcloth seems to have been of sufficient quality for any and all ships needing sails in the Royal Navy during this phase and so it was able to substitute for the French medrinack.

After 1613 and through to the end of the period the proportion of domestic sailcloth to total purchases declined to a level normally just over 50 per cent for an average of 386 bolts and this marks the third phase. The slide in Ipswich purchases occurred concurrently with the growth in purchases of the French vittery and noyalls canvas. Small amounts of Gdansk poldavis continued to be bought almost yearly until 1621 when purchases ceased. Purchases of vittery and noyalls canvas made inroads on the proportion controlled by the domestic supply and they may have supplanted poldavies. The mid-decade French war seems to have made no impact upon their purchase, even though all trade between England and France was stopped in 1627 by order of the French king.⁸¹

There are a number of possible reasons why the government shifted its source away from domestic domination to include overseas supplies once again. The sailcloth producing regions in Brittany may have recovered from the wartime devastation, the quality of the domestic product may have been insufficient or it may have declined, domestic supplies may have been insufficient for increasing demand, or the source may have changed for reasons of personal interest. Finally, Barber may no longer have been

⁸¹Annie Millard, 'The Import Trade of London 1600-1640', (Unpublished Ph.D. thesis, University of London, 1956), Vol. One, p. 173.

supplying the Navy and no candidate may have been willing or able to take his place. His name disappears from the port books after 1603.⁸² An overseas contract could then have been made.

It would be expected that with the passage of time, the socio-economic scars inflicted on a region racked by war would heal and trade and industry would, in some fashion, resume. While the trade resembled its pre-war pattern, it does not explain why purchasing officials made the decision to turn once again to foreign sources of sailcloth when the domestic industry appears to have, for the most part, satisfied demand.

It is possible that the quality of Ipswich sailcloth was simply not good enough for general use. Thirsk suggested that by the seventeenth century Ipswich sailcloth was popular for ships of less than 100 tons. She added that 'this was the secret of their success. They served a particular purpose, and for that use they were good value for money.'⁸³ As was seen above, however, Ipswich sailcloth was not only employed on small ships. They were used almost exclusively for sails on all ships during this phase, including the larger ones.

It may be that the quality of the domestic material had declined. If Barber had in fact exerted a significant amount of quality control, negligence may have followed his departure. The quality of the domestic material may also have declined if the production of poldavis was dominating sailcloth manufacture in England and if the poldavis type was

⁸²There is unfortunately a significant gap to the next available coastal port book, 1618-9. P.R.O. E190 598/10, 601/9.

⁸³She then added that Suffolk canvas made excellent sailors' hammocks. Joan Thirsk, Economic Policy and Projects, p. 41.

of a poorer calibre than the medrinacks variety. It has already been demonstrated above (Table 4.1) that between 1603 and 1619 the composition of identified canvas shipments from Ipswich to London was changing from predominately medrinacks to poldavies. It seems very possible, then, that poldavies were more commonly woven than medrinacks in the Ipswich area during this phase.

Although Royal demand for poldavies may have been increasingly met by domestic suppliers, purchases of this sort had never been significant. The bulk of identifiable sailcloth purchased had always been medrinacks. Medrinacks, therefore, were probably better cloth for the price. This would explain why only poldavies and Ipswich canvas were used for purposes other than sailcloth.⁸⁴ In 1620 Ipswich canvas was described by a member of the East India Company as 'trash'.⁸⁵

If poldavies were of a poorer quality then this would help explain why prices for poldavies were generally lower than either French medrinacks or English prior to the growth of domestic poldavies production. Prices averaged around 21s per bolt for foreign poldavies from 1585 until 1621 when purchases ended. At the same time French medrinacks approached 26s. English prices averaged 30s until 1619 when they dipped to 23s, when sailcloth and poldavies had dominated the coastal trade of Ipswich. If domestic poldavies had been sold to the government before 1619 at the pre 1619 rate, the

⁸⁴See above, f.n. 11. It is assumed that after 1622 domestic sailcloth was of the poldavy type. The East India Company decided to use poldavies for pepper bags, as it was much cheaper than canvas. CSPC 1625-9, p. 387. Ipswich canvas was used for bordering the waistclothes of ships and toparmour in 1622 and 1623. P.R.O. E351 2260, 2261.

⁸⁵CSPC 1617-21, p. 391.

Navy would have no doubt found them less than satisfactory. Prices then rose again to the end of the period. The canvas may not have been of sufficient quality to match the growing price and so purchases of Ipswich sailcloth declined.

Prices for canvas, both foreign and domestic, were being reduced beginning in 1622 because of defects and insufficient measurements. However, the domestic product was found to be faulty more often than the foreign. Ipswich canvas was abated eight times between 1622 and the end of the period for insufficient measure and three times for defects. Noyalls canvas by comparison was abated seven times for want of measure and only once for defects.⁸⁶

The proportion of domestic sailcloth to total sailcloth purchased may have declined because more sailcloth was required than the domestic industry could supply. In 1635 the Officers of the Navy complained that:

‘a great quantitie of saile canvas, both French cloth and Ipswich, were fit likewise to be thought of, being a commoditie... that cannot be had for any money on a sudden... whereof wee have had late experience by ye greate difficultie to finde out a sufficient quantitie of Ipswich canvas to make sailes...for the ten ships...’⁸⁷

That same year they found it difficult to supply the service with Ipswich canvas.⁸⁸ They contracted for noyalls canvas, vittery canvas, ‘and as much Ipswich canvas as possible can be had.’⁸⁹

⁸⁶P.R.O. E351.

⁸⁷P.R.O. SP16 291/31.

⁸⁸P.R.O. SP16 293/54.

⁸⁹P.R.O. SP16 297/26.

These concerns probably related to purchases made in 1636, when the largest number of bolts of sailcloth, 3,424, were procured. Of that total Ipswich supplied 1,121. This domestic figure was only exceeded twice before 1636, first in 1602 when 1,470 bolts of Ipswich canvas were purchased and then in 1630 when 1,150 bolts were purchased. However, there is no positive correlation between high demand and low proportion. Domestic purchases prevailed in 1602 and in that year Ipswich provided 91 per cent of the total 1,609 required. In 1604 another high figure of 943 bolts were purchased, and all but five of them were manufactured in the Ipswich area. In comparison, in 1614 of the relatively few 461 bolts purchased, only 267 came from Ipswich, 58 per cent. The lowest proportion of 27 per cent, purchased in 1631, was part of a total of only 279 bolts. The 1635-6 procurement problem was most likely a reflection of unusual demand and the extent of the Ipswich industry and was therefore exceptional. For the great majority of the years considered Ipswich produced and delivered to the government nothing similar to this figure and yet foreign sailcloth was purchased.

Hildebrand Prusson played an important role in the purchasing of sailcloth during this phase and it may have been his discretion to turn once again to foreign supplies.⁹⁰ Although not the first Prusson to sew sails for the Navy, he made his first appearance in the Treasury of the Navy papers significantly in 1613 when this final phase begins and remained until his death in 1637.⁹¹ By at least 1621 Prusson was being rewarded

⁹⁰ B.L. Cotton MSS. Otho E7, f. 130.

⁹¹P.R.O. E351 2251; P.R.O. SP16 366/32. Adrian Prusson, his father, (Prowse) is first mentioned as a sailmaker in 1582. P.R.O. E351 2218.

additional pay for sealing, measuring and choosing the bolts of canvas.⁹² In 1613 the proportion of Ipswich canvas purchased dropped below 90 per cent and, with one exception, remained well below.⁹³ In the following year purchases of Noyalls first became evident.

Prusson began his employment with the Navy during a period when corruption was at an exceptionally high level. It reached a peak during the years 1604 - 1618 when the treasurership and surveyorship were held by Robert Mansell and John Trevor respectively, the latter Prusson's relative by marriage.⁹⁴ Oppenheim described Mansell as 'an incapable and dishonest administrator' and his appointment was 'most unfortunate'.⁹⁵ Alan McGowan portrayed Mansell's appointment as 'a near disaster for the Navy' and Trevor as 'equally unscrupulous and only slightly less unpleasant.' He added that:

'within a few years no transaction could take place without such benefit that might be squeezed from the situation accruing by one means or another to Mansell or Trevor.'⁹⁶

Linda Peck stated that:

'the early Stuart Navy provides a good case study of the incentives to

⁹²Prusson was paid additional sums in 1621 for measuring canvas. P.R.O. E351 2259. More was paid to him for choosing, measuring and sealing canvas in 1624. P.R.O. E351 2262.

⁹³The exception was in the year 1616 when all canvas purchased was produced in Ipswich. P.R.O. E351 2254.

⁹⁴Trevor held the surveyorship from 1598 until 1611. For this relation see N.A.M. Rodger, The Safeguard of the Sea, p. 364.

⁹⁵M. Oppenheim, Administration of the Royal Navy, p. 189.

⁹⁶Alan McGowan (ed.), The Jacobean Commission of Inquiry of 1608 and 1618 (Navy Records Society, 1971), p. xiv.

corrupt practices in early modern administration because of the increasing importance of government contracting, expansion of offices, growth in expenditure, diversion of resources from the Crown to its officials and suppliers, and the changing social configuration of naval officeholding.⁹⁷

She added that ‘procurement and the letting of contracts was shaped by the personal interests of officials...’⁹⁸ Acting together, they combined with merchants to provide naval supplies at greatly inflated prices.⁹⁹ A manuscript suggested that Prusson worked in collusion with the two officials when it claimed that:

‘Pruson hath confesseth he hath ben accomtable to Sir Jo. T(revor?) and Sir Robert Mansell for all their provisions and therefore cant...deal with nobody ells.’¹⁰⁰

A comparison of prices paid by the Crown and those paid by merchants demonstrates the fact that the Navy was indeed paying inflated rates. In 1618 Ipswich canvas cost the king £1 10s the bolt, or 15 per cent more than that paid by merchants. Costs to the Crown for vittery canvas were 40 per cent higher at 14s per bolt. The king was charged 18d per yard for noyals, 29 per cent more than the price paid by merchants.¹⁰¹ It is unlikely that all of the additional amount can be accounted for by higher rates charged

⁹⁷Linda Levy Peck, Court Patronage, p. 107.

⁹⁸Ibid., p. 109.

⁹⁹Ibid., p. 115.

¹⁰⁰B.L. Cotton MSS. Otho E7, f. 130.

¹⁰¹The Commission’s report of 1618 (see below) compared the prices paid by the King for many naval necessities and those paid by merchants. The prices are probably reliable because Crown prices match those in the Treasury of the Navy papers, noyalls and Ipswich canvas from 1617 and vittery from 1614, the most recent year prior to 1618 when this type was purchased. Alan McGowan (ed.), The Jacobean Commissions of Inquiry, p. 268; P.R.O. E351 2252, 2255.

to poor credit risks like the Crown often was. It is interesting to note that Ipswich canvas seems to have afforded the suppliers the lowest rate of return.

Parliamentary debates and Crown inquiries resulted in two attempts to identify and reform the abuses during this period. In 1608 a commission was formed for this purpose but recommendations for reform were not implemented. By 1618 it was clear to King James that the Crown was in financial trouble and expenses needed to be reduced. Another commission was set up with instructions from the Privy Council to investigate abuses within the Navy and to offer suggestions to redress them.¹⁰² This one was more successful. The Navy officers were dismissed when they refused to administer the Navy under the commission stipulations and the administration of the Navy was put under the direction of the commission.¹⁰³ There was, however, no obvious reversal in the purchasing patterns for sailcloth. If abuses in sailcloth procurement were occurring, then Prusson was left unhindered to continue his work.

Prusson's private dealings hint at the motivation which may have lain behind his choice of suppliers. In 1621 he was hired as overseer of the East India Company's sails, cordage and masts with the responsibility for providing them.¹⁰⁴ As discussed above, it was not uncommon at this time for individuals to reap rewards in addition to their salaries. Prusson's efforts to enhance his income, however, seem to have exceeded the

¹⁰²The commission report is printed in Alan McGowan (ed.), The Jacobean Commission of Inquiry. See, as well, Roger Lockyer, Buckingham: the Life and Political Career of George Villiers, First Duke of Buckingham 1592 -1628 (London, 1981), pp. 49-50

¹⁰³Linda Levy Peck, Court Patronage, p. 125.

¹⁰⁴CSPC 1617-21, p. 480; Ibid., 1622-4, pp. 176-7.

norm.¹⁰⁵ In 1623, only two years after beginning his employment, complaints were lodged against him by Mr. Munnes concerning the quality of the goods supplied by him and the resulting charges.¹⁰⁶ At the same time there was ‘question for some falsehood in his Majesty’s service, he burnt his books.’¹⁰⁷ It was then decided by vote that:

‘the accusations against Pruson appear to be just, and that he shall in no sort be employed in the company’s service or be admitted to the sight of any of their books.’¹⁰⁸

The motives at work behind purchasing behaviour are not easy to ascertain. There is no reason to suppose from the evidence above, however, that the Crown or Navy officials were interested in establishing the domestic industry in order to reduce reliance on a foreign power for sailcloth. Additional contracts with new sources were probably needed when demand was high in 1588 and thereafter when French imports declined. Domestic contracts may, as well, have been profitable for the officials responsible for making them. The rise in overseas purchases that marked phase three is particularly interesting because the domestic industry seems to have received no support in the face of renewed foreign competition. This development occurred in spite of the fact that England was at war with both France and Spain. This conflict did not appear to have hindered supplies of French made canvas reaching England. It is reasonable to suggest that because

¹⁰⁵For example, a member of the company claimed Prusson told him that ‘where he served the company with oars at 4s the dozen he was a fool, for he should serve them at 7s the dozen, provided Pruson might have a share in the gain.’ *Ibid.*, 1622-4, p. 259.

¹⁰⁶Probably Thomas Mun, East India Company merchant and commentator on economic matters.

¹⁰⁷*CSPC* 1622-4, p. 259.

¹⁰⁸*Ibid.*

Hildebrand Prusson was responsible for choosing sailcloth, he determined the source of sailcloth, and that his reasons for choosing foreign supplies were at least partly motivated by self interest. Unfortunately, he destroyed the evidence that could have substantiated this.

V

The final issue to examine in this chapter is the impact the Crown's purchases of sailcloth might have made on the domestic industry. Firstly, attempts will be made to estimate the relative importance of the Navy as a customer of the Ipswich industry. The proportions of domestic sailcloth purchased to total shipments from Ipswich will be considered here. Secondly, the impact, if any, that changing numbers of domestic sailcloth purchases made on the indigenous industry will be examined.

Table 4.3 compares shipments of sailcloth from Ipswich to London with Crown purchases of sailcloth for that year and the year following. The Navy purchased more Ipswich sailcloth in 1570 and 1637 than was recorded in the port books. This suggests that either the sailcloth purchased was not shipped from Ipswich in the same year as it was recorded in the Treasury of the Navy reports or the cloth purchased by the Navy was not recorded in the port books. There is no reason to believe that it was withheld from the trade records so sailcloth purchased the following year is presented above for purposes of comparison.

It is clear from Table 4.3 that Crown purchases of Ipswich canvas were important to

TABLE 4.3: SHIPMENTS OF SAILCLOTH FROM IPSWICH TO LONDON, CROWN PURCHASES OF IPSWICH SAILCLOTH 1)FOR THAT YEAR 2)FOR THE YEAR FOLLOWING AND NAVY PURCHASES AS A PERCENTAGE OF IPSWICH SAILCLOTH SHIPPED 1)FOR THAT YEAR AND 2)FOR THE YEAR FOLLOWING (IN BOLTS) 1565-1637^a

Year	Shipments from Ipswich to London	Navy Purchases		Purchases as a per cent of sailcloth shipped	
		(1)	(2)	(1)	(2)
1569/70	11	36	0		
1579/80 ^b	275	0	13		4.7
1585/6 ^b	968	0	0		
1588/9	820	42	699	5.1	85
1591/2	1,230	280	400	23	33
1595/6	1,271	9	110	.7	8.7
1600/1	2,315	1,059	1,469	46	63
1603/4	1,453	932	0	64	0
1618/9	1,640	107	493	6.5	30
1628/9	1,345	51	1,150	3.8	86
1636/7	427	1,239	^c		

Source and Notes: P.R.O. E190 587/2-604/10; E351 2206-2278. ^aConversion from piece to bolt as previously described above, p. 123, f.n. 181. The years were listed here as they were presented in the port books. Crown purchases were for the second year and the year following; i.e., for the year 1569/70, Crown purchases are presented for 1570 and 1571. ^bThe six month port book figure was doubled to arrive at the figures here. ^cType of canvas purchased is unidentified.

the domestic industry. It is highly likely that in many years close to a third of the canvas found its way to naval vessels. The proportion may have exceeded 80 per cent twice but it was probably normally below 50 per cent. The Crown may have been the largest single

buyer but it did not buy the bulk of the domestically produced sailcloth. This suggests that either Ipswich canvas was being exported, shipbuilding in the River Thames was booming or the sailcloth was being redirected to other shipbuilding centres in England.

The numbers of sailcloth shipped from Ipswich to London appear to have increased to at least 1618/9 and then by 1628/9 they appear to have been in a state of decline (Table 4.1).¹⁰⁹ This trend roughly correlates with Naval purchases of the domestic product. Purchases of domestic sailcloth were roughly 130 bolts per year less during phase three than they were during the second phase. If what is being observed was indeed a decline in shipments of Ipswich sailcloth, then the decline must have been much greater than the 130 bolts no longer purchased by the government. While the impact of the drop in Royal purchases of domestic sailcloth was without doubt felt, the reasons for the decline of the Ipswich sailcloth shipments must be sought elsewhere.

It is possible that increased demand in the East Anglian port area absorbed the output that was normally shipped to London.¹¹⁰ Geoffrey Scammell suggested that in

¹⁰⁹Caution is used here because port books are good for snapshots of the state of trade for years in which the books exist. More data is necessary to confirm a decline.

¹¹⁰Little is known at this time of the history of the Ipswich sailcloth industry or of the Ipswich shipbuilding industry during this period. Any discussion of shipbuilding tends to be limited to the idea that it was booming during this period, and that it was important to the local economy. See, for example, A.G.E. Jones, 'Ship Building in Ipswich, 1700-1750' *The Mariner's Mirror* xliii, no. 3 (1957), p. 294. John Webb, 'Apprenticeship in the Maritime Occupations at Ipswich, 1596-1651' *The Mariner's Mirror* xlvi, no. 1 (1960), p. 33. Michael Reed claimed, as well, that 'ship owning, managing, building and the supporting trades were certainly of more importance than any one manufacturing industry.' Michael Reed, 'Ipswich in the Seventeenth Century' (unpublished Ph.D. thesis, University of Leicester, 1973), pp. 31, 34. Donald Coleman argued that during the late sixteenth and early seventeenth centuries Ipswich and Woodbridge 'became for a time the shipyards of London...' One of the main customers for these ships was the London-

shipbuilding, Ipswich came 'second only to the Thames...'¹¹¹ East Anglia's share of national tonnage of shipping was 28 per cent in 1582 (20,181 tons), rising to 30 per cent in 1629 (37,000 tons). While London and East Anglia both increased their tonnage, London tonnage increased because the size of ships increased, while East Anglia produced more ships.¹¹² Much of the increase in East Anglia shipping went to supply the growing east-coast coal trade.¹¹³

VI

Although gaps in the sources prevent a complete understanding of the issue, the government or Navy officials through their purchasing behaviour do not appear to have consciously attempted to initiate or support domestic production of sailcloth during this period. They seem to have done nothing to ensure that the product had a domestic origin, a move which would have supported the indigenous industry. Sailcloth may not have been financially significant as it did not command a large proportion of the money

Newcastle coat trade. D.C. Coleman, 'Naval Dockyards Under the Later Stuarts,' p. 153. I would like to thank the staff at the Suffolk Records Office for their efforts in helping me find an answer to this question. I would as well like to thank Bob Malster, author of a forthcoming book on the history of Ipswich, for his comments and excerpts from his book. He suggested that 'the shipbuilding seems to have been doing well and could have absorbed plenty of material...'

¹¹¹Geoffrey Scammell, 'British Merchant Shipbuilding, c. 1500-1750', International Journal of Maritime History xi, no. 1 (June 1999), p. 34.

¹¹²Kenneth R. Andrews, Ships, Money and Politics, p. 17.

¹¹³Ibid., p. 18; Ralph Davis, The Rise of the English Shipping Industry (Newton Abbot, 1972), p. 3.

allocated to the Royal Navy. It seems that, at most, only five per cent of the budget was dispersed on this product. The numbers of bolts purchased varied widely, and when purchases were high, so were Navy allowances.

Strategic concerns do not appear to have been present either. Had they been, it seems unlikely that the Government would have delegated the responsibility for making purchasing decisions to the Treasurer of the Navy, who by 1622 then delegated it again to Hildebrand Prusson, the individual entrusted with sewing the canvas into sails. Personal gain may have been a motivating factor when choosing suppliers. Although domestically produced sailcloth dominated purchases from 1590 to 1613, this was probably not a reflection of official concerns for a reliable supply. It is probable that the infant industry was stimulated by the additional demand made for Naval stores. A possible monopoly contract awarded perhaps for service or for money would have further extended the sales. Navy officials turned to foreign suppliers after 1613 and while it is possible that the quality of the domestic product had declined, it is, as well, further evidence that the Crown lacked interest in the domestic industry.

Navy purchases were important to the Ipswich industry because it was buying a significant proportion of the sailcloth shipped to London. It is possible that the industry suffered somewhat from a change in naval purchasing arrangements when sailcloth was again purchased overseas. However, the decline in the Crown's purchases was not enough to explain a credible decline in shipments. The domestic sailcloth industry continued to survive in spite of a lack of state support, however, and continued to provide sailcloth for shipbuilders.

CHAPTER FIVE

DIRECT CROWN INVESTMENT IN CORDAGE

I

Historians have neglected direct Crown investment in cordage and the consequences of this investment on the development of the domestic cordage industry. It is generally thought that investment during this period was on the foreign product. The existing literature on the domestic industry focuses on the Bridport story, where most of the domestically-produced cordage was manufactured throughout the medieval period. Production was in progress here by at least 1211 and continues to the present day.¹ D.M. Loades thought that most of the cordage purchased by the Navy during the medieval period came from Bridport.² Little is said of the state of the early modern industry and then historians disagree. Loades believed the Bridport industry had ‘fallen on hard times’ during this period and that ropemaking was declining. He added that it may have been that interlopers were undermining the trade, but it was equally possible that the industry priced itself right out of the market.³ William Tyson disagreed, believing that the

¹Bridport produces a booklet A Legacy of 750 Years of History (Bridport Industries Ltd.). See also, William Page (ed.), The Victoria History of the County of Dorset ii (London, 1908), pp. 344-8; Geraint Jenkins, The Craft Industries (London, 1972), pp. 14-8; William Tyson, Rope - A History of the Hard Fibre Cordage Industry in the United Kingdom (London, 1966); D.M. Loades, The Tudor Navy: An Administrative, Political and Military History (Aldershot, Hants. 1992), p. 87.

²D.M. Loades, The Tudor Navy, p. 87.

³Ibid.

industry continued to prosper.⁴

Essentially nothing has been written on the Crown's role as investor and producer of cordage and the consequences of this behaviour on the import substitution of cordage.⁵ In 1620 the commissioners of the Navy undertook production of hemp-fibre cordage in the shipyard at Woolwich and then at Chatham in 1624. The English government in the early modern period seldom manufactured the goods they required. This was probably the first time they became actively involved in an entire manufacturing process outside of shipbuilding, preferring instead either to purchase on the market or contract for the goods.

Cordage, then, is examined here because, if the government was interested in freeing this country from dependence on foreign supplies of ordnance and stores, then it would be expected that the Crown would directly invest in the domestic cordage industry. Like sailcloth, cordage was a vital store without which ships could not function. It is particularly interesting that the Crown acted in opposition to its usual behaviour by adopting the role of producer and so it is important to examine the reasons for this.

The first part of this chapter describes the sorts of cordage needed and the uses to which they were put. Secondly, it will discuss total purchases made by the Navy and the proportion of the budget that was accounted for by cordage. This will demonstrate the impact made by this product on Royal finances. Thirdly, the sources of supply, both

⁴William Tyson, Rope, p. 12.

⁵The Chatham Naval Museum, for example, presents very little information on the period prior to factory mechanization. See, The Ropery: Visitor Handbook.

foreign and domestic, will be examined. This chapter will also attempt to explain how and why the sources were chosen. It will be seen that the government chose its source of supply primarily for financial reasons. Concerns for national security did not play a large role in the decision-making process.

The sources of supply will be arranged in three parts: firstly, the Elizabethan era, when the source of virtually all cordage purchased by the Navy was overseas. Secondly, the Navy made a brief foray into subcontracting between 1610 and 1618. Finally, the Navy commissioners adopted the role of industrialists and initiated the Woolwich and Chatham ropeworks. The final section of this chapter will examine the impact direct government investment may have made on the need for imports.

II

The Navy and less so the Ordnance Office required many types of cordage, in enormous amounts, to keep them functioning. The varieties can be roughly grouped into three broad categories: strands, ropes and cables. Once the hemp is hackled, or cleaned and straightened, it is spun into yarn, or threads. A varying number of threads may then be twisted into a strand. Three or more strands, totalling more than six yarns, are laid together to form a rope. Three ropes laid together form a cable.⁶ A cable, however, may

⁶Geraint Jenkins, The Craft Industries, pp. 19-20.

contain only three strands, as a rope, with many threads in each strand.⁷

The Treasurer of the Navy meticulously recorded the kinds of cordage purchased and occasionally included the reasons for the purchase.⁸ Two sorts of cordage appear to have been produced from one strand. Twine is produced from one or more threads twisted together.⁹ Although uses for it are probably limitless, it was recorded as being used to sew sails and flags. Because marlin is defined as a small line made of untwisted hemp, it is included here as a strand. It was used to seize the ends of ropes to keep them from fraying and as an emergency repair job when a sail ripped out of its rope.¹⁰

There was a huge variety of ropes. Bolt ropes, head ropes, latchet lines and cringles were used about the sails. Shrouds came from either side of all the masts.¹¹ Rattling was used to make the steps by which sailors could climb the shrouds.¹² Sounding lines and deep-sea-lines were important depth monitors, the former over shoals and the latter, as the name implies, in deep water.¹³ Nettings were small ropes seized together with yarn in the form of a net. They were laid out and covered with a sail in order to protect

⁷Cable is defined as 'three strand rope' in G.E. Manwaring and W.G. Perrin, Seaman's Dictionary (Navy Records Society, 1922), p. 113. A table written in 1688 listing circumferences of cables, number of threads in a strand and total threads supports Manwaring and Perrin's observation. B.L. Add. MSS. 28,748, ff. 59v-63.

⁸P.R.O. E351 2197-2284.

⁹Geraint Jenkins, The Craft Industries, p. 19.

¹⁰G.E. Manwaring and W.G. Perrin, Seaman's Dictionary, p. 185.

¹¹*Ibid.*, p. 225.

¹²*Ibid.*, p. 208.

¹³*Ibid.*, p. 229.

the seamen from weather both too fair and too foul.¹⁴ Lashing lines were used primarily to bind the tackles and breechings of the great ordnance when they were hauled aboard ship.¹⁵ Hawasers were three-strand ropes often used, with an anchor attached, to warp, or haul, a ship over a bar. The Ordnance Office used breechings, tackles, lashers, crane ropes, draft ropes and a large number of undifferentiated ropes for a wide variety of reasons such as for binding carts and ordnance.¹⁶

A cable had to be sufficiently large to anchor a boat. If it is not large enough, it is considered a hawser. One boat's cable, then, is a larger ship's hawser. Cables tended to be larger than three inches circumference, and they could be massive. A 22 inch cable 103 fathoms long weighed almost 9,000 lbs and contained more than 2,500 threads.¹⁷ Normally, however, cables were even longer, measuring 120 fathoms in length.¹⁸

III

Because cordage was vital it had to be procured, one way or the other. What sort of impact did purchases make on the Navy and Ordnance Office treasury? Cordage occupied a minor part of the resources in the Office of the Ordnance and so was not included in

¹⁴Ibid., p. 191.

¹⁵Ibid., p. 176.

¹⁶P.R.O. E351 2615-2664.

¹⁷B.L. Add. MSS. 28,748, ff. 55v and 60v.

¹⁸Brian Lavery, The Arming and Fitting of English Ships of War 1600 - 1815 (London, 1987), p. 44.

this analysis. Yearly purchases averaged well below £100 before 1571, and then below £200 for a decade and a half after.¹⁹ Only by 1585 did amounts top £200, reaching £560 in 1595 and the exceptional £1,234 in 1610. Amounts averaged between £200 and £350 for the remainder of the period, with another exceptional figure of £1,227 in 1635.

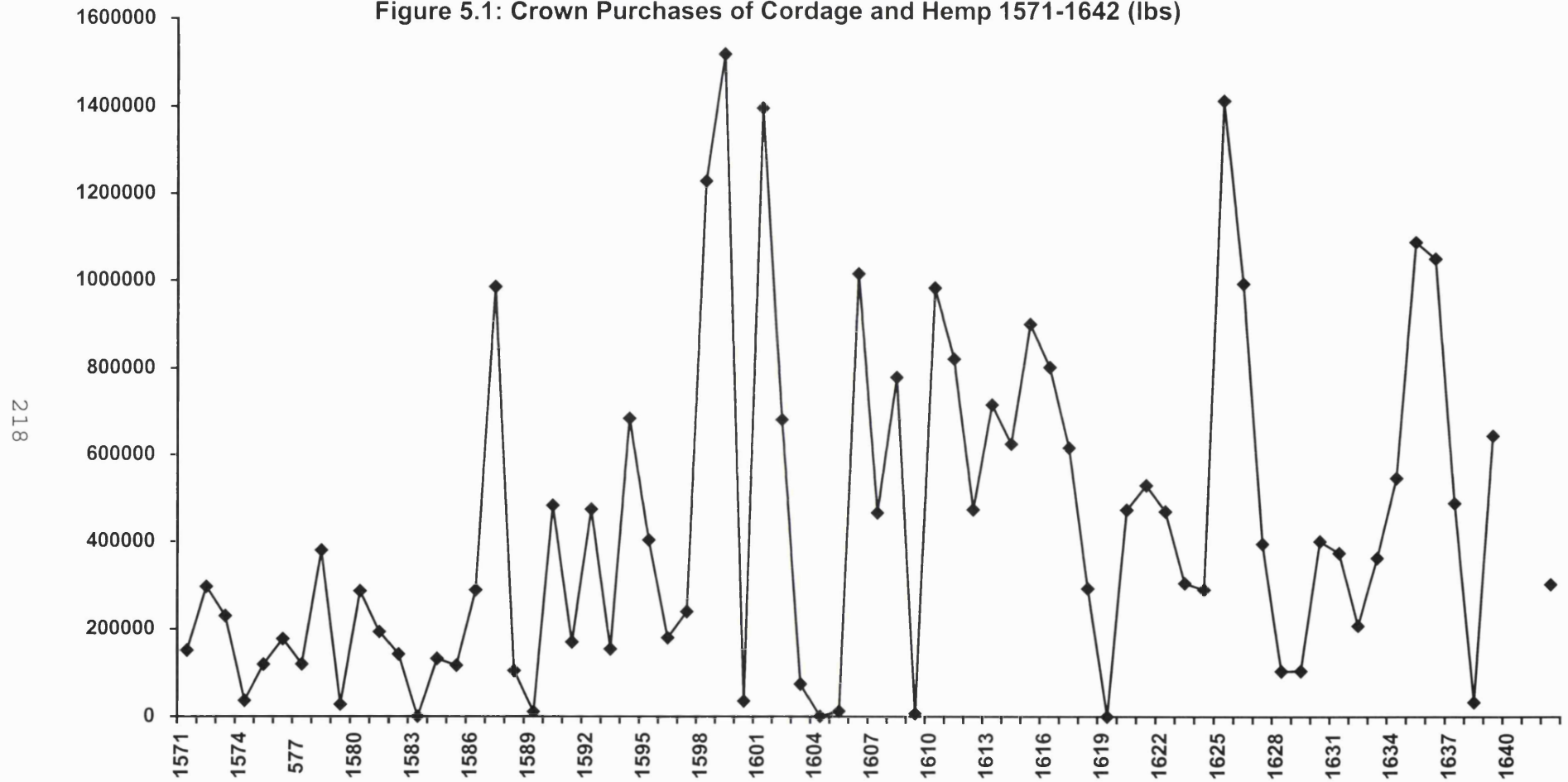
Figure 5.1 shows the amount of cordage and hemp purchased by the Navy yearly between 1571 and 1642 in lbs and Table 5.1 presents the values in five-year intervals in lbs and in their monetary value, the former from 1575 to 1635 and the latter from 1560 to 1635. The figures for weights and expenditure in Figure 5.1 and Tables 5.1, 5.2 and 5.3 were derived from the Treasurer of the Navy records. It is impossible to obtain data on the weight of cordage purchased prior to 1571 as the total money value includes several unit prices. It is expected that inaccuracies would be too great to estimate the weight. Thereafter, weight and/or cost per lb was included in the accounts for the bulk of the cordage.²⁰ A wide variety was purchased regularly each year, often in small quantities valued at under one pound. The Treasurer carefully noted the amount paid per unit of cordage, the total price and frequently the number of units. There is some evidence to suggest that some stockpiling was going on when prices were low²¹, but ongoing concerns with immediate finances appears to have kept this practice to a minimum.

¹⁹Cordage bought within the Office of the Ordnance was not listed here by weight because it was often recorded as numbers of coils in the Lieutenant of the Ordnance accounts. P.R.O. E351 2615-2664.

²⁰Minor amounts of cordage normally totalling well below £100 was purchased in most years for which no unit price or weight were provided.

²¹P.R.O. SP12 242/79.

Figure 5.1: Crown Purchases of Cordage and Hemp 1571-1642 (lbs)



Source: P.R.O. E351 2197-2284

**TABLE 5.1: ROYAL NAVY CORDAGE AND HEMP PURCHASES (Lbs)
AND AS A PROPORTION OF TOTAL NAVAL ALLOWANCES 1560-1635**

Year	Total Purchased (£s)	Total Allowances On Naval Accounts (£s)	Cordage As a Per Cent Of Allowances	Weight of cordage (lbs)
1560	7,886	84,300	9	
1565	0	7,844	0	
1570	3,916	17,528	22	
1575	1,203	6,894	17	118,931
1580	1,986	14,603	22	286,076
1585	1,078	17,908	6	116,577
1590	5,100	65,540	8	483,905
1595	3,616	59,040	8	403,326
1600	538	37,023	1	36,335
1605	162	28,672	0	12,369
1610	13,698	36,359	27	984,171
1615	13,591	36,131	37	902,439
1620	6,143	35,873	17	474,196
1625	16,824	163,969	10	1,412,386
1630	5,973	80,746	7	401,312
1635	20,092	65,748	31	1,090,357

Source: P.R.O. E351 2197-2274.

As can be seen from Figure 5.1 and Table 5.1, the amount of cordage purchased varied widely and so, outside of some apparent increases, a pattern is difficult to detect.²²

²²Figures relate to delivery dates rather than purchase dates. Payments were delayed in 1606, 1608 and 1610. P.R.O. E351 2244, 2246 and 2248. Unless otherwise explained below, when an account includes more than one year then an average is presented here.

While the £ value is included above, their weight is not. The account for 1640 is missing. There is one account for 1559 and 1560; the total for each year is given. 1560 is 4/5 of

Purchases during the Elizabethan era do tend to roughly follow the same trends observed for sailcloth, however. The average amount purchased yearly from 1571 to 1587 when Sir Francis Drake led the raid on Cadiz and Naval preparations for the arrival of the Spanish Armada necessitated additional supplies was 168,472 lbs. In only two years - 1565 and 1583 - was cordage not purchased. Purchases were then very erratic to the end of the period in 1642.

The data do suggest some increase in the amount of cordage purchased in 1560 and 1561 when events in Scotland necessitated naval preparations. While accounts for 1557 and 1558 are missing, £1,690 was purchased in 1555, £120 in 1556, and then for the two years 1559 and 1560 £9,258 was purchased, a substantially higher figure. Purchases were still high the following year when £7,168 worth of cordage was recorded. Purchases remained high in 1562 and 1563 when Elizabeth was providing support to the Huguenots on the continent. A total of £5,799 was purchased in those two years. Little cordage was then acquired until 1567 as tensions increased between England and Spain and England again went to the aid of the Huguenots. In that year £7,655 was purchased. Like sailcloth, purchases of cordage were then modest until war with Spain approached.

Wartime preparations in 1587 meant additional demands for cordage and this state of affairs continued until 1603. In 1587 985,648 lbs of cordage were purchased and they averaged 546,943 lbs a year throughout this period. Much of this increased average is

the total; the cordage figure presented here is therefore 4/5 of the total. One account is for 16 months, 1 January 1594/5 to 24 April 1596; figures presented here are averaged for one year. Hemp was included in Figure 5.1 and Table 5.1 because it was the primary raw material.

accounted for by the acquisitions made in 1598, 1599, and 1601 when substantially more than one million lbs was purchased in each year.²³ Much of it, without doubt, was used on ships sent to crush the Irish revolt.

Purchases were then minor through 1605 but after this year until 1619, in spite of prevailing peacetime conditions, considerable amounts were purchased. They averaged 654,686 lbs yearly, substantially more than the Armada period. The trend here deviates significantly from that of sailcloth as purchases of the latter during these years were less than half of the numbers purchased during the Armada years. This may be a reflection of the fact that, unlike sailcloth and gunpowder, cordage was needed during periods of peace simply to moor the ships in harbour. An exception was the year 1609 when no cordage was procured. It is interesting to note that the period from 1610 to 1618 inclusive was a nine year period when the cordage contract was awarded to private contractors intending to produce domestically.

No cordage was purchased in 1619, the year before the Navy took over production. Thereafter through 1642 an average of 522,976 lbs were purchased yearly, similar to that purchased during the war with Spain but less than that purchased subsequently. The wartime years with France and Spain during the mid 1620s were clearly met with additional purchases: 1,412,386 lbs in 1625 and a bit less in 1626 as the army under Mansfield was sent to the continent and an expedition sailed for Cadiz. Other peak years occurred in 1635 and 1636, when 1,090,357 and 1,052,696 lbs respectively were

²³P.R.O. E351 2235, 2236, 2238. All figures include purchases of hemp, negligible prior to 1620 but extensive thereafter.

purchased, much of this without doubt purchased with Ship Money and for the Sallee expedition. Some increase in 1639 suggests that additional supplies were needed when English forces were in Scotland.

Table 5.1 highlights the fiscal importance of cordage for the Crown and Navy. While little in the way of a trend can be gleaned from this, it is clear that cordage purchases captured a noticeable amount of the available resources, in some years an astonishing proportion. Prior to 1620 when the Crown began production the proportion of cordage expenditure to total Navy allowances averaged 13 per cent.²⁴ It normally claimed at least eight per cent and in some years substantially higher. The proportion was particularly high when the cordage contract was held by the private contractors in 1610 and 1615. Compared with expenditure on sailcloth, when purchases seldom rose above four per cent of Naval allowances, financially cordage was clearly more important.²⁵

Some types of cordage purchased were consistently recorded in the Treasury of the Navy reports by name. Unfortunately, the bulk of the cordage purchased was recorded simply as 'cordage'. Most of this was probably cables and hawsers. These two types were almost never listed when the many varieties of ropes and strands inevitably were and when they were, it was normally recorded as 'cordage viz. cables and halsers'. Secondly, this 'cordage' was noticeably cheaper per hundredweight than the other types. This was probably because it was less labour-intensive by weight to twist a large number of threads

²⁴Percentage was calculated from Table 5.1, using five-year increments.

²⁵See Table 4.2 above, p. 174.

into a strand and then close the strands.²⁶

The government, then, purchased a tremendous amount of cordage yearly, most of it cables and hawsers for the Navy. It was not an option - without it the Navy was useless. It is now necessary to examine the sources of the supplies.

IV

This section will present the sources chosen by the government for cordage supplies, the methods of purchasing and the individuals and/or groups responsible for making the purchasing decisions. It will also attempt to explain why they chose the sources they did. Three phases will be identified: the years up to 1610, the period of subcontracting from 1610 through 1618 and finally the years after 1620 when the Navy produced the cordage in the Royal dockyards. If the Crown was interested in making itself independent of foreign supplies for vital military goods, then it is reasonable that it should invest directly in cordage production. The reasons why the Crown finally did so will be fundamental to this argument.

The first era to be examined will be the medieval and early modern period up to the beginning of the Jacobean period. The government had at its disposal two sources of supply - domestic and foreign. Ropes were produced in England during this period. It is well acknowledged among historians, however, that the English government purchased

²⁶B.L. Add. MSS. 28,748, ff. 60v-63. Varying weights of cables, each three strands, were divided by the amounts of labour required to produce the strands and then the cables.

their cordage overseas, first from the Baltic region and then, beginning in the mid 1550s, the Russia, or Muscovy, Company merchants produced and then imported it from Russia. At the same time supplies continued to come from Danzig via Thomas Allen, the Queen's merchant from 1559-1603. The greatest share of the market, however, was clearly controlled by the Russia Company merchants throughout the Elizabethan era. It is not certain whether the various small ropes listed individually in modest amounts originated overseas as well but it is highly possible. Looking ahead, the Ordnance Office purchased essentially all of their various kinds of ropes between 1616 and 1639 from John Fletcher, Eastland merchant, and then George Fletcher.²⁷ It is significant that there is little evidence to suggest that the bulk of the ropes destined for the Navy might have a domestic origin.²⁸

Trade with Russia, initiated in 1553 via the northern route to the White Sea, was quickly organized into a monopoly company two years later. The Russia Company was a joint stock company; members pooled their resources and took a share of the profit whenever a ship returned. The Eastland Company, on the other hand, like the Merchant Adventurers, was organized as a regulated company.²⁹

A monopoly charter, awarded by the Crown for trade to a specific region, gave these companies legal status and theoretically at least provided them with protection from

²⁷P.R.O. E351 2651-63.

²⁸Some was bought locally. In 1571 34,432 pounds of English cordage was purchased. P.R.O. E351 2207. In 1574 five great cables weighing 11,950 lbs. and made in the town of Woolwich were purchased. P.R.O. E351 2210.

²⁹Henryk Zins, England and the Baltic in the Elizabethan Era (Manchester, 1972), pp. 113-4.

interlopers. This was clearly beneficial to the company merchants because on paper at least they did not have to compete with their fellow countrymen. The companies could as well regulate the trade and form diplomatic relations with foreign countries when needed with minimal government interference needed. The Crown benefited because the company might support diplomatic personnel and an organizational structure existed which could be more readily taxed and tapped for loans.

The Russian Tsar Ivan IV provided support for the Company as well by granting it a charter in the same year. This charter allowed the Company property and granted them exemption from customs or other taxes. Rudolph Robert thought that the Tsar was interested in developing the trade with England because he found that the traditional route to the Western markets through the Baltic, to which at the time Russia had no port, was 'carried out under serious handicaps.'³⁰ Ivan was extending the Russian frontier southward and he was frequently at war with his western neighbours. He was probably quite interested in trading with a Western power that could circumvent the Baltic and so avoid the countries with which he was frequently in conflict.

Another possible reason for his support may have been that he hoped to acquire arms from England. His army was poorly equipped and without a seaport on the Baltic, England could prove an attractive source. There is no direct evidence that this was carried out or even promised. There were complaints, however, from those who were

³⁰Rudolph Robert, Chartered Companies and Their Role in the Development of Overseas Trade (London, 1969), p. 58.

opposed to arms shipments such as Poland, Emperor Ferdinand I and Hamburg.³¹ Elizabeth denied that the trade was being carried out and in response, in 1561 she forbid the export of any provisions of war to any nation that was at war with a Christian nation.³² This probably did not put an end to the trade, if indeed there was one, for complaints continued.³³

A fleet of usually several larger ships made the four weeks' voyage to the White Sea and Archangel once a year. They stayed in Russia for a month to take on goods, notably cordage, furs, wax and grains, and then returned in August or September.³⁴

In 1558 Ivan conquered part of Livonia and this gave him a port on the Baltic - Narva, in the Gulf of Finland.³⁵ The Russia Company argued that the port was within

³¹The Tsar was frequently at war with Poland, and as a result, according to the Venetian ambassador, the Polish ambassador asked for and received assurances that the Russia Company would not trade in arms. T.S. Willan, The Early History of the Russia Company (Manchester, 1956), p. 63, 65. Calendar of State Papers, Venetian Series 1556-7, p. 1005.

³²T.S. Willan, Early History of the Russia Company, pp. 63-4; P.R.O. SP12 18/10.

³³Denmark, for example, complained in 1565 of arms shipments to Sweden, with whom it was at war, and during the next two years both Sweden and Poland complained of shipments of arms and craftsmen to Russia. Willan thought that because of the difficulties and dangers Elizabeth faced upon her accession to the throne and the efforts she made in acquiring arms from the continent for her own use, it was doubtful that much was exported to Russia. T.S. Willan, Early History of the Russia Company, pp. 65, 66.

³⁴Henryk Zins, England and the Baltic, p. 39.

³⁵This act was part of the struggles for the disintegrating State of the Knights of the Sword in Livonia which erupted in 1563 into the northern Seven Years War. Poland with Lithuania, Russia, Denmark and Sweden all laid claims to the territory. Ivan IV was interested not only in a port on the Baltic but in the total domination of Livonia. Alarmed, the Polish Commonwealth in 1557 declared war on the Order of the Sword, and in the spring of 1558 Russia invaded Livonia and occupied Narva and Dorpat. In 1560 Denmark took advantage of the conflict and acquired possessions of the Bishop of Osel. Sweden then occupied Estonia with the port of Revel in 1561. Poland with Lithuania also

its jurisdictions, while other merchants claimed rights to trade there as the port was not in the Company's contract. Once Russia had invaded, Poland initiated a blockade of the port, in part a reaction to the belief that England was shipping arms, food and craftsmen to Russia and in part a defence against Russian competition.³⁶ In December 1564 the Privy Council decided that the northern route was much safer for trade with Russia than the route to the port of Narva. Trade with the latter continued, however, and in 1566 the Russia Company's area of monopoly was extended to include it. In the decade following 1564 Narva provided only a minor proportion of the total Baltic trade but it was an important source for furs, wax, flax and hemp.³⁷ Trade continued on the northern route with little interruption.³⁸

The Russia and Eastland Companies did not have a monopoly on cordage; when purchasing it, the Privy Council familiarized themselves with current prices and then placed their order with the Russia Company, in rather general terms.

There is nothing to suggest that when the Russia Company merchants began their

held an interest in Livonia, and in 1561 the Master of the Order, Gotard von Kettler, made Livonia subject to the Polish Commonwealth, asking for its protection. Russia then gained the support of Denmark, who was interested in developing the Narva trade for the income it would derive from the Sound Tolls. Sweden in possession of Finland at first aligned herself with Russia in 1563 and in opposition were Poland, Denmark and the Hanseatic cities. *Ibid.*, pp. 41, 43-4.

³⁶*Ibid.*, pp. 43, 45, 46.

³⁷*Ibid.*, pp. 46-7.

³⁸Trade was interrupted between 1570 and 1572 when Elizabeth refused to enter into an offensive and defensive alliance agreement with Ivan. When trade resumed the merchants were required to pay half customs through the 1580s. Willan claimed, however, that the revocation did not stop the company from trading. T.S. Willan, The Early History of the Russia Company, pp. 91, 120-1, 130.

initial expeditions into Russia in 1553 that cordage sufficiently large to use for cables or hawsers was being manufactured there. Neither the skills nor the tools were available for hire or purchase. The Company began production first at Colmogro (Kholmogory), north of Moscow on the Northern Dvina River, in 1557 and in that year seven skilled English ropemakers, bringing tools with them, were sent to work the hemp growing there under the charge of the Company factor.³⁹ A decade later more than 100 men were employed in manufacturing cables and production had been moved to Vologda, south of Colmogro.⁴⁰

The reasons for working the hemp up into cordage in Russia rather than importing the raw material into England and then producing the cordage domestically are clear. Russia proved to be an excellent source of hemp, but it was not cost effective to ship the raw material to England. The Company officials in 1557 claimed that as freight was £4 a ton 'or little less...it [hemp] would not beare the charges.'⁴¹

It was not anticipated that start-up costs would be high. Land sufficient for production at Vologda was granted without apparent cost to the Russia Company by the Tsar in 1569 and a like amount may have been granted earlier at Colmogro.⁴² Initial instructions from the Company officials stipulated that a covered ropeyard, 16 feet by 180

³⁹Richard Hakluyt, The Principal Navigations, Voyages, Traffiques and Discoveries of the English Nation i (London, 1913), p. 382.

⁴⁰Ibid., ii, pp. 56, 90.

⁴¹Ibid., i, p. 382. The date is not certain but because of dates attached to surrounding letters it was probably written in that year.

⁴²Ibid., ii, p. 90.

fathoms, be built. A 'pale', or fence, was already in place at Colmogro, and this was thought to be 'one half of it [the cost.]' Another was to be added next to that and both sides were then to be covered over, which 'will be but little cost.' Nearby a tar house was to be built, 15 by 10 fathoms.⁴³

Secondly, the Company soon learned that Russian labour was cheaper to procure than English. Initially the Company agents were required by the Company to provide the ropemakers with labourers, probably Russian, so that when the English ropemakers returned to England, 'we be not destitute of good workmen.'⁴⁴ Richard Gray, agent at Colmogro, complained in the same year that the English ropemakers would not work for less than seven pounds a year. The agent believed that five Russians would work as well as three that were sent, 'and will not be so chargeable all, as one of these would be.'⁴⁵

Russian cordage quickly made serious inroads on the English market. By 1568 the Baltic's share of the market was less than half, and in 1587 the figure amounted to only a fifth. Zins suggested that this apparent decline was due to the cheapness of the Russian product.⁴⁶ England remained an important customer of Baltic cordage until towards the end of the sixteenth century, however, and in the decade after 1575 she was the largest.⁴⁷

⁴³Ibid., i, p. 392.

⁴⁴Ibid.

⁴⁵Ibid., p. 394.

⁴⁶Henryk Zins, England and the Baltic, pp. 231.

⁴⁷Ibid., pp. 229.

From 1595 imports of Baltic cordage were of little importance.⁴⁸

Although sales initially were made through a trading company holding a grant of monopoly from the Crown, that does not mean that the Crown found itself committed to purchasing its cordage from the Russia Company.⁴⁹ There were alternative sources which the government was free to pursue if it desired. Domestic cordage could have been purchased, or, more extensively, Baltic cordage from the Eastland Company. The government could have bought cordage from the Netherlands merchants as well, as they traded extensively in the Baltic region.⁵⁰

Why then did the Elizabethan government turn to foreign sources for its supply of cordage rather than domestic? There are four possible explanations. One may be that the skills required for production were not available domestically. The Navy officials hired

⁴⁸In 1568 359 shippounds were imported from Russia, some of it through the port of Narva, as compared with 303 shippounds from Danzig and Königsberg. The data for 1587 cover the final quarter of the year only, and 1,509 shippounds was imported by the Muscovy Company and 331 shippounds by the Eastland Company. Imports from the Baltic in 1595 amounted to 687 shippounds and from Russia, up to 3,000 shippounds. *Ibid.*, pp. 230-2.

⁴⁹There is nothing in the Company's charter to suggest that it had a monopoly on the cordage trade. For the charter granted during the reign of Philip and Mary see Richard Hakluyt, The Principal Navigations i, pp. 318-29 and Calendar of the Patent Rolls Preserved in the Public Records Office: Philip and Mary (1554-5), pp. 55-9. For an act for the corporation of the Company in 1566 see Richard Hakluyt, The Principal Navigations ii, pp. 66-72.

⁵⁰Difficulties began to emerge for the English trading to the Baltic in the early seventeenth century. Dutch competition in cloth exports grew as the price of English cloths increased and the quality fell. Secondly, the Dutch began to make available to the English Baltic products that competed with those imported directly by the English. It then became difficult to pay for Baltic imports, including hemp, as the market for English cloth in this region declined. R.W.K. Hinton, The Eastland Trade and the Common Weal in the Seventeenth Century (Cambridge, 1959), p. 162.

ropemakers to untwist and rework old cordage and junk into small ropes such as netting, wrayne ropes and later warps, port ropes, lashing lines and spun yarn.⁵¹ The cordage that was too rotten to be re-worked was picked into oakum for calking. This was the extent of shipyard production of cordage during the sixteenth century. Local labour was not expected during this period to hackle and spin hemp.

It is significant that the foray into subcontracting in 1610 was at the instigation of two merchants of the Russia Company, whom one would expect to have been exposed to the necessary skills while away on business.⁵² A condition for their contract was that they would employ ‘natural...or such as shalbe his Majesty’s natural subjects.’⁵³ While this directive may have been intended to satisfy domestic ropemakers, it was just as likely meant to encourage domestic acquisition of the skills. As well, when the Navy became involved in production, they soon looked overseas for supervisory skills. Harman Barnes, a Dutchman, was sent to England to build a stove and to act as master of the ropeworks at Woolwich, ‘giving directions for the making and stoving of cordage.’⁵⁴ He continued in this occupation until his death a decade later. This is probably not a feasible explanation, however, as cordage production has a long history in England and the process

⁵¹See, for example, P.R.O. E351 2197. Junk is defined as any piece of cable that is cut off, normally from an old cable. G.E. Manwaring and W.G. Perrin, Seaman’s Dictionary, p. 170. Ropes could be produced in this manner for around 3s 4d a hundredweight, as compared with the a new purchase price of four times that and more.

⁵²P.R.O. E351 2248. This Navy account identifies the individuals by name at the beginning of the account, and then later refers to them as Muscovia merchants.

⁵³B.L. Cotton MSS. Otho E7, f. 257v.

⁵⁴P.R.O. E351 2260. Although the exact meaning of ‘stoving’ is not clear, it may refer to the step immediately prior to the tarring process whereby the cordage was dried.

had not changed. There is also no reason to suppose that the ropemakers sent to Russia were not English.

Another possible explanation for why the government did not turn to domestic supplies may be that cables manufactured overseas were of a better quality. It was probably not the product but the raw material that met with such approval, however. Nesta Evans claimed that English hemp made perfectly acceptable products, but it could not compete with the overseas product.⁵⁵ Richard Middleton, merchant, reported in 1602 that 'the beste cables are maide at Horne, they worke with Danske hempe.'⁵⁶ In 1626 the East India Company required that all cordage purchased must be made of Russian hemp.⁵⁷ Pepys, writing at the end of the seventeenth century, found the English variety a poor substitute for either the best kind from Riga or the cheaper Muscovia sort.⁵⁸

A third possible explanation may be that the government bought where prices were lowest and overseas supplies were cheaper. Only two examples of the price of domestically produced cordage during the Elizabethan period are known. In 1571 the Navy purchased £344 6s 3d of English cordage at 20s the hundredweight. The previous year Russian cordage cost the Navy 16s and 18s the hundredweight.⁵⁹ In 1574 £252 10s

⁵⁵Nesta Evans, The East Anglian Linen Industry (Aldershot, Hants., 1985), p. 95.

⁵⁶P.R.O. SP12 283/88.

⁵⁷Calendar of State Papers, Colonial Series (hereafter CSPC) 1625-29, p. 202.

⁵⁸Nesta Evans, East Anglia Linen Industry, p. 96; R.W.K. Hinton, The Eastland Trade and the Common Weal in the Seventeenth Century (Cambridge, 1959), p. 97.

⁵⁹P.R.O. E351 2206.

more English cordage were purchased at the same rate.⁶⁰ English and Russian cordage may have been similar and thus comparable, for the English cordage was made up entirely of cables to be used for mooring and, as has been pointed out, most of the cordage imported was probably cables or halsers.

The Crown in 1549 may have supported a venture to produce cordage domestically because it thought this new source of supply would be cheapest. £100 was delivered in press to Thomas Trollop and William Brown, Lincolnshire merchants, with the expectation that within seven years £100 worth of Lincolnshire cordage would be turned over to the Treasurer of the Navy. The government only gave up hope of ever seeing its Lincolnshire cordage in 1564 when it discharged the account and made clear that the heirs and executors of the two merchants stood bound £400 for the performance of the covenant of the indenture.⁶¹ The original proposal and ensuing contract are not available but it is reasonable to assume that Trollop and Brown tempted the government by promising lower rates, as contracts so often do.⁶²

Finally, another explanation was that domestic entrepreneurship did not keep pace with the demands generated by the growth of English shipping that was occurring during

⁶⁰P.R.O. E351 2210. It is impossible to say why English cordage might have been bought twice at a higher rate than overseas. These appear to be isolated incidents, however.

⁶¹The account is faithfully reproduced in each Treasurer of the Navy account until 1564. For the final discharge of the account see P.R.O. E351 2200.

⁶²For a proposal containing promises of financial gain on the part of the government see B.L. Cotton MSS. Otho E7, ff. 255-64.

this period.⁶³ It has already been demonstrated that ships were becoming larger and more numerous as trading, fishing and exploring ventures reached further around the globe and natives captured an increasing share of the existing carrying trade.⁶⁴ One would expect to find some evidence of rope production in East Anglia because the building of large ships in the early seventeenth century was concentrated in this area as well as the Thames.⁶⁵ Ipswich port books do not show any movement of surplus cordage out of this region during the late sixteenth and early seventeenth centuries, and in fact it was imported from London.⁶⁶ London, meanwhile, was receiving the bulk of cordage imported from overseas.⁶⁷ In 1575 cable yarn was imported from overseas to Ipswich and in that same year Edward Osborne, merchant of the Eastland Company, shipped yarn from Ipswich to London.⁶⁸ The imports of cable yarn from the Baltic suggest that some assembly was going on of the type visible in the Royal shipyard and the surplus was sent to another area of high demand. It seems that the labour necessary

⁶³For an in-depth discussion of the development of the English shipping industry see Ralph Davis, The Rise of the English Shipping Industry in the Seventeenth and Eighteenth Centuries (Newton Abbot, 1972).

⁶⁴See Chapter Two, above.

⁶⁵See, above, pp. 119, 210-211; Nesta Evans, The East Anglian Linen Industry, p. 97.

⁶⁶P.R.O. E190 587/2-605/12. For shipments of cordage from London to Ipswich see 588/3, 590/11, 591/3, 592/9, 593/2, 594/11, 596/5, 603/5, 604/10.

⁶⁷For a yearly comparison of the profits of the custom and subsidy for cordage for five towns and cities 1592-1595, see B.L. Lansdowne MSS. 78, 86.

⁶⁸P.R.O. E190 590/14, 591/3. For the occupation see G.D. Ramsey, English Overseas Trade (London, 1957), p. 110. For other imports of cable yarn see P.R.O. E190 589/13, 600/1, 600/18, 601/10.

to finish this semi-manufactured good, or to produce it from hemp, was not sufficient to supply neighbouring regions with the finished product.

The West Country fishing ventures to Newfoundland and expeditions to the Americas and West Indies placed added demands on naval stores in that region that were only met through imports of foreign supplies. These port towns complained bitterly in 1623 that:

‘mastes, deales, hemp, cordige, pitch, tarr and other lyke necessarie materialls for the use of shipping were growne to that scarcetie and to such excessive rates and prices, occasioned by his Majesty’s late proclamacion of the 26th of July last (prohibiting the importacion of those or other the lyke Eastland commodities, either by his Majesty’s owne subjectes or strangers and restrayneing the sole importacion of the foresaid commodities unto the ...Eastland merchantes onely) as that the said porte townes are not able to maintain there shipping...’⁶⁹

Although the above evidence was written during a later period, the demands of the region for cordage were without doubt not being met domestically during the Elizabethan period as well.

The final two explanations for why the government bought cordage overseas are the most feasible. The Crown was always under tight budgetary constraints, and the means of paying for necessities was an ongoing concern. Secondly, it is not surprising that supply should lag behind swiftly escalating demand. Future demand was not immediately predictable as the need for cordage varied from year to year. Capitalists needed to become aware of a long term trend and then allocate their resources accordingly. And so, by 1610, two merchants find the economic niche.

⁶⁹Acts of the Privy Council (hereafter APC) June 1621-May 1623, pp. 502-3. The Crown limited importation of cordage at this time to the Eastland Company as part of a monopoly contract.

In 1610 Thomas Styles (or Stiles) and William Greenwell petitioned the Privy Council for, and received, a contract to make cordage for the Navy in the Royal shipyard at Woolwich.⁷⁰ The terms of the contract were as follows:

The two merchants were granted the right to use the existing ropeyard for a period of three years, and all cordage produced was to be sold to the King 'till his stores be fully furnished'.⁷¹ No 'old stuff' was to be employed in making the cordage, but rather Russian hemp. The dock at Woolwich was to be available for them to load and unload cordage and raw materials, provided they paid customs. The government was responsible for specific repairs and additions to the facilities. A new hemp house was to be erected and tools purchased at 'his Majesty's charge.' Thereafter, the contractors were responsible for the upkeep of the facilities. At the end of the contract all tools and facilities were to revert to the government.

When the merchants had produced twenty tons or more of cordage, a bill of indenture was to be made detailing the sizes, lengths and weights of the cordage. If a price could not be agreed upon then Sir Thomas Smith, governor of the Russia Company, '(a person well hable to judge of such commodities),' would determine the price. The Crown promised to pay the bills within two months. Greenwell and Styles promised to keep an account of the ropeworks, 'a president for others herafter,' which unfortunately is not to be found. This account was to have recorded the price of hemp, the number of workmen

⁷⁰It is unclear who the author was, Greenwell or Stiles. B.L. Cotton Otho E7, ff. 254-257v. This document includes both the proposal and the contract.

⁷¹The existing ropeworks were probably used by the Crown to rework the old cordage and store the new.

necessary for the dressing, spinning and laying of the cordage, the charge of carriage by water, the wastage of hemp in the dressing, the weight regained by the tar, and the price and quantity of tar in the laying of every ton. Only natural, or 'such as shalbe his Majesty's natural subjects' were to be employed. Finally, the contract could be broken upon a year's notice.⁷²

Why did the Privy Council lend its support to this venture? The proposal clearly spelled out the benefits to be gained if the government supported it. One advantage dominates their proposal: the cordage would be cheaper if they were allowed to provide it. This was true, they argued, 'by reason, that is one of the profitabilest commodities returned out of Russia'. Also, the King would be indirectly paying a proportion of additional charges if supplies were purchased overseas, such as transport, salaries of an:

'agent, £300 to an underagent £200 to divers servants... some £60 and some £50 per pece per annum... Besides, it is most clear, and evident, as I can plainly sett do[wn] onto your Lord that by a private course, here shalbe saved...the first, £6 in every ton at the least...'

The price of 'perfect cordage' would cost the government about 23s per hundredweight.

Two other issues only hinted at were that first, foreign producers were 'uncertain in the making of his provisions...'⁷³ Secondly, a further letter briefly alluded to troubles procuring overseas. It was claimed that 'cordage coming from beyond the seas may be surprised by the enemy and ymployed against us'.⁷⁴ The concern here was not that overseas sales would be cut off but that the enemy would be able to make use of a naval

⁷²P.R.O. SP14 98/38.

⁷³B.L. Cotton MSS. Otho E7, f. 255.

⁷⁴Ibid., f. 263.

store properly belonging to England. The petitioner, after stating reasons why they should be granted a contract, then asked the lords:

‘to silence these reasons in the hearing of Sir R.M. [Sir Robert Mansell] and Sir J.T. [Sir John Trevor] for I have used the most of these reasons to draw them to a liking thereof, because I suppose they come to me but for necessitie now that they have certain knowledge that they cannot be served out of Musco because the warr contineweth here all this winter.’⁷⁵

While this statement supports the argument that the government wanted to be independent of foreign countries for vital ordnance and stores, the thought that the Navy officials supported the contract for this reason should be viewed with scepticism. The writer, for reasons unknown, asked for secrecy and then in the same breath claimed Mansell and Trevor supported the proposal out of necessity. The quote has all the hallmarks of duplicity. The supply argument was not an argument put to the Privy Council.

No supply problem is evident. This is rather surprising given that Russia was fraught with political upheaval at this time. The Crimean Tartars made frequent forays into the country and, upon reaching Moscow in 1571, burned it to the ground.⁷⁶ Then, between the final years of the sixteenth century and the first two decades of the seventeenth various contenders challenged and then replaced the reigning ruler on the throne. Violence broke out when Boris Gudonov was overpowered by Dimitri the Pretender in 1605, backed by a Polish and Cossack army. In 1609 the Polish King, Sigismund, entered Russia with a large army and almost succeeded in seizing the Russian crown. Sigismund then wrote to James I, notifying him of Polish successes and asking that the English begin

⁷⁵Ibid., f. 264.

⁷⁶Richard Hakluyt, The Principal Navigations ii, p. 135.

paying all the normal customs dues from which they had previously been exempt.⁷⁷ Polish intervention failed, however, and Mikhail Romanov succeeded to the throne.⁷⁸ It appears that in spite of the troubles, the Russia Company merchants never vacated Russia or even Moscow, and trade rights were awarded by each succeeding ruler.⁷⁹ The only indication that trade was disrupted comes in 1613 when ambassadors were sent from Russia with the aim of restoring it.⁸⁰ There is ample evidence to demonstrate that trade was active in 1610 and immediately before, however, as cordage shipments arrived in that year and cloth was exported to Russia in 1608.⁸¹ As well, Russia Company merchants were attempting in that year to gain permission from the Crown to export bell metal and

⁷⁷J.K. Fedorowicz, England's Baltic Trade in the Early Seventeenth Century (Cambridge, 1980), p. 10.

⁷⁸Ibid.

⁷⁹Richard Hakluyt, The Principal Navigations, i, pp. 313-8 for privileges granted by Ivan Vasilivich in 1555 and in 1567, Ibid., ii, pp. 73-7; Ibid., ii, pp. 279-84 for those granted by the son of Ivan, Pheodor Ivanowich in 1586; Samuel Purchas, Purchas his Pilgrims (Glasgow, 1906) xiv, pp. 152-7 for privileges granted by Boris Gudonov between 1598 and 1605 and translated into English in 1605; pp. 168-72 for those granted by Dimitri the Pretender in 1605; p. 196 for a letter from Suiskey referring to a trade agreement in 1606; and pp. 285-92 for those granted by Michael Pheodorowich in 1621. The various towns where English factors resided are listed, including the cordage production towns of Vologda and Colmogro. Fedorowicz claimed that "because of the active commercial contacts between England and Muscovy, there were numerous Englishmen on hand in Russia to witness the 'Time of Troubles.'" J.K. Fedorowicz, England's Baltic Trade, p. 10.

⁸⁰Calendar of State Papers Domestic 1611-8, p. 204; P.R.O. SP14 74/91, Italian.

⁸¹The Navy purchased £9,364 worth of cordage in 1610, at least £4,476 of it being Russian cordage and £15,465 in 1611. P.R.O. E351 2248, 2249. For cloth shipments see P.R.O. SP14 40/25. For cordage shipments see P.R.O. SP14 54/48.

plate.⁸² It is important to note that in spite of political disruptions in Russia during this period, the Crown did not seek to remove the cordage industry to a 'safer' region. The import substitution of cordage was made at the behest of merchant entrepreneurs and they needed to propose and justify their scheme. As well, the all-important raw material, hemp, originated from the same region as cordage and little was now being attempted to promote its domestic cultivation.

There may have been another reason for supporting this project that was sensibly omitted from the contract. As discussed previously, corruption flourished in the Navy, particularly during the first eighteen years of the seventeenth century when Mansell was Treasurer.⁸³ Trevor, as well, was Surveyor during much of this period. These two officials were probably instrumental in the decision to award the contract due to the role they played as principal officers of the Navy but the approval of the Privy Council was needed. The writer of the proposal, when asking the lords not to divulge the contents, claimed to 'promise your lord not to silence any unjust matter which shall be made to me that may concerne his Majestys losse or hinderance.'⁸⁴ It is more likely, however, that given the personal interests of the two officials, the contractors were collaborating with them.

The government began to fulfil its part of the contract in 1610 when the Navy purchased £57 16s 7d worth of 'implements for making of new cordage' which included

⁸²P.R.O. SP38/9 docquet, June 6, 1608.

⁸³See above, pp. 203-206.

⁸⁴B.L. Cotton MSS. Otho E7, f. 264v.

a copper furnace to tar the yarn, hatchels, hooks, whorls, various items of metalwork, winches and other wooden tools. House carpenters and sawyers worked 'upon the new paleinge in of the rope yarde with deales' and the long ropehouse, tarhouse and other storehouses were newly floored. Bricklayers groundpinned the hemp house, plastered the walls and reset the tar kettles. A new building frame was built, 80 feet long, 16 feet broad and 11 1/2 feet high. Finally, the long ropehouse was tiled.⁸⁵ Repairs continued, and the government paid for the necessary work in spite of the fact that the contractors were now liable for upkeep. In 1614 Greenwell and Styles were reimbursed £18 18d for money spent repairing tools, the long ropehouse and storehouse. In addition, the government completed extensive work totalling £350 6s that included a new storehouse and a frame for a new room with a staircase.⁸⁶ The two entrepreneurs were again reimbursed in 1616 for money spent on repairing and replacing, at a cost of £34 17s 4d. A new door was put in the longloft, tar kettles were replaced, the crane in the tar house was mended, stakes and posts were set in the yard, the ground was levelled and a new cart and four new sheds were built.⁸⁷

The fledging business does not appear to have had a tremendous amount of success, although it remained in operation through 1618 when, despite a required year's notice, the government abruptly ended the contract.⁸⁸ Cordage made at Woolwich was purchased

⁸⁵P.R.O. E351 2248.

⁸⁶P.R.O. E351 2252.

⁸⁷P.R.O. E351 2254.

⁸⁸P.R.O. SP14 98/38.

from Styles and Greenwell only four times during the period- in 1612 (£6,624),⁸⁹ 1614 (£9,209),⁹⁰ 1616 (£12,094)⁹¹ and 1618 (£5,139 14s 8d)⁹². No other cordage was purchased in 1612, whereas a variety of ropes were purchased in small amounts as well in 1614, 1616 and 1618. This suggests that the larger cables and halsers were being manufactured in the ropery rather than the smaller varieties of cordage. In the alternate years the government purchased Russian cordage from the same two individuals, who probably had maintained their trading contacts. It is not clear why cordage was not purchased more regularly from the Woolwich works. It may be that output was not sufficient, although it appears to have been growing.

Table 5.2 records the weight, value and price per hundredweight of cordage purchased during this contract. Much of the high cost after 1609 may be accounted for by an increase in prices.

The savings promised to the government failed to materialize. Prices for the few years prior to 1610 averaged 26s the hundredweight. Thereafter they rose, exceeding 30s the hundredweight in 1614 and 32s in 1617. In 1618 they had risen to over 35s the hundredweight. As one would expect, Russian cordage sold by Greenwell and Styles did not sell for any less. At the same time, the price of hemp declined, from 29s the

⁸⁹P.R.O. E351 2250. Prices include handling costs.

⁹⁰P.R.O. E351 2252.

⁹¹P.R.O. E351 2254.

⁹²P.R.O. E351 2256. This probably represents less than a full year's output for the contract was cancelled in this year.

**TABLE 5.2: ROYAL NAVY PURCHASES OF CORDAGE IN POUNDS
STERLING AND IN WEIGHT 1610-8**

Year	Weight (lbs)	Purchases (£)	Price per hundredweight
1610 ^a	984,171	13,698	27s 10d
1611	822,722	11,465	27s 10d
1612	471,446	6,647	28s 2d
1613	717,226	10,237	28s 7d
1614	612,113	9,227	30s 2d
1615	902,439	13,591	30s 1d
1616	803,586	12,129	30s 2d
1617	617,012	9,978	32s 4d
1618	292,866	5,140	35s 1d

Source and Notes: P.R.O. E351 2248-2256. ^a£8,476 of this sum was paid to Benjamin Decrowe, agent for the Russia Company. The remainder was paid to Greenwell and Styles. £4,000 of the sum owed to Decrowe was paid the following year. It appears that all of the cordage was imported from Russia. P.R.O. E351 2248, 2249.

hundredweight in 1605 to 26s in 1614, 25s in 1615 and 21s in 1620.⁹³ It is hard to justify the capital invested and the willingness to pay inflated prices for exceptionally large amounts of cordage during years of peace unless corruption played a major role.

The 1618 Commission of Enquiry into abuses was particularly interested in cordage procurement. The Privy Council's preliminary instructions to the commission asked 'whether it will not be fit to stove all the cordage' and 'where and when such stores might

⁹³P.R.O. E351 2243, 2252, 2253, 2258. The price for 1620 is an average of a number of different prices.

be had at the best price for materials of good quality.’⁹⁴ The committee’s report described the ‘great extraordinary payments...made for cordage.’⁹⁵ Total payments made for cordage can clearly be seen to have increased during this period in Tables 5.1 and 5.2 above and Greenwell and Stile’s increasing prices have already been noted. The reasons why the payments were considered extraordinary are firstly, the quality of the cordage was poor. This no doubt meant that ships were lost and the cordage quickly wore out. Secondly, the scales at Deptford weighted a pound in the hundredweight too light which, they added, amounted to a loss of £828 6s 6d.⁹⁶ Thirdly, more tonnage was recorded in the account books than was bought. Fourthly, cordage was purchased when none was needed. Fifthly, the prices paid were higher than what merchants paid, ‘some being bought by art and not by the market.’⁹⁷ Finally, the cordage was wasted. The cables were too large and too long, and new cordage was sold by contract to others as old.

Recommendations to reduce abuses started with accountability at all levels of administration through more thorough recordkeeping. Secondly, it was argued that the length and size of the cables should be reduced to a size required for the purpose. Finally, money owed for ‘light’ cordage must be repaid by the merchants. The Commission then assumed the administering of the Navy for five years under the direction of the Lord Admiral. With ample stock in store, they suspended payments to Greenwell

⁹⁴Alan McGowan (ed.), Jacobean Commissions of Inquiry of 1608 and 1618 (Navy Records Society, 1971), p. xxi.

⁹⁵Ibid., p. 262.

⁹⁶This figure no doubt relates to all goods weighed on the scales, rather than just cordage.

⁹⁷Alan McGowan (ed.), Jacobean Commissions, p. 267.

and Styles.⁹⁸ The commissioners were in legal possession of a functioning ropeyard that was not supplying cheap cordage for the use of the Navy. They had seen first hand how production could be carried out and officials no doubt had access to the detailed production records. They must have been well aware of the costs of the inputs and the amount of cordage they could expect to produce. The stage was set for a take over: labour was available, tools had been purchased and repairs had been made.

Although the accounting system varied somewhat, for most years between 1620 and 1642 costs of rope production at Woolwich and then also at Chatham from 1624 were recorded in the Treasurer of the Navy accounts as an extraordinary expense under the heading 'Making of Cordage' or 'Provision of Cordage'. Details are available for provisions purchased, carriage and travelling charges, press and conduct charges, wages and entertainment, taskwork, rewards, tithes and property rents. Additional information probably similar to that kept by Greenwell and Styles was kept in separate ropeyard accounts but, like the former set, these are nowhere to be found. However, there is a tremendous amount of information to be gleaned from the accounts that are available.

Purchases were carefully recorded and itemized, with the price of each item given by unit and then totalled. An overwhelming proportion of the money spent on provisions was spent on hemp. The region of origin and the varying weights and prices were painstakingly calculated and recorded. Other purchases included tar, tools, a variety of ironwork and other materials for repairs and building materials. Categories defined as

⁹⁸Ibid., p. xxiv.

wages and entertainment, carriage and travel expenses, taskwork and rewards provided a wealth of information on the day to day workings of the facility. It is possible to catch a glimpse of the number and size of the buildings, their general condition, the amount and type of maintenance necessary to stay in production, the system of wage payment and the individuals responsible and the duties of the clerk.⁹⁹

The cordage produced was not limited to cables and halsers. However, small ropes continued to be purchased and occasionally cables as well. Sail lines, for example, were purchased and old, worn out cables were still being turned into netting ropes, port ropes, sounding lines and lashing lines. Cables and halsers were, certainly, the primary product produced.

⁹⁹The scale of production was quite large by early modern standards. The typical unit of production in the seventeenth century included a master, one or two journeymen and one or two apprentices. Employees of the Royal ropeworks numbered many more. Each ropery had a clerk who was paid 2s a day to take charge of the provisions and to keep account of weekly expenses, employment of workmen, and the quantity of rope produced. Another individual at £50 per year supervised the workmanship and surveyed the raw materials for purchase. This position evolved into master workman in the third year of production. Next were the 'ropemakers spynners hatchellors and labourers ymployed...in making of cordage.' Finally, a watchman was 'nightly watching in the ropehouse.' P.R.O. E351 2258-2284.

Unfortunately, evidence concerning the number of ropemakers employed is sparse. A good estimate can be made, however, as the daily rate and the total wages paid are given. Wages paid between 15 and 25 ropemakers an average 15d per day working year round, or 5,475 to 9,125 working days a year from 1620 until 1636. Then, numbers grew to 131 employees, or 47,815 working days and remained at a high level through 1642.

A rough estimate of the breakdown of ropemaking occupations goes something like this: one spinner could spin 64 pounds of hemp a day. One hatcheller was needed for every six spinners. For every 12 spinners one person was needed to turn the wheel to spin the yarn. Others closed the strands and cables and their numbers depended on the size of the cable. Nine inch cables, for example, needed 12 men to close four strands and 29 men to close four cables a day, each weighing 17,020 pounds. Finally, two labourers were needed to 'part the hemp' and sweep and clean the facilities. B.L. Add. MSS. 28,748, ff. 56v-60.

Output has to be estimated because it was only recorded once in this series of records.¹⁰⁰ The weight of the hemp plus ten per cent, however, is a good proxy for the weight of the finished product, tarred.¹⁰¹ The bulk of the unwanted weight of the hemp plant was probably removed in initial preparation stages done elsewhere, as records do not allude to 'retting, breaking and scutching'.¹⁰²

Table 5.3 compares the cost to produce cordage with prices of cordage imported from overseas. The figures are based on Treasurer of the Navy records and were arrived at by dividing total cordage costs by estimated output. The weight of ropes reworked from old cordage was not included. This comparison was possible to do because output was at times not sufficient for domestic demand and so imports were necessary. It must be remembered that output figures are dependant on the amount of hemp purchased. Variations in prices to produce reflect variations in prices of hemp and the degree to which hemp purchased in one year was used in that year. Carrying over will affect estimated production costs.

With this in mind, some trends are apparent. What is most striking in the above table is that the government was not always able to produce cordage cheaper than it was able

¹⁰⁰P.R.O. E351 2258.

¹⁰¹Three per cent of the weight of the hemp is lost in the hatchelling process. (The Ropery, the Historic Dockyard, Chatham Museum) The weight of the rope increases about 13 per cent after the stoving and tarring process, (P.R.O. SP14 149/113) for an approximate ten per cent increase from the weight of the hemp.

¹⁰²Evans here claims that heckling, the first stage mentioned in the Navy accounts, 'was less likely to be carried out by the grower than were retting, breaking and scutching.' Nesta Evans, East Anglian Linen Industry, p. 23.

TABLE 5.3: COST TO PRODUCE A HUNDREDWEIGHT OF CORDAGE IN THE NAVY ROPERY AND COST OF IMPORTED CORDAGE 1620-38

Year	Naval Ropery	Imported	Naval Ropery - Imported
1620	24s 5d	25s	-7d
1621	23s 9d	25s	-1s 3d
1622	63s 6d ^a	25s	+38s 6d
1623	26s 7d		
1624	14s 6d		
1625	20s 6d	24s	-3s 6d
1626	28s 9d	24s	+4s 9d
1627	23s 11d		
1628	22s 8d		
1629	20s	32s	-12s
1630	36s 7d	29s	+7s 7d
1631	36s 7d	33s 4d	+3s 3d
1632	38s 10d		
1633	37s 5d	35s	+2s 5d
1634	31s 7d	36s	-4s 5d
1635	35s 7d	39s	-3s 5d
1636	35s	37s	-2s
1637	40s	26s 8d	+13s 4d
1638	35s 10d		

Source and Notes: P.R.O. E351 2258-2266. ^aThis unusual figure is a result of the fact that little hemp was purchased in this year, while labour costs remained high. The accounts recorded the few incidents when ropemakers were paid for work performed outside of ropemaking. Labour costs, then, were accrued for making cordage. Therefore, hemp must have been carried over from the previous two years and/or stocks were available when the Navy took over production in 1620. Because output is dependent on quantity of raw material purchased, costs will vary. P.R.O. E351 2260.

to import it. Start-up costs in 1620 and 1621 were lower than import prices, but that situation seems to have reversed and prices for imports were normally less until the mid 1630s. It may be that a greater proportion of the cordage produced domestically was the smaller, more expensive ropes. It is highly likely, however, that the Navy Commissioners were able to reduce costs by reducing waste. Cordage sizes could be made to order and the quality could be closely supervised. These were issues concerning the commissioners in their 1618 report.

The Royal Navy took further steps to become more cost efficient. The Commissioners in 1618 had recommended that:

‘To diminish the King’s charge is the reducing of the ships and works to Chatham and Deptford so as all payments at Woolwich for repairing houses and wharves, for continual watchmen and labourers and for wages of officers new and old may speedily cease.’¹⁰³

The Navy board, the offices having been reinstated in 1625, then centred production only on the Chatham ropery in 1633 and the Woolwich yard was let to the East India Company. This may have helped reduce costs because prices for the several years following were lower than imported prices.

It was proposed to the Governor of the East India Company that the Company could save £500 a year and have better quality cordage if they produced their own in the Woolwich yard. Mr. Swanly and Walter Blackborne, the latter a ropemaker in the now empty Woolwich yard, advised in favour of the venture. A further opinion was sought

¹⁰³Alan McGowan (ed.), Jacobean Commissions, p. 283.

from Thomas Styles, who agreed as well.¹⁰⁴ Mr. Blackborne was ‘a very honest and able man, who, being called in, demanded £100 per annum, but thankfully accepted £80 for the first year’ to oversee the work.¹⁰⁵ The Navy officials let the yard for £100 per year, to be used to build a brick wall about the yard and for repairs,¹⁰⁶ to which the Company agreed. The understanding was that the government would have a magazine of cordage for ‘sudden services’¹⁰⁷ and that it would be returned when the government had use for it.¹⁰⁸ The government then:

‘went contrary to their former agreement, demanded, over and above the £100 rent...,that the company be also at the charge of reparations: the court conceived the difference was not great.’¹⁰⁹

By the following year the Commissioners of the Royal Navy asked for a loan of the Woolwich ropeworks in order to make 50 tons of cordage. The Company refused and deducted £8 14s out of the rent for repairs.¹¹⁰ The government then asked if Walter Blackborne might make 50 to 100 tons for the Navy if the Company could spare him. The Company agreed since they had already made the cordage they would need for the

¹⁰⁴CSPC 1630-34, p. 401.

¹⁰⁵*Ibid.*, p. 403. Note above (f.n. 99) the previously paid wages of a supervisor, £50.

¹⁰⁶CSPC 1630-1634, p. 419.

¹⁰⁷*Ibid.*, p. 409. The government does not appear to have made any repairs to the Woolwich roperyad during the years of the East India Company occupancy. P.R.O. E351 2272-2274.

¹⁰⁸CSPC 1630-34, p. 416.

¹⁰⁹*Ibid.*, p. 446.

¹¹⁰*Ibid.*, p. 546.

following year, but 'required him to be warned to the Court on Friday next.'¹¹¹ Blackborne continued in 1635 to produce cordage for the government while drawing a salary from the East India Company.¹¹² In July 1635 the government demanded the return of the roperyard. The Company, 'finding that there will be little occasion to use the said yard,' gave it up.¹¹³

It seems obvious why the East India Company was willing to return the yard to the possession of the Navy. They most likely found they were unable to provide themselves with cordage at a cheaper price, particularly under the terms of the contract. Blackburne, who had returned to the government's employ, was soon making cordage for the East India Company as well, at what was most likely a better rate than they had been getting. Secondly, they probably found their freedom to produce hindered by Royal interference. They had only a year left on the contract and it may not have been worth fighting for.

Why did the government want it back? Output at Chatham was probably not sufficient for Naval needs as large amounts of cordage averaging over £4,000 were purchased in 1633 and 1634. At the same time, domestic production appears to have been cost effective. The price of imported cordage was increasing in 1633 and was now more expensive than the cordage produced at Chatham. Cordage could be made to order domestically and the quality checked on the spot. Had trading difficulties between England and Russia and the Baltic been a factor it would be expected that the government

¹¹¹Ibid., p. 559.

¹¹²A Calendar of the Court Minutes etc. of the East India Company 1635-1639, (Oxford, 1907), pp. 39, 52.

¹¹³Ibid., p. 75.

would have continued the Tudor campaign to promote the domestic cultivation of hemp, imported from these areas. Robert Atherall, ropeyard employee paid to pick old ropes into oakum, provided his thoughts on the issue. He complained of the loss suffered by the King for buying cordage falsely made and buying ropes ready made that had been exposed to the elements during production. He added that the government had been paying an unreasonable price to the rope merchants. His motive for the discourse was clearly self-interest, however, as he promised to make match £10 a ton cheaper if allowed to make it in the ropeyard.¹¹⁴

V

It is now necessary to assess the impact Crown purchases might have made on the domestic industry. This will be attempted by firstly, estimating the proportion of Crown purchases to total imports prior to the advent of domestic production. Secondly, the level of imports of cordage will be examined beginning after the development of the dockyard ropeworks. As with sailcloth, it is necessary to make the assumption that imported cordage which the Navy then purchased was recorded in the port books. Unfortunately, the available data make only a rough comparison possible.

When import data from Tables 2.9 and 2.10 are compared with Crown purchases of cordage (Tables 5.1 and 5.2 above), the general impression is that an important proportion of the cordage imported was taken up by the Navy. As with sailcloth, it is possible that

¹¹⁴Ibid., pp. 286-7.

Crown purchases were not recorded in the year they were imported. Therefore, it is unlikely that purchases were not a part of the import figure for 1565, even though none were recorded as acquired in that year. In fact, the Crown purchased well over the 1559/60 import figure in each of the years 1559, 1560 and 1561, suggesting that either the cordage was stored in England for some time before purchase or domestic cordage was being purchased as well.

Cordage production in the Royal dockyards beginning in 1620 probably made an impact on the level of imports. Output was apparently insufficient in 1622 because in that year the Crown purchased £5,590 of cordage. Very nearly that amount was imported in 1621/22. Thereafter, available data suggest that imports of cordage were minimal.

VI

A common thread running through all interactions regarding the government and cordage was finance. The Crown, always in tight financial constraints, was ever alert to the possibility of saving or making money and promoters of cordage projects were keen to that fact, wording their proposals to highlight anticipated savings to the Crown.¹¹⁵ Other concerns were apparent but less frequent. Second to finance was the concern that

¹¹⁵For a discussion of the financial constraints of the Crown during this period see C.G.A. Clay, Chapter 11, 'The Financing of the Government' in Economic Expansion and Social Change: England 1500-1700 ii (Cambridge, 1984), pp. 251-81; Frederick C. Dietz, The Exchequer in Elizabeth's Reign (Northampton, Mass., 1923), p. 93; W.R. Scott, The Constitution and Finance of English, Scottish and Irish Joint Stock Companies to 1720 iii (Cambridge, 1911), pp. 485-509.

the cordage produced was not of the quality that it should be for the price. Ropemakers commonly slipped in a bit of the old stuff and then covered their tracks with tar. The third most common concern was that cordage was vulnerable to theft, no matter what walls were built and records carefully kept. Finally, and rarely, the fact of convenience is addressed. The evidence examined does not suggest a concern that supplies might be cut off during external disturbances.

However, the individuals responsible for purchasing and directing works in the dockyards may have negated Crown efforts to reduce the cost of cordage supplies. Styles and Greenwell emphasized the fiscal benefits to be gained in their proposal to the Privy Council. However, these two ropemakers may well have been promoted by officials who were motivated by personal, rather than Royal, money management. The subcontracting experiment with Styles and Greenwell did not prove cheaper. The East India Company was not interested in providing cordage for the Navy. The government through the Commission adopted the role of manufacturer because it thought it could produce cordage more cheaply than that produced elsewhere. If savings were made it was probably a consequence of greater supervision and quality control. In the process of discovering this, it needed to experiment with other methods of procurement. The steep decline in the level of Royal purchases overseas may explain why cordage was import substituted during this period. Government demand probably provided minimal benefit to other English producers. They had traditionally survived by providing for private users and probably continued to do so.

CHAPTER SIX

DIRECT CROWN INVESTMENT IN GUNPOWDER

I

Continental disruptions and an increasing role for gunpowder in warfare meant the Crown and nation was concerned that an adequate supply of powder be provided. The literature emphasises the politically-generated difficulties inherent in importing gunpowder to explain the Crown's interest in its domestic development.¹ Gunpowder was vital because without it the English could no longer play a role in either foreign politics or the international economy. It would also be defenceless in the event of invasion by a hostile power. Permission to export powder from a foreign country often needed to be acquired from the rulers first.² If it was a hostile power or if the supplying country was itself at war, permission might not be forthcoming or supplies might simply not be available for purchase.

The Crown, however, found finance an increasingly important consideration when procuring gunpowder, yet the existing literature sheds no light on its influence. Carlo

¹E. W. Bovill, 'Queen Elizabeth's Gunpowder' Mariner's Mirror xxxiii, no. 3 (Cambridge, 1947), p. 182; Jenny West, Gunpowder, Government and War in the Mid Eighteenth Century (Irthlingborough, Northants.), p. 10; H.E. Malden (ed.), The Victoria History of the County of Surrey ii (London, 1905), p. 307.

²E.W. Bovill, 'Queen Elizabeth's Gunpowder', p. 182. The quote refers to the reigns prior to Elizabeth, but there is no reason to think the same would not be true during her reign.

Cipolla states that:

‘we know the history of gunpowder production mainly from a technological point of view...much less has been written on the economic aspects of the subject...And in general we know nothing about the prices of gunpowder, costs of production, size and structure of the firms, marketing of the powder, etc.’³

This chapter, then, will explore this increasing interest in gunpowder as a fiscal issue as it examines Royal demand and the Crown’s changing relationship with the gunpowder market.

First to be examined will be estimations of the proportions of powder purchased by the Crown and by the private market. This will establish the relative importance of the public and private sectors as consumers of powder. It will then present the volume of powder purchased annually by the Crown and compare the resulting costs with Ordnance Office allowances. Thirdly, the types of gunpowder that were available for purchase will be identified.

The next section of this chapter examines the sources chosen for the supply of gunpowder within the context of the changing relationship between the Crown and the market. It will examine the sources of gunpowder purchased, the methods of purchasing and the individuals responsible. It will also attempt to explain why they chose the sources they did. The section will be examined in three parts. The first part covers the period to 1635 when the Crown was the major domestic purchaser of gunpowder and the distribution of monopoly grants to domestic producers fell within the scope of Royal

³ Carlo Cipolla, Guns and Sails in the Early Phase of European Expansion 1400-1700 (London, 1965), pp. 151-2.

prerogative. The second part covers the ensuing years to 1641 when the Crown became the sole manufacturer and wholesale distributor of powder in England. Finally, in that year, market resistance to centralized control resulted in complete loss of both the Royal monopoly and the Royal prerogative to distribute that monopoly. The Crown simply contracted for its own needs.

II

The Crown did not provide free of charge all of the powder needed to defend the realm. It supplied at its own expense only those departments immediately under its jurisdiction: primarily the Navy, the castles and forts. Merchants and inhabitants of towns and counties were left to their own devices. While they were often able to procure Royal supplies of powder, they had to pay for it. They also bought powder from overseas merchants or from domestic producers throughout much of the period. It is, therefore, difficult to determine the amount of powder that was purchased and then consumed directly by the Crown.

Two estimates from 1637 and 1638, however, suggest the distribution of powder between public and private. The first estimate amounts to a total of 154 lasts 800 lbs at 2,400 lbs to the last. Of that, the Crown needed approximately six lasts of powder for ships in ordinary and 15 lasts for naval consumption, extraordinary. A further ten lasts were required for Ireland, making Crown demand about 31 lasts yearly, or 20 per cent of the total. The private sector included merchants, requiring 50 lasts, and trained bands

of militia, for 73 lasts 800 lbs for a total of 123 lasts 800 lbs.⁴

The second estimate was substantially higher, totalling 291 lasts 2,246 lbs. The Crown required 46 lasts 2,200 lbs, or 16 per cent of this; castles and forts were expected to consume six lasts 2,200 lbs and the Navy, 40 lasts. Merchants' ships needed 50 lasts and 100 lasts 1,346 lbs were required to supply magazines. Gunpowder consumed by trained bands was put at 94 lasts 1,346 lbs.⁵ To divide the estimates in this way between private and public is rather arbitrary. The divisions here represent the extent of the Crown's feelings of direct responsibility. Were the division made between personal consumption and consumption for reasons of national security, then the latter would surely consume the larger proportion of both estimates.

III

While Crown consumption of powder, then, was actually a rather small proportion of the total powder consumed in England, it was without doubt the largest single buyer. Figure 6.1 and Table 6.1 demonstrate the amount of gunpowder and saltpetre purchased by the Crown between 1559 and 1640, Table 6.1 as well in pounds sterling in five year intervals between 1560 and 1640.⁶ Gunpowder and saltpetre purchases were recorded

⁴P.R.O. SP16 373/36.

⁵P.R.O. SP16 381/67.

⁶Data for Figure 6.1 and the following tables are based on January to January delivery dates, rather than payment dates. Data include purchases of gunpowder and raw materials and the labour to make the powder. It does not include labour employed in reworking old powder. Data presented here is an average when more than one year was

in the Lieutenant of the Ordnance Office accounts until July 1624 and gunpowder in the debenture books from 1593 and these sources have been described above, in Chapter Two.⁷ The data from the two sources during the overlapping years are virtually identical and so a transition to the second source was not problematic. Therefore, sixteenth century data here, in Figure 6.1 and in the following tables were drawn from Ordnance Office accounts and subsequently, from the debenture books.

The purchase patterns were very similar to those of sailcloth.⁸ Again, four phases can be identified. Phase One runs from 1558 to 1588. The second phase continues through the years of Spanish conflict, ending around 1603. The third phase then covers the years through 1623 and the final phase continues to the end of the period.

Between 1558 and the Spanish Armada of 1588, powder was purchased every year with the exception of 1585. The amounts acquired were relatively consistent, averaging

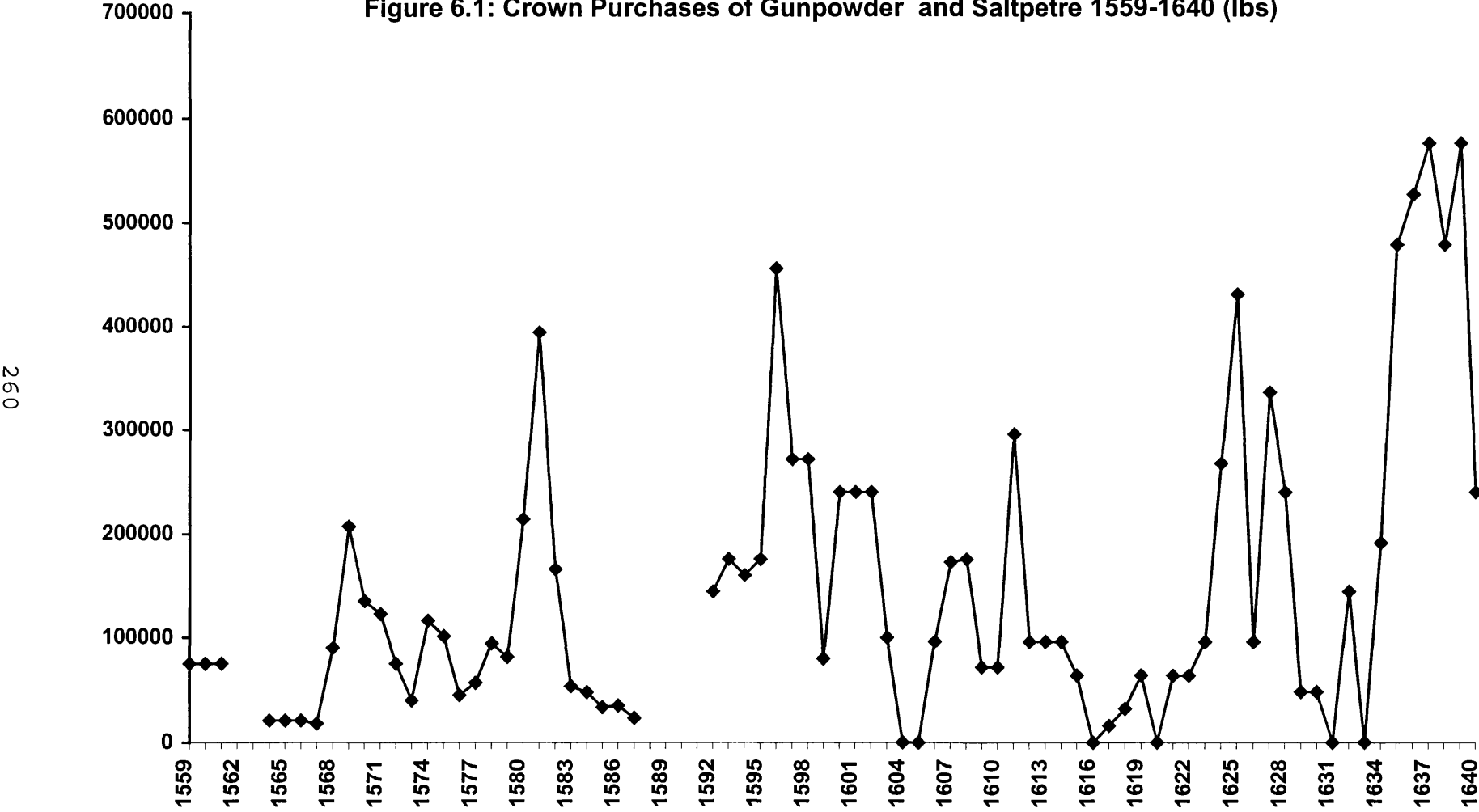
included within one account. One account runs from 29 Sept. 1563 to 24 June 1566. No attempt was made here to estimate purchases for 1563 as little data are available for this year. The figure for 1566 is 2/11 of purchases to give a rough estimate of purchases for the first six months. This figure was then multiplied by two. P.R.O. E351 2617. Total allowances per year are included in the account for 1567-70 so the figures for these years are estimated as a proportion of total gunpowder purchased based on each year as a per cent of total allowances. P.R.O. E351 2618. The account for 1640 is for four months only. More may have been purchased. P.R.O. WO 49/75.

From 1574 an account still occasionally included more than one year but the account now recorded the year in which various purchases were made. Therefore, any repeating figures from that date reveal consist levels of purchasing. These years are a reflection of the contracting system working as it should; the raw materials are being made available to the powdermakers, the powdermakers are fulfilling their contracts and the Crown is paying in sufficient time to ensure continued delivery. The frequency with which this occurred is clearly visible.

⁷See pp. 130, 133.

⁸See p. 172.

Figure 6.1: Crown Purchases of Gunpowder and Saltpetre 1559-1640 (lbs)



Source: P.R.O. E351 2616-51; W.O. 49 17-75.

TABLE 6.1: GOVERNMENT GUNPOWDER AND SALTPETRE PURCHASES 1560-1640 AND AS A PROPORTION OF TOTAL ORDNANCE ACCOUNT SPENT ON GUNPOWDER 1560-1610

Year	Total Powder Purchased (£s)	Total Allowances on Ordnance Accounts (£s)	Gunpowder As a Per Cent of Allowances	Weight of Gunpowder (lbs)
1560	2,354	9,931	24	75,199
1565	844	3,339	25	21,062
1570	4,952	10,991	45	134,953
1575	3,626	9,427	38	101,226
1580	9,007	13,764	65	213,761
1585	1,148	7,300	16	33,450
1590 ^a				
1595	5,867	14,981	39	176,000
1600	7,000	15,775	44	240,000
1605	0	6,360	0	0
1610	2,400	9,012	27	72,000
1615 ^b	2,133			64,000
1620	0			0
1625	15,300			432,000
1630	1,700			48,000
1635	16,000			480,000
1640	7,500			240,000

Source and Notes: P.R.O. E351 2616-51; P.R.O. W.O. 49 17-75. ^aData are not available. ^bOrdnance Office records are now grouped such that estimates of yearly expenditure would be highly suspect. For example, the P.R.O. E351 2651 account includes ordinary expenses for 1 January 1619/20 to 31 March 1624, and extraordinary expenses for 1 April 1621 to 17 July 1625.

around 90,000 lbs a year. More was purchased in 1569 - 206,928 lbs - possibly a result of increasing tensions with Spain but purchases were probably also made when the

Northern rebellion threatened national stability.⁹

The large purchases made in 1580 and 1581 of 213,761 lbs and 394,133 lbs respectively may have been, like sailcloth, a response to the Spanish acquisition of both Portugal and the Portuguese Navy, thus making the domination of England by Spain conceivable. This, as well, was the year when the Duke of Parma and his army returned to the Netherlands. Interestingly enough only saltpetre was purchased in 1585 although the Treaty of Nonsuch was signed with the Dutch and the Earl of Leicester was sent to the Netherlands. Sir Francis Drake, as well, went with two ships belonging to the Queen to the Spanish coast and the West Indies. No one was paid in that year to convert the saltpetre to powder. Powder was therefore either taken from the stores and not replenished or it was procured upon arrival on the continent. It is reasonable that the figure was not higher in the lead up to the attempted Spanish invasion of 1588. It was unlikely that stocks of gunpowder were accumulated in advance of attack unless the attack appeared imminent. Gunpowder had a short shelf life and could, within a year, require repairs.

The demand for powder grew during the second phase which covered the war with

⁹In that year the two northern earls, Northumberland and Westmorland, in support of the Catholic religion and resentful of the extension of Tudor authority in the North, rebelled, taking Durham. They then marched south for a week in an effort to reach Mary, Queen of Scots, held at Tutbury. The reasons for the ensuing retreat are not clear, but it is likely they either heard of the army of 10,000 men under the command of the Earl of Warwick and the Lord Admiral Clinton approaching from the south or they were aware that a message had been sent warning Cecil to move Mary from Tutbury. The rebellion, described by Wallace MacCaffrey as a 'non-event' with only one limited engagement, lasted just five weeks before it was over. Wallace MacCaffrey, *Elizabeth I* (London, 1993), pp. 129-30; Anthony Fletcher, *Tudor Rebellions* (Harlow, 1983), p. 90.

Spain from 1588 through 1603 and included Tyrone's rebellion in Ireland. Unfortunately, no record has been found that describes the amount of powder purchased in 1588 and the three years following. It seems that the amount available was insufficient in 1588 for the fleet fighting the Spanish Armada found themselves without adequate supplies.¹⁰ However, the average amount of powder purchased yearly during this phase was about 213,000 lbs, almost two and a half times the previous average. Amounts were relatively consistent with the exception of the peak year 1596 when 456,725 lbs were purchased, some of it no doubt for the raid by Howard and Essex on Cadiz which included 17 of the Queen's ships.¹¹

After the war with Spain and the suppression of Ireland and through 1624 England remained at peace. The average amount of gunpowder purchased yearly fell to a level a bit less than the yearly average prior to 1588, now approximately 79,000 lbs per year. This suggests that during periods of peace the demand for gunpowder was, at best, stable. No powder was purchased in 1605, for the first time since 1585.¹² Gunpowder purchases declined still further during the second decade of the seventeenth century to 1624, the prelude to further years of warfare.

Finally, after 1623 and during years when gunpowder was procured, record amounts were attained. Over 400,000 lbs in a year were bought a number of times but this figure

¹⁰Richard W. Stewart, The English Ordnance Office: A Case-Study in Bureaucracy Royal Historical Society Studies in History n. 73 (Woodbridge, 1996), p. 86.

¹¹Geoffrey Parker, 'The Dreadnought Revolution of Tudor England' Mariner's Mirror lxxxii, no. 3, p. 275.

¹²Although the data is missing for 1588-91, it is expected that powder would have been purchased during the year of the Armada and shortly afterwards.

was offset by the four years when relatively little or no powder was purchased. Even so, the 1620s and 30s saw a return to the average levels required during the years of the Spanish conflict and more besides. A yearly average of around 275,500 lbs was purchased between 1624 and 1640. Like both cordage and sailcloth, purchases were high in 1625 and 1627 when England was at war with Spain and France, and supplies most likely went to the continent with Mansfield's troops, and for the assaults on Cadiz and the Isle of Rhé. The period ended with five years of purchases that were consistent, and consistently large. Some of these purchases can be indirectly attributed to Ship Money. While the money was directed to be spent on the Navy, it made possible an increased level of naval activity, thus increasing the demand for more gunpowder. Much was no doubt spent on guarding English waters, the Sallee pirate expedition, and the conflict with Scotland.

It is important to note that the growth of purchases during this phase cannot be attributed solely to the Crown's immediate need for powder. While most years of peak purchases during this phase can be attributed to political disturbances internationally, Crown demand appears to have increased during the years 1635-9 because private consumers were required during this period to purchase their powder directly from the Crown.¹³ The Royal arsenal had become the sole source of gunpowder for the entire kingdom. Total domestic demand is therefore included in these figures.

A substantial proportion of the funds available to the Ordnance Office was being

¹³'Whereas his Majestie is resolved to take into his hands and disposition all the gunpowder...made of the saltpetre of the kingdome, for the better furnishing of his Majesties owne occasions and his subjects.' P.R.O. SP16 277/96.

spent on powder. Table 6.1 shows the proportion of the cost of powder to total expenditure during the years 1560 to 1610. The proportion for the years provided above only fell below the 1560 figure of 24 per cent twice - in 1585 and 1605, when no powder was purchased. While gunpowder was probably the single most important item in the Ordnance Office budget, it did not tend to consume more than half. Once within the years analyzed, however, the proportion spent on gunpowder exceeded 50 per cent and then by a substantial margin. In 1580 a comparatively large £9,007 was spent on powder from an Ordnance Office account of £13,764, making a proportion of 65 per cent. It is very possible that the proportions were higher still during years of conflict when data are missing.¹⁴

IV

Until 1581 two types of gunpowder were purchased: corn powder and serpentine powder. Thereafter corn powder was the type normally obtained from both foreign and domestic sources. The two sorts of powder probably differed only in quality during this period, rather than differing in the uses to which they were put. Powder was originally serpentine, and the ingredients, saltpetre, brimstone and ashes, were simply ground down and mixed together. There were disadvantages to serpentine powder, however, for the components tended to separate when shaken and it absorbed water easily, leaving no

¹⁴See Richard Stewart, 'Arms and Politics: the Supply of Arms in England 1585-1625' (unpublished Phd. thesis, Yale, 1986), p. 193 for an estimate of 80 per cent for the year 1624.

space for the circulation of air necessary for combustion. It could, as well, be packed too tightly or too loosely within the gun.¹⁵

The invention of 'corned' powder alleviated these problems. The powder was moistened after mixing and then sieved to form grains, the size of the grains varying according to the requirements of the gun. Corn powder was initially only used for muskets and similar guns, but its uses spread during this period to supersede serpentine powder.¹⁶ The granulated corn powder was better able to withstand damp conditions.¹⁷ As a result it was consistently more expensive, averaging a penny a lb more (Table 6.2).

Table 6.2, drawn from the Lieutenant of the Ordnance accounts, relates the amount of each type of powder purchased yearly and their price per lb between 1559 and 1587. It can be seen that serpentine powder was falling from favour by 1571, with the apparent exception of 1574 when the price of corn powder had risen steeply. After 1578 serpentine powder was no longer purchased, although it was manufactured from raw materials belonging to the Queen for two more years. However, when powder was manufactured from the Queen's materials, the type of powder was almost entirely corn powder. It may be, then, that serpentine powder was not of sufficient quality to satisfy demand. The price of what may have been an inferior product had increased

¹⁵Brian Lavery, The Arming and Fitting of English Ships of War 1600 - 1815 (London, 1987), p. 135.

¹⁶Ibid.

¹⁷H.E. Malden (ed.), The Victoria History of the County of Surrey ii, p. 311.

**TABLE 6.2: GUNPOWDER PURCHASED BY THE CROWN, BY TYPE
(lbs) 1559-1587^a**

Year	Corn Powder		Serpentine Powder	
	Lbs	Price Per Lb	Lbs	Price Per Lb
1559	12,553	8d	7,517	7d
1560	12,553	8d	7,517	7d
1561	12,553	8d	7,517	7d
1562 ^b				
1563 ^b				
1564	3,641	8 1/2d	11,248	7d
1565	3,641	8 1/2d	11,248	7d
1566 ^c	1,821	8 1/2d	5,624	7d
1567	5,004	8 1/2	9,140	8d
1568	25,020	8 1/2	45,698	8d
1569	57,546	8 1/2	105,106	8d
1570	23,973	8 1/2	69,487	8d
1571	67,707	9d	45,471	8d
1572	28,038	9d	39,600	8d
1573	25,800	9d	14,400	8d
1574	51,035	11d	64,886	8d
1575	51,607	11d	21,730	9
1576	16,685	10d	28,100	8d
1577	32,684	11d	8,400	9d
1578	53,223	10d	9,387	11d
1579	81,410	10d	0	
1580	213,761	10d	0	
1581	394,133	10d	0	
1582	166,177	10d	0	
1583	12,006	10d	0	
1584	22,438	10d	0	
1585	0		0	
1586	2,400	8d	0	
1587 ^d	21,020	8, 8 1/2d	0	

Source and Notes: P.R.O. E351 2616-29. ^aThe data refer to powder purchased, rather than powder manufactured using the Crown's raw materials. Totals are given in Figure 6.1 and Table 6.1 above. ^bData are not available. ^cThe figure here is for six months. P.R.O. E351 2617. ^dGeorge Evelyn was charging close to 9d during this year. P.R.O. E351 2629.

substantially in 1578, the final year of purchase, as well. It is difficult to say why except that supply must have declined. Once corn powder was the only type available then it was quite standard; the powder was tested by Royal gunners before purchase to ensure that a minimum quality was maintained. The name serpentine does not appear to have been used again.¹⁸

V

While the Crown was concerned for strategic purposes that a steady supply of gunpowder be available, fiscal factors help explain the Crown's behaviour in the gunpowder market. This section will present the sources chosen for gunpowder supplies and reasons why specific sources were chosen. It will also include the methods of purchasing, the individuals to whom procurement contracts were awarded and the individuals and/or groups responsible for making the purchasing decisions. There are three parts to this section, the first covering the period to 1635, when the Crown was the major domestic purchaser of gunpowder and grants of monopoly were awarded to producers who were at liberty to produce for others. The Crown then became the sole manufacturer and wholesale distributor of powder in England until 1641. The third part examines the resistance to centralized control that resulted in the beginning of free trade

¹⁸However, in 1599 two types of powder were being produced, now referred to as 'caliver' and corn powder. The caliver powder may have been serpentine although the Lieutenant of the Ordnance Office recorded the types as 'caliver and cannon corn.' See, for example, P.R.O. E351 2642.

in the gunpowder industry.

During the period up to 1635 the Crown altered its methods of procuring powder by moving away from three sources available to it during the sixteenth century to a single source that was almost entirely domestic and supplied by patent of monopoly. Like cordage and sailcloth, initially it was purchased from various merchants trading on the continent. As stated in Chapter Two, between 1562 and 1592 it is impossible to determine what proportion of total purchases was made up of imports and what proportion was domestic.¹⁹ Ordnance Office accounts from this date do not reveal sources and debenture books, which do, begin only in 1593.

There does not appear to have been any sort of systematic method of purchasing the foreign powder. The Privy Council directed that supplies be bought when stocks ran low and then funds from which the suppliers were paid were distributed to the Ordnance Office. Powder was purchased from various merchants such as Thomas Gresham, the Queen's merchant in Flanders, William Hall and Christopher Hudson, and a haberdasher, Henry Dale.²⁰ Some of the gunpowder came from the Baltic during the second half of the sixteenth century, and England was one of the chief importers of Baltic gunpowder.²¹

Another option was to purchase the raw materials and then contract with various powder makers to manufacture the materials into powder. The Ordnance Office

¹⁹See p. 132.

²⁰P.R.O. SP12 115/7, 147/50, 183/78, 195/112.

²¹Henryk Zins, England and the Baltic in the Elizabethan Era (Manchester, 1972), p. 237.

purchased saltpetre, brimstone and ashes, and then paid the powder makers £20 per last for corn powder and an average of £10 for serpentine powder for their efforts.²² Charles Wolman was one such powder maker and there were others.²³ Some of the powder was made on the premises, for in 1560 a powder mill was built in the artillery yard, probably in the environs of the Tower, at a cost of £160 5s 6d.²⁴ The raw materials continued to be purchased by the Crown through 1587 and are thereafter seldom seen in the Ordnance accounts.

Initially all of the saltpetre originated overseas for the method of producing it domestically was unknown. Like gunpowder, it was imported primarily from continental Europe.²⁵ The same merchants who procured gunpowder from the continent supplied saltpetre as well. After 1561 saltpetre was produced domestically.

There was some effort to import saltpetre directly from Morocco between 1572 and probably 1590 which resulted in drastic, although temporary, changes to the structure of the Moroccan trade. A discussion of this trade serves to highlight the individuals and motivations at work behind the procurement of overseas supplies of this vital raw material.

English merchants were trading in this region by 1551, exporting principally textiles

²²See, for example, P.R.O. E351 2623.

²³P.R.O. SP12 83/45.

²⁴P.R.O. E351 2616.

²⁵There were no known mines of saltpetre in Europe, however, so it had to have been first imported from the East. E.W. Bovill, 'Queen Elizabeth's Gunpowder', p. 183.

and some tin in exchange for primarily sugar.²⁶ Small amounts of saltpetre were shipped from Morocco directly to England, for probably the first time, in 1572. John Williams, a factor for merchant Edmund Hogan, was sent to Morocco to try and sell some thin linen cloth. There he found stocks of saltpetre maintained for the use of the Sharif, Abdullah Al-Ghalib (1557-74). Al-Ghalib was only willing to trade the saltpetre for cannon balls and so a small amount of saltpetre was shipped to England, and shot was sent to Morocco for proof.²⁷ Abd el-Malek (Sharif 1576-1578) made another offer in 1577 to trade saltpetre for cannon balls and this offer was apparently accepted as well.²⁸

The extent to which this trade was carried on is not clear. Bovil claimed that Elizabeth accepted el-Malek's offer 'eagerly' and that she took care 'to destroy every relevant record,' suggesting it was to be a secret agreement.²⁹ Portugal was anxious to protect its interests in Morocco and so objected to English trade with that country, particularly the trade in arms, which had been prohibited by successive papal bulls.³⁰ A trade agreement was reached between England and Portugal in 1577 whereby Elizabeth

²⁶Willan claimed that the date when trade began was 1551. T.S Willan, Studies in Elizabethan Foreign Trade (Manchester, 1959), p. 145. Bovill, on the other hand, claimed that 'pikes, lances, coats of mail, helmets, metal for casting cannon, ammunition for small arms and artillery, sulphur, timber for building ships and a variety of marine gear such as oars, cordage and sails' were exported as far back as 1541. E.W. Bovill, 'Queen Elizabeth's Gunpowder', p. 179-80.

²⁷T.S. Willan, Studies in Elizabethan Foreign Trade, p. 118;

²⁸E.W. Bovill, 'Queen Elizabeth's Gunpowder', p. 183.

²⁹Ibid., p. 184.

³⁰Dahiru Yahya, Morocco in the Sixteenth Century: Problems and Patterns in African Foreign Policy (Harlow, 1981), p. 59.

agreed to act to prevent English merchants from exporting arms to Morocco upon the King of Portugal agreeing never again to forbid English trade with Morocco.³¹ It is not clear how much saltpetre was imported at this time but Edmund Hogan, sent to Morocco in 1577 as the first ambassador from England, was able to obtain 90,000 lbs.³²

Gresham, with Elizabeth's approval, was looking for more saltpetre from Morocco in 1579.³³ While the outcome of Gresham's efforts is unknown, efforts were renewed in 1581 with a plan to trade saltpetre for ship timber. Ahmad al-Mansur (Sharif 1578-1603) was developing his navy and England was seen as a potential source of timber. He would only sell his saltpetre if supplied with this product. Leicester, with trading interests in Morocco and a monopoly on the export of timber³⁴, helped to gain Elizabeth's consent for some to be shipped to Morocco in exchange for saltpetre. In June 1581 merchant John Symcot was commissioned to supply it, probably as agent for

³¹Ibid., p. 61.

³²Willan argued that the saltpetre trade was probably not the motivating force behind his going, but rather to redress wrongs done to English merchants. T.S. Willan, Studies in Elizabethan Foreign Trade, pp. 119, 148-9. The figure was expressed in quintals, and there are 300 lbs to a quintal. The Concise Oxford Dictionary (Oxford, 1984), p. 848.

³³Bovill, 'Queen Elizabeth's Gunpowder', p. 153. The union of the Crowns of Spain and Portugal was becoming apparent, and England became interested in forming an alliance with Morocco and Algiers with the intention of encircling Spain and Portugal. The aim was not only defensive but was a means of invading Spain if necessary from a hoped-for English naval base at Mogodor, Morocco. This move was justified by the precedent established by the Franco-Osmanli alliance and secondly, it was acceptable for 'a Protestant Queen of England and a Protestant Prince of Orange to seek Islamic alliances against a Catholic power.' Dahiru Yahya, Morocco in the Sixteenth Century, p. 130. Yahya explained that "'Popery' and the Inquisition were virtually as abhorrent to the Protestants as was Islam." Ibid., p. 131. The alliance, as well, would remove the possibility of a Spanish-Moroccan alliance.

³⁴T.S. Willan, Studies in Elizabethan Foreign Trade, p. 164.

Leicester.³⁵

Delays followed, and Symcot only left for Morocco with the timber in December, 1582.³⁶ Imports of saltpetre the following year were minor, however, amounting to only 8,064 lbs.³⁷ Timber exports were then replaced with metals, specifically iron.³⁸ Symcot died in England shortly thereafter³⁹ but Leicester appears to have retained his interest in both the shipping of munitions and to some degree the Moroccan trade in general.⁴⁰

This trading arrangement led indirectly to the establishment in 1585 of the Barbary Company.⁴¹ The impetus to its incorporation seems to have been Leicester's interest in a monopoly of the export trade in timber and metals to the Sherif of Morocco. In order to attain this he needed to exert control over other merchants involved in the Moroccan trade.⁴² He managed to obtain a stay of their shipping until they agreed to form the Company, appoint an agent, pay Leicester a fee of £1,000 for his services and

³⁵Ibid., pp. 163-4; Dahiru Yahya, Morocco in the Sixteenth Century, p. 131.

³⁶T.S. Willan, Studies in Elizabethan Foreign Trade, p. 167.

³⁷Willan provided the figure of 72 cwt. This figure is based on 112 lbs to the hundredweight. Ibid., p. 171.

³⁸E.W. Bovill, 'Queen Elizabeth's Gunpowder', p. 154.

³⁹T.S. Willan, Studies in Elizabethan Foreign Trade, p. 171.

⁴⁰Ibid., pp. 172-5.

⁴¹Ibid., p. 154.

⁴²Ibid., p. 183. Willan argued that Leicester's interest in the Barbary Company 'was probably financial rather than strictly commercial' for in that year he was raising money for his expedition to the Low Countries. Ibid., p. 188.

refrain from shipping metals.⁴³ The charter was then granted to Leicester, Ambrose, Earl of Warwick and 40 London-based merchants.⁴⁴

Leicester, in combination with Arthur Atye, Richard Staper and Alexander Avenon, continued under licence to export metals and to import saltpetre, as well as to trade in other goods as a partnership within the framework of the Company. The licence to export saltpetre and import metals, procured from Al-Mansur, had cost them £4,000 and this amount was paid for in metals in the first shipment.⁴⁵

Trade in metals and saltpetre seems to have been minimal. The Sharif's need for the former appears to have been satisfied with the amount received in payment of the £4,000.⁴⁶ No saltpetre seems to have been imported during the first year of the partnership, ending in June 1586, and 11,536 lbs were imported during the second year.⁴⁷ The saltpetre had to first be refined at Taroudant by an English saltpetre maker, John Taylor, under the supervision of Miles Dickinson, factor. The numerous charges incurred on the saltpetre, both in the production process and in the shipment, resulted in a product unprofitable to import into England.⁴⁸ Of the 11,536 lbs imported in the

⁴³Ibid., pp. 183.

⁴⁴Ibid., p. 184.

⁴⁵Ibid., pp. 240-1.

⁴⁶Ibid., pp. 253, 255.

⁴⁷Willan quoted 103 cwt. Ibid., p. 257.

⁴⁸Ibid.

second year, 5,600 remained unsold and a loss of £24 1s 7d was incurred.⁴⁹ That it should have been sold in 1587 at a loss is rather surprising, given that confrontation with Spain was anticipated.

In the third year of the partnership 14,280 lbs of saltpetre were imported and, when added to the previous year's unsold saltpetre, the whole amount was sold for a loss of £34 8s 6d.⁵⁰ During the next and final year, saltpetre at last showed a profit. The price for 117,080 lbs had fallen in Morocco from 60s the hundredweight to 48s excluding various minor additional charges. It was then sold for 72s to 74s the hundredweight.⁵¹ Most of the other imports incurred a loss, suggesting that the profits to be made were on the exports to Morocco and there was no choice but to import goods at a loss.⁵² The partnership was then wound up with but 2s 8d over the original £5,000 subscribed.⁵³

The Barbary Company charter expired in 1597 and was not renewed. No one appears to have wished its extension, and trade reverted to the independent, individualistic form that had characterized the trade to Morocco prior to the original grant. It is not clear if supplies of saltpetre continued to be imported from Morocco

⁴⁹Ibid.

⁵⁰Willan quoted 127.5 hundredweight of saltpetre. Ibid., p. 258.

⁵¹Ibid., p. 259.

⁵²Willan argued that had bills of exchange from Morocco been possible, the loss on them would have been greater. Secondly, the gold that was imported sustained a loss. There was no other option but to import goods, and as the range was narrow, 'there was little room for manoeuvre.' Other goods imported included sugar, almonds and indigo. Ibid., pp. 259-60.

⁵³Ibid., p. 261.

during the seventeenth century. Dahiru Yahya claimed that the export of saltpetre was stopped in 1590 because the Sharif needed it for his own use.⁵⁴ It is impossible to determine from the sources available the duration of the stoppage. Willan analyzed only the export trade to Morocco at the end of the sixteenth century for there are no data for imports. He said nothing of saltpetre, but thought 'there is no reason to believe that such goods differed much, if at all, from those of earlier years.'⁵⁵

The final method by which the Crown acquired powder during this phase was by purchasing it from manufacturers who used their own raw materials. The first key contract granted during this phase to supply powder to the Crown was awarded in 1562 to three individuals: Brian Hogge, Robert Thomas and Francis A. Lee. They claimed to have five mills which, when fully at work, would produce enough powder to furnish the kingdom and provide 200 lasts of powder yearly for the use of the Queen. Their proposal promised to produce the powder and sell it to the Crown for 65s the hundredweight, slightly less than 8d the pound for corn powder and 56s 8d, less than 7d the pound, for serpentine. They offered to sell to the private sector at 8d and 7d respectively.⁵⁶ The prices were raised a penny in 1567.⁵⁷

⁵⁴Dahiru Yahya, Morocco in the Sixteenth Century, pp. 171-2.

⁵⁵T.S. Willan, Studies in Elizabethan Foreign Trade, p. 299.

⁵⁶65s and 56s 8d the hundredweight respectively. P.R.O. SP12 21/56. The Crown purchased corn powder overseas for 8d in 1559. P.R.O. SP12 7/5. Other prices tendered in 1559, and it is unclear whether the producer was domestic or foreign, were 8 1/2d for fine corn powder, 8d for corn powder and 7 1/2d for serpentine powder. P.R.O. SP12 8/12. Another supplier in that year, probably foreign, offered course cannon powder (probably corn) at 8 1/2d and corn powder (probably fine) at 9 1/2d. P.R.O. SP12 8/13. Purchases made in 1560 were paid for at the rates of 8d for corn powder and 7d for serpentine powder in 1560. P.R.O. SP12 14/3.

That the Crown during this period used the latter two methods of procurement simultaneously can be seen in a note written in 1571 which recorded the suppliers of saltpetre and gunpowder for the preceding four years. Saltpetre was purchased from both the Royal saltpetremen and from merchants, and men such as Charles Wolman were paid for their labour making powder with the Queen's raw materials. At the same time Francis Lee sold the powder he and the others named on the contract had made.⁵⁸ The question to be considered here is not why the Crown began to purchase and produce domestic powder but why imported powder continued to be procured during this phase when it was being manufactured domestically.

There are several possible reasons. Firstly, there may have been insufficient saltpetre to produce enough powder for the Crown's needs. This was certainly true, and remained a problem throughout the period. There is evidence as early as 1546 which suggests that officials might have preferred producing their own powder to buying it had the saltpetre been available.⁵⁹

Secondly, the powder produced domestically may have been of poorer quality than the foreign product. This is most unlikely, for no complaints were found during this phase while later in the period complaints centred upon the poor quality of the foreign,

⁵⁷P.R.O. SP12 83/45.

⁵⁸Ibid.

⁵⁹Letters and Papers Foreign and Domestic Henry VIII xxi, part 1 (1546), p. 257.

rather than domestic, product.⁶⁰ The dilemma of a short shelf life meant that powder could not be stockpiled for emergencies. When more had to be procured with any sense of urgency, then it was a seller's market and quality was sometimes sacrificed.

Thirdly, it may have cost more for the Crown to produce its own powder than to buy foreign during periods when it was freely available overseas. Edward Randolph, Lieutenant of the Ordnance, estimated the cost to make corn powder in England in 1564. A last of gunpowder required 1,850 lbs of saltpetre at 60s a hundredweight, or about 7d the lb, for £55 10s, 300 lbs of brimstone at 30s the hundredweight, or £4 10s and 300 lbs of coal powder at 8s the hundredweight, or 24s. The labour spent in making a last amounted to £20. The estimate included wastage of 12 lb in the hundredweight of saltpetre. 200 lbs wastage at 7d the lb amounted to £6 10s 6d. Total cost was estimated at £87 14s 6d the last, or almost 9d the lb.⁶¹ Saltpetre was clearly the most expensive item at 71 per cent of the total cost and, as a result, its price was of interest throughout the period. Although prices are scarce for this early phase, it appears that the cost to produce gunpowder domestically did not compare favourably with the price of foreign

⁶⁰In 1624, for example, the East India Company thought the quality of powder at Hamburg was inferior to English powder. Calendar of State Papers, Colonial Series (hereafter, CSPC) 1622-4, p. 275. Also, in 1625/6 the Lord Mayor and aldermen of London 'had found by experience that upon occasions heretofore of their endeavouring to buye upp on the suddane in those forraigne partes greate quantities of powder to be brought hither that advantage hath beene made of the urgent necessitie and want here in such sorte as thet they were forced many times to take ill and unserviceable powder and at more unreasonable prices then otherwise they had needed.' Acts of the Privy Council (hereafter, APC), March 1625-May 1626, pp. 375-6.

⁶¹P.R.O. SP12 33/40.1.

purchases. In 1558 and 1559, for example, foreign powder cost £80 the last.⁶²

The Crown was interested in the domestic production of gunpowder because it was an additional source with the added benefit of being free from foreign interference, for 'better it is to have then wantinge, to wishe.'⁶³ However, it also had to be inexpensive. In 1564 the lieutenant of the Ordnance claimed that 'I see no reason to seek for powder beyond the seas if it may be made as good cheap at home.'⁶⁴ Domestic saltpetre may have been cheaper than the imported material by as much as ten shillings the hundredweight.⁶⁵ The initial contract prices agreed with Lee were 65s the hundredweight, or £78 the last, for cornpowder and 56s 8d, or £68 the last, for

⁶²P.R.O. SP12 1/31, 7/5. The powder for 1558 was serpentine, for 1559, corn. Other prices tendered in 1559, and it is unclear whether the producer was domestic or foreign, were £85 for fine corn powder, £80 for corn powder and £75 for serpentine powder. P.R.O. SP12 8/12. Purchases made in 1560 were paid for at the rates of £80 for corn powder and £70 for serpentine powder. Again, it is not clear whether the powder was foreign or domestic. P.R.O. SP12 14/3.

⁶³P.R.O. SP12 1/31.

⁶⁴H.E. Malden (ed.), The Victoria History of the County of Surrey ii, p. 311; P.R.O. SP12 33/40. Winchester noticed in reference to Lee's contract that 'the price which have them be reasonable.' P.R.O. SP12 21/56.

⁶⁵Imported saltpetre cost 93s 4d the hundredweight, or 10d the lb. (with 112 lbs. to the hundredweight) in 1558. P.R.O. SP12 1/31. It fell to the above quoted 60s in 1559. P.R.O. SP12 7/5. By 1560 the price had risen again to 70s the hundredweight. P.R.O. SP12 14/3. It remained at that price for the years between 1567 and 1571. During these same years and possibly before, domestically produced saltpetre sold for 60s. P.R.O. SP12 83/45. Some saltpetre was purchased for that price the following year, 1572, and also at 70 and 75s. P.R.O. E351 2620. Thereafter prices were higher - 70s in 1576 and 1577 (P.R.O. E351 2622), 75s in 1583 (P.R.O. E351 2625), 80s and 83s 4d in 1584 (P.R.O. E351 2626) and 66s 8d for the remainder of this phase. P.R.O. E351 2627-9). It is not possible to tell, however, whether this saltpetre was foreign or domestic. It may be that the less expensive domestic saltpetre was sold directly to the powder makers and so was not recorded in this source.

serpentine. The prices were so low compared to the estimated cost of production that little of the more expensive foreign saltpetre could be used if they were to receive a return on their labour. A price of 70s the hundredweight for saltpetre would have added more than £10 to the production costs of a last of powder, making the total estimate for raw materials more than £67. While no doubt the contractors were counting on the profits to be made within the private market, the Crown had effectively tied their hands by making them dependent on a domestic supply of the raw material.⁶⁶

If the Crown was going to have a steady source of cheap powder then it had to do something to encourage domestic saltpetre production. As a result, in 1561 Queen Elizabeth paid Gerrard Honricke of Germany £300 to introduce the art of making saltpetre.⁶⁷ He was to write down the instructions, including information concerning the best production places and materials, and teach native Englishmen the art. Philip Cockeram, mercer, and John Barnes, haberdasher, were licensed for ten years to oversee production. They were to select the individuals who would be trained in the art of making saltpetre, supervise the instruction, facilitate payment of the £300, and deliver the saltpetre to the officers of the Ordnance. The price the Crown was willing to pay

⁶⁶By 1567 their prices had risen to 9d and 8d the pound respectively when the price of saltpetre had not risen. This rate more nearly approximates the Crown's estimation of the cost to make gunpowder if domestic saltpetre was used. P.R.O. SP12 83/45.

⁶⁷The method of acquiring saltpetre and the problems which developed out of this method have been described in other sources and so will not be covered here. See, for example, H.E. Malden (ed.), The Victoria History of the County of Surrey ii, pp. 306-321; Richard Stewart, 'Arms and Politics: the Supply of Arms in England 1585-1625', pp. 177-187. Honricke appears to have dabbled in more than just the fine art of making saltpetre for later, in 1578, we find him seeking a patent for the sole right to built engines invented by him for draining mines. P.R.O. SP12 125/50.

for the resulting saltpetre was 'the price in Flemish money for which it is sold at Antwerpe' or 1d in the lb under the price for which it is sold in England.⁶⁸ In return, they were promised a monopoly of all saltpetre making in England, Ireland 'and elsewhere in the Queen's dominions'. If, however, the venture within a year 'be not proved to be of such utility and profit as is pretended,' the monopoly would be suspended.⁶⁹ The Crown hoped that soon it would be made in the realm 'at less cost and expense than it could be had and bought overseas.'⁷⁰ While the Crown was clearly willing and perhaps even anxious to encourage Honricke's entrepreneurial efforts, it was not interested simply because a steady supply of saltpetre would be available. It would also be cheap. If the Crown could save a penny a pound on saltpetre, as promised, the £300 paid to Honricke would be offset after only 30 lasts, or well within a year!

Commissions were again granted for making saltpetre at least by 1573. In that year one was granted to the Earl of Warwick, Master of the Ordnance, and William Pelham, Lieutenant.⁷¹ It is doubtful that they did the work themselves given the nature of their present occupations and so they probably subcontracted the work out. Others may have been making it in England for general sale because the Company of Grocers was only restricted from buying it from the Crown's powdermakers.⁷² Others promising to

⁶⁸P.R.O. SP12 16/29-31.

⁶⁹Ibid.

⁷⁰P.R.O. SP12 16/30.

⁷¹P.R.O. SP12 91/44.

⁷²The source only refers to named individuals who would be, without a doubt, the powdermakers. APC 1571-5, p. 210.

produce saltpetre were provided some encouragement. John Bovyat was awarded a grant in 1575 for 21 years to manufacture saltpetre and then gunpowder from stone minerals.⁷³

English powder makers, then, needed to have a steady supply of cheap saltpetre if they were going to supply the Crown at low rates and the realm with domestic powder during periods when foreign powder was available. If foreign powder was not available but cheap domestic saltpetre was, then the contract would have been fulfilled but the producer would probably have realized more profit through private sales. If the contractors had to rely on foreign saltpetre because domestic saltpetre was in short supply at a time when foreign powder was not available then the powder maker would have been unwilling to sell the powder to the Crown at the low rate. He would have wished to sell it privately instead. The Crown would either have had insufficient powder, would have contracted at a higher rate or would have bought the foreign saltpetre and paid to have it made into powder. If foreign powder was cheaper to purchase overseas then it was cost effective to do so, and the infant industry may then have been left to its own devices. While it is possible that Lee's output was not sufficient to supply the Crown with the required amount of powder during these years of peace, there is nothing in the evidence to suggest that this was the case.

By the seventeenth century the Crown had essentially limited its source of powder to a single domestic producer. After 1587 the Crown no longer put out saltpetre to various powder makers, and by the turn of the century powder was very rarely purchased

⁷³P.R.O. SP12 106/53.

overseas. The Armada years ushered in the system whereby the Crown awarded individuals a patent of monopoly to produce the entire domestic output of gunpowder. The patentees contracted to supply the Crown with a pre-determined amount of powder monthly at specified rates and were free to sell the surplus to private individuals. The patent changed hands three times during this phase. Various members of the Evelyn family began producing under patent in 1588, occasionally with the assistance of one other. The Earl of Worcester then acquired the grant in 1607, and in 1617 it reverted back to the Evelyns.

In 1588 the Crown awarded a contract to George and John Evelyn and Richard Hill to produce saltpetre and gunpowder for a period of 11 years. They were not new to gunpowder production, having previously supplied gunpowder to the Crown using their own raw materials.⁷⁴ The contract called for six lasts 1,600 lbs of corn powder to be delivered monthly to the Ordnance Office to be paid for at the rate of 8d the lb, £80 the last. Royal purchases of saltpetre ceased for the most part and the contractors purchased the raw materials directly from their deputies, the saltpetremen, at the rate of £3 6s 8d the hundredweight for immediate payment.⁷⁵

The Privy Councillors determined all matters relating to saltpetre production. They appointed the saltpetremen, assigned various numbers of counties to each of them, fixed the price and determined the amount each was to deliver to the powdermaker. Saltpetre

⁷⁴P.R.O. E351 2629.

⁷⁵APC 1588, p. 30. Normally a hundredweight of saltpetre weighed 112 lbs. to allow for wastage. This document allowed 10 lbs. on the hundredweight.

production costs were controlled as well, such as the prices of raw materials and of transport. Problems developed between the saltpetremen and the local inhabitants as both the Council and the saltpetremen tried to keep the costs as low and the profits as high as possible. These problems were taken up by the Council. It is difficult to determine whether this level of control of the raw material was new to this contract or whether it was present prior to it. The price had been the same since 1585 and so the arrangement with the saltpetremen may have begun then.⁷⁶ The Privy Council maintained control of saltpetre production until 1620 when it was run in the same way by committee.

Table 6.3, derived from the Ordnance accounts, examines the Evelyn contract: the deliveries, costs and payments. The amount of powder delivered normally met or surpassed the contracted amount and the Exchequer and Ordnance Office were relatively responsive with payments and so a new contract was produced in September 1599. This one was made with John and Robert Evelyn and Simon Furner for a period of six years and called for eight lasts 800 lbs each month of corn powder at 7d, rather than 8d, the lb, when 'no prince in the world is served at so mean a rate'.⁷⁷ The Crown now received 25 per cent more powder for less than one tenth more in costs.

The contract was only successful until May 1603, shortly after James I came to the throne, although officially it ended prematurely in October 1604.⁷⁸ Another was

⁷⁶P.R.O. E351 2627. Prior to this account prices for saltpetre varied, and none were purchased at this rate.

⁷⁷P.R.O. SP12 272/68.

⁷⁸H.E. Malden (ed.), The Victoria History of the County of Surrey ii, p. 314. Purchases ceased at the earlier date. P.R.O. WO 49/29, 30, 31.

**TABLE 6.3: THE EVELYN CONTRACT: GUNPOWDER DELIVERED
1592-1607 (1)Amount supplied by Evelyns (2)Amount contracted to be
delivered (3)Total cost (£s) (4)Amount paid yearly (£) (5)Price per lb^a**

Year	(1)	(2)	(3)	(4)	(5)
1592 ^b	144,000	192,000	4,800		8d
1593	144,000	192,000	4,800	8,000	8d
1594	192,000	192,000	6,400	8,000	8d
1595	176,000	192,000	5,867	5,867	8d
1596	304,000	192,000	10,133	12,799	8d
1597	320,000	192,000	10,667	9,067	8d
1598	240,000	192,000	8,000	9,067	8d
1599	144,000	128,000	4,467	2,333	8, 7d
1600	240,000	240,000	7,000	7,000	7d
1601	240,000	240,000	7,000	7,000	7d
1602	240,000	240,000	7,000	7,000	7d
1603	100,000	240,000	2,917	2,917	7d
1604	0	24,000	0		
1605	0	288,000	0		
1606	96,000	288,000	3,200	3,200	8d
1607	0	96,000			

Source and Notes: P.R.O. WO 49/17-33; E351 2630 for 1592, E351 2633 for 1597.
^aTotal owed for years 1592-1607: £82,251. Total paid £82,250. ^bP.R.O. E351 and P.R.O. WO 49 are missing for this year. The amount supplied by the Evelyns in 1592 is based on itemized payments made the following year. P.R.O. E351 2630.

enacted immediately thereafter with John and Robert Evelyn and Richard Harding, who offered 10 lasts a month for 21 years at 8d the lb but they fulfilled little of this

contract.⁷⁹ The Evelyns and Harding lost their contract in 1607.

It is possible to speculate on a few reasons why the grant was originally awarded to the Evelyns and Hill. Firstly, Hogge, Thomas and Lee may no longer have been available to produce powder, as their names disappear from powder accounts by 1570. Secondly, as mentioned above, the Evelyns were already producing powder and so sales to the Crown could continue without delay. Thirdly, the price offered by the Evelyns and Hill for corn powder was lower than that paid for powder between 1578 and 1584 by 2d a lb.⁸⁰ George Evelyn was charging the Crown close to 9d in 1587.⁸¹ This meant, in effect, a savings of about £800 yearly on this latter price if he fulfilled his new contract and much more on the former. The price offered, however, was below the estimate made to produce powder in 1564 and saltpetre was now more expensive. The only incentive to produce powder for the Crown at what may have been very little profit or none at all was if the suppliers also had a monopoly to supply the private sector as well at higher prices. Whereas previously Hogge, Thomas and Lee simply supplied a fixed amount to the Ordnance Office, the Evelyns and Hill were appointed to also be the sole manufacturers of gunpowder. The industry was not to be allowed to develop freely in England.

Fourthly, the sources suggest that both the powdermakers and the saltpetremen paid

⁷⁹See P.R.O. SP38/7, docquet, Oct. 7, 1604 for the individuals involved and the number of years. See P.R.O. WO 49/30-2 for gunpowder produced during the years of this contract.

⁸⁰See Table 6.2, above. Small amounts of powder were purchased in 1586-7 for 8d.

⁸¹P.R.O. E351 2629.

for their contracts. In 1595 the saltpetremen promised to pay 1d a lb for 21 years:

‘if they may have a commission as liberal as Mr. Evelyn, ...so that if 300 lasts be made yearly, there will be a gain of £3,000.’⁸²

They claimed the gunpowdermen were offering 2d a pound.⁸³ Looking ahead, in 1628 Stevens, a saltpetreman, claimed he paid the Duke of Buckingham £1,700 yearly rent for his commission.⁸⁴ In 1629 William Richardson complained to the commissioners that having paid £100 for a commission for making saltpetre, on the death of the Earl of Totness he was supplanted by the appointment of two others.⁸⁵

That there were problems in the ensuing contracts can be seen from the frequency with which contracts ended prematurely and because small amounts of powder were produced for the Crown between 1603 and 1607. It is not clear why powder deliveries stopped in May 1603 when the Evelyns and Hill were fully paid. It may have happened because Queen Elizabeth had died the end of March, leaving the validity of the patent in doubt. Secondly, they may have preferred selling elsewhere, against the terms of their contract. Finally, it may be that the Crown had sufficient powder in store now that the country was at peace. In 1602 the Evelyns offered additional powder to the government, complaining of a great stock of powder on their hands that was growing daily. The Crown did not appear to have taken it, and as a result, 30 lasts of powder and 10 of

⁸²P.R.O. SP12 255/63.

⁸³Ibid.

⁸⁴P.R.O. SP16 101/46.

⁸⁵P.R.O. SP16 151/64.

saltpetre was shipped to the States General 'without any prejudice' to the Royal stores.⁸⁶

In 1607, after four years of little or no delivery, the Evelyns lost the contract.

On 13 May 1607 James I awarded the contract to the Earl of Worcester, Master of the Horse and Privy Councillor.⁸⁷ He was to supply six lasts 1600 lbs monthly at 8d the lb, additional powder to be paid at the rate of 9d the lb. Due to his position it is highly unlikely that he worked the contract itself. He probably guaranteed delivery of the powder to the Crown and accepted payment for it. He would then have had to pay the powder makers, probably receiving a fee for the service. It appears that he retained the services of the Evelyns.⁸⁸ Table 6.4 examines the Earl of Worcester's contract and is derived from the debenture books and the Ordnance accounts. A comparison of prices in Tables 6.3, 6.4 and 6.5 suggests that the Earl may have paid the Evelyns their old rate of 7d the lb while keeping an additional penny or two for himself. Extra profit may also have been derived from the saltpetremen, for it was claimed that he 'received from them 10s for every cwt. of peter which his Lordship enjoyed...'⁸⁹

The first two years of the contract were successful, as more powder than contracted for was delivered to the Office of the Ordnance, some at the higher rate of 9d.⁹⁰ The

⁸⁶P.R.O. SP12 284/10.

⁸⁷P.R.O. SP38/8, docquet, 8 May 1607.

⁸⁸'Under his Lordship Mr. Evelyn...made the powder.' P.R.O. SP16 180/10. In 1607 and 1608 money was 'paid to the Earl of Worcester...for...powder delivered by John and Richard Evelyn and Richard Hardinge Esq. for the said Earl.' P.R.O. E351 2643, 2644.

⁸⁹P.R.O. SP16 180/10.

⁹⁰Two of the first year's deliveries were late, however.

**TABLE 6.4: THE EARL OF WORCESTER'S CONTRACT:
GUNPOWDER DELIVERED 1607 - 1619 (1)Amount supplied by Worcester
(2)Amount contracted to be delivered (3)Total cost (£) (4)Amount paid
yearly (£) (5)Price per lb^a**

Year	(1)	(2)	(3)	(4)	(5)
1607 ^b	104,000	128,000	3,634	6,067	8d, 9d
1608	232,000	192,000	7,833	5,933	8d, 9d
1609	88,000	152,000	2,933	2,400	8d
1610	88,000	96,000	2,933	2,400	8d
1611	96,000	96,000	3,200	5,067	8d
1612	96,000	96,000	3,200	3,200	8d
1613	96,000	96,000	3,200	1,867	8d
1614	96,000	96,000	3,200	1,600	8d
1615	64,000	96,000	2,133	1,600	8d
1616	0	96,000	0	2,667	
1617	16,000	144,000	533	0	8d
1618	32,000		1,067	2,066	8d
1619	64,000		2,133	1,134	8d

Source and Notes: P.R.O. WO 49/33-48 for amount delivered, contract amounts, money owed and price per lb. P.R.O. E351 2643-50 for amount paid. ^aTotal owed for years 1607-19: £35,999. Total paid: £36,001. ^bP.R.O. E351 2643, as P.R.O. WO 49 is missing for this year. The amount was adjusted to reflect deliveries recorded in P.R.O. WO 49/33 in 1608 which were included in the P.R.O. E351 2644 for 1607.

following year the first six months' proportion of powder was not received 'as should have been delivered' although payments to the Earl do not appear to have fallen behind.⁹¹ At that point a warrant from the Treasurer ordered that half the contracted

⁹¹P.R.O. WO 49/34.

amount, or three lasts 800 lbs, were to be brought in monthly at 8d the lb.⁹² The years from 1611 to 1614 were then the longest running period when a consistent amount was produced for the Crown yearly. It may be that the totals asked for previously were higher than Worcester wanted or was able to continue to fulfil. No powder was delivered in 1616 and the reason is unknown. It is doubtful whether the powder was made and then sold privately in that year for there were complaints of a scarcity in the country. The normal rate of six lasts 1600 lbs was resumed in 1617 and the Earl delivered some of it. Powder delivered in 1618 and 1619 fell short of fulfilling the amount contracted for in 1617 and the Crown, short of supplies, had to look overseas for more.⁹³

It is unclear why the King granted the Earl the patent when it appears to have been a more costly method of procuring powder. The patent was very possibly a result of the patronage system, whereby courtiers were awarded with gifts, normally for a service, some of them in the form of monopoly grants. There does not appear to have been much of value to the Crown in this patent when compared with the last, unless difficulties with payment meant the Earl would absorb the delay, ensuring that powder continued to be delivered. The Exchequer does not seem to have been late with payments while the Evelyns held the contract, however (Table 6.3). The reason why the Earl then lost the patent is quite clear.

It seems that the reforming zeal that attacked the Navy Office in 1618 grew to include the Ordnance Office as well. The Ordnance Office had always had a reputation for poor

⁹²P.R.O. WO 49/34.

⁹³APC January 1618-June 1619, pp. 355-6.

management and corruption.⁹⁴ Officers were embezzling munitions, selling supplies to their own offices and colluding with suppliers to fix higher prices, supposedly with the intention that some of the excessive payments would be returned to the officer.⁹⁵ Sir Robert Dallison, who became Lieutenant of the Ordnance in 1608, was most notorious. He immediately began upon taking office to embezzle and pocket the money paid him for salaries and suppliers. He as well used his position to obtain 60-year leases on Crown land which he then turned into private residences, renting them to others. His activities were discovered in 1616 when he was imprisoned and his lands seized for the debt of £9,887 owing to the Crown. Lord Treasurer Suffolk, also implicated, was forced to resign in 1618. The Office of the Ordnance was clearly in need of reform.⁹⁶

The Privy Council granted a commission in 1620 to the Lord Marquis of Buckingham, Lord High Admiral of England, Lord Carew, Master of the Ordnance, and Sir Lionel Cranfield, Master of the Wards to oversee and direct saltpetre and gunpowder in England and Ireland.⁹⁷ These Commissioners for Gunpowder and Saltpetre were directed to act as overseers and directors '(though not in that nature and qualitie as the

⁹⁴Richard W. Stewart, The English Ordnance Office, p. 44.

⁹⁵Ibid., p. 50.

⁹⁶Ibid., pp. 53, 57.

⁹⁷APC July 1619-June 1621, p. 188; P.R.O. SP14 105/93, 94. Cranfield was also leader of the Commission appointed to reform the Navy in 1618. Alan McGowan (ed.), The Jacobean Commissions of Inquiry of 1608 and 1618 (Navy Records Society, 1971), pp. xviii, xix. It is probably for these positions that the commission was also referred to as the Navy Commission. Michael Young argued that the Navy Commission and this commission were one and the same. Michael Young, 'Illusions of Grandeur and Reform at the Jacobean Court: Cranfield and the Ordnance' Historical Journal xxii, no. 1 (1979), pp. 55, 56.

Lord Privy Seale held the same place)' and to authorize and appoint individuals to make saltpetre and gunpowder.⁹⁸ The purposes of this commission may have been similar to the Navy commission because not only was Cranfield a member of both but both attempted to save the Crown money. During that same year the Commission for Saltpetre and Gunpowder proposed to save £10,330 4s 2d by the suppression of offices and by the King's resumption of saltpetre manufacture for the provision of his own gunpowder.⁹⁹ The only proposal acted upon was the one concerning gunpowder.¹⁰⁰

As well, insufficient gunpowder was delivered in the years following 1617, and in April 1621 the patent reverted back to the Evelyns, father and son. It was renewed several times up to and including 1635 when the second phase began. Table 6.5, derived from the debenture books, examines the Evelyns' contract. The rate returned to the 7d a lb charged prior to the Earl's commission for six lasts 1,600 lbs of powder to be delivered monthly.¹⁰¹ The King was to receive 3d in the pound.¹⁰² The saltpetremen continued to be paid by Evelyn as they had in the past. The price of saltpetre at some point fell to £3 3s 4d. The contract was renewed in July 1624. Now 20 lasts were to be delivered monthly for 8 1/2d the lb for three years, no doubt a wartime measure.¹⁰³

⁹⁸APC July 1619-June 1621, p. 188. The Earl of Worcester was the Lord Privy Seal.

⁹⁹P.R.O. SP14 117/54.

¹⁰⁰Michael Young, 'Illusions of Grandeur and Reform at the Jacobean Court', p. 61.

¹⁰¹P.R.O. WO 49/50.

¹⁰²P.R.O. SP14 161/13.

¹⁰³APC June 1623-March 1625, pp. 229-30; P.R.O. WO 49/54.

TABLE 6.5: THE EVELYN CONTRACT: GUNPOWDER DELIVERED 1621-1636 (1)Amount supplied by the Evelyns (2)Amount contracted for (3)Total cost (4)Amount paid yearly (5)Price per lb^a

Year	(1)	(2)	(3)	(4)	(5)
1621	64,000	128,000	1,867		7d
1622	64,000	192,000	1,867		7d
1623	96,000	192,000	2,800	7,000	7d
1624	268,000	384,000	9,492		8 1/2d
1625	144,000	576,000	5,100	5,100	8 1/2d
1626	96,000	576,000	3,400		
1627	336,000	576,000	11,900		8 1/2
1628	240,000	576,000	8,500		8 1/2
1629	48,000	576,000	1,700		8 1/2
1630	48,000	576,000	1,700		8 1/2
1631	0	576,000	0		8 1/2
1632	144,000	576,000	4,900		8 1/2, 8d
1633	0	576,000	0		8d
1634	192,000	576,000	6,400		8d
1635	480,000	576,000	16,000		8d
1636	480,000	480,000	17,500		7 1/2, 8d

Source and Notes: P.R.O. WO 49/50-70. ^a For the years 1621-5 inclusive: total delivered: £21,126; paid, £12,100.

At the same time the saltpetremen were directed to bring in twice the amount of saltpetre for the same period.¹⁰⁴ The contract was again renewed in March 1628 to begin in May under the same terms but this one stipulated that the powder be paid by the Lord

¹⁰⁴ APC June 1623-March 1625, pp. 214-6.

Treasurer within 14 days of delivery.¹⁰⁵ A new contract in April 1632 reduced the price of the 20 lasts to 8d the lb for three years. This freed the Evelyns from £2,000 extended by the Crown in 1624 in prest to pay for erecting mills and for security of payment.¹⁰⁶ The Evelyns contracted to furnish powder one more time under essentially the same terms.¹⁰⁷

In early 1635 Evelyn applied for a new contract but claimed:

‘he cannot contract to deliver gunpowder at 8d the pound, by reason the King takes the benefitt and sale thereof into his owne hands. Thereupon the lords thought it not fitt to treat any further with the said Evelin, but rather to deale with some others who offered themselves to contract at...easier rates.’¹⁰⁸

There are several reasons why the contract may have been awarded to the Evelyns in 1621. They were no doubt an attractive choice because they were willing to contract at a cheap rate. The Lords claimed in 1635 that they saved the King by the contract with John Evelyn £1,200 per year if the full proportion of powder contracted for was delivered.¹⁰⁹ An alternate offer for a gunpowder contract was made in 1630, probably by an Alexander Feris. He was offered access to the Lord Treasurer only if his bid was

¹⁰⁵P.R.O. SP16 529/88.

¹⁰⁶P.R.O. SP14 168/38; SP16 363/65.

¹⁰⁷P.R.O. SP16 289/61; WO 49/65, 70, 75.

¹⁰⁸P.R.O. SP16 284/18. Different tenders came forth, Sir Arthur Mainwaring and Pitcairn (Pittacruces), Groom of the Bedchamber, offered 8d per lb. in 1632 using a new engine that goes by means of a horse which was approved. CSPC 1630-4, p. 282. They renewed their offer in 1635 and the Earl of Newport and Sir John Heydon offered powder for 7d if upon his Majesty’s stock of £4,000. If upon their own, 8d. P.R.O. SP16 286/94.

¹⁰⁹P.R.O. SP16 306/114.

lower than Evelyn's.¹¹⁰ Secondly, if the Evelyns were producing for the Earl of Worcester then their facilities would already be up and running. Finally, he may have been the only producer manufacturing powder on a scale large enough to supply the country's largest customer.¹¹¹ The commissioners claimed in 1627 that they renewed the contract with Evelyn because 'his workes are the readiest to entertayne the same without losse of tyme or other prejudice to his Majesty's service'.¹¹²

It is clear from Table 6.5 that already after the first year of the new contract insufficient powder was delivered into the Office of the Ordnance. This created a shortage of powder and the problem continued for the most part during the whole of the contract. George, Earl of Totness, Master of the Ordnance, claimed in 1627 that 'in the memorie of man that office was never so weake in munitions as at this present, and especially in powder.'¹¹³ Three reasons have come to light for the shortage. Firstly and probably most importantly, payments to the contractors immediately fell behind and this seems to have percolated down through the payment chain, leaving both the powdermaker and the saltpetremen unable to deliver. Unfortunately, gunpowder payments were no longer made out of the Office of the Ordnance after 1625 and so it is impossible to trace yearly payments. Thereafter, the evidence must be qualitative. A

¹¹⁰P.R.O. SP16 172/23.

¹¹¹Knowledge of other producers comes primarily from the evidence that they were suppressed. The Bristol powder makers, for example, appear to have been supplying a local market. The East India Company only began producing powder in the 1620s.

¹¹²APC July 1619-June 1621, pp. 117-8.

¹¹³P.R.O. SP16 80/17.

comparison of columns two, three and four in Table 6.5 for the years prior to this date demonstrate the paucity of payments made and of powder delivered in relation to payment owing and contracted amounts. Sir F. Nethersole reported in 1624 that the greatest charge against the Lord Treasurer was his neglect to pay the gunpowder makers, so that the supply of powder was very small.¹¹⁴ In 1628 Dutch powder was purchased, which Captain John Heydon claimed was of a poorer quality and twice as expensive. He argued that had the Evelyns simply been paid, the Crown would have received more and better powder for its money.¹¹⁵

There were numerous complaints regarding lack of payments from both the powdermakers and the saltpetremen.¹¹⁶ Evelyn refused to deliver more in 1625, saying his estate could not afford it.¹¹⁷ In 1628 George, Earl of Totness, told Buckingham that:

‘Mr. Evelyn for want of payment of greate somes due unto him for the powder which he hath allready brought in, sinkes under the burden thereof, whereby wee are to expecte no more from him...until he may be satisfied.’¹¹⁸

The saltpetremen were refusing for a short time in 1627 to take out new deputations

¹¹⁴P.R.O. SP14 163/3.

¹¹⁵P.R.O. SP16 94/105.

¹¹⁶Calendar of State Papers Domestic (hereafter CSPD) passim. See, for example, P.R.O. SP16 104/12.

¹¹⁷P.R.O. SP16 5/85.

¹¹⁸P.R.O. SP16 90/64.

‘whereby...the works must fall’.¹¹⁹ In 1631 they petitioned that their saltpetre be accepted and paid for or be allowed to sell it to the subjects.¹²⁰ While the Evelyns were accused of having made a fortune out of the monopoly, it is likely that little of what had been accumulated remained in a liquid form which could be employed to pay the saltpetremen.¹²¹

Secondly, the shortage of powder may have been caused by a shortage of saltpetre, caused in turn by the methods employed when extracting it. People all over the country complained of the damage done by the saltpetremen when they dug on private property, particularly after 1617, and the saltpetremen in return complained that people were unwilling to help them, as in making carts available and leaving choice saltpetre locations untouched and available for digging.¹²² This reason is certainly viable because supplies meant for the Royal stores do not appear to have been diverted to the private market. When the Crown suffered from a shortage of powder, private individuals often complained at this time of a shortage as well.¹²³ As a result the Crown purchased supplies of foreign saltpetre from the East India Company.

¹¹⁹P.R.O. SP16 71/54. They settled in that year. SP16 72/32.

¹²⁰P.R.O. SP16 200/47.

¹²¹In 1628 it appeared that ‘Mr. Evelyn and his agent Pygott by their monopoly for the sole making and selling of gunpowder, gyving bribes, deceaving the King, abusing the subject, and out of other men’s labours, have gott an estate of neare forty thousand pounds within that 4 yeres.’ P.R.O. SP16 529/88.

¹²²CSPD, passim.

¹²³The East India Company, for example, claimed in 1634 there was a scarcity of powder in the city, ‘there being not any to be bought for money’. CSPC 1630-4, p. 607.

Thirdly, the Crown seldom purchased foreign powder after 1600. It may have been difficult to do so after the outbreak of the Thirty Years War in 1618. For example, merchants had trouble importing gunpowder when the King of Denmark had an army in the field because he was absorbing available supplies.¹²⁴ The same financial difficulties that hindered the purchase of domestic powder probably affected the Crown's ability to purchase foreign powder as well.¹²⁵

In 1636 during the next phase the Evelyngs shared domestic production with Edward Collins, who began to produce gunpowder for the Crown using foreign saltpetre.¹²⁶ The contract with the Evelyngs was not renewed when it expired that same year. The reasons do not seem to have been of their making. That they were fully operational at the end of their contract is clear because they delivered the full amount in that year. They were, however, in non-fulfilment of the contract because the final year of the contract was the only year when the full amount contracted for was delivered. When the officers of the Ordnance accused them of this they replied that the saltpetremen had failed

¹²⁴In 1626 £161 of the East India Company's powder was taken by the king of Denmark's army. *Ibid.*, 1625-9, pp. 225-6.

¹²⁵It was available from foreign sources during some periods for in 1624 the East India Company was able to purchase it in Hamburg, Danske (Gdansk) and the Low Countries although the Company thought the quality inferior to English powder. *Ibid.*, 1622-4, pp. 275, 277. Also, Capt. Langford of the East India Company reported in 1628 that Jacatra insisted on sending great quantities of powder and that great quantities could be purchased for 3 1/2d per lb. *Ibid.*, 1625-9, p. 467.

¹²⁶H.E. Malden (ed.), The Victoria History of the County of Surrey, p. 318-9; CSPC 1626, pp. 203-4; P.R.O. SP16 302/119. Edward Collins had been producing powder for the East India Company until his death in 1636. This individual was well known to Crown officials because they had been trying since 1626 to suppress Company powder production. See, for example, P.R.O. SP16 184/4; CSPC *passim*.

to deliver 700 lasts of saltpetre, that they had supplied the counties by warrant 131 lasts, and that they had sold 609 lasts, as allowed by the contract on failure of payment.¹²⁷ Upon investigation the Commission determined that the Evelyns had brought in gunpowder in proportion to the quantity of saltpetre supplied to them.¹²⁸

The second phase began in 1635 when the Crown became the sole supplier of gunpowder in England.¹²⁹ Royal purchase records now reflect private demand as well as Crown. All saltpetre and gunpowder produced had to be delivered into the King's stores. Before 1588 the Crown, domestic producers and importers all sold gunpowder and saltpetre for whatever price the market allowed. Thereafter until 1635 the contractors retained a monopoly to produce and sell powder at prices set by the Crown once Royal needs for powder had been met. Now, purchases were made from the Crown.¹³⁰

The Crown probably assumed control of powder in order to profit from the sales. Prior to 1584 the Crown did not seek a profit from the sale of powder it had purchased from the powdermaker; the Ordnance Office sold powder for the price it paid for it.¹³¹ By 1584 this no longer appears to have been the case. The price to purchase powder

¹²⁷P.R.O. SP16 292, p. 61.

¹²⁸P.R.O. SP16 376/157.

¹²⁹P.R.O. SP16 277/96. James F. Larkin, Stuart Royal Proclamations ii, p. 548.

¹³⁰P.R.O. SP16 306/117.

¹³¹See, for example, P.R.O. E351 2622.

from the Crown in that year was 11d the lb, up a penny over the price the Crown paid.¹³² In 1588 the sale price was probably still higher than the Crown's cost - sales with prices of 10 and 12d were recorded when the new contract price was 8d.¹³³ The average price paid for powder sold by the Crown then continued into the 1630s at a rate of 10d the lb when the Crown paid between 7 and 8 1/2d.

The Crown became well aware of the profits it could accrue because in 1635, when it had assumed total control of wholesale distribution, estimates were written of extensive profits which could be made on varying amounts of powder.¹³⁴ In that year the price rose to 12d.¹³⁵ In 1636 the Lords of the Admiralty suggested that the price could be raised to 18d, to which the King agreed.¹³⁶ However, they had resolved to hear what prices powder was selling for in such places as France, Hamburg and the Low Countries before setting the price for the domestic powder.¹³⁷ In early 1637 a proclamation both raised the price of domestically produced gunpowder to 18d the lb and prohibited

¹³²P.R.O. E351 2626.

¹³³APC 1588, pp. 128, 146. See Table 6.3, p. 284 for contract price.

¹³⁴In 1635 Evelyn claimed that if the Crown assumed control of sales, the Royal stores would be furnished first and then it would stand to profit £3,000 per annum if sold at 10d. Secretary Coke added a further calculation on a smaller sale. Another estimate by an unknown author of profit on 50 lasts at 7d the lb was £220, on 100 lasts, £600. If the price were raised one half of a penny, the profit on 100 lasts would then be £1,100. Upon 240 lasts the profit at 7d was estimated at £1,994 15s, or at 7 1/2d, £3,194 15s. P.R.O. SP16 306/113.

¹³⁵P.R.O. SP16 306/115.

¹³⁶P.R.O. SP16 321/81.

¹³⁷P.R.O. SP16 346/81.

TABLE 6.6: EXPENSES AND NET PROFIT PER UNIT ACCRUING TO THE CROWN FOR GUNPOWDER PRODUCTION 1636-39

Unit of measure	Amount paid to powdermaker	Sale price	Profit	Profit as a per cent of cost
last	£75	£180	£105	140
hundred-weight	£3 2s 6d	7£ 10s	£4 7s 6d	

Source: P.R.O. SP16 376/161, 162.

imports.¹³⁸ The retailer could sell it in London and for 30 miles around for an additional two pennies. Beyond that distance the retailers could receive another half penny. By 1638 some were paying the Crown 20d.¹³⁹ Prices began falling in 1640, however, as sales declined.¹⁴⁰ Profits made from sales to the private sector, then, transferred from the monopoly producers to the Crown (Table 6.6). Without competition the Crown could charge what it wanted and the price went up. A concern with profits is evident because accounts which recorded outgoing powder and income from sales were regularly kept.¹⁴¹ By 1639 they were kept monthly.¹⁴²

¹³⁸James F. Larkin, *Stuart Royal Proclamations* ii, pp. 546-9; P.R.O. SP16 345/38; 354/84; 321/81.

¹³⁹In 1638 50 lasts of powder was sold to William Greene, merchant for 20d. P.R.O. SP16 355/61, p. 6.

¹⁴⁰P.R.O. SP16 461/35.

¹⁴¹Between the first of December 1635 and the 31 of May 1636, 52 lasts 14 barrels at £5 the barrel was sold, for a total of £6,310 for a net profit to the Crown of £2,366 5s. P.R.O. SP16 337/48. Profit was derived by deducting the cost of the powder at seven and a half pence the lb from sales. While dates and totals show some variety, it appears that a minimum £6,620 was probably made during 1636-7. The figure represents total

It is unlikely the Crown engrossed sales in order to restrict supplies from reaching adversaries for the Crown also sold powder to retailers, who could then sell domestically to whomever they wished.¹⁴³ Although money earned from sales may have gone to pay the powdermaker, there is nothing to suggest that powder was sold in order to subsidize Crown consumption of powder. Proceeds from the sales were ultimately delivered to the Exchequer.¹⁴⁴

On 24 June 1636 the gunpowder contract was awarded to Samuel Cordwell and George Collins, the latter probably a relation of Edward, for 13 years from the last day of October. They agreed to take all the saltpetre the saltpetremen could make, and to deliver at least 20 lasts a month at 7 1/2d the lb. The contractors were not to sell any of the powder they produced but to deliver all to the Crown.¹⁴⁵ They probably paid

minus supplies for the king's service. See, for example, 1637 'A list of money received for powder sould and delivered out of his Majestie's magazine since the 29th September last 1636. Of the chandlers of London' £3,560; the East India Co. £2,527 10s; for supplies for magazines in the counties £532 10s; for supplies for the king's service (sold to the Navy), £13,653; total, £20,273. SP16 368/38. Another document claims the account from the Office of the Ordnance from Michaelmas 1635 to Michaelmas 1637 to be £6,620 - the same as the amount above minus gunpowder to the Navy. SP16 371/4. In just three short months beginning the first of November 1638 the Crown received £2,595 for powder. SP16 412/6. 'Breife of the powder sould and money received and paid to this daie... £49,479 16s 9d.' SP16 361/107. See, as well, SP16 361/107; 371/4; 373/38; 412/6; 414/8.

¹⁴²P.R.O. SP16 292, p. 90.

¹⁴³ In February 1639 the amount supplied for his Majesty's service and sold to the counties and chandlers was 10 lasts 1,450 lbs. Money received from counties and chandlers was £1,785. P.R.O. SP16 414/8. A directive in 1636 restricted the amount the retailer could charge to not more than 1s 8d. SP16 321/81.

¹⁴⁴P.R.O. SP16 311/84.

¹⁴⁵P.R.O. SP16 292, p. 21.

TABLE 6.7: THE COLLINS/CORDWELL CONTRACT: GUNPOWDER DELIVERED 1636 - 1640 (1)Amount supplied by Collins/ Cordwell (2)Amount contracted for (3)Total cost (4)Price per lb

Year	(1)	(2)	(3)	(4)
1636	48,000	96,000	1,500	7 1/2d
1637	576,000	576,000	18,000	7 1/2d
1638	480,000	576,000	15,000	7 1/2d
1639	576,000	576,000	18,000	7 1/2d
1640 ^a	192,000	576,000	6,000	7 1/2d

Source and Notes: P.R.O. WO 49/70, 75. ^aPayment records end after the April 1640 delivery and so the entry for this year is not complete.

£3 3s 4d per hundredweight for domestic saltpetre for that was the amount Collins paid in 1635 and the Evelyns had paid the same.¹⁴⁶

The data for this period end in 1640 but Cordwell continued to produce after that.¹⁴⁷

Table 6.7, derived from the debenture books, presents this contract. It gives every indication that the powder production was successful as the full proportion was normally brought in on time.

The Evelyns' contract was probably not renewed in 1635 because they were unable or unwilling to compete with the prices offered by Collins and Cordwell. Collins and Cordwell clearly stated the benefit to be derived from this contract to the Crown in their proposal which was carefully noted by Secretary Windebank - a saving of £1,200 per

¹⁴⁶This was the price Collins was to pay for foreign saltpetre in 1635. P.R.O. SP16 302/119.

¹⁴⁷Journals of the House of Commons 1640-2, p. 984.

annum over the 8d price formerly given.¹⁴⁸

In 1641 an act called ‘for the free bringing in of gunpowder and saltpetre from foreign parts and for the free making of gunpowder in this realm’.¹⁴⁹ The gunpowder monopoly had fallen victim, like other monopolies before it, to arguments for free-trade that had spanned more than four decades.

Grants had been made through letters patent under the great seal to livery companies or guilds which gave them the right to incorporate and control an economic activity such as a specific industry or trade. Elizabeth as well granted monopolies for new inventions and increasingly granted licenses to corporations of merchants trading to specific foreign regions. As well, penalties that had been imposed by penal statute were discarded by grant. David Dean argued that it was when grants were issued for old practices that opposition was provoked.¹⁵⁰

Little opposition to monopolies was voiced during the reign of Elizabeth. William Price, a leading authority on monopolies, attributed this to a number of factors. First, Elizabeth pursued the policy for monopolies cautiously, working for the most part within the confines of the common law. Secondly, she enjoyed essentially unquestioning loyalty from her subjects. She had forestalled opposition in Parliament for most of her reign by aligning herself with legal and trade interests. Finally, the deference paid to Privy

¹⁴⁸P.R.O. SP16 319/70.

¹⁴⁹Journals of the House of Commons 1640-2, p. 225.

¹⁵⁰David Dean, Law-Making and Society in Late Elizabethan England: the Parliament of England 1584-1601 (Cambridge, 1996), p. 85.

Councillors, most of whom held seats in Parliament, enabled them to silence opposition.¹⁵¹

Opposition to monopolies in Parliament developed during the final decade of Elizabeth's reign, however. Complaints were voiced in 1597-8 and again in 1601 concerning the legality of patents of monopoly and their misuse by the patentees and their deputies.¹⁵² Elizabeth promised reform in 1597 and under further pressure from Parliament in 1601, abolished the more offensive of the patents. The courts were allowed to determine what grants would remain. The legal criterion for the legitimacy of a patent was stated as follows:

‘...when any man by his own charge and industry, or by his own wit or invention doth bring any new trade into the realm, or any engine tending to the furtherance of a trade that never was used before; and that for the good of the realm; -that in such cases the king may grant to him a monopoly-patent for some reasonable time, until the subjects may learn the same, in consideration of the good that he doth bring by his invention to the commonwealth, otherwise not.’¹⁵³

Strictly speaking, then, the gunpowder monopoly was outside the limits of the law. In spite of initial promises for reform monopolies continued to multiply during James' reign and complaints in Parliament continued as well. Again he promised reform. Financial constraints, however, meant James had to seek extra-Parliamentary methods of raising money, including granting additional patents of monopoly. As a result the Statute of Monopolies, which passed in Parliament in 1624, declared that:

¹⁵¹William Price, The English Patents of Monopoly, (Cambridge, 1913), pp. 17-20.

¹⁵²David Dean, Law-Making and Society in Late Elizabethan England, p. 85.

¹⁵³William Price, The English Patents of Monopoly, p. 24.

‘all monopolies, commissions, grants, licenses, charters, and patents for the sole buying, making, working, or using of any commodities within the realm were contrary to law.’¹⁵⁴

Patents granted for new inventions for 14 years were exempted, as were existing patents granted for new inventions for 21 years and patents granted to corporations. As a result, Charles, also with financial difficulties, granted more patents to groups of individuals for established industries under the disguise of new processes. Price claimed that:

‘not only were the monopolies granted largely in the fiscal interest and the rents accordingly made the chief concern, but a new policy was adopted in the sale of privileges. The policy was new at least in the thoroughness with which it was carried out.’¹⁵⁵

Complaints concerning abuses grew, and by 1639-40 a large number of monopolies were either surrendered by a Privy Council unwilling to put them to the test of law or were called in by Parliament.

Complaints relating specifically to the gunpowder monopoly grew more numerous during the seventeenth century as supply was restricted to the Crown, the selling price increased and the extraction practices of the saltpetremen continued to be onerous. The validity of the gunpowder monopoly was addressed in the Parliament of 1624 but it was explicitly allowed in the Statute of Monopolies along with printing, ordnance and shot. The nature of the industries excluded suggests it was done for reasons of national security.

Sir Edward Coke, Secretary, the following year provided a number of reasons why

¹⁵⁴Ibid., p. 34.

¹⁵⁵Ibid., p. 41.

the monopoly should continue. Firstly, the subjects would only allow saltpetremen in the service of the King to dig for saltpetre in their houses and cellars. Secondly, a growth in demand would increase the price of saltpetre and the sources would be over-exploited. At the same time the quality of both saltpetre and powder would decline. Finally, 'his Majesty shall certainly be impoverished for his service.'¹⁵⁶

George Carew, Master of the Ordnance, recommended that powder production using foreign saltpetre only be unrestrained. He thought this unreasonable, however, for it would be impossible to stop saltpetremen from selling domestic saltpetre to powder manufacturers. As a result, the sources would be overworked and the king would not be able to get sufficient powder.¹⁵⁷ Clearly the notion here is that the Crown should not have to pay market prices for gunpowder. Parliament appears to have been temporarily satisfied, assured of the necessity of adequate stocks of cheap powder in the Ordnance.

The structure of the gunpowder industry as it had developed by 1641 was not favourable to many and merchants, masters and owners of ships wrote petitions of complaint concerning the 'engrossing and restraint of gunpowder.' The petitions were referred to the committee for Monopolists early in 1641 and the industry was opened to competition.¹⁵⁸ The reasons provided for this were that:

'the price of gunpowder hath been excessively raised many powder works decayed this kingdom very much weakened and endangered the merchants

¹⁵⁶P.R.O. SP16 11/24.

¹⁵⁷P.R.O. SP16 11/27.

¹⁵⁸Journals of the House of Commons 1640-2, p. 75; Statutes of the Realm v, p. 131.

thereof much damnified many mariners and others taken prisoners and brought into miserable captivity and slavery many ships taken by Turkish and other pirates and many other inconveniences have from thence ensued and more are likely to ensue if they be not timely prevented.¹⁵⁹

The first reason provided clearly related to the economics of the powder monopoly. National security was clearly a factor as well, but no longer was Crown control of the industry considered necessary or even desirable in order to provide the resources to repel invasion. The gunpowder monopoly did not need to be put down in order that revolutionary parliamentarians might be able to begin production and so stockpile for the coming Civil War. Clandestine operations no doubt continued to exist throughout the period in spite of the prohibitions. Faith in the Crown's ability to protect and provide a necessary provision at a reasonable price was at an end. By the outbreak of the Civil War the industry was at last able to freely respond to market forces and a rapidly growing domestic market.

VI

The Crown's direct need for supplies of gunpowder assisted the development of the native gunpowder industry because it promoted the domestic production of the raw material, saltpetre. The introduction of this industry into England provided a boost to domestic powdermakers because a consistent, inexpensive source of saltpetre was then available. This production was not only a consequence of the Crown's need for ample

¹⁵⁹Act 16 Charles I. c. 21. Statutes of the Realm v, p. 131.

supplies of powder but of the price which the Crown was willing to pay for them. The Crown did not initiate saltpetre production solely to ensure that supplies were available; prices had to be low because domestic powder sold to the Crown had to be cheap. The development of the domestic industry, then, is closely intertwined with Crown efforts to keep down its own costs.

Because gunpowder was so closely controlled by the Crown, non-payment made the most serious impact on the domestic industry and its effect was negative. Production was halted several times for this reason. Nonpayment probably then percolated down to the saltpetremen who were already producing insufficient amounts of the raw material. Although clandestine powder works probably remained in operation throughout the period of monopoly control, if the holder of the monopoly did not produce, then total domestic production certainly fell. Illegal operators could not quickly increase their output, and complaints of a shortage could be heard from around the country.

Gunpowder was also seen as a profit making industry, and this idea was most realized during the reign of Charles I when control of both production and distribution was vested solely in the Crown. This motive did nothing to assist the developing gunpowder industry or ensure that it continued to develop. The Crown's method of ensuring supplies of cheap powder meant the industry could not respond to market forces. Production was limited to select individuals. Prices of inputs were controlled in order to keep cost, and therefore contract price, down. Competition was suppressed and so it was a seller's market. Further analysis of these more indirect methods will be examined in the following chapter.

CHAPTER SEVEN

INDIRECT MEASURES AND THEIR IMPACT ON THE IMPORT SUBSTITUTION OF SAILCLOTH, CORDAGE AND GUNPOWDER

I

The previous three chapters sought to determine whether the purchasing behaviour of the Crown facilitated the import substitution of cordage, sailcloth and gunpowder. Although purchases were not generally made with the aim of encouraging the native industries, much might have been accomplished indirectly to affect that end. The aim of this chapter is to determine whether indirect methods were employed by the Crown for this purpose.

Historians now argue that when the government acted to affect the development of the consumer industries, measures were either a reaction to the economic environment or were promoted by vested interests. There was no clear policy to assist them.¹ However, they argue that the Crown encouraged the munitions industries because a domestic supply would alleviate reliance on foreign sources.² The focus of the discussion has been on

¹See, for example, Barry Supple, Commercial Crisis and Change in England, 1600-1642 (Cambridge, 1959), pp. 227-8; C.G.A. Clay, Economic Expansion and Social Change: England 1500-1700 ii (Cambridge, 1984), pp. 203-5.

²See, for example, Jenny West, Gunpowder, Government and War (Irthlingborough, Northants., 1991), pp. 2, 10; Richard Stewart, 'Arms and Politics: the Supply of Arms in England 1585-1625' (unpublished Ph.D. thesis, Yale University, 1986), pp. 177-8, 187; John Nef, Industry and Government in France and England, 1540-1640 (Philadelphia, 1940), pp. 89-90.

gunpowder rather than naval stores and, in order to demonstrate Crown interest, historians rely almost exclusively on grants of monopoly awarded to gunpowder makers, in particular the 1561 saltpetre contract granted to Gerrard Honricke.³ Historians limit evidence of Crown interest in cordage and sailcloth to legislation that promoted the domestic cultivation of hemp, primarily, they argue, in order to provide the Navy with cordage and sailcloth and to increase employment.⁴

There are a number of methods by which the Crown could facilitate the import substitution of cordage, sailcloth and gunpowder. These might take the form of controls on: prices, competition, quality, the transfer of skills and arbitration of disputes and this chapter will look at each of these in turn. Limitations on the prices of inputs could enable the developing industry to keep the finished product selling price low or competitive. Price controls which might assist the native industry might take the form of prohibitions or tariffs on the export of raw materials, which would effectively reduce demand and hence their prices. Inducements to import the raw materials would act to increase supply and depress prices as well. Maximum price levels on raw materials, domestic or imported, and wage ceilings would also work to reduce the cost of inputs. Interest rates on capital borrowed is a modern day phenomenon. Industries during the period concerned tended to require little capital and that which was needed was often borrowed from family

³John Nef argued that succeeding grants of gunpowder and saltpetre monopolies were initiated in order to make the nation independent of foreign supplies. John Nef, Industry and Government in France and England, p. 90.

⁴See, for example, Nesta Evans, The East Anglian Linen Industry: Rural Industry and Local Economy 1500-1850 (Aldershot, Hants., 1985), p. 51.

or friends.

Secondly, a product seeking a market while the industry manufacturing it is developing its production skills might benefit by protection from competition. Therefore, restrictions on imports of finished goods might be expected from a government interested in seeing the establishment of the industry. Thirdly, while controls on quality might be more welcome when directed against competitors, at the same time they might encourage the potential consumer to view the product as being of a high standard. Fourthly, the initial establishment of an industry will also depend on the acquisition of the necessary skills and this could be more easily facilitated with Crown assistance. These skills may be acquired through the immigration of knowledgeable people, of native people going overseas for the purpose of learning them and then returning in order to practice them, or through written instructions delivered from overseas. The continued growth of the domestic industry then depends on the spread of these skills within the native population.

Finally, disputes often arise between a producer and his suppliers of goods and services. A government interested in the import substitution of munitions might become involved in the arbitration process in order to ensure continued production.

There were several tools available to the Crown during the Elizabethan and early Stuart years which would have enabled them to implement these protectionist devices. Proclamations were issued by the King, often with the advice of his council, for such purposes as administration, defence and foreign affairs, commercial and industrial regulation, social and religious life and the press. Parliamentary acts, or statutes, normally entered either the House of Lords or the Commons as paper bills. There they were

handed either to the Lord Chancellor or Speaker or to the clerks of the respective Houses. The clerks then decided whether the bill was public or private. Those who stood to benefit from private bills tended to be individuals or localities, while public bills were expected to be broader in scope and beneficial to the wider population. As private bills had fees payable at every step of the process, promoters were interested in seeing their bill entered as a public bill and so tended to promote the wider benefits to be gained from the measure.⁵ Bills normally went through three readings before passing the House. After the second reading it was either considered further in committee, engrossed (written neatly on parchment which would form, with alterations, the act), or rejected.⁶ If the bill passed upon the third reading it was then sent to the other House for another three readings. Any changes made by the second House needed to be approved in the first. When a bill had passed both houses of Parliament it then required the approval of the King in order to become an act.⁷ Acts and proclamations were then implemented through directives issued by the Privy Council.

Only three acts concerning munitions have come to light, one relating to each of the three products under consideration. Most of the measures concerning munitions were issued as proclamations by the Crown or as Privy Council and committee directives.⁸

⁵David Dean, Law-Making and Society in Late Elizabethan England: the Parliament of England, 1584-1601 (Cambridge, 1996), p. 7.

⁶Ibid., p. 20-1.

⁷Ibid., p. 22.

⁸The movement of the bills can be traced in the volumes of the Journals of the House of Commons and House of Lords and acts which have become law are printed in Alexander Luders et al. (eds.), Statutes of the Realm, (London, 1810-28). Proclamations for the

The reasons for this were that Parliament played a more minor role during this period, they met infrequently and because defence, trade and industry were traditionally the King's decision-making prerogative. It was not always clear whether an issue fell within the jurisdiction of Crown or Parliament, however, and proclamations were issued in some cases which in later years would be illegal.⁹

Most of the legislation during this period relating to cordage, sailcloth and gunpowder, whether acts, proclamations or directives, falls within the context of prices, competition, quality, the transfer of skills and arbitration. This chapter will therefore examine these various acts, proclamations and directives within this structure in an effort to first explain why they might have been implemented and, secondly, the impact they may have had on the native industries. It will also examine evidence of efforts to apprehend and punish offenders because directives which were not enforced could not have made an impact. This chapter does not pretend to be a complete survey of all legislation put forth on this subject during this period. It presents the most important examples relating to the most important themes that specifically mention the strategic industries considered here.

Tudors and early Stuarts are printed in Paul L. Hughes and James F. Larkin (eds.), Tudor Royal Proclamations i, ii and iii (New Haven, 1964 and 1969), James F. Larkin and Paul L. Hughes (eds.) Stuart Royal Proclamations i (Oxford 1973) and James F. Larkin (ed.) Stuart Royal Proclamations ii (Oxford, 1983). The above works are reinforced primarily with information from the Acts of the Privy Council (hereafter APC) and state papers.

⁹David Walker, The Oxford Companion to Law (Oxford, 1980), p. 1,003.

II

If the Crown was interested in establishing the munitions industries domestically then it would be expected that legislation would be set in place to reduce the costs of inputs by first, increasing the quantity available. Prohibitions and tariffs on the export of raw materials and inducements to import or produce them domestically would increase the supply and hence reduce the price. Secondly, the government might support raw material price ceilings. It would be expected that the selling price of the finished product would be determined by the market. No evidence has come to light that exports of hemp, the dominant raw material in cordage and sailcloth, were restricted, although the House of Commons requested in 1576 that they should be prohibited.¹⁰ Legislation to effect this may have been unnecessary in this case because England did not generally export hemp. Little grew domestically and the quality was probably poorer than that available elsewhere. Continental weavers of hemp looked to Russia and the Baltic, rather than England, for their supplies of the raw material.

The export of saltpetre, however, was not allowed except by special licence from the King.¹¹ The saltpetre that was sold for foreign consumption was either sold by the Crown itself or the East India Company and various other merchants received permission

¹⁰ P.R.O. SP12 107/53.

¹¹Calendar of State Papers, Colonial Series (hereafter CSPC) 1625-9, pp. 685-6; Calendar of State Papers, Venetian (hereafter CSPV) 1603-7, pp. 19-20.

to re-export.¹² It appears that permission was only granted when sufficient amounts were in store. The volume of sales was probably insignificant and so would not have affected supply and hence the willingness of the saltpetremen to supply at set prices. Although smuggling no doubt occurred, the export trade restriction on saltpetre probably limited competition for the raw material, enabling the Crown to keep prices low.

Most goods, raw materials or finished products, imported or exported, paid customs duties of five per cent on their generally underrated official values.¹³ Saltpetre was shipped by special licence from the King and so was exempt from paying but foreign hemp was not.¹⁴ In 1608 James placed added impositions on trade goods in addition to the five per cent duty. Both saltpetre and hemp were exempted from this.¹⁵ The exemptions on indirect taxation, then, may have worked to keep the prices of the primary raw materials low, particularly for gunpowder, but the system of taxation probably provided only minimal assistance to the domestic cordage and sailcloth industries.

Other inducements to import raw materials were offered only to the East India Company who traded in saltpetre. The Company owed its monopoly charter to the King's favour, and continued trading rights depended on occasionally meeting the needs of the King. While this normally took the form of cash loans, in this case the Company was

¹²For Royal sales to France and the Netherlands see CSPV 1603-7, p. 19. For East India Company sales see CSPC 1625-9, pp. 685-6; *Ibid.*, 1630-4, pp. 531-2. For sales by an unidentified merchant to Venice see CSPV 1603-7, pp. 19-20.

¹³C.G.A. Clay, Economic Expansion and Social Change ii, p. 254.

¹⁴Annie Millard, 'The Import Trade of London 1600-1642', (Unpublished Ph.D. thesis, University of London, 1956) i, p. 278; *Ibid.*, i, appendix, p. 13.

¹⁵*Ibid.*, i, appendix, p. 14.

also induced, from 1625, to import saltpetre at low prices. The Crown would, if necessary, use threats to force the price of the raw material down.¹⁶ In 1636 the Crown offered to pay the East India Company £3 per hundredweight for saltpetre but the Company refused to deliver at this price. The Crown responded by claiming that if they didn't, they would have to pay the Crown one and a half per cent of the value of the silver shipped in order to ship it at all. The Company depended on the right to export silver in order to pay for imports as there was little market in the East for English goods. They were promised that they would receive no favour from the king:

‘but on such terms as will make them repent having denied him so small a courtesey; ... they might keep the saltpetre, but should never have leave to transport it (for sale overseas).’

The king got his saltpetre.¹⁷

The Crown was interested in producing the raw materials domestically. Interest in domestic saltpetre production was considered in Chapter Six. Efforts to promote the domestic cultivation of hemp probably began during the reign of Henry VIII when a 1532/3 act of Parliament compelled farmers to grow one quarter of an acre of hemp or flax with every 60 tillable acres.¹⁸ The act was renewed several times and then allowed

¹⁶In 1637 The Crown paid £3 10s the hundredweight for East India saltpetre. P.R.O. SP16 292, p. 49; In 1638, the Crown paid £4 per hundredweight. Calendar of the Court Minutes of the East India Company 1635-9, p. 297.

¹⁷Calendar of the Court Minutes of the East India Company 1635-9, p. 172.

¹⁸Statutes of the Realm iii, p. 421.

to expire around 1547.¹⁹ It was revived in 1563 during the reign of Elizabeth and the ratio became 1:60.²⁰ The reasons for the act, however, seem to have had little or nothing to do with the import substitution of vital munitions. Henry VIII's basis for enforcing the cultivation of hemp was to increase employment and to improve the balance of trade.²¹ Elizabeth thought domestic cultivation would lead to 'the better provision of nettes for helpe and furtherance of fishing, and for eschewing of idlenes.'²² Being unpopular, the act was repealed in 1593.²³ While the law was enforced and fines were collected, the act probably did little to encourage the growing of hemp domestically. Farms with 60 or more acres of arable land tended to be located in regions of light, sandy soil unsuitable for its cultivation. Hemp was already growing in areas more agreeable to it such as the Lincolnshire Fens.²⁴

Of the three goods examined here, specific price ceilings were set after 1588 only for gunpowder and its inputs. A limit was placed on the prices to be paid for saltpetre and transport, as might be expected, but controls were placed on the selling price of the finished product as well. As suggested in Chapter Six, the Crown probably placed price

¹⁹Renewed in 1536, *Ibid.*, p. 663; again in 1539, *Ibid.*, p. 725; in 1541-2, *Ibid.*, p. 853 and in 1545, *Ibid.*, p. 1,014. Evans stated that the act expired at the end of Henry VIII's reign. Nesta Evans, The East Anglian Linen Industry, p. 50.

²⁰Statutes of the Realm iv¹, p. 425.

²¹*Ibid.*, iii, p. 421.

²²*Ibid.*, iv¹, p. 425.

²³*Ibid.*, iv², p. 855; Nesta Evans, The East Anglian Linen Industry, p. 51.

²⁴Nesta Evans, The East Anglian Linen Industry, p. 50.

controls after 1588 in order to assure itself of a steady supply of inexpensive powder. Price limits were placed on domestic saltpetre and its transport in order to keep production costs down and contract prices low. Prices varied for saltpetre imported by the East India Company, however, because the Company was unwilling to contract for a fixed amount, it not being 'safe or fit.'²⁵ Efforts to reduce or freeze the prices of the inputs, by force if necessary, probably assisted the development of the native gunpowder industry. Low or static input costs during a period of inflation could have increased domestic demand by enabling the final product to be affordable to an increasing segment of the population. However, increased demand as a result of the price fixing may have come only from the Royal market as it was the Crown who benefited from the lower prices. Other consumers paid more.

It is not as clear why the Crown determined the prices at which the finished product, gunpowder, was to be sold by the contractors to private individuals. It is most likely that the contractors' prices were set high, rather than low, in order to provide the contractor with a substantial income and a continuing interest in providing powder for the Crown. In 1625 the East India Company thought Evelyn's rates were too high.²⁶ This opinion was repeated in 1634.²⁷ Ongoing problems with interlopers highlight the problem. Interlopers in the powder trade were apparently selling the product at a lower price than Evelyn's, and he complained. In 1635 the East India Company were offered £4 13s 4d

²⁵Calendar of the Court Minutes of the East India Company 1635-9, pp. 101-2.

²⁶CSPC 1625-9, pp. 34, 54.

²⁷Ibid., 1630-4, p. 611.

per hundredweight, or 11.2d per lb, for powder from a Mr. Russell when Crown rates were set at 12d.²⁸ Evelyn was probably unwilling to undercut the competition, preferring instead to eliminate them through appeals to the King.

The setting of fixed prices on gunpowder sales to the Crown might have encouraged the import substitution of gunpowder and saltpetre because the Crown could then buy a greater quantity from domestic sources. When prices were set below the market rate then foreign suppliers could not compete for the Crown market. Fixed prices may have made little difference to the private market. Illicit sales at market prices were probably common when interlopers produced and import restrictions were absent. However, when the price of domestic powder was high, the market for this product may have contracted.

While the Crown appears to have made some effort to increase the amount of saltpetre and hemp in the country and so reduce input prices, the benefits to the domestic industries appear to have been limited. Hemp could be exported and some duties were payable on both imports and exports. Efforts to promote its domestic cultivation were generally unsuccessful. Restrictions on the export of saltpetre and freedom from the

²⁸Calendar of the Court Minutes of the East India Company 1635-9, p. 122. Crown officials themselves sold for less. The Venetians in 1604 claimed that the price to be offered for saltpetre and computed here into pence per lb., was approximately 4d the lb. CSPV 1603-7, p. 20. The ministers, however, would have to be bribed. 'Bribery is so general in this country (England) that it is useless to hope for anything unless this method be adopted.' *Ibid.*, p. 183. The Venetian ambassador was authorized to offer up to 120 ducats, or £27, the ton. *Ibid.*, p. 175. According to the exchange rates of 1603, a Venetian ducat was worth 54d English. *Ibid.*, p. 20. Interlopers could charge higher prices during periods of powder shortages. For example, the king's price in 1626 was 4£ 3s 4d per barrel. P.R.O. SP16 36/52. The following year, when Crown prices would not have changed, the East India Company sold powder they had purchased from the City of London for £5 5s per barrel, or a bit more than 12d per lb. CSPC 1625-9, p. 392.

payment of customs probably made some contribution towards increasing the amount of this raw material in the country. Honrick's grant to teach Englishmen the art of making saltpetre and inducements to the East India Company to import it were probably much more effective and were probably enacted for that purpose. Price controls on saltpetre and gunpowder were meant to enable the Crown to buy a greater quantity from domestic sources at low rates.

III

A new and developing industry may benefit from a protected market, free from the competition of a more experienced, foreign adversary. Royal support, then, would mean that protectionist trade barriers such as import prohibitions and high tariffs on manufactured goods produced overseas were ordered.

With the possible exception of saltpetre, trade duties and impositions were considered an important source of funds and were not used to facilitate the development of the native munitions industries during this period. Financial inducements, in fact, were awarded for the importation of finished munitions. Foreign cordage and gunpowder were exempted from the 1608 additional impositions mentioned above.²⁹ In 1610 the imposition levied on imported Vittry canvas, a type of sailcloth made in France, was abated because it was thought to have been too high.³⁰ The exemptions on indirect taxation, then, may have

²⁹Annie Millard, 'Import Trade of London' i, appendix, p. 14.

³⁰Ibid., p. 16.

worked to keep the price of the primary raw material in gunpowder low but they did nothing to encourage the development of the native cordage and sailcloth industries. It would only have encouraged merchants to import them. Supplies were important; it did not matter that they were imported so long as they were available.

Only gunpowder ever faced import restrictions. The proclamation of 1637 described above both raised the price of powder sold to the public to 18d the lb and prohibited its importation.³¹ Consumers and retailers were directed to purchase powder from the Crown stores.³² The Crown justified the proclamation by first, claiming that domestic purchases alone would encourage the ‘settling a work of such importance as the making of peter, and powder in His owne kingdomes...’ Secondly, ‘the makers thereof, appointed by His Majesty, may receive no interruption or discouragement therein...’³³ Customs officials were directed to seize the powder when it arrived in England. Consequences for both offenders and officials who allowed the powder to pass included confiscation of the powder, loss of office and ‘such further penalties and punishments as may be inflicted on the offenders...’³⁴

This proclamation may have contributed towards the import substitution of gunpowder. If the restriction was effective, domestic powder would then have made up 100 per cent of the total supply and the substitution of domestic for foreign would have

³¹See pp. 300-1.

³²James F. Larkin, Stuart Royal Proclamations ii, p. 548.

³³Ibid., p. 547.

³⁴Ibid., pp. 547-8.

been complete. It is difficult to determine how successful officials were in implementing the proclamation. There are isolated records of apprehensions. The high price demanded of gunpowder, however, would have encouraged smuggling, thus countering the protective nature of the import restriction.

It appears as though the Crown was treating domestic gunpowder as an infant industry, protecting it from foreign competition. It was not only foreign competition that was eliminated, however, but domestic competition as well. It is probable that the Crown was seeking to monopolize the market in order to profit by it rather than encourage the domestic industry to expand. It had just inquired as to the price of overseas powder, and then at the same time had both increased the selling price and prohibited its importation. If the price of domestic powder was artificially raised above the price of foreign powder, then, in the absence of restrictions, foreign powder rather than domestic would have been purchased. The Crown was probably unwilling to compete with foreign producers when a return on investment of over 100 per cent could be realized in the domestic industry.

IV

Developing industries upon occasion might benefit from quality controls. Although these controls might be unwelcome, they could ensure that the reputation of the domestically produced item would be positive and that the article could be trusted when used as it was meant. Measures which attempted to control the quality of the products considered here address only sailcloth. An act 'againste deceitfull making of cordage'

was passed by Parliament in 1593 but because it was concerned with the passing off of old cordage as new rather than production controls it will not be included here.³⁵

Outside of stating the proportions of raw materials to be used, the standards of quality for gunpowder were not determined by law, probably because the quality was easily detected during proofing. Complaints were made in 1623 concerning the poor quality of powder, the result, claimed James I, of buying poor quality foreign powder and of ‘defective making of powder within this Realme covertly and secretly, and without warrant of his Majesties Commission...’ The defective powder was then sold before it was proofed.³⁶ Because the infrastructure for quality control was already in place, the method of solving the problem was to issue a proclamation restricting domestic production and sales to the holders of the monopoly contract.

The measure against the ‘deceptfull and false makinge of mildernix, and powle davies, whereof saile clothes for the Navie and other shippinge are made’ was an act of Parliament passed in 1604.³⁷ This act was meant to control the raw materials used, the size of the cloths and training procedures. The act began by claiming that sailcloth production was only introduced into England in 1590 ‘to the great benefitt and comoditie thereof.’³⁸ However, according to the act increasing interest, rather than skill, in its

³⁵The act was passed because individuals were covering old, worn cables with tar and then selling them as new. As a result lives and ships belonging both to the Crown and to private subjects were lost. This was the reason given for the measure. No reference was made to standards of production for new cordage. Statutes of the Realm iv², p. 857.

³⁶James F. Larkin and Paul L. Hughes (eds.), Stuart Royal Proclamations i, pp. 565-6.

³⁷Statutes of the Realme iv², p. 1049.

³⁸Ibid.

manufacture resulted in the spread of the industry and a decline in the quality of the product. It claimed manufacturers were using inappropriate materials, the cloths were imperfectly woven and they were not manufactured to the correct size.³⁹

To remedy this situation it was enacted that a seven-year apprenticeship was required for anyone wishing to enter the trade and produce sailcloth ‘called termed or knowne by name or names of Mildernix and Powle Davies...’ Offenders were to pay 20 shillings for every month they were producing. Secondly, the sailcloth must be made of ‘good and sufficient hemepe’ and must be no smaller than 33 yards long and three quarters of a yard wide. Also, the cloth must not be sold before it is ‘well beaten scoured bleached’ and the cloth must be ‘well driven with a brasen or iron shuttle.’ Offenders were to pay five shillings for each piece of cloth not made to these specifications. Fines were to go to the Crown and to the informer. It appears that the directive was not enforced, however. No record has come to light of offenders who were brought to London and prosecuted. Complaints concerning the poor quality of sailcloth continued and increased.

George Unwin claimed that the act was probably promoted by Ipswich sailcloth manufacturers rather than Crown officials.⁴⁰ It would be expected that the Crown would

³⁹It was claimed in the act that ‘the saide clothes do yearlie and daylie growe worse and worse...to the great deceit and hurte of all his Highnes lovinge subjects that are to use & employ the same...and to the great damage of his Highnes Navie,...and within short tyme like utterlie to overthrow the arte and trade of making clothe of that kinde within this realme; whereupon his Highnes saide subjects, aswell the makers as users of the saide clothes are much hurte and impoverised through the deceitfulnes unskilfulnesse and ignorance of the weavers and makers of the saide clothes.’ Ibid.

⁴⁰William Page (ed.), The Victoria History of the County of Suffolk ii (London, 1907), p. 271.

be very interested in the quality of sailcloth being produced for more than 90 per cent of the sailcloth purchased by the Crown for the Navy at this time was manufactured domestically. Crown officials were, as claimed above, most likely not directly concerned.⁴¹ The job of choosing sailcloth for the Navy appears to have been delegated to the officers of the Navy, and this responsibility may have been in the hands of John Trevor, surveyor at this time. Trevor has already been described as 'unscrupulous'.⁴² It is unlikely that he expressed concern for the quality of sailcloth available to him.

While the act was probably not promoted by the Crown, it was probably not promoted by Ipswich sailcloth makers either. A bill read in Parliament for the making of sailcloth the following year but apparently not passed appears to have been initiated by the burgesses of port towns.⁴³ It may have been an act, then, brought by consumers with influence in an attempt to improve the quality of the domestic product, rather than an effort on the part of Ipswich producers to control supply or of the Crown to assist the native industry.

V

The initial development and then expansion of an industry requires that relevant skills and technological knowledge be available to it. The government may promote or

⁴¹See above, pp. 210-1.

⁴²See above, p. 203; Alan McGowan, The Jacobean Commission of Inquiry of 1608 and 1618 (Navy Records Society, 1971), p. xiv.

⁴³The Journals of the House of Commons i, p. 205.

encourage communications and/or travel overseas, support immigration and offer inducements for training and rewards to inventors and innovators. Some encouragement was given to those with skills not available in England or to those with new processes of manufacturing. Only processes for making saltpetre were offered any support during this period although a patent for the making of cordage was issued during the reign of Edward VI and one for sailcloth during the reign of Philip and Mary.⁴⁴ As mentioned previously, in 1561 Queen Elizabeth paid Gerrard Honricke of Germany £300 to introduce the art of making saltpetre. He was required to write down the instructions for making it and teach native Englishmen the art.⁴⁵ It is not clear, however, whether Honricke was an entrepreneur seeking an economic niche or whether he was contacted by the Queen for the purpose of importing the technological know-how. He was apparently successful for saltpetre was subsequently produced domestically.

John Bovyat justified his request in 1575 for a monopoly to make saltpetre from 'stone minerals' by claiming that the product would be superior than that made in the traditional way, it would be a great profit and 'benefit for a common wealthe' and also in terms of national security - the enemies would not confiscate it. Nothing more was heard of his efforts except that in 1581 he was requesting that his grant be confirmed by Act of Parliament.⁴⁶

⁴⁴Thomas Trollop and William Brown(e) received £100 for the making of cordage, to be repaid at the end of seven years in cordage. P.R.O. E351 2194. Francis Owdrey and William Blackwall were loaned £200 to produce sailcloth. They were expected to repay the loan with cash rather than sailcloth. P.R.O. E351 2197.

⁴⁵P.R.O. SP12 16/30, 31. See also p. 280 above.

⁴⁶P.R.O. SP12 106/53.

Another grant appears to have been issued to a Henry Pope in 1583 for in that year he reported his success at making saltpetre from a mineral substance found in the cliffs of Fulstone. While he had hoped to make a ton of saltpetre in that year, nothing more is heard of his project.⁴⁷ A grant was awarded in 1623 to Thomas Warwick and others, of London, to make saltpetre in a new manner. They were not to interfere with the present commission and were to sell only to the king's storehouse.⁴⁸

In 1627 a patent was granted to Sir John Brooke knight and Thomas Russell for the sole making of saltpetre using a new invention that would not require carts or any digging in houses. The process apparently utilized urine, in liquid form. A proclamation therefore required that the subjects:

‘shall carefully and constantly keepe and preserve... all the urine of man during the whole yeare, and all the stale of beastes, which they can save, and gather together...’⁴⁹

The patent granted to Honricke to produce saltpetre was probably the only successful attempt to promote the skills necessary for the import substitution of munitions. The domestic production of saltpetre ensured that less gunpowder would need to be imported from the continent when foreign saltpetre was unavailable. The grant to Honricke was probably made in an effort to make available a sufficient quantity of saltpetre at a low price. The grants of 1623 and 1627 may have been made because the Crown was trying to alleviate the exploitation of the property owner that was at the root of the many

⁴⁷P.R.O. SP12 161/11.

⁴⁸P.R.O. SP39/15/52, Sign. Mss., July 22, 1623.

⁴⁹James F. Larkin(ed.), Stuart Royal Proclamations ii, pp. 116-120. For the quote, see p. 119.

complaints. It is doubtful that the innovators were successful, however, for nothing was ever heard of them again. The processes may have been unworkable or the terms unacceptable.

Outside of this example, the Crown instead acted to impede the spread of the munitions industries during this period. This was attempted with the cordage industry and was certainly done in the case of gunpowder. That the Crown should actively attempt to halt the spread of industries producing goods vital to a country's security is particularly interesting and the reasons for them deserve attention.

In 1604 James I by act of Parliament continued an act passed in 21 Henry VIII for 'the true making of greate cables halsers and ropes...'⁵⁰ The Henrican act restricted cordage production to within a five mile radius of Bridport. Also, hemp growers within the same region were restricted to selling their crop only in the town's market. Finally, the weight for the good was set at 20 pounds to the stone.

The original statute was probably an attempt to protect the town of Bridport's economy by restricting cordage production and the hemp market to that town. It is not clear why the act was renewed during the reign of James I. It may have been promoted by interested parties from Bridport who were attempting to shore up what may have been a declining trade. There is no indication that the act was enforced as no transgressions have come to light. If it was enforced, it would not have assisted the native industry to develop and expand and so it was probably not passed in order to facilitate the import substitution of cordage.

⁵⁰Statutes of the Realm iii, pp. 291-2; *Ibid.*, iv², p. 1,050.

The Crown was probably more successful in limiting the number of producers within the gunpowder industry. Clandestine powder operations had been running in England probably since the early days of the industry's history.⁵¹ These operations were given encouragement in 1624 when, in the face of a national shortage, individuals and corporations were given permission by letters patent to produce for their own use. When attempts were made to again restrict production to the holders of the monopoly contract, it was clear that a 'floodgate' of small production facilities had been opened that proved highly resistant to closing again. The case study of the East India Company's efforts to operate powder mills in the face of Crown opposition demonstrates this point.

In 1624 Lord Carew reported that the King had set up nine mills but these were insufficient to make powder for the general public. The East India Company was therefore permitted to set up mills for their own use.⁵² The freedom to produce was short lived, however, and in 1625 the Company was advised by an undisclosed individual to hurry and set up the mill 'for fear of prevention.'⁵³ Lord Carew then advised them not to set up the mill, as Evelyn would work the saltpetre the Company had imported into gunpowder for them.⁵⁴ The Company, however, thought Evelyn's rates were too high.⁵⁵ He offered to make it for 12d the lb, which compared very unfavourably with

⁵¹The unknowing could learn how to make powder from a little book. P.R.O. SP16 410/40.

⁵²CSPC 1622-4, p. 476.

⁵³*Ibid.*, 1625-9, p. 31.

⁵⁴*Ibid.*, p. 34.

⁵⁵*Ibid.*, p. 54.

the Crown's selling price of 10d a lb for powder at this time.⁵⁶ The Company set up mills in 1625 in the outskirts of Windsor Forest and were immediately ordered to stop production.⁵⁷

The reasons for the suppression were probably personally motivated and it appears that the suppression at this time had little official support. The Company was ordered to stop production because, as Lord Carew claimed, 'the deere might receive prejudice by it.'⁵⁸ Resistance to the facility seems to have come from Sir Arthur Mainwaring, possibly a keeper or some sort of official of the park where the mills were set up.⁵⁹ Evelyn claimed to know 'nothing of any interruption' to East India Company powder production.⁶⁰ Secretary Conway could find no reason why the East India Company should not continue manufacturing powder.⁶¹ Sir John Coke, Master of Requests, was well aware of the shortage of good powder and the poor quality of foreign, so that it made him 'very sorry to hear of any means neglected for so necessary a provision.'⁶²

⁵⁶Ibid., p. 79. The price is quoted at £5 per barrel and price per pound is based on 100 pounds to the barrel. Ronald Edward Zupko, A Dictionary of English Weights and Measures (Madison, 1968), p. 16.

⁵⁷P.R.O. SP16 5/85.

⁵⁸Ibid.

⁵⁹'The Company conceive the command has been obtained at the suit of Sir Arthur Mainwaring or some keepers.' CSPC 1625-9, p. 88. Mainwaring and an Andrew Pitcairn are seen ten years later offering to produce gunpowder for the Crown with their three mills. P.R.O. SP16 283/13; 290/42.

⁶⁰CSPC 1625-9, p. 88.

⁶¹P.R.O. SP14 214, Conway's letter book, p. 226; CSPC 1625-9, p. 89.

⁶²CSPC 1625-9, p. 90.

Carew, on the other hand, was concerned that ‘...besides the opening of a flood gate (if the East Indie Companie erect powder mills) the king shall lose muche in his proffitt, for you know that he is to have a benefit of every pound of powder made by Evelyn.’⁶³ Coke claimed he would inform his Majesty that the issue ‘is of more consequence than private profit or pleasure.’⁶⁴

In 1626 letters patent granted the Company a licence to erect powder houses in Surrey, Kent, or Sussex ‘on agreeing with the owners of the soil and those that have lawful interest in the waters thereof.’⁶⁵ It may have been granted as compensation for the Crown commanded the Company at this time to unprofitably import saltpetre from India.⁶⁶ The Company settled on a site in Surrey.⁶⁷ They were making enough powder by 1628 to consider selling it and did by the following year, in opposition to the contents of their patent.⁶⁸ They may have been selling it as early as 1627 for in that year John Evelyn complained to the Privy Council that the Crown had not paid him for his powder for six months. He was therefore legally able to sell the powder that had been earmarked for the Crown to the public, but because the East India Company, with a new grant, and a Michael Waring, who had no authority to produce, were making it, he could find no

⁶³P.R.O. SP14 185/6; CSPC 1625-9, p. 38.

⁶⁴CSPC 1625-9, p. 90.

⁶⁵*Ibid.*, p. 235.

⁶⁶Calendar of the Court Minutes of the East India Company 1635-9, pp. 49-50.

⁶⁷CSPC, 1625-9, pp. 243-4.

⁶⁸*Ibid.*, pp. 489, 668.

domestic market for it except to sell at a great loss. He asked that the payments be continued or the other producers restrained, as powder production ‘was never permitted to any but your petitioner and his ancestors for about this three score years.’⁶⁹

The Crown appeared to have left the matter alone for several years as the state of Evelyn’s contract was clearly troubled. Payments due to Evelyn were in arrears and the contracted amounts of powder were not being delivered.⁷⁰ In 1630 the Company received permission to export powder.⁷¹ That same year, however, efforts to suppress interlopers were renewed as the Crown decided to renew the arrangement with Evelyn and ‘otherwise he cannot perform his contract.’ Also, the Crown intended to take possession of the Company’s mills, probably for Evelyn’s use.⁷² The Company’s response was to plead, in light of their possession of letters patent and the fact that they had great stores of saltpetre both on hand and due shortly to arrive, the import of which the King had encouraged, that they might be allowed to continue production.⁷³

Permission appears to have been granted, for the following year Evelyn complained that the Company was still making powder.⁷⁴ In 1632 Evelyn was once again sending substantial amounts of powder to the Royal stores and during the same year the Company

⁶⁹P.R.O. SP16 89/9; CSPC 1625-9, pp. 432-3.

⁷⁰See above, pp. 295-6.

⁷¹CSPC 1630-4, p. 37.

⁷²*Ibid.*, p. 81.

⁷³*Ibid.*

⁷⁴P.R.O. SP16 184/4; CSPC 1630-4, p. 116.

was called before the Lords of the Council and required to give up their patent.⁷⁵ The Crown claimed that the Company had been given permission in 1624 to produce powder for their own use, and selling it was:

‘to the great prejudice of his Majesty, and frustrating of the late contract with Mr. Evelyn, his Majesty’s agent, for the sole making and providing of powder within this kingdom.’⁷⁶

The Company claimed they could not legally surrender their patent to make powder ‘unless it be evicted from them by law’.⁷⁷ Secondly, they reasoned that as the patent had been granted to the Company, the governor and committees did not have the power to surrender it without the Company’s order by general court.⁷⁸

The Council refused the Company’s request to repossess the patent through the law courts as it ‘would spin out time.’ They also refused a general calling of the Company court as it ‘might prove doubtful if put to the generality.’⁷⁹ The Company then again requested leave to work their large stocks of saltpetre. They were allowed to finish the saltpetre they were then working, and the Council promised the Company that they would receive good powder at reasonable rates. Also, they were promised reasonable rates for any saltpetre imported or they would receive permission to transport it.⁸⁰ Later that year

⁷⁵For the Company account see CSPC 1630-4, pp. 315, 317-9; For deliveries of powder see above, Table 6.5.

⁷⁶CSPC 1630-4, p. 266.

⁷⁷*Ibid.*, p. 288.

⁷⁸*Ibid.*, pp. 315, 318.

⁷⁹*Ibid.*, p. 318.

⁸⁰*Ibid.*, p. 319.

the Company's powder maker is found, with doubtful legality, claiming to have just made 100 barrels and with plans to make more before Christmas.⁸¹

So ends the recorded saga of East India Company gunpowder production. In general there are two reasons why the Company was able to produce as long as it did in the face of Crown opposition. The principal reason was that the Crown spent little time and energy actually trying to suppress a patent offered during a serious but temporary nationwide shortage of gunpowder. The opposition was easily eradicated in 1625 by moving the production site. The Crown effectively ignored Evelyn's pleas in 1626 and this probably reflects their poor working relationship at this time. The final push in 1632 probably originated with Evelyn, who was once again producing for the Crown and so may have felt justified in demanding that the letter of his grant be enforced. The Crown, even then, granted the Company an extension.

Secondly, East India Company officials were able to delay the suppression of production by either ignoring the directives or by appealing for additional time to work stocks of raw materials. In the absence of a police force or standing army, the Crown depended on local officials such as justices of the peace, mayors of the communities or, in the case of corporations like the East India Company, the governor and committees, to enforce directives. The directive to suppress production does not appear to have received support from the Company officials to whom it was directed. Numerous cues to cease production were only heeded when the Crown eliminated the Company's legal justification for continued production. Once direct and forceful action was taken,

⁸¹Ibid., pp. 321, 334.

production appears to have ceased within a year. It may be that with their own monopoly privileges to protect, continued interloping was deemed unwise.

While the East India Company may have been treated with leniency during the latter half of the 1620s because of its special role of importer of the much needed saltpetre, the evidence suggests that the Company's experience was not an isolated one. Domestic production was known to be occurring at three or four places in Bristol, one in Dorsetshire and one at Battle, in Sussex.⁸² Michael Waring was only finally shut down in 1630 after being in production since at least 1627.⁸³ Walter Parker, of Dorset, arrested in 1635 for making gunpowder, claimed to have been making powder since 1588.⁸⁴ The town of Bristol had received permission to make enough powder produced from foreign saltpetre within the city in 1624 for their own use and for furnishing ships.⁸⁵ Crown efforts to then suppress the thriving enterprise there continued throughout the 1630s.⁸⁶

The monopolist was normally the individual who brought illicit powdermaking activity to the attention of the Crown.⁸⁷ The interloper was usually then arrested and either sent to stand before the Council or was committed to prison in his own locality.

⁸²P.R.O. SP16 89/11.

⁸³PC2 39/693 Index to Privy Council Registers (1628-33).

⁸⁴P.R.O. SP16 286/27.

⁸⁵APC March 1625-May 1626, pp. 212, 240.

⁸⁶See, for example, P.R.O. SP16 200/26, 353, fol. 76.

⁸⁷Robert Davies, however, was discovered making powder in Middlesex because he set his neighbour's house on fire. P.R.O. SP16 292 p. 89.

His saltpetre and gunpowder were seized.⁸⁸ The saltpetremen who supplied the interloping powdermaker with the raw materials was then deprived of his commission.⁸⁹ The interloper might also have to give bond not to make powder again.⁹⁰ The punishment does not appear to have acted as a deterrent, however, and repeat offending was common.⁹¹ In the case of small private producers less well known to the Crown, the motivation to cease production after apprehension was probably less well developed.

No effort, then, was made to promote or encourage individuals with the necessary skills and technological knowledge in the cordage and sailcloth industries during this period. While some efforts were made in the gunpowder industry, once saltpetre was established, the Crown was more interested in restricting domestic production of gunpowder. The suppression of domestic competition could have been helpful in establishing the domestic industry if the market was small and profits were low. If that were the case then multiple producers would marginalize profits and increase the risk of ruin. This was not the case in the gunpowder industry, however. The market was well developed and profits were high in England at this time. The Crown was not attempting to facilitate the import substitution of gunpowder by eliminating domestic competition. It was the contractor's right by patent to a monopoly and it was this right that was being implemented, although without a great deal of enthusiasm.

⁸⁸PC2 421/286 Index to the Privy Council Registers (1628-33).

⁸⁹P.R.O. SP16 353, fol. 57v.

⁹⁰P.R.O. SP16 376/165.

⁹¹See Calendar of State Papers Domestic (hereafter CSPD), passim.

Producers quite often were found to have abused their monopoly contracts during this period. The finished good selling in a protected market may have become exceedingly expensive, or the manufacturer may have attempted to acquire more of the raw materials and services for a given price than allowed by the terms of the contract. At the same time, the terms of the contracts allowed individuals to infringe on the rights of others. Both Parliament and the public demanded redress. They called for the abolition of the grants, and the suppliers of raw materials and services retaliated against the manufacturers in kind. Resolution of the complaints was necessary if the manufacturing process was to carry on smoothly. A fifth way by which the Crown could have assisted the development of native industries, then, was to arbitrate when differences arose. An examination of the ways in which problems were addressed and solved provides clues as to the motivations of the Crown. The general Parliamentary opposition to monopolies led to the suppression of a grant made for sailcloth and differences which developed during the production of saltpetre led to Crown efforts to seek solutions.

Some of the grants complained of in the 1601 Parliament, which included one for poldavis and medrinacks, were:

‘so far differing from those main grounds and reasons which have been mentioned in the grants, and have also in the execution of the said letters patent been extremely abused contrary to her highness’ intention and meaning therein expressed: She is now pleased...to publish and declare...to be void.’⁹²

⁹²Ibid., p. 236.

This grant for sailcloth has not come to light, but it may be a patent made to Rufus Barber for the sole buying or the searching and sealing of these cloths.⁹³ By at least the end of her reign, then, Elizabeth appears to have believed that the grant was doing nothing to support the domestic sailcloth trade and could be safely discarded, thereby placating the opposition.

Other patents, including those ‘for the better furnishing of the realm with such warlike provisions as are necessary for the defense thereof (as namely that concerning saltpetre),’ had been abused as well and were to be reformed at first rather than abolished.⁹⁴ The saltpetre contracts fixed the prices to be paid for transport at a low level and granted saltpetremen the right to freely dig for saltpetre upon private land. These rights kept the costs of gunpowder production low but the rights were abused and as a result opposition to the saltpetremen sprang up. Sir Francis Seymour in 1630 summarized the complaints thus:

‘The saltpetremen...care not in whose house they digge, threatening men that by their commission they may digg in any mans house, in any room and at any time...They have already digged up some malting rooms and threaten to dig more... They digg up the entries and halls of divers men... If any oppose them they break up mens houses, and digg by force... They make men carry their saltpetre for a groat a mile...and take their carriages as well in sowing time as in harvest...’⁹⁵

The saltpetremen had their own charges. They claimed that cart owners refused access to carts, that property owners restricted access to prime saltpetre grounds and thirdly, the

⁹³B.L. Lansdowne MSS. 108, 78.

⁹⁴See above, pp. 230-4 for factors leading to the abolition of the gunpowder contract.

⁹⁵P.R.O. SP16 161/1.

owners tampered with the grounds by paving them over or digging them up, making harvesting the saltpetre impossible.⁹⁶ Saltpetremen, then, complained that property owners were not allowing them to work according to the terms of their commissions, and property owners complained that the saltpetremen were not working according to those terms.

The Crown needed to ensure that people in possession of the saltpetre grounds had protection of their property in order for saltpetre mining to continue unmolested, and the saltpetremen needed the Crown to enforce their specific liberties in order to provide cheap saltpetre. A number of proclamations were issued during the reigns of James I and Charles I in an effort to appease both sides and encourage the mining of saltpetre.

The first proclamation ‘inhibiting the use and execution of any charter or graunt made by the late Queene Elizabeth, of any kind of monopolies, &c.’ was issued by James during his first year as King of England in 1603.⁹⁷ All monopolies granted during the reign of Elizabeth were made void until the grant could be examined and allowed, with the exception of grants made to a corporation or company or ‘for the maintenance or enlargement of any trade of merchandize.’⁹⁸ Saltpetre was the only product mentioned specifically, and reference was made to ‘disorders and abuses.’ As a remedy saltpetremen were to:

⁹⁶Principal complaints as stated in 1637 were 1)the rise in prices of wood ashes and coal 2)decay in the quantity of good ground for making saltpetre 3)defects in carriage and 4)the irregularity of payment. P.R.O. SP16 354/115.

⁹⁷James F. Larkin and Paul L. Hughes (eds.), Stuart Royal Proclamations i, pp. 11-14.

⁹⁸Ibid., p. 12.

‘have especiall care to execute their offices and authorities without any maner of oppression, grievance or wrong to be done to any our loving subjects.’⁹⁹

With few specifics or consequences included, the document appears to be more a message of good will from an incoming monarch rather than a real effort to solve the problems.

A second proclamation was issued during this reign in 1624:

‘for the preservation of grounds for making of salt-peeter, and to restore such grounds which now are destroyed, and to command assistance to be given to his Majesties salt-peeter-makers.’¹⁰⁰

The proclamation began by declaring the necessity of making saltpetre and gunpowder domestically because of the dangers and expenses of obtaining supplies overseas. Supplies ‘are not to be obtained but at the pleasure of other princes, at unreasonable rates and prices.’ Once purchased, they may be intercepted in shipment, or ‘by contrary winds hindered, or utterly lost by shipwreck...’ Then, if importation was successful, the mercantilist argument applied.

‘...The same is not to be had but for ready money to be transported and paid for the same, wherby the treasure of our realmes would be much diminished, and other forreine realme thereby enriched...’¹⁰¹

The proclamation aimed to end the property owners’ practice of paving saltpetre mines and carrying away the earth and spreading it on the land. The saltpetremen were also to fill in the holes they made and leave the property in the state in which it was found. Also, incentives paid by the landowner to the saltpetremen in order to avoid the

⁹⁹Ibid., p. 13.

¹⁰⁰Ibid., p. 611-7.

¹⁰¹Ibid., p. 611.

digging of a site or the commandeering of a cart were to end. The Commissioners of the Navy were to hear complaints from both saltpetremen and private individuals, and George, Duke of Buckingham, Lord High Admiral of England and George, Lord Carew, Master of the Ordnance were to send for offenders. The Commissioners were to then examine them and, if they thought necessary, refer them to the Star Chamber Court. Finally, town and country officials were warned to cooperate.

Charles I issued a proclamation combining this decree with one issued in 1623 upon his accession to the throne in 1625. The latter was notice that the production and sales of powder and saltpetre were restricted to the monopolists.¹⁰² Other proclamations were issued in 1627 and 1635, all essentially reiterating the one presented in 1624 with the addition of points from the 1623 proclamation included in that written in 1627.¹⁰³ An addition was made in the 1625 version requiring saltpetremen not to harm the pigeons. The proclamation issued in 1627 added that carts may be requisitioned for four pence the mile, a decrease from the eight pence allowed in 1620.¹⁰⁴ The proclamation of 1635 was much more stern in nature and it claimed ‘that they (private individuals) have of late times sundry wayes much more impaired and destroyed the growth and mines of saltpetre, then formerly.’¹⁰⁵ It is clear from the number of times the same directives were issued and from the exhortation included in the proclamation of 1635 that the commissioners

¹⁰²For the proclamation issued in 1623, *Ibid.*, pp. 565-8. For the proclamation issued in 1625, James F. Larkin (ed.), Stuart Royal Proclamations ii, pp. 16-20.

¹⁰³James F. Larkin (ed.), Stuart Royal Proclamations ii, pp. 157-62, 453-7.

¹⁰⁴APC July 1619 - June 1621, p. 177.

¹⁰⁵James F. Larkin (ed.), Stuart Royal Proclamations ii, p. 454.

were not successful in reducing abuses.

The evidence suggests that the grievance procedure as set out in the proclamations was observed. The Crown made a serious effort to understand the nature of each grievance. When a petition of complaint was delivered to the commissioners, the disputing parties were called to London as, quite often, were witnesses. The Commissioners examined them and, when necessary, referred the offenders to the Star Chamber Court. The procedure was a time consuming and expensive process, however, and the petitioners must have felt confident of success because many initiated it. Almost without exception the King, commissioners, and Lords supported the accusers and punished the accused.

The procedure was bound to fail, however. The nature of the articles in the commissions granted to the saltpetremen ensured that the offenses committed by property owners would be repeated. Saltpetremen were granted the right to requisition carts and teams from the communities within which they worked at predetermined rates. While the rates during the reign of Elizabeth appear to have been competitive, by 1617 the price was set at eight pence the mile.¹⁰⁶ The price fell in 1627 to four pence and then rose somewhat in 1637 to six pence per mile.¹⁰⁷ Not only was remuneration low but the carts could be demanded during planting and harvesting seasons when farmers needed them most. Secondly, saltpetremen could enter a property and dig whether it was convenient for the property owner or not. These rights to exploit made the saltpetremen

¹⁰⁶APC August 1616 - December 1617, p. 254.

¹⁰⁷James F. Larkin (ed.), Stuart Royal Proclamations ii, p. 159; CSPD 1637-8, p. 95.

a particularly disliked group. The tolerance and patience of the property owners were strained to breaking point.

An enforced trip to London, a spell in prison and a fine was usually sufficient to convince an offending property owner to mend his ways. The offensive rights granted to the saltpetremen remained but the property owner would normally have to deal with the same saltpetreman in the future. The saltpetreman, armed with his commission, continued to exercise these rights in the extensive area assigned to him. While he, too, may have suffered a stay in prison and a fine for acting beyond the letter of the law, he was then able to resume this behaviour towards other individuals. As a result, relations between property owners and saltpetremen remained uncooperative. Saltpetremen continued to exploit and landowners continued to do what they could to prevent the domestic production of saltpetre from occurring on or near their property. While the Crown was willing to arbitrate, it was not willing to change the terms of the contract in order to achieve cooperation; to do that would have increased the price of gunpowder.

VII

There were a number of ways, then, in which the Crown could have actively assisted the new and developing munitions industries during this period. Controls were placed on prices, competition and quality, and some attempt was made to acquire skills and technological knowledge and reform the abuses that had set in. However, gunpowder and saltpetre were the only real benefactors, and seldom was the legislation concerning them

strictly a result of concerns for national security. Fiscalism played an important role.

The Crown gave little assistance to the sailcloth and cordage industries. Trade regulations were not enacted for protectionist purposes. No attempt was made to restrict the export of hemp. Little was probably ever exported anyway, however, and so a prohibition was probably unnecessary. Hemp grown in England was not in demand on the continent. At the same time little effort was made to encourage its import for it was never entirely free from the burden of customs. Imports of foreign made sailcloth and cordage were welcome and in fact, encouraged, to the possible detriment of the native industries. Impositions placed during the reign of James I were abated for cordage and for a type of sailcloth.

Some attempts were made to increase the amount of hemp available. The Crown promoted its domestic cultivation but it did so most likely in order to stimulate the fishing industry and increase employment rather than for strategic purposes. Its efforts were, for the most part, unsuccessful.

While concerns regarding the quality of the munitions were often voiced, legislation to control quality and skills training was only enacted in the case of sailcloth. The act was probably initiated not by the Crown but by the private sector who wished to see the quality of the local product improved.

The Crown provided the gunpowder industry with substantially more assistance but an important reason was the expectation that regulation would reduce costs. Much of the support was devoted to providing the powdermaker with an inexpensive, regular supply of the raw material. The East India Company was strongly encouraged to import saltpetre

and customs were not collected. Exports, as well, were disallowed. Mediation was offered to allow the domestic production of saltpetre to continue unabated.

The Crown encouraged individuals with the skills necessary for the production of saltpetre. Various schemes were supported but only the initial attempt appears to have been successful - that of Gerrard Honricke's in 1561. The reasons for this interest were probably both strategic and economic.

Efforts to reduce costs also worked against the developing gunpowder industry. Imports were only disallowed when it was discovered that the Crown could stand to make a great profit through complete control of the trade. The measure was not meant to benefit the industry. Conflicts between property owners and saltpetremen could never be fully resolved when the Crown was unwilling to change the terms of the contracts. The aggravating terms could not be changed without inflicting huge cost increases on the Crown. Crown expenditure on gunpowder could also be reduced if the powdermaker held monopoly power over domestic production. Energy was, therefore, spent in preventing the gunpowder industry from proliferating throughout the kingdom.

The Crown, then, does not appear to have had any strategic interest in providing legal support to the developing domestic cordage and sailcloth industries during this period. They were both vital munitions; it was most important that they be available - from whatever source. The Crown appears to have been more interested in the gunpowder industry. Foreign saltpetre and powder were not always available in the best of times. It was, as well, expensive. Better that it be import substituted so that it would always be available, and cheaply, as were cordage and sailcloth.

CHAPTER EIGHT

CONCLUSION

This thesis has investigated the role of the Crown in the import substitution of the sailcloth, cordage and gunpowder industries during the reigns of Elizabeth, James and Charles. Historians have argued that the English government provided some assistance for the domestic development of consumer goods industries during the early part of Elizabeth's reign but from then on assistance was absent or even counter-productive. While most historians give little credit to the Crown for establishing these industries, the belief has prevailed since the days of Adam Smith that the Crown should, and did, actively work to establish the munitions industries domestically in order to reduce dependence on the vagaries of overseas trade. Of the three industries studied here, only gunpowder has previously received substantive attention, and the monopoly contract with Gerrard Honrick was frequently cited.

The purpose of this thesis was to examine the gunpowder, sailcloth and cordage industries in order to verify whether these industries, in fact, developed in England with the Crown's assistance, and whether that assistance was forthcoming because the Crown wished to be independent of foreign supplies. Historians have seldom provided an economic explanation for their development. It was argued here, however, that fiscalism and self-interest were important factors behind the domestic development of these industries.

It was necessary to first quantitatively determine that these goods were import

substituted during this period. The literature identifies the establishment of these industries in England by describing the activities of the entrepreneurs involved or by presenting evidence of a decline in the imports of the manufactured goods and an increase in the imports of raw materials using the port books. Nesta Evans, for example, employed port books to this purpose and she and Eric Kerridge related the early development of the sailcloth industry to the key individuals involved.

The methodology employed here has been substantially different. In order to demonstrate that import substitution was occurring, it was necessary to show that supply was stable or growing, and that imports made up a declining proportion of that supply. It was demonstrated first that demand, and hence total supply, for the goods appears to have increased with the growth of English shipping. While overseas port books were used to demonstrate that imports of cordage had declined during the first half of the seventeenth century, they were of little help when trying to establish the import substitution of sailcloth and gunpowder. Other sources were employed, known to historians but used here for a different purpose. The coastal port books, normally employed for evidence of coastal shipping, were used to demonstrate that the Ipswich sailcloth industry was able to first satisfy local demand and then expanded to supply sailcloth for the domestic market outside of the region during the latter half of the sixteenth century. Lieutenant of the Ordnance accounts, employed as records of purchase, were used to demonstrate that gunpowder production was, increasingly, domestic.

The thesis then examined the references to these goods made by the Crown and individuals in order to determine if and what interest they might have had in domestic

production. Historians, who relied on the same evidence, identified a sincere interest in the industries for security purposes, but they do not tend to recognize a fiscal motive. This thesis has shown that finances were considered as an important, although probably not primary, concern. If munitions were produced at home they would be more affordable. Secondly, domestic production would alleviate a perceived balance of payments problem.

Comments left by the Crown and by individuals suggest other reasons why they held such a sincere interest in these goods which more nearly corresponds with the traditional view in the literature. The Crown and contemporaries clearly believed that sailcloth, cordage and gunpowder were vital to all maritime countries, without which England could not defend herself or her neighbours maintain a stance of aggression. It appears, as well, that the Crown and contemporaries thought it important to produce these munitions at home. Concerns were that reliance on foreign supplies could be precarious - that the goods could fall into enemy hands, or a foreign supplier could become an adversary and so cut off supplies. Moreover, the overseas market could dry up as continental markets, themselves in conflict, could increase local demand and so leave little for export to England. At the same time domestic production could contribute towards internal stability by providing employment and by allowing for greater control to monitor quality and restrain unlawful elements from purchasing.

When, however, the Crown's actual behaviour, whether as purchaser or indirectly as law maker, was examined, the evidence suggested either an overriding interest in financial matters or a complete lack of interest in the products. An excellent way of estimating the

level of Crown interest is by analysing the level of control exerted when these goods were purchased. Until the Armada years, the level of Crown control over methods of purchasing was minute and similar for all three goods. Purchases of sailcloth and cordage were under the complete control of the Navy officials who were probably concerned first and foremost with procurement finances, fiscal or personal. Although a monopoly grant was awarded to the Russia Company to trade with the northeast regions, the decision to produce cordage in Russia was a company decision that was made after the grant was awarded.

At this time, gunpowder was provided through the Office of the Ordnance from a variety of sources. Some of it was manufactured within the Tower either by contracting for the labour or by purchasing from domestic manufacturers. Other powder was purchased from overseas suppliers. The Crown probably demonstrated more interest in the supply of gunpowder and saltpetre than sailcloth or cordage because efforts were made to develop a domestic supply of saltpetre, albeit at least in part for fiscal reasons. Also, it appears that the Crown played an important hand in arranging overseas purchases of gunpowder.

Arrangements for the purchase of gunpowder changed during the reign of Elizabeth when a monopoly contract was awarded to the Evelyns in 1588. For the next two decades control of gunpowder procurement was entirely in the hands of the central government while cordage and sailcloth purchases remained relegated to the Navy officers. This contract guaranteed to the Evelyns not only a monopoly of the Royal market but a monopoly of domestic production as well. The fact that it was awarded during the year

when the Spanish Armada sailed is probably no coincidence. However, the powder, which was intended to be readily available, had to be cheaper than that which had been purchased previously. This contract was probably important for the import substitution of gunpowder because a domestic producer could be assured of a regular market; thus a regular supply of domestic powder could now be produced.

The next change in government procurement practices affected all of the goods and coincided with what has subsequently been identified as the most corrupt period in the history of the Navy - the first two decades of the seventeenth century. The purchase of all three goods was entrusted to individuals most concerned with personal profit rather than the state of national security or of the health of government coffers. This appears to have been true in the Ordnance Office as well and the consequences for the development of the munitions industries varied. The gunpowder contract was awarded to the Earl of Worcester, who probably farmed it out to the Evelyns for personal profit. Sailcloth purchases were placed in the hands of Hildebrand Prusson, castigated by the East India Company for his self-indulgent practices. In neither instance could these decisions have benefited the industries, for Prusson appears to have purchased overseas and the status of gunpowder, although now more expensive, remained essentially the same. The production of cordage, however, previously purchased almost exclusively overseas, was now produced domestically, although in alternate years. Cordage was now, for the most part, import substituted.

Finally, the crown assumed control of the production of cordage for the use of the Navy and then complete control of gunpowder. Fiscalism asserted itself as first, in 1620

cordage was produced in the Navy shipyards. While still under the direction of the Navy officials, the directive to produce domestically for the needs of the Royal Navy no doubt came from the central government and the reasons were most likely fiscal. Secondly, crown control of gunpowder was complete by 1637 when imports were disallowed and all domestic consumers needed to appeal to the Crown for supplies. The Crown had clearly discovered a good way of making a profit. Sailcloth purchases, meanwhile, remained under the control of Prusson.

Why were purchases of these three goods handled differently? It was perceived that substantial savings could be made on cordage by contracting with a domestic producer and then by assuming control of production. Manufacturing facilities on Royal shipyard premises were already up and running so that little capital investment was necessary. Secondly, cordage purchases constituted a substantial proportion of the Navy budget, averaging 13 per cent and in some years substantially more. Sailcloth, on the other hand, averaged less than three. Being a less expensive item, it could be produced as a cottage industry.

While the Elizabethan government may have been more concerned with finding a reliable source of gunpowder, it was also the most expensive of the three goods during that period and this accounts in part for the early interest in this product. It is interesting that the Crown abandoned the gunpowder production that had been occurring in the Tower during the early years of Elizabeth's reign and contracted out for the powder. The savings accrued by assuming control of the production process may have been perceived as minimal. The contract price agreed upon in 1588 may have been relatively low

because the contractor could expect to make additional money selling on the private market at the same time as selling cheaper powder to the Crown. Finally, the Crown may have assumed complete control of the gunpowder market in 1635 because the profit margin may have been higher than that for cordage or sailcloth and the domestic market more extensive. Gunpowder was probably used in every county, while the use of sailcloth and to a lesser extent cordage was limited to the coastal regions.

There were a number of ways not directly related to purchasing concerns in which the Crown interfered with the production and supply of munitions and Crown attention was overwhelmingly on gunpowder. The Crown occasionally regulated prices, competition and quality of the three goods and it made some effort to attract skills and technological knowledge. It worked, as well, to mediate complaints that developed. It does not appear, however, that these efforts were made in order to import substitute cordage, sailcloth and gunpowder solely in order to reduce reliance on foreign suppliers. It was at times motivated by private pressure groups. The primary concern seems to have been that these goods, considered vital for national security, should be available from whatever source, and at a low price. Customs duties, in any case low, were not employed to encourage imports of hemp or to discourage the import of the finished good. Imports of the finished good were, in fact, encouraged through abatements of the duties and impositions owed. Protection from foreign gunpowder only came towards the end of the period and the reason for this was purely fiscal. Merchants importing hemp received no encouragement to do so. Crown efforts to mediate in the clashes that resulted from the saltpetre contracts were an effort to maintain the status quo, through which the Crown could make purchases

of inexpensive gunpowder.

Other acts were designed to maintain security by increasing employment and by encouraging the fishing industry in order that ships and seamen would be available in the event of war. The only overt act that might be construed to suggest that the Crown wanted to import substitute munitions in order to reduce reliance on foreign suppliers that was clearly of benefit to the domestic industry was the 1561 grant to Gerrard Honricke to teach Englishmen the art of making saltpetre. Even this, however, is coloured by fiscalism. The £300 spent would be recouped in a very short period of time and consequent purchases of powder were anticipated to be cheaper.

Is there any discrepancy between the arguments set forth by the Crown and contemporaries justifying the import substitution of munitions and the actions taken by the Crown in regard to these goods? The most notable point is the lack of evidence to clearly demonstrate that the Crown acted to bring about domestic production out of primarily strategic concerns. An exception, again, might be Honricke's grant to teach the art of making saltpetre to the English. Fiscalism is apparent in the record, and it appears to have been a particularly important impetus to Crown involvement. Most Crown involvement had nothing to do with an interest in establishing the industries domestically but with effecting a reliable source from which goods could be purchased cheaply. Negligence is apparent as well, particularly in the sailcloth industry. Much of what the Crown did do might have worked to retard or restrict the further development of the industries. The development of the cordage, sailcloth and gunpowder industries is very similar, then, to what we know about the development of the consumer goods industries.

SOURCES AND BIBLIOGRAPHY

I.

Primary Sources: Manuscripts

Public Records Office, London

E101 64/19 Exchequer, King's Remembrancer: Accounts Various

E122 173/3 Exchequer, King's Remembrancer: Particulars of Customs Accounts

E159 427 Exchequer, King's Remembrancer: Memoranda Rolls and Enrolment Books

E190 Exchequer, King's Remembrancer: Port Books

E351 2197-2288 Exchequer, Treasurer of the Navy Accounts

E351 2616-2663 Exchequer, Lieutenant of the Ordnance Accounts

E356 29 Exchequer, Pipe Office: Customs Accounts Rolls

SP12 State Papers Domestic, Elizabeth I

SP14 State Papers Domestic, James I

SP16 State Papers Domestic, Charles I

SP38 State Papers, Docquet

SP39 State Papers, Signed Manuscripts

WO49 War Office, Ordnance Office Various Accounts, Debenture Books

British Library, London

Additional Manuscripts 28,748. 'Rules for making cordage.'

Cotton Manuscripts Otho E 7. 'Divers warrants...and other papers relating to the ordnance, Navy...saltpetre, &c. from the time of Edward VI to James I.'

Lansdowne Manuscripts 78, 86. 'The profits of the customs and subsidy for cordage, in London, and some other ports. June 1595.'

Lansdowne Manuscripts 108, 78. 'Observations on a suit to make sail-cloths at Ipswich, Suffolk, which may be soon preferable to French sail-cloths.'

Lansdowne Manuscripts 3, 70. 'A copy of the privy seal before the new book of reates of tonnage and poundage. May 28, 1557.'

II. Printed Primary Sources

Acts of the Privy Council of England, 1556-1631 (London, 1898-1964).

Brewer, J.S. and Bullen, William (ed.), Calendar of the Carew Manuscripts, 1575-88 (London, 1868).

Bruce, John (ed.), Verney Papers Down to the End of the Year 1639 (Camden Society, London, 1853).

A Calendar of the Court Minutes etc. of the East India Company 1635-1639 (Oxford, 1907).

A Calendar of the Patent Rolls Preserved in the Public Records Office: Philip and Mary 1554-5 (London, 1936).

Calendar of State Papers, Colonial Series: 1574-1660 (London, 1860).

Calendar of State Papers, Colonial Series: East Indies, China and Japan, 1513-1624 (London, 1862-78).

Calendar of State Papers, Colonial Series: East Indies, China and Persia, 1625-9 (London, 1884).

Calendar of State Papers, Colonial Series: East Indies and Persia, 1630-4 (London, 1892).

Calendar of State Papers, Domestic Series: 1547-1640 (London, 1856-80).

Calendar of State Papers, Venetian Series: 1603-7 (London, 1900).

Dietz, Brian (ed.), The Port and Trade of Elizabethan London Documents (London, 1972).

Fitch, Marc (ed.), Index to Testamentary Records in the Commissary Court of London iii (London, 1985).

Hakluyt, Richard, The Principal Navigations, Voyages, Traffiques and Discoveries of the English Nation i, ii (8 vols., London, 1913).

Hughes, Paul L. and Larkin, James F. (eds.), Tudor Royal Proclamations i (New Haven, 1964).

Hughes, Paul L. and Larkin, James F. (eds.), Tudor Royal Proclamations ii and iii (New Haven, 1969).

Index to the Privy Council Registers 1628-33.

Jansson, Maija, Two Diaries of the Long Parliament (Gloucester, 1984).

Journals of the House of Commons, 1640-2 i, ii (1803).

Journals of the House of Lords, 1578-1614 i-iii.

Larkin, James F. and Hughes, Paul L. (eds.), Stuart Royal Proclamations i (Oxford, 1973).

Larkin, James F. (ed.), Stuart Royal Proclamations ii (Oxford, 1983).

Letters and Papers Foreign and Domestic Henry VIII, 1546 part 1 (London, 1908).

Luders, Alexander et. al. (eds.), Statutes of the Realm iii-iv² (London, 1810-28).

McGowan, Alan (ed.), Jacobean Commissions of Inquiry of 1608 and 1618 (Navy Records Society, 1971).

Mun, Thomas, 'England's Treasure by Foreign Trade', McCulloch, J.R. (ed.), Early English Tracts on Commerce (London, 1952).

Purchas, Samuel, Hakluytus Posthumus, or, Purchas his Pilgrimes (Glasgow, 1905).

Roberts, Lewes, 'The Treasure of Traffike or a Discourse of Forraigne Trade', McCulloch, J.R. (ed.), Early Tracts on Commerce (London, 1952).

Sharpe, Reginald R. (ed.), Calendar of Wills Proved and Enrolled in the Court of Husting, London i (London, 1889).

III. Articles, Books and Theses Cited

Andrews, J.H., 'Two Problems in the Interpretation of the Port Books' Econ. Hist. Rev. 2nd series, ix, no. 1 (1956-7), pp. 119-22.

Andrews, Kenneth R., Elizabethan Privateering: English Privateering During the Spanish War 1585-1603 (Cambridge, 1964).

Andrews, Kenneth R., Ships, Money and Politics: Seafaring and Naval Enterprise in the Reign of Charles I (Cambridge, 1991).

Astrom, Sven-Erik, From Cloth to Iron: the Anglo-Baltic Trade in the Late Seventeenth Century (Helsingfors, 1963).

Astrom, Sven-Erik, 'The Reliability of the English Port Books' The Scandinavian Economic History Review xvi, no. 2 (1968), pp. 125-36.

Beveridge, W., Prices and Wages in England (London, 1939).

Bovill, E.W., 'Queen Elizabeth's Gunpowder' Mariner's Mirror xxxiii, no. 3 (1947), pp. 179-86.

Bowen, H.V., War and British Society 1688-1815 (Cambridge, 1998).

Braddick, Michael J., The Nerves of State: Taxation and the Financing of the English State, 1558-1714 (Manchester, 1996).

Brenner, Robert, Merchants and Revolution: Commercial Change, Political Conflict, and London's Overseas Traders, 1550-1653 (Princeton, 1993).

Brewer, John, Sinews of Power: War, Money and the English State, 1688-1783 (New York, 1989).

Carus-Wilson, E.M., and Coleman, O., England's Export Trade (Oxford, 1963).

Cell, Gillian T., English Enterprise in Newfoundland 1577-1660 (Toronto, 1969).

Chalkin, C.W., Seventeenth-Century Kent: A Social and Economic History (London, 1965).

Chaudhuri, K.N. The English East India Company: The Study of an Early Joint-Stock Company 1600-1640 (London, 1965).

Chaudhuri, K.N., 'The English East India Company in the 17th

and 18th Centuries: A Pre-Modern Multinational Organization', Leonard Blussé and Femme Gaastra (eds.), Companies and Trade: Essays on Overseas Trading Companies During the Ancien Régime (Leiden, 1981), pp. 29-46.

Cipolla, Carlo, Guns and Sails in the Early Phase of European Expansion 1400-1700 (London, 1965).

Clapham, Sir John, A Concise Economic History of Britain: From the Earliest Times to 1750 (Cambridge, 1949).

Clark, G.N., Guide to English Commercial Statistics 1696-1782 (London, 1938).

Clark, G.N., The Seventeenth Century (Oxford, 1947).

Clarkson, L.A., The Pre-Industrial Economy in England 1500-1750 (London, 1971).

Clay, C.G.A., Economic Expansion and Social Change: England 1500 - 1700 ii (Cambridge, 1984).

Coad, Jonathan G., The Royal Dockyards 1690-1850: Architecture and Engineering Works of the Sailing Navy (Aldershot, 1989).

Coleman, D.C., Economy of England 1450-1750 (London, 1977).

Coleman, D.C., 'Eli Heckscher and the Idea of Mercantilism', The Scandinavian Economic History Review v, no.1 (1957), pp. 3-25.

Coleman, D.C., 'Labour in the English Economy of the Seventeenth Century', E.M. Carus-Wilson (ed.), Essays in Economic History ii (London, 1962), pp. 291-308.

Coleman, D.C., 'Naval Dockyards Under the Later Stuarts', Economic History Review 2nd series, vi, no. 2 (1953), pp. 134-155.

The Compact Edition of the Oxford English Dictionary ii (Oxford, 1971).

Cook, Jr., Weston F., The Hundred Years War for Morocco: Gunpowder and the Military Revolution in the Early Modern Muslim World (Boulder, 1994).

Cooper, Ernest R., 'The Dunland Iceland Ships', Mariner's Mirror xxv, no. 2 (1939), pp. 170-77.

Croft, Pauline, 'Trading with the Enemy 1585-1604', The Historical Journal, xxxii, no. 2 (1989), pp. 281-302.

Cull, Frederick, 'Chatham Dockyard; Early Leases and Conveyances For Its Building During the 16th and 17th Centuries', Archaeologia Cantiana lxxiii (1959), pp. 75-95.

Cunningham, W., The Growth of English Industry and Commerce in Modern Times: the Mercantile System 2/1 (Cambridge, 1919).

Cunningham, W., The Progress of Capitalism in England (Cambridge, 1916).

Cunningham, W. and McArthur, Ellen A., Outlines of English Industrial History (Cambridge, 1898).

Davies, C.S.L., 'Supply Services of the English Armed Forces 1509-50' (Unpublished D. Phil. thesis, Oxford, 1963-4).

Davies, C.S.L., 'The Administration of the Royal Navy under Henry VIII: the Origins of the Navy Board', English History Review, lxxx, no. 3 (1965), pp. 268-88.

Davies, Godfrey, The Early Stuarts 1603-1660 (Oxford, 1967).

Davis, Ralph, 'England and the Mediterranean, 1570-1670', F.J. Fisher (ed.), Essays in the Economic and Social History of Tudor and Stuart England (Cambridge, 1961).

Davis, Ralph, The Rise of the English Shipping Industry in the Seventeenth and Eighteenth Centuries (Newton Abbot, 1972).

Dean, David, Law-Making and Society in Late Elizabethan England: the Parliament of England, 1584-1601 (Cambridge, 1996).

Dietz, Brian, 'Overseas Trade and Metropolitan Growth', Beier, A.L. and Finlay, Roger (eds.), The Making of the Metropolis: London, 1500-1700 (London, 1986).

Dietz, Brian, 'The Royal Bounty and English Merchant Shipping in the Sixteenth and Seventeenth Centuries' The Mariner's Mirror, lxxvii, no. 1 (1991), pp. 5-20.

Dietz, Frederick C., English Public Finance, 1485-1641 ii (New York, 1964 edition).

Dietz, Frederick C., The Exchequer in Elizabeth's Reign (Northampton, Mass., 1923).

Duffy, Michael, 'Introduction: The Military Revolution and the State 1500-1800' in Michael Duffy (ed.), The Military Revolution and the State 1500-1800 (Exeter Studies in

History no. 1, Exeter, 1981).

Duffy, Michael, 'The Foundations of British Naval Power', Michael Duffy (ed.), The Military Revolution and the State 1500-1800.

Ehrman, John, The Navy in the War of William III 1689-1697 (Cambridge, 1953).

Elton, G.R., Studies in Tudor and Stuart Politics and Government: Papers and Reviews 1946-7 (Cup: 1974).

Epstein, M., The Early History of the Levant Company (New York, 1908, reprint 1968).

Evans, Nesta, East Anglian Linen Industry: Rural Industry and Local Economy 1500-1850 (Aldershot, Hants., 1985).

Fedorowicz, J.K., England's Baltic Trade in the Early Seventeenth Century (Cambridge, 1980).

Fisher, F.J., 'Commercial Trends and Policy in Sixteenth Century England' Econ. Hst. Rev. 2nd. series, x (1940).

Fletcher, Anthony, Tudor Rebellions (Harlow, 1983).

Friis, Astrid, Alderman Cockayne's Project and the Cloth Trade: The Commercial Policy of England in its Main Aspects 1603-1625 (London, 1927)

Glete, Jan, Navies and Nations: Warships, Navies and State Building in Europe and America 1500-1860 i, ii (Stockholm, 1993).

Gomes, Leonard, Foreign Trade and the National Economy: Mercantilist and Classical Perspectives (Basingstoke, 1987).

Gough, J.W., The Rise of the Entrepreneur (London, 1969).

Greengrass, Mark, France in the Age of Henri IV: the Struggle for Stability (London, 1984).

Hamilton, Henry, The English Brass and Copper Industries to 1800 (London, 1926)

Hammersley, G., 'The State and the English Iron Industry in the Sixteenth and Seventeenth Centuries', Coleman, D.C. and John, A.H., (eds.), Trade, Government and Economy in Pre-Industrial England (London, 1976).

Hatcher, John, The History of the British Coal Industry i (Oxford, 1993).

Hawkins, Michael, 'The Government: Its Role and Its Aims', Conrad Russell (ed.), The Origins of the English Civil War (London, 1981), pp. 35-65.

Hebb, David Delison, Piracy and the English Government (Cambridge, 1994).

Heckscher, Eli F., Mercantilism ii (London, 1935).

Helleiner, G.K., International Trade and Economic Development (London, 1972).

Hill, Christopher, Reformation to Industrial Revolution: A Social and Economic History of Britain, 1530-1780 (London, 1967).

Hinton, R.W.K., The Eastland Trade and the Common Weal in the Seventeenth Century (Cambridge, 1959).

Hughes, Ann, 'Local History and the Origins of the Civil War' Richard Cust and Ann Hughes (eds.), Conflict in Early Stuart England: Studies in Religion and Politics 1603-1642 (London, 1989), pp. 224-53.

Innis, Harold A., The Cod Fisheries (New Haven, 1940).

Israel, Jonathan I., Dutch Primacy in World Trade 1585-1740 (Oxford, 1999).

Jack, Sybil, Trade and Industry in Tudor and Stuart England (London, 1977).

Jenkins, Geraint, The Craft Industries (London, 1972).

Jones, A.G.E., 'Shipbuilding in Ipswich 1700-1750' Mariner's Mirror xliii (1957) no. 3, pp. 294-305.

Keay, John, The Honourable Company: A History of the English East India Company (London, 1991).

Kennedy, Paul, The Rise and Fall of British Naval Mastery (London, 1983).

Kenyon, J.P., Stuart England (Harmondsworth, Middlesex, 1978).

Kerridge, Eric, Textile Manufactures in Early Modern England (Manchester, 1985).

Kurlansky, Mark, Cod: A Biography of the Fish That Changed the World (London, 1998).

Lavery, Brian, the Arming and Fitting of English Ships of War 1600-1815 (London, 1987).

Lawson, Philip, The East India Company (London, 1993).

Lipson, E., A Planned Economy or Free Enterprise: the Lessons of History (London, 1944).

Lipson, E., The Economic History of England ii, (London, 1956).

Lloyd, T.H., England and the German Hanse, 1157-1611: A Case Study of Their Trade and Commercial Diplomacy (Cambridge, 1991).

Loades, David, 'From the King's Ships to the Royal Navy', J.R. Hill (ed.) The Oxford Illustrated History of the Royal Navy (Oxford, 1995).

Loades, D.M., The Tudor Navy: An Administrative, Political and Military History (Aldershot, Hants., 1992).

Lockyer, Roger, Buckingham: the Life and Political Career of George Villiers, First Duke of Buckingham 1592 -1628 (London, 1981).

Lockyer, Roger, The Early Stuarts: A Political History of England 1603- 1642 (London, 1989).

Lounsbury, Ralph Greenlee, The British Fishery at Newfoundland 1634-1763 (Yale, 1969).

MacCaffrey, Wallace T., Elizabeth I (London, 1993).

MacCaffrey, Wallace T., Elizabeth I: War and Politics 1588-1603 (Princeton, 1992).

Malden, H.E. (ed.), The Victoria History of the County of Surrey ii (London, 1905).

Manwaring, G.E. and Perrin, W.G., Seaman's Dictionary (Navy Records Society, 1922).

Marcus, G.J., A Naval History of England vol. 1: The Formative Centuries (London, 1961).

Millard, Annie, 'The Import Trade of London 1600 - 1640' (Unpublished Ph.D. thesis, University of London, 1956), volumes One, Two and Appendix.

Morrill, J.S., The Revolt of the Provinces: Conservatives and Radicals in the English Civil War 1630-1650 (London,

1980).

Nef, John, Industry and Government in France and England 1540-1640 (Philadelphia, 1940).

Nef, John, The Rise of the British Coal Industry i (London, 1932).

A New English Dictionary on Historical Principles vi, vii, x.

O'Brien, Patrick K. and Hunt, Philip A., 'The Rise of a Fiscal State in England, 1485-1815', Historical Research: The Bulletin of the Institute of Historical Research lxvi, no. 160 (1993) pp. 129-170.

Oman, Charles, The Art of War in the Sixteenth Century (London, 1937).

Oppenheim, M., Administration of the Royal Navy and of Merchant Shipping in Relation to the Navy: from mdix to mdclx (London, 1896).

Page, William (ed.), The Victoria History of the County of Dorset ii (London, 1908).

Page, William (ed.), The Victoria History of the County of Suffolk ii (London, 1907).

Palliser, D.M., The Age of Elizabeth: England Under the Later Tudors 1547 - 1603 (London, 1992).

Parker, Geoffrey, The Military Revolution: Military Innovation and the Rise of the West, 1500-1800 (Cambridge, 1988).

Parker, Geoffrey, 'The Dreadnought Revolution in Tudor England' Mariner's Mirror lxxxii, no. 3 (1996), pp. 269-300.

Parker, Geoffrey, 'The "Military Revolution", 1560-1660 - A Myth?' Journal of Modern History xlvi, no. 5 (1976), pp. 195-214 and reprinted in C. J. Rogers (ed.), The Military Revolution Debate: Readings on the Military Transformation of Early Modern Europe (Oxford, 1995), pp. 37-49.

Peck, Linda Levy, Court Patronage and Corruption in Early Stuart England (London, 1992).

Penn, C.D., The Navy Under the Early Stuarts and Its Influence on English History (Manchester, 1913).

Perceval-Maxwell, M., The Outbreak of the Irish Rebellion of

1641 (Montreal & Kingston, 1994).

Presnail, James, Chatham: The Story of a Dockyard Town and the Birthplace of the British Navy (Chatham, 1952).

Price, William Hyde, The English Patents of Monopoly (Cambridge, USA, 1913).

Ramsay, G.D., 'The Smugglers' Trade: A Neglected Aspect of English Commercial Development', Transactions of the Royal Historical Society 5th series, ii (London, 1952), pp. 131-7.

Ramsay, G.D., English Overseas Trade During the Centuries of Emergence: Studies in Some Modern Origins of the English Speaking World (London, 1957).

Ramsey, Peter, 'Overseas Trade in the Reign of Henry VII: the Evidence of Customs Accounts' Econ. Hist. Rev. 2nd series, vi, no. 2 (1953), pp. 173-82.

Ramsey, Peter, Tudor Economic Problems (London, 1966).

Reed, Michael, 'Ipswich in the Seventeenth Century' (unpublished Ph.D. thesis, University of Leicester, 1973).

Rich, E.E. and Wilson, Charles (eds.), Cambridge Economic History of Europe, v, (Cambridge, 1977).

Robert, Rudolph, Chartered Companies and Their Role in the Development of Overseas Trade (London, 1969).

Roberts, Michael, 'The Military Revolution, 1560-1660', C.J. Rogers (ed.), The Military Revolution Debate.

Rodger, N.A.M., 'The Development of Broadside Gunnery, 1450-1650', Mariner's Mirror lxxxii, no. 3 (1996), pp. 301-23.

Rodger, N.A.M., 'Guns and Sails in the First Phase of English Colonization, 1500-1650', Nicholas Canny (ed.), The Oxford History of the British Empire, Vol. 1, The Origins of Empire: British Overseas Enterprise to the Close of the Seventeenth Century (Oxford, 1998).

Rodger, N.A.M., The Safeguard of the Sea: A Naval History of Britain, 660-1649 (London, 1997).

Cliff Rogers, 'Military Revolutions of the Hundred Years' War', C.J. Rogers (ed.), The Military Revolution Debate.

The Ropery, the Historic Dockyard, Chatham Museum, display information.

Scammell, Geoffrey, 'British Merchant Shipbuilding, c. 1500-1750', International Journal of Maritime History xi, no. 1 (June 1999), pp. 27-52.

Schmoller, Gustav, The Mercantile System and Its Historical Significance (London, 1884, reprinted 1914).

Scott, W.R., The Constitution and Finance of English, Scottish and Irish Joint Stock Companies to 1720 iii (Cambridge, 1911).

Sharpe, Kevin, The Personal Rule of Charles I (London, 1992).

Smith, Adam, The Wealth of Nations (London, 1991), with an introduction by D.D. Raphael.

Steensgaard, Niels, 'The Companies As a Specific Institution in the History of European Expansion', Leonard Blusse and Femme Gaastra (eds.), Companies and Trade: Essays on Overseas Trading Companies During the Ancien Régime (Leiden, 1981), pp. 245-264.

Stephens, W.B., 'The Exchequer Port Books as a Source for the History of the English Cloth Trade', Textile History i, no. 2 (1969), pp. 206-13.

Stephens, W.B., 'The West Country Ports and the Struggle for the Newfoundland Fisheries in the Seventeenth Century', Percy Russell (ed.), Report and Transactions of the Devonshire Association lxxxviii (Lynton, 1956).

Stewart, Richard W., 'Arms and Expeditions: the Ordnance Office and the Assaults on Cadiz (1625) and the Isle of Rhé (1627)', Mark Charles Fissel (ed.), War and Government in Britain, 1598-1650 (Manchester, 1991).

Stewart, Richard, 'Arms and Politics: the Supply of Arms in England 1585-1625' (unpublished Ph.D. thesis, Yale University, 1986).

Stewart, Richard, The English Ordnance Office: A Case-Study in Bureaucracy Royal Historical Society Studies in History no. 73 (Woodbridge, 1996).

Stone, L., 'Elizabethan Overseas Trade', Economic History Review 2nd series, xi, no. 1 (1949-50), 30-58.

Supple, Barry, Commercial Crisis and Change in England, 1600-1642 (Cambridge, 1959).

Thirsk, Joan, Economic Policy and Projects (Oxford,

1988).

Thrush, Andrew, 'Naval Finance and the Origins and Development of Ship Money', Fissel, Mark Charles (ed.), War and Government in Britain, 1598-1650 (Manchester, 1991).

Thrush, Andrew Derek, 'The Navy Under Charles I 1625-40' (Unpublished PhD thesis, University of London, 1991).

Toynbee, Arnold, Lectures on the Industrial Revolution in England (London, 1884).

Tyson, William, Rope - A History of the Hard Fibre Cordage Industry in the UK (London, 1966).

Unwin, George, Studies in Economic History (London, 1966).

Walker, David, The Oxford Companion to Law (Oxford, 1980).

Webb, John, 'Apprenticeship in the Maritime Occupations at Ipswich, 1596-1651', Mariners Mirror xlvi, no. 1 (1960), pp. 29-34.

Wernham, R.B., After the Armada: Elizabethan England and the Struggle for Western Europe 1588-1595 (Oxford, 1986).

Wernham, R.B., Before the Armada: the Growth of English Foreign Policy 1485-1588 (London, 1971).

Wernham, R.B., The Making of Elizabethan Foreign Policy 1558-1603 (Berkeley, 1980).

Wernham, R.B., The Return of the Armadas: The Last Years of the Elizabethan War Against Spain, 1595-1603 (Oxford, 1994).

West, Jenny, Gunpowder, Government and War in the Mid Eighteenth Century (Irthlingborough, Northants., 1991).

Wheeler, James Scott, The Making of a World Power: War and the Military Revolution in Seventeenth Century England (Gloucestershire, 1999).

Willan, T.S. The Early History of the Russia Company (Manchester, 1956).

Willan, T.S., The English Coasting Trade 1600-1750 (Manchester, 1967).

Willan, T.S., The Muscovy Merchants of 1555 (Manchester, 1953).

Willan, T.S., 'Some Aspects of English Trade with the

Levant in the Sixteenth Century', English Historical Review lxx, no. 276 (1955), pp. 399-410.

Willan, T. S., Studies in Elizabethan Foreign Trade (Manchester, 1959).

Willan, T.S., A Tudor Book of Rates (Manchester, 1962).

Williams, N.J., 'Francis Shaxton and the Elizabethan Port Books', The English Historical Review lxvi, no. 260 (1951), pp. 387-395.

Williams, N.J., The Maritime Trade of the East Anglian Ports 1550-1590 (Oxford, 1988).

Wilson, Charles, England's Apprenticeship 1603 - 1763 (London, 1966).

Wood, A.C., A History of the Levant Company (London, 1964).

Woodward, D.M., 'Short Guide to Records: Port Books', History lv, no. 184 (1970), pp. 207-210.

Yahya, Dahiru, Morocco in the Sixteenth Century: Problems and Patterns in African Foreign Policy (Harlow, 1981).

Young, Michael, 'Illusions of Grandeur and Reform at the Jacobean Court: Cranfield and the Ordnance', Historical Journal xxii, no. 1 (1979), pp. 53-73.

Zins, Henryk, England and the Baltic in the Elizabethan Era (Manchester, 1972).

Zupko, R.E., Dictionary of English Weights and Measures (Madison, 1968).